Effects of 'The Teachability Factor' Professional Development Workshop on Teachers' Perceptions of Challenging Children in their Classroom

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Abstract

Within the extensive research literature on attachment neurobiology there is little empirical research on it's application to education. The research suggests there is a significant relationship between being securely attached and one's behavioural and academic outcomes, so the benefits of such an approach are potentially significant. While teachers have an increasing awareness of the importance of brain processes, neuroscience research has not been readily available to educators because it is such a new field. In this vacuum neuromyths have flourished based on pseudoscience and lack scientific validity. Therefore the need for an accurate translation of the empirical attachment research findings to education is urgently needed.

This research tests whether *The Teachability Factor,* an eight week session professional development course developed by the Neufeld Institute, is able to translate attachment neuroscience findings into an effective, evidence-based program for early childhood teachers.

Using the BASC-2 and Index of Teaching Stress, there are significant effects in the student domains of attention, aggression, ADHD, hyperactivity, and highly significant effects in teacher domains of stress, sense of competence, and satisfaction from teaching. Thus significant benefits are shown from teaching evidence-based attachment neuroscience to teachers.

Key words: neuroscience, attachment theory, neuromyths, teacher intervention, neuroeducation, teacher professional development, early childhood education, anti-social behaviour, academic achievement, under-achievers, professional development

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List of Abbreviations

As this research study uses many abbreviations, this section is for referencing the abbreviations contained herein.

AGCD	Aggressive / Conduct Disorder
ANXW	Anxiety / Withdrawal
BASC-2	Behaviour Assessment System for Children, 2nd Edition
DTP	Disruption to the Teaching Process
ELLA	Emotional Lability / Low Adaptability
FWP	Frustration Working with Parents
ITS	Index of Teaching Stress
LALD	Low Ability / Learning Disability
LSFT	Loss of Satisfaction From Teaching
OMPC	Orbital Medial Prefrontal Cortex
SCNS	Sense of Competence / Need for Support
STU CHAR	Student Characteristics Domain Score
TEACH CHAR	Teacher Characteristics Domain Score

Introduction

Background

This research comes after years of working in both the early childhood and secondary education sectors. Eight of these years were spent working directly with teachers and parents of children with significant behavioural and emotional deficits. Traditional cognitive behavioural approaches often did not work, despite well meaning, deeply intentioned, qualified and committed adults. Thus a search for a model that would work began.

Adverse to attachment theory because of it's historical associations with unorthodox practice (Sears & Sears, 2001), I reluctantly turned to the growing body of literature linking John Bowlby's (1907 - 1990) attachment theory with recent neuroscicence findings. Surprisingly, the research not only made sense, but the interventions actually worked in the classroom and the home. Determined to find a direct theoretical application to education and the classroom I was lead to Dr. Gordon Neufeld of the Neufeld Institute, Canada. This institute, through the leadership, research and synthesis of Dr. Gordon Neufeld, 'connects the dots' between developmental psychology, attachment theory and neuroscience. In doing so it provides a powerful model for working with children who are failing to mature in developmentally appropriate ways, or who have had interrupted attachment relationships. Neuroscience has supported attachment theory by showing how brain patterns and wiring are delayed or reduced when attachment relationships are weak. Seeing strong links between weak attachment and institutionalised care in some early childhood settings I wanted to investigate whether the model presented by the Neufeld Institute could inform teachers of ways to work with the challenging children in their care in effective and enduring ways. Having completed a two year internship with this institute, and seeing the

theory work effectively in practice, I wanted to provide some scientific evidence to support Neufeld's paradigm. I recognised that to get attachment theory and neuroscience integrated into teachers college's training, as well as classroom practice, empirical research was needed. Hence my research interest in this subject.

With the numerous interventions purporting to help teachers with challenging and unteachable students, evidence-based research is needed more than ever. With all our education, knowledge, methodological and pedagogical improvements over the last two hundred years, teachers continue to report that teaching is getting harder, student violence is increasing and academic rates are dropping[1] (Laxton, A., 2013; Radio NZ News, 2013). Vannest, Reynolds and Kamphaus (2008) rightly contend, "While scientific methods for diagnosing emotional and behavioural problems in children have made tremendous strides in recent years, intervention science has not keep pace" (p. 1). Dr Nicola Atwool, in a 1999 paper entitled 'Attachment in the School Setting' concluded that in order for teachers to work best with behaviourally problematic students "teacher education needs to include information and training about child development theory and practice, developmental consequences of risk and trauma, children's understanding of death, protective factors and resilience including attachment, skills in adult-child interpersonal relationships, emotional availability and the role of affect in helping relationships" (p. 318-319). This research seeks to address this concern by testing a new approach for teachability challenges within a New Zealand educational context.

1 Formerly among the top-performing OECD nations, New Zealand is now outside the top 10 countries in reading and science, and barely above the average in maths. In countries previously ranked below New Zealand, scores improved or declined only slightly. That was enough to push New Zealand from seventh to 13th in reading, seventh to 18th in science and from 13th to 23rd in maths.

Statement of the Problem

New Zealand has recently faced three violent attacks by youths[2] (Ellingham, 2014, Manning, 2014). With the plethora of research, programs and finance available, why are we not seeing the improvements we desire as a society?

Piaget, the renowned Swiss psychologist, highlighted the vital role education plays in societal achievement when in 1934 he said, "Only education is capable of saving our societies from possible collapse whether violent or gradual" (Munari, 1994, p. 313). Western liberal democracies, like New Zealand, believe in the value and priority of education. Long before New Zealand ratified the United Nations Convention on the Rights of the Child in 1993 (Human Rights Commission, 2014), including the right of every child to receive free and compulsory education, we have made significant investments in human and economic capital to see our children and young people have access to a good education. Compared to other OCED countries our academic achievements are higher than the norm (OECD, 2014; Sturrock and May, 2002, Statistics NZ, 2014, Ministry of Education, 2014).

Ironically then, coupled with such academic success, is an informed awareness that a significant percentage of our New Zealand children are at risk of not achieving (Davison, 2013; Education Review Office, 2008; Ministry of Education, 2014; Sturrock and May, 2002; Wylie, 2011). In a major report of the Education and Science Committee (2008) of the New Zealand House of Representatives, the extent of the non-achieving problem was the central focus. It acknowledged that while overall New Zealand achievement rates were comparable or better than other OECD countries there was a significant disparity between those who achieved and a group they termed 'the tail of underachievement.' Citing ERO data (2005) it was suggested that as many as 20 percent of New Zealand students are part of the under achieving tail. Hattie (2003) while speaking at the Knowledge Wave Conference argued

[2] An 11 and 12 year old arrested for the murder of a dairy owner in West Auckland, an 11 year old arrested for stabbing a 10 year old in the school playground and a teenager arrested for yet another stabbing.

that our tail 20 percent of underachievers should cause us serious concern as a society. In 2013 these students were further identified as "Priority Learners" (Ministry of Education (MOE), 2013, 2014; Stoop, 2012; Te Kete Ipurangi (TKI), n.d.) and various programs, including Ka Hikitia and the Pasifika Education Plan, have been developed to try to rectify these results (TKI, 2014).

The New Zealand Principals' Federation (n.d.) reports 14 percent of our children are not achieving at a satisfactory level in reading, maths and science and that at NCEA level two, 20 percent of students do not achieve the qualification. Their report also highlights two poignant areas relating to underachievement: Firstly, Maori and Pasifika children are not achieving at the same level as other students (see Amituanai-Toloa (2010) for a more comprehensive discussion of this factor), and secondly, the increase in problematic student behaviours in schools. These two factors are often interrelated as evidenced by the data on school stand-downs and expulsions (Education Counts, 2014).

Table 1 **School Stand-Down and Exclusion Rates by Ethnicity**

	Stand-down rates per 1000 students, 2012	Expulsion / Exclusion rates per 1000 students, 2012
Maori	42.8	2.9
Pasifika	27.7	2.2
Others	17.8	0.9
Asian	6.0	0.4

While Ministry of Education (2014) data indicates a decrease in rates of stand-downs and expulsions from the year 2000 to 2012, such a reported decrease isn't necessarily correlated to an improvement in student's behaviour. As an experienced high school teacher I'm cognisant of the ever evolving legal and political considerations that must now

be applied before a student can be stood-down or expelled. These more stringent criteria and processes are more likely to account for the statistical decrease.

Globally, western countries are reporting an increasing trend of children in schools with problematic behaviours (Shanker, 2012). To illustrate, the New Zealand Herald has published three news articles that saliently highlight these concerns. In 2010 there was a 20 percent increase over the previous year in the number of Auckland children (under age 16) being treated by the Community Alcohol and Drug Services (382 children). Dr. Christie, the lead child psychiatrist added this comment, "The people who get to our service . . . probably represent five percent of the problem." He added that four children aged 11 years and fifteen aged 12 years were treated for drunkenness in the year (Johnston, 2011). In a New Zealand Herald article (Lesk, 2011) titled, "Misbehaviour by Kids Rated No. 1 Social Issue," Dr. John Langley is quoted as saying up to 47,000 children and young people in our compulsory school system can be described as having conduct or significant behaviour problems. He further adds that this is the single biggest social problem New Zealand has. As a teacher, his summation is quite believable. Crime statistics report police apprehended 64 children under the age of nine years for assault in 2010 compared to 33 in 2009 (44 of whom were boys); four children under the age of nine years committed serious assaults resulting in injury and 827 children aged 10-13 assaulted a person in 2010 compared to 770 in 2009 (Lesk, 2011).

Using Department of Education (2014) data the following behaviours account for student stand-downs and expulsion in 2012:

Table 2 **Percentage of Stand-downs by Behaviour, 2012**

Percentage of Stand-downs by Behaviour, 2012	
Physical assault on another student	26.0
Continual Disobedience	22.7
Verbal assault on staff	13.6
Theft or vandalism or arson	7.7
Drug use	7.1
Smoking or alcohol	6.3
Physical assault on a teacher	2.9
Verbal assault on another student	2.7
Other behaviours	11.0

Table 3 **Percentage of Expulsions by Behaviour, 2012**

Percentage of Expulsions by Behaviour, 2012	
Drug use	25.5
Continual disobedience	24.8
Physical assault on another student	16.8
Physical assault on a teacher	7.3
Verbal assault on another student	1.5
Verbal assault on staff	1.5
Smoking or alcohol	1.5
Theft, vandalism or arson	8.0
Other behaviours	13.1

As an indicator that behavioural problems are not simply a New Zealand schooling phenomena, the British Teachers Support Network (2007) reports 49 percent of teachers in the United Kingdom had been assaulted by students. The attacks include stabbing with scissors and nails, attempted strangulation and students trapping teacher's hands in doors; 39 percent of teachers had had their personal property defaced or damaged. The report also said more than one-in-two teachers had considered quitting because of student

behaviour. Shanker (2012) a Distinguished Research Professor at York University argues that research indicates four significant child behaviour trends since 2005: (a) there has been an increase in the number of cases of children with problematic behaviours, (b) the problematic behaviour is exhibited by children of an increasingly younger age, (c) the problem behaviour is more extreme, and (d) there has been a closing of the gender gap of children with problematic behaviour. Historically boys have outnumbered girls.

Several U.S. studies have found that the amount of time a teacher actually teaches is the best predictor of a student's academic achievement (Keith & Fine, 2005; Vannest & Hagan-Burke, 2010). Children with behavioural and emotional problems often result in teachers spending less time actually teaching students, with the consequence that classroom learning potential decreases. Vannest and Hagan-Burke's (2010) research found some teachers spending less than half their teaching time actually teaching. The U.S. data confirms the extent of the problem. Jamieson and Romer (2005) quote the U.S. surgeon general report suggesting that 20 percent of American school age students would qualify for mental health services. The U.S. Department of Health and Human Services (2012) report the following data:

- One in five children and adolescents aged between 6 to 17 years is affected by a mental health problem, and only about 50 percent receive any mental health intervention treatment (Merikangas, He, Burstein, Swanson, Avenevoli, Cui, Benjet, Georgiades, Swendsen, 2010).

- One in ten children and adolescents are affected by a conduct disorder.

- Up to ten percent of children and adolescents are affected by an anxiety disorder and only 32 percent of these receive treatment (Merikangas et al., 2010).

The American Psychiatric Association (2000) reports that between three to seven percent of children and adolescents have attention-deficit/hyperactivity disorder (ADHD) and only 48 percent receive treatment (Merikangas et al., 2010). Such statistics highlight the challenges teachers face. It is the reality of this juxtaposition of the teacher desiring to provide learning in the classroom, contrasted with the student with emotional and behavioural problems wanting to disengage from the learning process, that my research seeks to provide an integrated approach to solving.

Traditional solutions.

As academic outcomes for children continue to flatline (Davison, 2013; Moir, 2013; Organisation for Economic Co-operation and Development (OECD), 2014; Small & Kirk, 2013; Wong, 2013) and behaviour indices worsen, a proliferation of intervention has followed. For decades our problematic students have been the recipients of numerous well intentioned projects, (most recently Charter schools, Investing in Educational Success (IES) and Community of Schools (COS)), (Ministry of Education, 2014; Thrupp, 2014) aimed at improving their behaviour and / or academic attainment. Educationalists have been proactive in seeking answers to lift this 'under achieving tail'. Over the years various interventions, models and program initiatives have been implemented with varying results (Welsh, 2013), yet the problem of under achieving, poorly behaved students continues and even grows. In turn, these intervention projects have been critiqued and assessed and found to have marginal success, so have been replaced by yet another theory or methodology (Ministry of Education, 2013, August 23). And all the while, the behaviour and academic results of children continue to challenge the very experts who passionately work to find *the* answer. Will the latest $359 million dollar experiment[3] be the change that makes the difference (Ministry of Education, 2014)?

[3] Investing in Educational Success, an initiative aimed at improving teacher skills in order to raise student achievement , has been budgeted to cost NZ$359m over the next 4 years.

Foundational to historical interventions is the concept of a 'method' or an 'approach' to the intervention. Teachers are taught a series of steps, or a specific program of techniques, skills or lessons to train themselves or a student in. Once taught, the student either succeeds or fails and the course is either lauded or abandoned. Patrick Welsh (2013), retired teacher writes satirically of his four decades of teaching through a variety of education reform in the Washington Post. His thoughts echo many experienced colleagues' inertia; an attitude that says 'this too shall pass' as new initiatives are promoted to replace old redundant ones. This can result in teachers becoming cynical and complacent about initiatives to improve student behaviour and achievement, and rightly so. Thus the problem is multifaceted.

The historical approaches can be conceptualised into three broad categories 1) teacher focus (e.g. increasing teacher qualifications or developing a new pay system such as Investing for Educational Success), 2) student focus (e.g. providing learner support, special education etc), or 3) their family environment or school environment (e.g. foster care, parent education or we develop Charter schools and flexible modern, 21st Century Learning environments and introduce technology and high speed internet) (MOE, 2011; New Zealand Parliament Select Committees, 2008, 2012).

Teacher focus.

New Zealand wide pedagogical initiatives include, but are not limited to "Tomorrow's Schools" promoted by the Picot report (PPTA Annual Conference, 2008, Wylie, 2012), Standards Based Assessment, Assessment for Learning (MOE, 2011), National Standards, performance pay, Executive Principals, 21st Century Learning, AKO (MOE, 2010, 2011; New Zealand Parliament Select Committees, 2008, 2012; TKI, 2014, 2014) and Investing in Educational Success and Community of Schools (COS) teachers (MOE, 2014). The reasoning is if we can improve our teachers, surely we will improve our students' outcomes.

Within class, teacher focused pedagogical initiatives have included Learning Styles (commonly summed up as visual, audio and kinesetic or VAK), Left and Right Brain teaching, Brain Gym / Educational Kinesiology, along with the traditional methods of questioning, brain storming, role playing, lecturing (Howard-Jones, 2010). There are, of course, many more (see neuromyth section in the literature review for more on this). Improving teacher quality is, without doubt, an important part in the puzzle. But history shows that this alone does not resolve the problem of the under achieving tail.

Student focus.

Student focused interventions are broad and varied, ranging from Learner Support departments in schools and the Special Education Service to water hydration and the intake of Omega 3 (Howard-Jones, 2014; Pasquinelli, 2012). Pam Schiller (1999) in her book 'Start Smart! Building Brain Power in the Early Years' devotes an entire chapter to adequate hydration of children, while numerous advertisements and website are dedicated to the power of Omega 3, which is really based on a limited amount of scholarly research (Kirby, Woodward, Jackson, 2010). Popular student learning models include Howard Gardener's Multiple Intelligences and Edward De Bono's Thinking Hats (Howard-Jones, 2014). Student focused methods for discipline include removing a student from the classrooms, the detention system, the use of the deans structure, report cards, visits to the principal and communication with home. There would be few teachers who are not familiar with these behaviour modification methodologies, and many more. A focus on the student is an important part of improving student outcomes but this research suggests that an attachment approach is more effective.

Environment focus.

More recently the classroom and school environment have come into focus with the 21st Century Education model and charter schools (MOE, 2010, 2011; New Zealand

Parliament Select Committees, 2008, 2012; TKI, 2014). Suggestions that more open planned classrooms and open ready access to internet and computer technology will be an answer to lifting student learning and engaging the distracted learner are rife in modern education literature. The New Zealand Ministry of Education (2010, 2011) has made 21st Century Learning Environments a priority in the design of new or renovation of existing schools and the integration of technology is strongly recommended and financially resourced[4] (TKI 2014). Charter schools are an attempt to change the student environment in the hope that a new environment will promote improved behavioural and academic success. The learning environment is no doubt a factor in student learning. But a quick assessment reveals schools in the developing world can achieve positive student outcomes in classrooms without walls, windows and desks, let alone with modern bright furniture, open planned 21st Century learning environments and high speed internet (F. Siamoongwa, personal communication, December 20, 2013)[5]. Schore (2005) reminds us that it is the social environment that lays the foundation for secure attachment and learning:

> In the past, an "enriched environment" has been defined narrowly as a complex physical environment, and the reputed impact of early exposure was on cognitive development. It now is clear that for optimal brain development, the infant also needs to interact with an enriched social environment (p. 210).

Thus, while the physical environment makes learning more enjoyable and more attractive, it is not a panacea for teachability problems.

While all three approaches to improving student outcomes have validity, this research suggests that a powerful, yet often overlooked and relatively cost effective intervention, comes through dyadic intersubjectivity and a sense of safe attachment to appropriate adults. Dyadic intersubjectivity mechanisms have been shown to improve both academic and

[4] all this with contrary research indicating children should have less screen time (Appendix A)

[5] F. Siamoongwa grew up in Zambia and attended a very basic school but is now an international bank auditor

behavioural concerns and is strongly supported by neuroscience and attachment theory. As Bergin and Bergin (2009) state,

> Attachment influences students' school success. This is true of students' attachment to their parents, as well as to their teachers. Secure attachment is associated with higher grades and standarized test scores compared to insecure attachment. Secure attachment is also associated with greater emotional regulation, social competence, and willingness to take on challenges, and with lower levels of ADHD and delinquency, each of which in turn is associated with higher achievement (p. 141).

This research looks at the power of an attached relationship in moderating a student's behaviour and thus rendering them teachable. An attachment approach considers the antecedents of the antisocial student behaviour (environment) and recognises that what makes a child teachable also renders pro-social behaviour. Because of it's relationship focus, attachment theory can't be taught by curriculum (teacher based intervention programs), but is rather caught through the experience of secure attachment. The child is not seen as an individual with learning or behavioural deficits (child focused), but is viewed as emotionally and relationally hungry and insecure. Thus, an attachment approach links the three broad areas covered by most interventions and uses the power of relationship to restore a child to developmental maturity and security, thus enabling them to think and behave in socially and academically beneficial ways; and this, all evidence-based through neuroscience and MRI imaging. The links between insecure attachment, learning and behavioural problems will be discussed in the literature review.

The research will particularly look at whether an academic understanding of attachment and neuroscience impacts on teachers' attitude towards, and experience of, challenging children in the classroom and if the behaviour is reportedly improved following the strengthening of the teacher-student relationship.

Purpose of the Study

The purpose of this study is to test the effect of *The Teachability Factor* professional development course on teachers' perceptions of emotionally and behaviourally problematic students. The intent is not to give teachers another method, or another intervention, but rather to give teachers a 'new pair of glasses,' a new way of seeing the students they work with.

The Teachability Factor acts as a translator of psychological language, attachment and neuroscience and puts these pivotal understandings in a framework that teachers can use to inform their practice. It gives perspective and depth to a teachers' insight, understanding and ability to interpret a student's behaviour and gives the teacher confidence to adapt his or her teaching to the individual needs of a child.

The purpose of this paper therefore is to determine if giving a teacher these new insights and understandings improves their perceptions of challenging children in their classroom, as well as providing them with confidence to approach each individual challenging student in more appropriate and effective ways.

Context of the Study

The research uses *The Teachability Factor,* an eight session, 16 hour workshop as an intervention for teachers with a specifically identified challenging focus child in the classroom. Teachers responded to a pre and post intervention questionnaire, answering it with this specific focus child in mind.

Teacher participants (n=14) responded to questions in three broad categories: teacher stress, child internalising and child externalising indicators, and an open ended

questionnaire regarding their opinion of the intervention. Two A-rated[6] psychological inventories (Index of Teaching Stress [ITS] and Behavioural Assessment System for Children 2nd Edition [BASC-2]) were selected to increase validity and robustness of the research.

The remainder of this research will be arranged in the following chapters: Hypotheses and Questions, Literature Review, Methodology, Results, Discussion and Recommendations.

[6] Rating refers to Validity testing of the inventory across norms and population groups. A-rating being the highest validity.

Hypotheses and Questions

The procedures in this research study were employed to provide evidence of a dependent relationship between participating in *The Teachability Factor* training and teacher perceptions of their focus child, in a preschool population. The hypotheses and research questions follow.

Statement of Null Hypotheses and Research Questions

Global domain.

The two **hypotheses** are:

1. *That the teacher professional development workshop, The Teachability Factor, developed by Dr. Gordon Neufeld, Neufeld Institute, Canada, will have no effect on a teacher's perception of a specific challenging child in the classroom.* Research questions 3 - 16 look at this in detail from the ITS and BASC-2 questionnaires.

2. *That the teacher workshop, The Teachability Factor, is not an effective evidence-based professional development course for teachers who work with challenging children in the classroom.* Research questions 17 and 18 consider this in depth as summative questions.

The **research questions** are divided into three sections, the teacher domain, the student domain and summative questions.

Teacher domain.

3. Is there a relationship between a teacher participating in *The Teachability Factor* and their stress levels (TEACH CHAR)?

4. Is there a relationship between a teacher participating in *The Teachability Factor* and their sense of competence and reduction in their need for support (SCNS)?

5. Is there a relationship between a teacher participating in *The Teachability Factor* and their sense of teaching satisfaction (LSFT)?

6. Is there a relationship between a teacher participating in *The Teachability Factor* and the degree of disruptions in their teaching process (DTP)?

Student domain.

7. Is there a relationship between a teacher participating in *The Teachability Factor* and their perception of an overall improvement in the challenging student (STU CHAR)?

8. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception that there has been an improvement in the student's distractibility, impulsivity, restlessness and attention span (ADHD)?

9. Is there a relationship between a teacher participating in *The Teachability Factor* and a teacher's perception of an improvement in the student's emotional and adaptive behaviour (ELLA)?

10. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception of an improvement in a student's anxiety and withdrawal in the classroom (ANXW)?

11. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception of an improvement in their ability to cope with, and successfully teach the specific student, given their specific learning challenges and needs (LALD)?

12. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception of a decrease in distress caused by the student's aggressive behaviour (AGCD)?

13. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception of a reduction in the student's externalising problems?

14. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception of a reduction in the student's internalising problems?

15. Is there a relationship between a teacher participating in *The Teachability Factor* and the teacher's perception of a reduction in the student's behavioural symptoms?

16. Is there a change in teachers' approach to challenging student behaviour after participating in *The Teachability Factor* course?

Summative questions.

17. Can teachers benefit from an understanding of what has predominantly been a theory and practice in the psychological world?

18. Can the insights and understandings from neuroscience and attachment psychology be translated into an effective course for teachers?

Literature Review

The literature review will examine the history of attachment, it's types and basic tenets. It will then consider the links between neuroscience research findings and attachment theory because "many of Bowlby's ideas have been supported by neurobiological research" (Bell, 2009, p. 190). Each section will intertwine applications of Attachment Theory to education, specifically in the context of *The Teachability Factor* professional development course. Finally the literature's relevance to the educational setting will be summarised.

Robinson (2006; 2010), through his immensely popular TED talks describes what he calls a crisis in how western societies are educating their children. In 2001 the United States government legislated the 'No Child Left behind' (NCLB)Act (Anthes, 2002). It's intended goals were to raise student achievement by implementing standardised testing, providing students and their parents with more choice, and making teachers accountable for their student's achievement (U.S. Department of Education, 2004). This legislation was in response to data showing a growing percentage of US students dropping out of college, or not even attending college (Anthes, 2002). Rather than increasing teachability, this legislation has largely had the reverse effect, creating demotivated students and teachers alike, resulting in increasing numbers of students (and teachers) dropping out of the educational system (Robinson, 2011).

Like America, the New Zealand government is trying to find solutions to our student underachievement. Recognising the educational problems Robinson enunciates, the New Zealand government's response to underachievement has been to implement an intervention process similar to that of NCLB; namely, to provide parents with more choice (Charter Schools), implement standardised assessment and improve teacher quality. Professor Thrupp (2013) has argued that the antecedents of underachievement run deeper

than mere attitudes towards some parents, or their socio-economic standing. He questions why New Zealand's National Standards would have any better outcomes than the United States NCLB when they are based on a similar premise. In the light of such a critique, and given the findings from recent neurobiological research, it is puzzling that there is a considerable lack of attention being given to the areas of attachment and neuroscience in recent New Zealand Education initiatives (MOE, 2013). This is curious given the impact that these processes are promising to have on potential learning outcomes. While other countries are channeling resources into training teachers in attachment and neuroscience (Bath Spa University, 2014; Bergin & Bergin, 2009; Commodari, 2013; Cozolino, 2013; 2014; Dubinsky, 2010; Geddes, 2003; 2006; Hook & Farah 2012; Immordino-Yang & Damasio, 2007 & 2010; Korthagen, Loughran & Russell, 2006; Wetz, 2009; 2010); New Zealand is still concentrating it's efforts on the quality of teacher pedagogy (Investing in Education and COS teachers), the classroom environment (Charter Schools and 21st Century classrooms), and achievement standards (MOE, 2014).

Within the context of confronting this educational dilemma of why students have trouble learning, Neufeld proposes a new way of addressing the student achievement issue (Neufeld, 2008, 2012). He poignantly points out the irony that with more knowledge available, the best trained and educated teachers we have ever had in our educational systems, highly developed and research based curriculum, and access to advanced technologies for even the youngest of students, that teachability is still a pressing challenge. Neufeld's explanation for such a dilemma is that our educational processes have often failed to take cognisance of the intrapsychological needs of children, and that these intrapsychic drives have to first be satiated before a student can become an optimised learner (Commodari, 2013; Immordino-Yang & Damasio, 2007; Neufeld, 2007). For Neufeld (2009) the foundation of these intrapsychic drives is the need to attach. According to Simpson and Howland (2012), "Perhaps no single theory in the psychological sciences has generated more empirical research during the past 30 years than attachment theory" (p.

282). The effective remediating of emotional and behavioural problems through the mechanisms of attachment are well researched. This literature review will discuss the relevant attachment and neuroscience research that is applicable to enhancing a child's teachability (Bergin & Bergin, 2009; Carroll-Lind & Angus, 2011; Cozolino, 2013; 2014; Immordino-Yang et al 2007; The Allen Report, 2011). The research indicates, if we can render students more teachable through a better understanding and application of attachment theory and neuroscience, then we can improve academic outcomes as well.

Neufeld's seminar series, *The Teachability Factor* (2012) is an evidence-based teacher training course that directly addresses the issue of student behaviour, learning and achievement (see Appendix B for discussion of salient factors for evidence-based programs). The theoretical framework for this educational learning intervention is Attachment Theory supported by the scientific discoveries of neuroscience. Therefore the literature review will examine the literature of both.

The literature review will have the following structure:

1) History of attachment theory and the four types of attachment
2) Description of attachment theory's basic tenets
3) Attachment and neuroscience
4) The child's social brain
5) Self regulation
6) The orbital medial prefrontal cortex
7) The Polyvagal Theory
8) The caution of neuromyths
9) Attachment theory's relevance and application to education

While the availability of evidenced-based research is limited in the field of attachment and education (Cozolino, 2013), it is extensive and expanding in the psychological and

psychotherapy domains (due in large part to the increase in contemporary neuroscience findings that support attachment). Bell (2009) suggests, "Attachment theory has had a phenomenal record of success in generating research on both parent-child and adult close relationships" (p. 177). From this perspective, this literature review will look at research in relevant fields that demonstrate the importance and effectiveness of attachment and neuroscience, and will extrapolate that to an educational framework. This is done both boldly and cautiously as the researcher is cognisant of the historical examples of misapplied brain research in education (Adey & Dillon, 2012; Dekker, Lee, Howard-Jones, & Jolles, 2012; Immordino-Yang et al, 2007; Schultz, 2009).

History of Attachment Theory

Attachment is defined as the primal drive humans have for proximity (Bowlby, 1969; 1973, 1979; Johnson & Whiffen, 2003; Johnson, 2004; Karen, 1998; Mikulincer & Shaver, 2007; Schore, 1994; Siegel, 1999; Siegel & Hartzell, 2004). Children have an innate drive for the pursuit and preservation of proximity and when they achieve this physical, emotional, social and psychological closeness and connection with a significant other it creates a sense of attachment (Neufeld, 2010). Attachment is an interrelated brain system that seeks proximity to meet the human need for protection and comfort, or as Bowlby described it, the "urgent desire for comfort and support in adversity" (Bowlby, 1988, p. 121). These are viewed as adaptive instincts for survival (Bell, 2009; Bowlby, 1969; Panksepp, 1998). The Latin word for proximity (proximitas) means nearness or closeness, and this aptly describes the construct of attachment.

Bowlby, a British scientist, psychiatrist, and psychologist is considered the pioneer of Attachment Theory (Berk, 2009). His early life experiences formed the foundation for his theory on attachment (Bowlby, 1969; Karen, 1998). His childhood was characterised by emotional distress due to his loss of proximity, with what he terms, emotionally distant

parents; his nanny was his primary caregiver. Later as a psychiatrist in London during World War Two he witnessed how traumatised children were when they were separated from their parents. Being trained in a psychoanalytic approach by Melanie Klein in the 1930's, what Bowlby witnessed at his clinic was at variance with his professional training. Kleinians saw a child's inner life of fantasy as being the essential component and that real life experiences were inconsequential in clinical diagnosis (Karen, 1998). This discounting of a child's real experiences disturbed Bowlby and lead to an acrimonious split from Kleinian psychoanalysis.

Both Freud (1973) and Bowlby (1969) saw the importance of a child's early experiences with their mother as being foundational for subsequent adult behaviour, but they differed in how the bond was achieved. Freud saw this emotional bonding as serving the purpose of drive reduction; primarily through feeding activities with the mother, the child's hunger and pain were satiated thus creating a bond (Berk, 2009; Waters, Crowell, Elliot, Corcoran & Treboux, 2002). On the other hand, Bowlby rejected Freud's drive reduction theory (Bowlby, 1969; Peters, 1999), and contended that a child's proximity seeking behaviours were for the purpose of engaging a caregiver in a nurturing relationship "in terms of the child's basic needs for protection, affection and security" (Mikulincer & Shaver, 2012, p. 260). Bowlby was strongly influenced by Darwin and he postulated that the child's attachment behavioural system was innate and adaptive to assure the survival of the species (Bowlby, 1988; Mikulincer & Shaver, 2012). Lorenz's study of the imprinting of baby geese influenced Bowlby (Berk, 2009), as did Harlow's Rhesus monkey experiments (Harlow & Zimmerman, 1959), in which baby monkeys were reared from birth with two "surrogate mothers;" one made of soft cloth, and the other of wire mesh. The experiment showed the baby monkey's preference for the soft cloth surrogate, even though the mesh wire surrogate had the food bottle. In summary, Freud saw children as needy, anxious, and clingy; Bowlby saw children as competent, curious and fully engaged with their environment (Waters, et.al., 2002).

Bowlby's Attachment Theory posits that children need adult attachment figures in order to optimally develop as human beings. In 1952 Bowlby wrote a report for the World Health Organisation on maternal deprivation and in it he suggested the development of attachment bonds was necessary for survival (Pittman, Keiley, Kerlpelman & Vaughn, 2011). Mikulincer and Shaver (2012) summarise Bowlby's ideas when they state, "Bowlby proposed that attachment, an enduring emotional tie with specific others (often a small set of others), is central to psychological development and ensures an infant's survival by eliciting care and protection from stronger and wiser figures (whom he called attachment figures)" (p. 260). These innate attachment drives within a child like crying, smiling and cooing are bonding behaviours from the child signalling their need for proximity with their caregiver. These attachment signals act like a homeostatic system where the child feels anxiety, emits an attachment signal, resulting in their attachment caregiver responding with closeness and comfort, thus the child reverts to a calm, homeostatic state (Bell, 2009; Peters, 1999; Schore, 2003; 2009).

Attachment development is a process that Bowlby saw evolving over the first two years of a child's life and beyond (Bowlby, 1969). Significantly, (though Bowlby was unaware of it when he formulated his theory), neuroscience has found that this two year span overlaps with vital neurophysiological development of the child's brain, as we'll shortly discuss (Schore, 2003; Siegel, 1999). Damon (1983) describes Bowlby's attachment development as a four phase process:

1. Preattachment phase (birth - 6 weeks). Infant uses a variety of non verbal signals to connect with caregiver (smiling, cooing, crying).

2. Attachment in the making phase (6 weeks - 6-8 months). Infant begins to selectively attach to one person rather than to a stranger.

3. Clear-cut attachment phase (begins around 6 months - 2 years). Infant can discriminate between primary caregivers and other people and use their primary

caregivers as a secure base to explore their environment. Stranger danger heightened at this phase.

4. Goal corrected partnership (18 months - 2 years and beyond). Development of complex attachment relationships with caregiver - beginning of an attachment partnership.

Attachment Theory was largely rejected by Bowlby's contemporaries because it couldn't be empirically tested; how do you measure a relationship to determine if it impacts a child's development? Mary Ainsworth, Bowlby's American research assistant, devised a method to test the state of the attachment relationship. While working in Uganda (attachment is shown to be a natural human drive in all cultures [van IJzendoorn & Kroonenberg, 1998]), Ainsworth developed an hypothesis that a parent's sensitive responsiveness to the infant's non verbal signals was vital in determining the quality of an infant's attachment (Ainsworth, 1967). Sensitivity does not mean parental warmth, Ainsworth discovered. A parent can be warm, but not sensitive, leading Ainsworth to contend that parental sensitivity is the prime component for attachment to occur (Ainsworth, 1972; Grossman and Grossman, 1999).

From this initial hypothesis, Ainsworth developed The Strange Situation procedure to assess a child's attachment state (Ainsworth, Blehar, Waters & Wall., 1978). The procedure involved having a mother and child enter a room filled with toys. A few minutes later a stranger enters the room. The mother then leaves the room and the infant is left with the stranger for 3 minutes, when the mother returns. Ainsworth's research assessed the child's reaction to their mother's absence, as well as the child's response when their mother returned to the room. The Strange Situation creates incremental stress for the child (Schore, 2003), which Ainsworth postulated would activate the child's attachment system.

Her research found that a child's response to their returning mother fitted within three categories of behaviour (Ainsworth, et al. 1978; Cassidy & Shaver, 1999; Pittman, et al.

2011). These research results have been replicated in thousands of studies (Siegel, 2010). Education is beginning to see the relevance of these categories in the context of teacher-student attachment (Geddes, 2003; 2005). The (now) four basic patterns are (Ainsworth et al., 1978) (see Appendix C for a fuller description of Infant Strange Situation behaviours):

1. Secure-Autonomous attachment.

About 66 percent of children within the research sample had secure attachment. These children show signs of distress when their mother leaves the room, and on the mothers return they (a) seek interaction or contact with her, (b) delight on mothers return and distress quickly subsides, and (c) the child returns to play. The mother's response was to read her child's signals and responded sensitively - called attunement (Siegel, 2010a).

In an educational setting, the securely attached child is eager and willing to learn, is attentive, full of curiosity and co-operative. This securely attached student is self aware, positive, hopeful and expects the teacher to be able to help them learn (Geddes, 2006; Wetz, 2010).

2. Insecure Avoidant attachment.

Around 20 percent of children fitted within this category. Their attention was focused on the environment and away from the parent. On separation they showed indifference with few or no indications of distress. When the mother returned they actively ignored her by looking away, or turning away remaining occupied with their toys. The mother's response was to not engage with (ignore) her child on returning to the room and seemed indifferent to her child. Hopkins, cited in Geddes (2003) describes the profound effects of rejection: the infant experiences an acute conflict between 'the desire for and the dread of physical acceptance, and self representation of being in some ways untouchable or repellent' (1987, p. 21). Families who have experienced unresolved loss and separation were over represented in the avoidant attached pattern in Geddes research (2005).

In the classroom these students are characterised by their unwillingness to risk failure.; "If I don't try, I can't fail," seems to be their catch cry. Seemingly contradictory, the task, if perceived as possible, will become the focus and the source of the student's resilience as it is safer than risking rejection from the teacher. This student, if academically capable, risks being overlooked by the teacher as such pupils can appear model students as they get on with the task with apparent independence. Geddes (2003) notes that in her sample, avoidant students included a high proportion of black and mixed race children. Relocation experiences count as loss events to children and thus immigration may be a factor in these children. This has significant implications for New Zealand with it's high immigration rates and Pacific Island students making up a significant proportion of our under achieving tail.

Thus Geddes' (2005) learning triangle has the task as the focal point in the classroom:

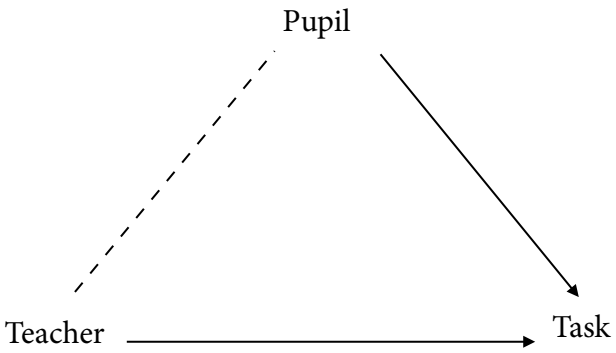


Figure 1 **Learning Triangle of the Avoidant Attachment Profile**, (Geddes, 2005, p. 82). Copyright © SEBDA, reprinted by permission of Taylor and Francis Limited, www.tandfonline.com on behalf of SEBDA.

Geddes learning profile helps to identify such students in the classroom:

Table 4 **Learning Profile of the Avoidant Attachment Pattern** (Geddes, 2005, p. 85). *Copyright © SEBDA, reprinted by permission of Taylor and Francis Limited, www.tandfonline.com on behalf of SEBDA.*

Learning profile of the avoidant attachment pattern	
Stage 1: Approach to school / classroom	• apparent indifference to anxiety in a new situation
Stage 2: Response to the teacher	• denial of need for support and help from the teacher • Sensitivity to the proximity of the teacher
Stage 3: Response to the task	• Need to be autonomous and involved in the task independent of the teacher • Hostility felt towards the teacher is directed towards the task • The task is the emotional safety barrier between the pupil and the teacher
Stage 4: Skills and difficulties	• likely to be under achieving • limited use of language • limited use of creativity

3. Ambivalent or Resisting attachment.

Around 10 to 15 percent of children fitted into this classification. These children's attention was focused on their parent, and not the environment. They exhibited some distress (clingy behaviours) before separation, and strong distress during separation. When the mother returned they were not soothed or calmed, but rather continued to show distress. They could also show anger towards the stranger, or the mother on reunion. The mother's response on return was inconsistent - sometimes she showed sensitivity and engagement, and other times she ignored and acted non-responsive to her child.

Geddes (2005) summarises the characteristic behaviour patterns of such children in the classroom thus:

> the pupil can become clingy and demanding, and the learning task can be experienced as increasing the apparent reliance on the teacher and an intrusion into the possibility of close proximity to her (sic). This can be very briefly summarised as a preoccupation with the teacher which excludes the task and is associated with high anxiety about independent thought and action, with under achieving as an outcome (Geddes, 2005, p. 79).

She provides the following summaries in both table and diagram:

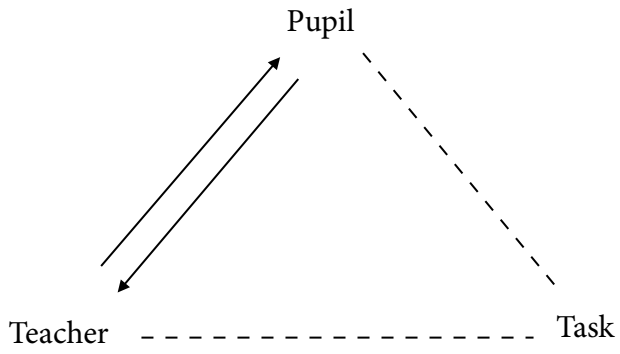


Figure 2 **Learning Triangle of the Resistant / Ambivalent Attachment Relationship**, (Geddes, 2005, p. 80). Copyright © SEBDA, reprinted by permission of Taylor and Francis Limited, www.tandfonline.com on behalf of SEBDA.

Table 5 **The Resistant / Ambivalent Attachment Pattern of Behaviour Demonstrated in the Learning Situation** (Geddes, 2005, p. 240). *Copyright © SEBDA, reprinted by permission of Taylor and Francis Limited, www.tandfonline.com on behalf of SEBDA.*

The Resistant / Ambivalent Attachment Pattern of behaviour demonstrated in the learning situation	
Stage 1: Approach to school / classroom	• high levels of anxiety and uncertainty
Stage 2: Response to teacher	• need to hold onto the attention of the teacher • apparent dependence on the teacher • expressed hostility towards the teacher
Stage 3: Response to the task	• difficulties in attempting task unsupported • unable to attend to task because of concerns about loss of teacher attention
Stage 4: Skills and difficulties	• likely to be under achieving • language may be well developed • learning may be accompanied by hostility

Geddes (2005) concludes, "these children have great difficulty in education because of the fear of independence and autonomy that is implied by learning and indicates growing up" (p. 240).

4. Disorganised / disorientated attachment.

Later research by Main and Solomon (1986; 1990; Main & Hesse, 1990) identified a fourth category of infant attachment called disorganised/disorientated attachment. These children exhibited contradictory behaviours by initially using proximity seeking behaviours, then suddenly replacing them with avoidance attachment behaviours. This juxtaposition between approach seeking behaviours towards the parent, followed abruptly by flight behaviours from the parent, lead to what Main describes as infant disorganisation (Main, 2000). Disorganised attachment occurs when a parent acts in extreme and

frightening ways towards their child, resulting in a severe lack of attunement which creates alarm for the child (Siegel, 2010a). It is estimated that approximately 10 percent of the general population has disorganised attachment state and within high risk groups, such as drug addicted parents, 80 percent (Hesse & Main, 2000). Stalker and Davies (1995) found that victims of sexual abuse were insecurely attached with disorganised attachment status predominating. This severe lack of attunement creates alarm or psychological terror within the child (Geddes 2003; Siegel, 2010), leading Main to postulate that the child's innate attachment behaviours are triggered on separation, but when they they get close to their mother, their threat neural circuitry gets activated resulting in avoidant behaviours (Hesse & Main, 2000; Main, 2000). Children with disorganised attachment are highly alarmed children (extensively described in Main, Goldwyn and Hesse, *Adult Attachment Scoring and Classification Systems*, 2002, Department of Psychology, University of California at Berkeley).

The implications for classroom practice with these children is profound. These children represent society's most vulnerable and troubled youth. While small in terms of the percentage of the population, the impact of their behaviour on the classroom environment and teacher energy is significant, and research suggests this group of insecurely attached students is increasing (Shanker, 2012). Bergin and Bergin (2009) state that "in general, disorganised children have the most negative outcomes" (p. 145). In the classroom typical behaviour includes (Geddes, 2003):

- control
- lack of trust
- hyper-vigilance
- unpredictable aggression
- avoidance of situations where student is likely to feel helpless
- avoidance of situations where they may feel humiliation or denigration

- strong overwhelming feelings with little ability to transform these feelings into thoughtful understanding
- brain patterns activated for fight and flight
- hyperactivity
- absence of sense of self and empathy for others

Intuitively and experientially, it is understood such described behaviours can cause stress for teachers, other students in the classroom, as well as making it difficult for the disorganised attached student to learn. These behavioural characteristics are often accompanied by a diagnosis such as Conduct Disorder, Oppositional Defiance Disorder, Dysthymic Disorder, or Reactive Attachment Disorder (RAD), and can often be mistaken for Attention Deficit Hyperactivity Disorder (ADHD) (see American Psychiatric Association, 2013, DSM-5 for disorder symptomatology). Both Geddes (2003; 2005) and Neufeld (2007a; 2012a; 2012c) stress the importance of distinguishing between these conditions, as wrongly medicating a student inhibits the ability for the process of maturation to work, and thus impedes the ability of the child to grow out of the disorganised state.

Reducing levels of anxiety and creating a safe environment for these children is paramount. Typical school discipline for the above behaviours works counteractive to finding a solution. A raised voice, detentions, being sent to the deans office, for example, only increase a student's sense of alarm, thus working against the possibility of helping the student to find a place of rest and safety where they can lower their defenses and learn. Once again, Geddes (2005) provides a very useful learning profile of these students:

Table 6 **Learning Profile of the Disorganised / Disoriented Attachment Pattern** (Geddes, 2005, p. 92).

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Learning profile of the disorganised / disoriented attachment pattern	
Stage 1: Approach to school / classroom	• intense anxiety which may be expressed as controlling and omnipotent
Stage 2: Response to teacher	• great difficulty experiencing trust in the authority of the teacher, but may submit to the authority of the head of the school • may be unable to accept being taught
Stage 3: Response to the task	• task may seem like a challenge to fear of incompetence, triggering overwhelming feelings of humiliation and rejection of the task • difficulty accepting 'not knowing' • need to appear omnipotent and know everything already
Stage 4: Skills and difficulties	• likely to be under achieving and at a very immature stage of learning • may seem unimaginative and uncreative and find conceptual thought difficult

Wetz (2010) cites evidence from David Howe's research (1995) that suggests that only 55 - 65 percent of students are securely attached (p.16). If insecure attachment creates the learning and behaviour challenges as outlined above, then attachment needs to be a vital part of teacher training and our education systems.

Description of Attachment Theory's Basic Tenets

Neufeld's seminar, *The Teachability Factor,* uses the following theoretical constructs from Bowlby's and Ainsworth's attachment literature and research as foundational constructs to *The Teachability Factor* (Neufeld, 2012):

a. **Attachment is an inborn motivating drive and takes precedence over other needs.** Neufeld (2009) contends attachment is the context in which all other needs are met. Bowlby (1969) stated that intimate attachment to other human beings is the centre around which a person's life revolves. Separation from an attachment figure is inherently stressful for a child (Neufeld & Mate, 2005).

b. **Children need dependence before they can be independent** (Neufeld, 2011). Bretherton and Mulholland (1999) suggest there is no such thing as complete independence because humans are always seeking connection with other human beings.

c. **Attachment gives a child a safe haven** (Bowlby, 1988; Cooper, Hoffman & Powell, 2009; Powell, Cooper, Hoffman & Marvin, 2014). Because attachment is an adaptive instinct it provides a child with a sense of safety, ensuring that they will be protected from harm and comforted if they get hurt. Schore's research (1994) found proximity to an attachment caregiver soothes the child's nervous system by down regulating their alarm system. Porges' (2011) Polyvagal Theory has found the human limbic system is always seeking social engagement, but will only do so if the person's neural safety system is activated. Having a secure attachment activates a child's social engagement system, which provides the child with a safe haven, thus allowing the child to interact with their environment in healthy and developmentally appropriate ways (Hughes & Baylin, 2012). Without a safe haven the child's amygdala - their neural stress response system - will be more easily

activated, resulting in defensive behaviours that diminish a child's ability to discover and learn (Neufeld, 2010a; 2010b).

d. **Attachment gives a child a secure base** (Bowlby, 1988; Neufeld 2010a; 2012c; Waters et. al., 2002). When a child feels safe they have a natural curiosity to explore, because if they encounter a threat to their safety, they can retreat to their safe haven. Without this sense of safety a child will be reticent to venture forth in emergent ways because they will lack the confidence that they can return to safety (Mikulincer, 1998; Powell, et al., 2014).

e. **Physical accessibility, affect (emotional) responsiveness and behavioural engagement build attachment connections** (Bowlby, 1979; Fosha, 2000; Johnson, 2004; Neufeld, 2010, 2012). When the attachment figure is accessible, responsive and engaged (Johnson, 2004), the child feels secure in their caregivers proximity so will venture forth (Bowlby, 1988; Neufeld, 2007; Waters et al. 2002).

f. **Emotion is the key organising principle for attachment to occur** (Cozolino, 2006; Hughes, 2012; Johnson, 2009; Knudson-Martin, 2012; Neufeld, 2007; Siegel, 2010a; Trevarthen, 2003). Bowlby (1979) understood emotion as the integrator of the attachment system: "The psychology and psychopathology of emotion is . . . in large part the psychology and psychopathology of affectional bonds" (p. 130). Neufeld (2012a; 2012c) calls emotion 'the engine of maturation.' Ryan (2007) summarises the historical evolving of emotion through attachment research, "After three decades of the dominance of cognitive approaches, motivational and emotional processes have roared back into the limelight" (p. 1).

g. **Affect dysregulation occurs for the child when they do not have a safe haven or a secure base** (Schore, 2003a; 2003b; 2005). An immature child, defended because of overwhelming emotions of insecurity, cannot be the explorative, creative, interested, motivated learner that education expects to teach.

h. **A child's primary task in their first year of life is to form a secure emotional bond with their attachment figure, usually the mother** (Schore, 2000; 2005). For this to occur, caregiver sensitivity and attunement are needed to activate a child's attachment system (Ainsworth, et al. 1979; O'Sullivan & Ryan, 2009). While Ainsworth's acute observation skills identified sensitivity as a vital component for secure attachment to occur, Stern's research has made a profound contribution to our understanding of how the process operates within an attachment dyad (Stern, 1985; 1992). Prior to Stern's work, developmental theorists generally viewed a child's development as 'non-social' (Brazelton, 2006; Siegel & Brazelton, 2005). But Stern's work highlights the central importance of the mother-child interactions in shaping a child's developing self. Children are social beings who need the right interaction with their caregiver to have optimal development. Central to Stern's work is the idea of attunement (Stern 1985). To achieve this the child's mother must be psychologically attuned to the natural flow and states of her child's affect - including both positive and negative affects (Neufeld, 2013). Healthy development involves the child having the capacity to experience differing affective states, and this is achieved by the attachment figure mirroring the child's affect, and thus creating affect synchrony with her child (Feldman, Greenbaum, & Yirmiya, 1999); affect synchrony describes a caregiver's ability to match a child's affect (Cairns, 2002; Heard & Lake, 1997).

A child's natural affective states are like a rhythm that oscillates between high energy and low energy exchanges (Neufeld, 2013). As the mother (or attached caregiver) attunes to the rhythms of her child by a process of engagement, disengagement, then followed by reengagement, she creates affect synchrony for her child, which in turn acts as an interactive affect regulator for her child (Schore, 2003a). Being attuned to her child's affective state, the mother is able to shift her child's negative emotional state of hypo or hyper arousal to a state of rest (Neufeld,

2012). Schore (2002) calls this process interactive repair. Johnson (2004) calls this the dance of attachment, where each dyadic member learns the emotional 'dance' of the other (see also Raikes & Pope-Edwards, 2009). And it is this dance which nourishes the development of the child's executive functioning pre-frontal cortex region that regulates affective states for the child - the orbital medial prefrontal cortex (Cozolino, 2006; Siegel, 2012).

Mikulincer and Shaver, (2012) found that when the mother is attuned to her child it soothes her infant (down regulates the child's arousal state), but when there is misattunement it distresses the child (up-regulates the child's arousal state). Mothers who can emotionally attune with their child's emotional state create strong emotional bonds of attachment.

An essential component of attuned maternal care is the mother's ability to regulate her own negative affect states by not being overwhelmed by her child's negative affect and behaviour (Fonagy, Steele, Steele, Leigh, Kennedy, Mattoon, 1995; Holmes, 1993, 2001). Hughes and Baylin (2012) term this blocked parental care, describing the situation where a parent's dysregulation disrupts them from reattuning with their dysregulated child. When mothers can stay regulated they are better able to stay in attunement, or reattune with their aroused child, resulting in their child moderating their negative affect (Brazelton & Greenspan, 2000; Gottman & Gottman, 2007; Greenspan, 1981). Attunement provides the child with a secure haven and a safe base thus helping the child develop patterns of secure attachment. Misattunement, on the other hand, contributes to insecure patterns of attachment because it creates a defensive reaction for the child; the child's vulnerability is not acknowledged, so it is not validated or normalised, causing the child to experience vulnerability too much to bear. This causes the

child to go into defensive detachment (Fonagy et al., 1995; Neufeld, 2010; Schore, 2000).

i. **Attachment schema create for the child neural frameworks with strategies for processing and dealing with emotion.** Bowlby (1969; 1973; 1980) called this an "internal working model" because maternal care (or its absence) creates for the child a representation of how they see themselves and others. Internal working models develop out of repeated interactions with one's attachment figure. These interactions imprint on the child's memory and influence how the child thinks, feels and behaves (Bowlby, 2014; Johnson, Dweck, & Chen, 2007; Magai, 1999). They act like a template that filters the child's perceptions. Securely attached children have an internal working model that they are worthy of love and affection and they have confidence that such care will be given them. They believe they will be taken care of - protected from harm and comforted if hurt. Their working model is that others are dependable and worthy of trust. Johnson and Whiffen (2003) contends, "Working models are formed, elaborated, maintained, and, most important . . . changed through emotional communication." (p. 9).

There is evidence from American and Canadian research that the percentage of securely attached people in their societies is decreasing (Schore, 2014; Shanker, 2013). With at least one third of children having insecure attachment with at least one care giver (Bergin & Bergin, 2009), and as many as 80 percent of children diagnosed with ADHD having attachment issues (Clarke et al, 2002 cited in Bath Spa, 2014), coupled with the prevalence of early infant separation from their primary caregiver, attachment issues should be both understood and prioritised by education policy and processes (Bath Spa, 2014; Geddes, 2003; 2005; 2006; Wetz, 2010). If attachment theory and neuroscience findings are valid, we would thus expect to see an increase in social impairment and resulting ramifications for academic achievement.

Neufeld (2007a; 2008; 2009; 2010b; 2011a; 2012a; 2012c) argues that the insecure child's lack of attachment and consequent emotional stress creates for them a defense reaction against vulnerability too much to bear. He insightfully cautions that it is 'nuts!' (his words) to use an intervention on an already alarmed child that will increase the child's defenses. And he quotes Freud in support: "The brain can do two things very well. It can either grow us up, or defend us against the vulnerabilities too much to bear. But it can't do both" (Neufeld, 2011). *The Teachability Factor* workshop uses the power of attachment to strengthen the student-teacher relationship, thus creating a safe base for students. This enables the student's defenses to soften through the process of dyadic co-regulation with their teacher, so they can become curious, emergent learners (see Appendix D, The securely attached child, Neufeld, 2008).

While Bowlby is referred to as the father of Attachment Theory (Johnson, 2004), another recent eventuality has had an even greater impact on establishing Attachment Theory as valid and authoritative. Schore (2014) describes attachment as the dominant theory of social/emotional development available to science today. The reason why it is so described is because of the advances in neuroimaging technologies, like MRI scanners.

Historically, scientists could only study dead brains; today neuroscience is able to study living brains and can identify how the mind works (Robinson, 2011). It is no longer guess work what the brain needs for optimal growth. While some developmental researchers have argued children's growth is determined solely by their genes, and parents have no influence apart from passing on their genes (Harris, 2009), or child development is determined by innate temperament (Kagan, 2009), both have been shown to be unsupported by recent neuroscience findings.

Neurobiological studies are now providing substantive support for Bowlby's Attachment Theory, namely that the emotional quality of a child's earliest attachment experiences are perhaps the single most important influence on human development (Siegel

& Sroufe, 2013). These research findings have vital insights for how children best learn, and Neufeld's *Teachability Factor* (2012) is based on this research. Immordino-Yang and Damasio (2007) state that

> In particular, the neurobiological evidence suggests that the aspects of cognition that we recruit most heavily in schools, namely learning, attention, memory, decision making and social functioning are both profoundly affected by and subsumed within the processes of emotion (p. 3).

They go on to emphasise:

> any competent teacher recognises that emotions and feelings affect students' performance and learning as does the state of the body, such as how well students have slept and eaten or whether they are feeling sick or well. We contend, however, that the relationship between learning, emotion and body state runs much deeper than many educators realise and its interwoven with the notion of learning itself (ibid).

The relevant neuroscience literature will be discussed.

Attachment and Neuroscience: The Power of Emotion

> Research demonstrates that emotions fundamentally drive cognitive learning and, in order to generate successful learning, educators need to engage the affective dimensions of pupil's minds (Antonio, 2007; Immordino-Yang & Damasio, 2007, cited in Bath Spa, 2014, p.25).

Key findings from neuroscience research provide cogent empirical evidence that early attachment processes are essential for optimal child development (Cozolino, 2006; Hughes, 2012; Noriuchi, KiKuchi & Senoo, 2008; Shore, 1994; 1997; Siegel, 2001; 2010a; Siegel & Hartzell, 2003; Strathearn & Fonagy, 2009; Tronick, 2007). Bowlby (1969) argued, "the merits of a scientific theory are to be judged in terms of the range of phenomena it embraces, the internal consistency of its structure, the precision of the predictions it can

make and the practicability of testing them" (p. 173). Thirty years after Bowlby wrote this, Thompson (2000) describes Attachment Theory as the dominant approach to understanding early socio-emotional and personality development during the past quarter-century of research, and Schore (2012) concurs that Attachment Theory has become the dominant theory of social-emotional development available to science. Bowlby (1979) prophetically predicted that one day science would locate the attachment system in specific regions of the brain. And further, Main (1999) reasoned, "we are now, or soon will be, in a position to begin mapping the relations between individual differences in early attachment experiences and changes in neurochemistry and brain organisation" (p. 881). Today neuroscience research has found that the affective sensory inputs that create the attachment psychobiological states of a child are processed primarily at an implicit, unconscious level, in the child's right neural hemisphere (Schore, 1994; 2005; 2014).

Bowlby's first academic training was in biology (Bowlby, 2014) and Attachment Theory is an integration of biological structure with psychological function (Schore 2000). Today this research field is called 'interpersonal neurobiology,' a term coined by Dr. Dan Siegel, a UCLA psychiatry professor and neuroscientist, to describe the way the brain grows and is influenced through social relationships (Siegel, 2010a). Two dominant neurobiological attachment processes are foundational for Neufeld's *Teachability Factor* (2012): a child's brain is social and needs safe human interaction to optimally develop, and secondly, attachment processes mediate a child's development of self-regulation. As will be argued, while both processes are distinct, both are also interconnected.

The child's social brain.

Science has long debated what is the most important: a child's nature (their genes, DNA), or nurture (the child's environment) (Berk, 2009). The new research field of neurobiology provides important discoveries into how nature and nurture work. It appears both are equally important for a child's healthy development (Siegel, 2010b). The child's

DNA needs the right environmental experiences to get wired properly, so the genes can realise the child's full potential. In a real sense therefore, nature must have the right nurture to flourish (Brazelton & Greenspan, 2000), or as Schore (2005) states, mother nature needs mother nurture. The child's brain is a social organ that is developed and shaped through early attachment experiences, where the child's experiences interface with the child's genes - nature and nurture interacting - to create optimal growth for the child (Cozolino, 2006; Crabbe & Phillips, 2003; LeDoux, 2003). This interaction between the child's genes and their social environment leads to profound lasting change.

A human brain has over one billion neurons and each neuron can have between 10 to 10,000 synaptic connections to other neurons (for fuller discussion of brain structures and functioning see Cozolino, 2006). These are living systems, and even neurons, the basic building blocks of our brains, are social by nature; neurons only exists in relationship with other neurons, and none exist in isolation. For a child's brain to mature correctly millions of individual neurons have to link up to form neural networks that perform specialised functions through the child's nervous system (Cozolino, 2006; Siegel, 2012). If these neural networks don't get wired properly the child will not mature, or have a deficit, in these functional areas (Schore, 2005).

Interpersonal neurobiological research has found that early experiences shape a child's brain, and further that the child's brain requires certain types of nurturing experiences to adequately develop (Schore, 2003a; 2003b; 2009; Watt, 2003). Children mature as their brains self-organise and this is influenced by inputs from their attachment caregivers. Schore (2005) asserts,

> The self-organisation of the developing brain occurs in the context of a relationship with another self, another brain. This other brain is the right brain of the primary caregiver, the mother. Although controversies have existed in the past, a large and consistent body of developmental neuroscience research across both human and animal species confirms the central role of the early relationship with the mother in the neurobehavioral

> development and, therefore, future social-emotional and stress-regulation capacities of the developing individual (p. 219).

He further contends,

> The spectrum of regulated affective transactions within a psychobiologically attuned mother-infant attachment relationship defines an enriched environment more correctly (than a physical environment) - one that has a long-term impact on emotional development and the essential capacity of self-regulation (p. 210).

The implications for infants in early childhood centres with large classrooms, several teachers and staff turnover are profound. Could it be as, Neufeld (2010a; 2012a) asserts, that many of our children today have 'too many mothers' in infancy and this is creating insecurely attached children, and thus leading to emotional immaturity, increased anti-social behaviour, and decreasing academic attainment?

From the moment a child is born their brain is switched on to attend to, absorb, and learn from human contact, especially maternal care (Schore, 2005). When a parent interacts in attuned ways with their child, the child feels emotionally connected to them and the child's brain gets positively activated. This process is called neurogenesis and occurs when the caregiver's attuned interaction triggers the child's brain to create new neurons that form new brain circuits for the child (Siegel, 2010a; 2012). Neurobiological attachment research posits that attachment rich experiences trigger neurogenesis for the child's secure attachment neural system and the insecure attachment neural system is created by attachment deficit experiences (Schore, 2012; 2014; Siegel, 2010).

Schore's seminal research (Schore, 2001; 2002; 2003a; 2003b; 2005; 2009) on the development of a child's right hemisphere brain shows how maternal care builds biological structures in a child's brain that mediate secure attachment. Our brain is like two brains; a right hemisphere that specialises in implicit (unconscious) functioning and is dominant for processing affective inputs, including processing facial, prosodic and bodily information,

and a left hemisphere that dominates in explicit, conscious processing like reasoning, thinking and language. Each hemisphere has different structural and functional properties. For the first 3 years of life a child's right hemispheric neural development is dominant, not the child's left hemisphere that will later process thinking, reasoning and language (Chiron, Jambaque, Nabbout, Lounes, Syrota & Dulac, 1997; Cozolino, 2006). The right hemisphere is not just shaped by innate factors like DNA, but by emotional interactions with an attachment figure. These early emotional and relational attachment rich experiences are pivotal for the healthy neural development of the child, especially the higher executive functioning regions of the prefrontal cortex, that are dependent on specific social experience to develop (Siegel, 2012).

Emotions are the heart of attachment bonding processes and these early right brain implicit experiences trigger neural affect pathways of secure attachment (Greensberg & Goldman, 2008; Johnson, 2004; Schore, 2008). These non-verbal affect processes are the basis for attuned communication within the attachment dyad (Schore, 2005), and the child's right brain is primarily concerned with these non-verbal communication signals (Schore, 2000). Schore argues these non-verbal, implicit responses between child and caregiver are at the heart of the attachment relationship because they enable the child and caregiver to encode and decode the meaning in their mutual communication. As an example, he shares research where the non-verbal signal of an aggressive face is seen for 50 milliseconds - much too fast for it to be processed consciously, but the right hemisphere will process it and the person will get a cortisol reaction; the left hemisphere has no awareness of it (Schore, 2012).

The right brain communicates primarily through these non-verbal implicit processes: facial expression, voice prosody, tone pitch, gestures, posture, body movement (Porges, 2011). All these implicit right hemisphere non-verbal neural processes influence social proximity. Schore (2005) suggests that the dyadic interaction of right brain to right brain

non-verbal communications are the psychobiological organising structure for a child's attachment. He contends, "Attachment relationships are essential because they facilitate the development of the brain's self-regulatory mechanisms. Studies reveal that these essential self-regulatory structures are located in the right (and not left) brain" (Schore, 2005, p. 206). Securely attached children have mothers whose non-verbal right brain has the ability to read their child's right brain, non-verbal messages, and attune to these implicit responses, resulting in the formation of an attachment bond. Attachment bonds are formed when a parent can psychobiologically attune to their child's unconscious states, including implicit negative affect. Impaired right brain functioning misinterprets these responses.

The right hemisphere is also the dominant processing centre for implicit cognitive processing of facial, prosodic and bodily information embedded in emotional communication, all components of attachment (Schore, 2008). These early relational and emotional right brain processes significantly influence how a child's emotional regulation circuitry gets developed. The child's ability to self-regulate powerfully illustrates this creative interface between the integration of experience and genetic neural processes. As Cozolino (2006) argues, our brains are really social brains.

The Teachability Factor teaches that an immature orbital medial prefrontal cortex (OMPC) (see later heading 'Orbital Medial Prefrontal Cortex'), developmentally delayed by insecure attachment, is at the heart of numerous problematic behaviours of children, like attention deficits and aggression (Neufeld, 2009; 2010). Neuroscience findings suggest that if schools are to effectively minimise child aggression they need to facilitate secure attachments so that the neural circuitry of the OMPC can be optimally wired, resulting in the child's ability to self or co-regulate. As will now be discussed, any interference in the wiring of the OMPC in early childhood has significant implications for emotional and behavioural problems in children.

Self regulation.

One of the salient characteristics of maturity is the ability to regulate one's affect, called self-regulation (Neufeld, 2000; Schore, 2012; Shanker, 2013). Gross and Thompson (2007) define emotional regulation as the child's ability to monitor, evaluate and modify their emotional responses. Baumeister and Voh's *Handbook of Self-Regulation* (2011) identifies the salient components that define self-regulation:

1. The person can adapt their energy to align with the demands of a situation.
2. The person can evaluate and change their emotions.
3. The person can focus their attention or intentionally ignore distractions.
4. The person is aware of the needs of differing social situations and can adjust their attention to be engaged in each different social interaction.
5. The person can emotionally connect through empathy with another person.

These are the hallmarks of a mature, well functioning student and such regulatory traits enable a child to reach their full potential (Shanker, 2013).

As already discussed, emotion is the key mechanism for attachment, and being able to regulate one's emotions is foundational for creating Bowlby's safe haven and secure base. Schore (2000) describes attachment as, "essentially a regulatory theory, and attachment can be defined as the interactive regulation of biological synchronicity between organisms" (p. 23). Sroufe (1996) defines attachment as the dyadic regulation of emotion, and Fonagy and Target (2002) argue that the whole of child development should be viewed as the enhancement of self-regulation. Johnson (2008) refers to emotion as the most powerful force in the room. Neufeld (2012a) calls emotion the 'engine of maturation'. The ability to regulate affect is the central tenant of attachment, such is the essential role emotions play in forming secure bonds. Within an attachment construct, parenting effectiveness is

associated with a parent's ability to act as an implicit right brain affect regulator of their child's positive and negative affect (Hughes, 2012; Siegel, 2007; Siegel & Bryson, 2011; Siegel & Hartzell, 2003). Neufeld (2011b; 2012a; 2013) puts this into lay terms by saying that parents must be the mixing bowl of a child's emotions until they are mature enough to mix their own. He suggests that when a parent can do this their child experiences a sense of safety, resulting in the child lowering their defenses, and thereby learning to develop their own ability to self-regulate. He argues that when a child has to defend against loss of proximity they are more likely to dysregulate (Neufeld, 2013).

Attachment relationships are critical for the proper development of the self-regulatory mechanisms of the child's brain. An increasing body of evidence indicates that "the maturation of these adaptive right brain regulatory capacities is experience dependent, and that this experience is embedded in the attachment relationship between the infant and the primary caregiver" (Schore, 2001, p. 10). Schore (2005) reinforces this by saying, "Attachment relationships are essential because they facilitate the development of the brain's self-regulatory mechanisms" (p. 206). As discussed, for the first three years of a child's life the right brain's development that specialises in affect processing, is dominant (Cozolino, 2006). Schore (2005) suggests, early attachment experiences imprint the child's right brain, altering the child's internal structural brain mechanisms that process and regulate sensory input and this has the effect of reducing negative affect and enhancing the child's adaptive capabilities (p. 208).

These early attachment dyadic experiences create a brain structure for the child that helps them organise how they will manage their emotions. Positive attachment experiences (emotionally close, responsive, safe, attuned), or negative attachment experiences (maternal loss, deprivation, rejection, inconsistency of care) influence the child's neural network of synaptic connections and, as a consequence, either enrich or limit the functional capacity of the child's brain during later stages of development (Helmeke, et al., 2001). Sub-optimal

social environments and insecure attachments affect not just later behaviour and emotional regulation, but equally important, they affect the future development of neural structures that are meant to regulate these functions in adulthood (Cozolino, 2006; Schore, 2003). Accordingly, Fonagy and Target (2002) contend attachment is foundational because it facilitates the development of the brain's major self-regulatory systems.

There are numerous research studies highlighting the vital role this right hemisphere development plays in the optimal self-regulatory growth of a child (for discussion of extensive research, see Schore, 2012). Bowlby (1969) had written that mother-infant attachment communications take place within a non-verbal dyadic interaction of facial expressions, tone of voice, posture, physiological changes, tempo of movement and incipient action. As early as 1975, Brown and Jaffe (1975) had suggested that the right brain hemisphere dominates for the pre-linguist child when it comes to processing visual and acoustic communication. In 1997 Chiron (Chiron et al., 1997) found the right brain hemisphere is dominant in human infants. Le Grand's research (Le Grand, et al., 2003) found that for a child to recognise a face requires right hemisphere processing of the visual input. Minagawa-Kawai, Matsuoka, Dan, Naoi, Nakamuram & Kokima, (2009) suggests that for a child to survive it is vital they perceive gaze early as it helps attract the attention of caregivers, thus increasing the likelihood of being taken care of. They also suggest this gaze ability develops in the first few months of life, and is located in the right hemisphere.

Schore (2008) summarises the advances in neuroscience by suggesting "the essential biological purpose of intersubjective communication in all human interactions, is the regulation of right brain/mind/body states" (p. 15). He further adds, "Bowlby stated that attachment behaviour was based on the need for safety and a secure base. We have demonstrated that attachment is more than this; it is the essential matrix for creating a right brain self that can regulate its own internal states and external relationships. Attachment

intersubjectivity allows psychic structure to be built and shaped into a unique human being" (p. 17).

Bowlby's hypothesis (1973) was that when the child lost physical and emotional closeness with their attachment figure it would stress the child resulting in the sequential responses of protest, despair and detachment. These are all states of dysregulation, exhibited by insecurely attached children in Ainsworth's Strange Situation (Ainsworth et al., 1978). But the research also showed that when the infant's mother was accessible and responsive, her interaction would act as the primary affect regulator for her child. Through this dyadic interactive process of attunement - affect synchrony -the child learns to co-regulate (Fieldman, Greenbaum, & Yirimya, 1999), so that as they mature the child develops the capacity to autoregulate (Schore, 2000). Ovtscharoff and Braun (2001) describe this as a homeostatic regulation system between members of a dyad, where the:

> dyadic interaction between the newborn and the mother serves as a regulator of the developing individual's internal homeostasis. The regulatory function of the newborn-mother interaction may be an essential promoter to ensure the normal development and maintenance of synaptic connections during the establishment of functional brain circuits (p. 33).

These early attachment experiences trigger neurochemical processes (oxytocin, vasopressin, endorphins, and dopamine) that build secure attachment bonds for the child (Carter, 2005; Porges, 2005; Schore, 1994). Conversely, the lack of such attachment interactions inhibit these positive affect neurochemicals, causing a fight or flight chemical reaction (administered via cortisol, adrenalin neurochemicals) (Porges, 2005; 2011)(see Appendix E, the Neuroception model).

How does this attachment co-regulation system work? When the mother provides her child with adequate care it gets translated into neural biological structures, namely secure neural pathways between the child's limbic system (emotional processes) and their

cortex region (thinking, reasoning processes) (Porges, 2005; Siegel, 2007). Siegel and Bryson (2011) describe it as integrating the child's 'upstairs brain' (cortex) and their 'downstairs brain' (limbic). Through repeated attuned interactions within the dyad the infant's neural security circuitry gets imprinted. When a child feels stressed the proximity of their mother's regulated state co-regulates them; the mother's attuned state helps build the child's brain in ways that optimise network integration, autonomic arousal and positive coping responses (Cozolino, 2006). Conversely if the child receives inadequate maternal care, "the mother's behaviour serves as a source of stressful environmental information for the developmental maturational pattern of the neural circuitry of the stress system" (Schore, 2012).

Evidence is growing that in the absence of secure mother-child attachment, teachers can substitute, at least to some degree, and provide a safe haven for students, albeit temporary (Bergin & Bergin, 2009; Geddes, 2003; 2005; Wetz, 2010). These temporary safe respites may be sufficient for some older children to mature as so many master-teacher case studies have shown (Cozolino, 2014).

Bowlby (1969) understood that the mother-child attachment state "is accompanied by these strongest feelings and emotions, happy or the reverse" (p. 242), and that the child's ability to cope with stressful situations is associated with certain maternal behaviours (p. 344). Bowlby (1979) also postulated that within a child's brain was a control system that regulated the child's affective responses, and that by the end of the child's third year some maturation threshold is passed, abruptly resulting in the child's ability to cope with maternal separation improving[7] (p. 205). Today, neuroscience has discovered Bowlby's control system is the orbital medial prefrontal cortex (OMPC) (Cozolino, 2006; Siegel, 2007; Schore, 2008). We also know how this 'control system' gets developed, which will now be discussed.

[7] Does this have implications for an ideal age of maternal separation? Does infant daycare interrupt a child's attachment and therefore their ability to self regulate later in life? This author believes further research is warranted.

The Orbital Medial Pre Frontal Cortex

The child's brain is constantly scanning its environment to detect threats to its safety. The amygdala is the primary region that does this assessment as it specialises in the appraisal of threats, attachment inputs, early memory, emotions, and mediates the fight-flight response (Adolphs, 2003; Cozolino, 2006; Porges, 2013). Being directly connected to the autonomic nervous system it can rapidly activate automatic responses to threats of danger. But it is also connected to the prefrontal cortex region of the brain, and especially the OMPC - the two regions are located in close proximity to each other, and have significant connectivity (Fuster, 1985; 1997; Schore, 1994).

The OMPC is considered the most important executive function region of the brain (Cozolino, 2006; Siegel, 2010a). Its executive functions organise, plan and coordinate the data that comes in from other brain regions, including the limbic and brain stem regions. Specifically it helps the brain self-regulate by playing an inhibitory function to alarm signals received from the amygdala (Schore, 1994). Neuroscience findings indicate that to mediate the arousal affects of the amygdala requires the development of the higher order functioning of the cerebral cortex, and specifically the OMPC region (Cozolino, 2006; Davidson, Jackson, & Kalin, 2000; Morgan, Romanaski, & LeDoux, 1993; Shin, Wright, Cannistraro, Wedig, McMullin & Martis, 2005).

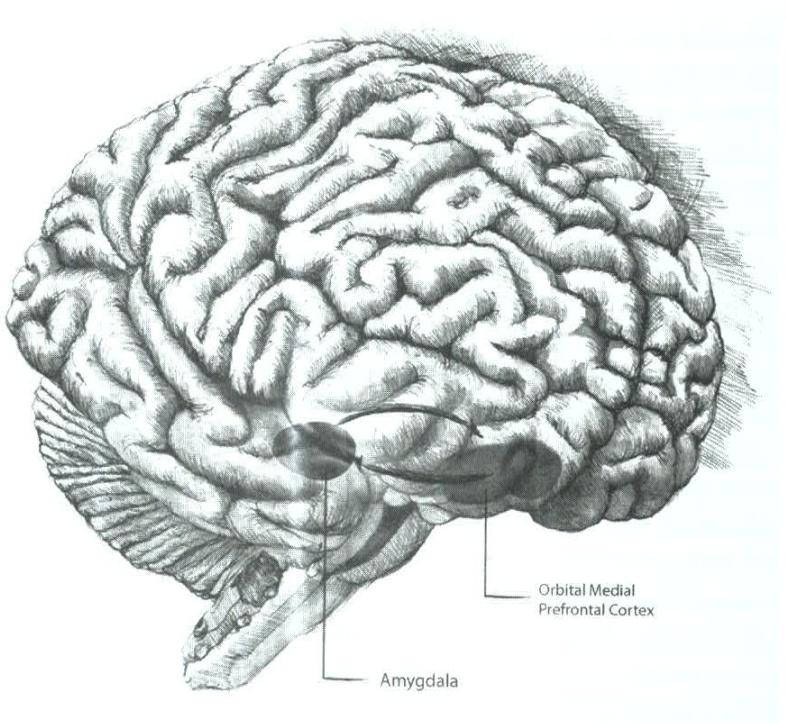


Figure 3 **The Social Brain: A Thumbnail Sketch (Cozolino, 2006, p.61)**
The networks connecting the orbital medial prefrontal cortex and the amygdala are hypothesised to be involved with fear conditioning, emotional regulation and attachment schema.

In teacher workshops I share this practical illustration of how this process works: A big dog comes into the 2 year old's back yard. The optical nerve sends a signal to the child's amygdala with the dog's image. The amygdala can't reason so it fires off a signal to the OMPC asking for information: "Am I safe? Is this 'thing' a threat? Do I have the necessary resources to cope with this potential threat?" At this age the child's prefrontal cortex isn't developed enough to interpret these signals about the dog, so the prefrontal cortex sends back a message, "This 'thing' is a dog, but we don't know if this dog is a threat . . . So you are on your own!" Immediately on hearing this the amygdala activates its defence strategy of fight or flight, causing the child to scream. Mum comes running and sees it is the neighbour's friendly dog Rover, so with regulated attunement she reassures her child that they are safe. She does this by right brain implicit communication - tone of voice, eye gaze, smiling, modulated voice, touching and holding. Her implicit communication interactions create neurogenesis for the child's safety neural circuitry between the amygdala and the OMPC. And by so doing it helps wire or develop this executive functioning region. The

OMPC gets developed to act in it's proper executive functioning role through repeated attachment experience episodes as described here, so that by the age of around 3 years the securely attached child begins to auto regulate (Giedd, J., Stockman, M., Weddle, C., Liverpool, M., Alexander-Block, A., Wallace G., … Lenroot, R., 2010). An insecurely attached child is significantly more likely to have regulation delay or impairment (Siegel & Bryson, 2011).

Attachment rich experiences have some highly significant outcomes for the child's development of their prefrontal cortex. Interpersonal neurobiology has found that this executive functioning brain region is developed through attachment experiences, resulting in the child having ten empirically evidenced capacities as summarised in the left column of the following table. The right hand column shows the likely behaviour of an immaturely wired OMPC.

Table 7 **Functions of the Prefrontal Cortex**

Behaviour of children with developed prefrontal cortex	**Behaviour of children with under-developed prefrontal cortex (Neufeld, 2012)**
1. The capacity to regulate the body controlling bodily functions like heart beat, respiration, digestion (Luria, 1980; Schore, 2003a).	Easily aroused, overwhelmed, aggressive uncontrolled, irrational outbursts.
2. The capacity for attuned communication where the child gets in synchrony with its attachment caregiver (Baker, Frith & Dolan, 1997; Schore, 2003; 2005; Siegel, 2010a).	Disconnected, distracted, attention problems. Frequent misunderstandings.
3. The capacity to accurately interpret visual facial information (Scalaide, Wilson, and Goldman-Rakic, 1997).	Frequent misunderstandings mixed with anxiety and over-reactions.

Behaviour of children with developed prefrontal cortex	Behaviour of children with under-developed prefrontal cortex (Neufeld, 2012)
4. The capacity for emotional balance where the child isn't under aroused, or overwhelmed (Garavan, Ross & Stein, 1999; Schore, 2000).	Emotional meltdowns, anger outbursts, hyper and hypo behaviour, volatile mood swings. Tendency towards black and white thinking.
5. The capacity for response flexibility that creates a gap between stimuli and response; allows the child to pause before acting (Elliot, Frith & Dolan, 1997; Fonagy & Target, 1997; Rolls, 1986).	No moderation in response - 'all or nothing' extreme swings of emotion and behaviour. Unlikely to demonstrate patience when frustrated.
6. The capacity to modulate fear, allowing the child to remain calm even when they have experienced a previous alarming situations (Derryberry & Tucker, 1992; Schore, 2000).	Hyper and hypo arousal, anxious, nervous, phobic, scattered attention.
7. The capacity for empathy, helping the child feel with another (Baron-Cohen, 1995; Schore, 2000; Voeller, 1986;).	Lack of care, concern for others and civility. Inability to put self in another's shoes. Inconsiderate, rude and selfish. Unlikely to consider the concept of fairness other than fairness for self.
8. The capacity for insight that allows the child to see the consequences of their actions (Stuss, Gow, & Hetherington, 1992).	Unaware of logical cause and effect. Unable to infer from or predict forward. Lack of ability to work hard towards a worthwhile goal. Lack of responsibility. Impulsive and inconsiderate.
9. The capacity for moral awareness that helps the child see the common good and make choices aligned with that common good (Siegel, 2010a).	Impaired decision making. Repeated bad decisions. Not learning from one's mistakes, lacks ability to think two dimensionally and consider impact on others.

Behaviour of children with developed prefrontal cortex	Behaviour of children with under-developed prefrontal cortex (Neufeld, 2012)
10. The capacity for intuition (gut feeling) that provides the child with body wisdom; another source of information that is different from logic (Siegel, 2010a).	Lack of perspective when something goes wrong, Does not understand irony or paradox. Unable to reflect upon past action and learn from mistakes.

Summarising a large body of neuroscience research findings Schore (2014) emphasises that it is now well established that the child's capacity for self-regulation is fundamentally shaped throughout the child's early attachments. For the first two years of a child's life their brain grows faster than at any other period of their life span, and this time is critical for wiring the child's OMPC so they develop a correct internal working model of secure attachment (Cozolino, 2006). Schore (2000) summarises,

> The primary caregiver's interactive regulation is therefore critical to the infant remaining positively charged, as well as coping with stressful negatively charged affects. These affect regulating events are particularly impacting the organisation of the early developing right hemisphere (p. 35).

And in his research titled, Early Relational Trauma, Schore, (2003a) warns,

> the early social environment, mediated by the primary caregiver, directly influences the final wiring of the circuits in the infant's brain that are responsible for the future social and emotional coping capacities of the individual. The attachment relationship thus directly shapes the maturation of the infant's right brain, which come to perform adaptive functions in both the assessment of visual and auditory socio-emotional communication signals and the human stress response (p. 112).

These attachment rich experiences provide the mechanisms that develop the orbital medial prefrontal cortex, which enable the child to regulate their emotions (Schore, 2012).

Attachment learning is an imprinting process that stamps the developing limbic circuits that are the core of the developing, emotional, unconscious mind. The imprinting works both positively and negatively as Schore explains, (2012), "It is important to note that these early experiences may be regulated or dysregulated, imprinting either secure or insecure attachments" (p. 35). He then quotes Watt (2003a), "If children grow up with dominant experiences of separation, distress, fear and rage, then they will go down a bad pathogenic developmental pathway" (p. 109). The child's early attachment experiences, both positive and negative, get encoded into the child's right brain circuitry.

Neufeld (2007a; 2007b) refers to this limbic system as the 'emotional brain'. It is this emotional brain that causes a person to defend because of emotionally stressful experiences. To remain in touch with emotions, a person must remain relatively soft hearted and vulnerable. Too much stress causes the brain to create survival filters or defenses. Neufeld (2007a) describes three processes of defence where a person either 1) 'numbs out' (emotional defenses - the ability to actually feel emotions is lost and motivation decreases as emotion is the brain's primary motivational system), 2) 'tunes out' (attention deficits result) or 3) 'reverses out' (motivational defenses) of attachment relationships. This last state is demonstrated by, for example, Reactive Attachment Disorder (RADS) and is "the most desperate and costliest line of defence" (Neufeld, 2007, p. 30).

Anderson, Bechara, Damasio, Tranel & Damasio's (1999) research found that if the child had impaired OMPC development in their first 18 months of life, it correlated to a significant increased risk of developing abnormal social and moral behaviours later in life, resembling psychopathy. Interestingly, Bowlby's first published work in 1944 was a study of 44 juvenile thieves. Gaensbauer and Seigel (1995) found that intense and prolonged stress for a young child impacted on "the establishment of psychophysiological regulation and the development of stable and trusting attachment relationships in the first year of life" (p. 294).

The Polyvagal Theory

Porges (2011) advances an insightful theory he calls the Polyvagal Theory that provides an excellent insight into how these vital right brain processes function for a child. His research has found that within our nervous system are numerous circuits that perform specialised tasks. Of primary importance for the child to securely attach are two neural systems: the social engagement system which allows for social bonding (attachment system), and a fear system that assesses for threats and danger. Both systems are adaptive instincts for the child's survival, and both systems operate outside of conscious perception, allowing the child's brain to rapidly assess their environment for safety or danger (Porges, 2004). The amygdala can identify a possible threat in one tenth of a second, significantly faster than conscious thought (Davis & Whalen, 2001). Porges calls this unconscious process 'neuroception' (2004). Neuroception is an unconscious neural assessment of all incoming sensory data to identify possible threats to the child and it is meditated through the child's amygdala which is centrally located in the limbic system. It's key function is to filter all major sensory inputs to ascertain whether they are safe, dangerous, or life threatening. It's assessment determines whether a child will have approaching behaviours, or avoiding behaviours (Hughes, 2012), so it plays a vital role in attachment behaviours of proximity. Neufeld (2007a; 2010a; 2012a) refers to these same constructs as 'vulnerability' or a 'soft heart' creating a language that every day teachers can understand.

The theoretic construct of the Polyvagal Theory is that the human brain regulates both social behaviours and defensive behaviours and it does this through a three stage neural assessment process with each stage having it's own specific neural circuitry involving the autonomic nervous system. Porges describes how these three neural systems function for not only a child, but all human beings (Porges, 1993; 1995; 1997; 1998; 2001; 2011):

Stage 1: Social engagement system.

This system can only be triggered when the nervous system detects the environment is safe. If the child's amygdala perceives there is no threat it activates the child's social engagement system, causing the child to feel safe, with the result they will socially and emotionally engage with others. The child's brain is constantly scanning its environment to see if it is safe; it is an instinctive drive because the child's brain knows that it needs safety more than any other need to survive. As Schore (2005) has aptly described, if the child's right brain receives signals of safety (attuned care), it activates this social engagement system, allowing prosocial and bonding behaviours to occur for the child. Social behaviours - the mother's physiology - precede the development of social bonds; the physical state of the caregiver is tested before the child will rest in physical proximity. Once the child experiences safety the amygdala signals the release of two neuropeptides, oxytocin and vasopressin (Carter, 2005). These hormones act as inhibiting agents against threat signals, thus allowing the child to socially engage by utilising such behaviours as gazing, smiling, cooing, and sucking - all implicit right brain behaviours. And to repeat, the child's prosocial behaviours are a response to their caregivers right brain implicit communication messages (facial expression, proximity, vocalisation, etc.) signalling to the child they are safe.

Stage 2: Mobilization system.

If neuroception can't trigger the child's social engagement system because there is the absence of safety sensory signals, then the child's neural mobilisation system gets triggered. This system's primary responses are fight or flight. The child's nervous system evaluates the risk threat then regulates the body (heart and lungs and viscera) to support the expression of adaptive behaviour to match the perception of danger. Cortisol and adrenalin reactions result in a fight or flight response (Carter, 2005). These hormones override the social engagement system and cause the child to defend. The problem with continued defenses is

that they are not always adaptive for the child. Getting a cortisol reaction and running from an angry dog is adaptive, but getting a cortisol reaction to a caring, though misattuned, mother can be maladaptive. In my clinical work I'm constantly seeing children with fight (aggression, defiance, dominance) behaviours, or flight (withdrawing, clingy, anxious) behaviours because their neuroception system sees dad or mum or caregiver as unsafe, so they react defensively. Ironically, the parents are kind and involved and devoted, just not attuned to the child's affective state, so the child's mobilisation system gets activated. And Neufeld (2012a) postulates the same process occurs for some students in our educational systems. He further suggests that the 'emotional back pack' students bring with them may already be in flight or fight mode due to home experiences.

Stage 3: Life threat system.

If the mobilisation system doesn't get triggered then the life threat system is activated and the child freezes. Panksepp (1998) says this is an adaptive survival instinct because predators don't usually eat dead animals - hence the mouse immobilises in the face of the predatory cat. For children, this can involve physical immobilisation, but mostly I see preschool children in this stage, as being socially and emotionally immobilised; they play in total isolation from other children, as though other children don't exist - no eye contact, no proximity, and the absence of any social interaction. Their social behaviours have shut down. Neufeld calls this 'numbed out and tuned out' (Neufeld, 2007a, 2009, 2010a).

The amygdala plays a vital role for the child to assess whether a situation, or person, is safe or a threat, thereby causing them to instinctively move towards their caregiver (or a stranger), or away from them. This is the same process that operates within the attachment dyad and Neufeld (2012a) extrapolates this to the teacher-student interaction. Porges (2011) provides this insight,

> To effectively switch from defensive to social engagement strategies, the mammalian nervous system needs to perform two important adaptive tasks: [1] assess risk, and [2] if

> the environment is perceived as safe, inhibit the more primitive limbic structures that control fight, flight, or freeze behaviours (p. 57).

He further advises (2004), "Infants, young children and adults need appropriate social engagement strategies in order to form positive attachments and social bonds." (p. 22). His research has identified some of these strategies as being: 1. Make eye contact, 2. Use a gentle tone of voice, 3. Use prosody when speaking to your child (appealing inflection and rhythm to voice), 4. Use contingent facial expressions, 5. Practice using raised eye brows (it also is found to modulate the human voice) - both triggers for safety neuroception (see Dykema, 2006 and Porges, 2011 for a detailed discussion of specific interventions that enable the activation of a person's social engagement system). The caregiver's physiological responses that trigger a child's social engagement system, leading to the creation of secure attachment neural mechanisms, are descriptive of Schore's right brain implicit communication strategies for attuned maternal care (Porges, 2011; Schore, 2012).

Brazelton and Greenspan (2000) make the point that, "Nurturing emotional relationships are the most crucial primary foundation for both intellectual and social growth . . . The most important learning in the early years is provided by human interaction. Objects and learning devices do not compare" (p. 2).

The Polyvagal Theory has important implications for education. An insecurely attached student with an activated mobilisation system (fight or flight) is likely to have at least one of the three defence processes Neufeld refers to (2007a) and may also show impaired OMPC functioning, meaning there is an increased likelihood that they will lack the neural processing capacity to calm and self soothe (so they will struggle to focus and apply themselves to learn). They may also have the increased possibility of having problematic behaviour because they can't self-regulate. Defenses incapacitate the acknowledgement of the real emotions. Without emotions being fully felt, the brain cannot work efficiently to regulate it's response.

In a real sense therefore, student's behavioural disruption at school can be seen as an affect-regulation problem, contingent upon the development of the orbital medial prefrontal cortex. There are some preliminary teacher professional development programs (Bath Spa University, 2014; BrainU, University of Minnestoa (2013); Canadian Self-Regulation Initiative, 2014; Wetz's Urban Village Schools (2009), being developed that utilise such an approach. Neufeld's (2010, 2012) T*eachability Factor* has been doing so for a number of years, and this research suggests it may achieve highly significant, positive results.

Attachment Theory's Relevance and Application to Education

> Our minds are **continually shaped** by emotions, experiences, relationships, opportunities, attitudes, values and beliefs, knowledge and genes. However, there is an *instinctive* ***priority of attachment*** *over the brain's exploratory system - feeling* ***safe*** *and* ***secure*** *is* <u>*more important*</u> *than* ***learning*** (Bath Spa, 2014) (emphasis theirs).

Given the literature documented above, this research contends there is strong validation for Dr. Neufeld to extrapolate neurobiological attachment empirical findings to an educational environment. He is not alone in suggesting that there is (Bergin & Bergin, 2009; Cozolino, 2013; 2014; Geddes, 2003; 2005; Howard-Jones, 2010; 2014). Heather Geddes (2003; 2005) strongly suggests that an adequate understanding of insecure attachment allows teachers to interpret meaning from student's anti-social behaviour and therefore adapt their practice. She reinforces the notion that their behaviour is often the only form of communication left for an insecurely attached student, "For some children acting out has become their only form of communicating distress and anxiety, and paying attention to behaviour and it's possible meaning becomes our only source of understanding" (p. 232). She goes on to state:

> Attachment theory and research, now linked to brain development, have led to an explosion in understanding about the implications of early attachment experience on social and emotional development and consequently on teaching and learning (p. 232).

Thus it is the belief of this researcher that attachment theory and neurosicence must be understood together to have the best impact on education. Neufeld (2007a) takes attachment theory even further, reasoning:

> Attachment could be considered the unifying and universal principle of science. Solar systems, molecules, compounds, atoms, families, people groups, religions and galaxies - are all systems of attachment. In the psychological arena, our inclination to attach is the most powerful psychological force shaping personality and behaviour (p. 36).

As discussed in the introduction, student motivation and teachability for a growing number of students, poses a societal challenge that traditional punishment and reward cognitive-behavioural interventions struggle to address (Shanker, 2012). A dominant feature of students with problematic behaviours is their poor self-regulation (Bergin & Bergin, 2009; Hook & Farah, 2012; Shanker, 2013; Wetz, 2010). Siegel (2010a) suggests that the common feature of all problematic behaviours is the person's inability to regulate their affect, with the resulting behaviour displaying hypo, or hyper arousal characteristics. He also says this is true for all psychiatric disorders. The central role of affect in a person's life has only become prominent since neuroscience research discovered these affective neural circuitry through neuroimagining technologies (Siegel, 2007). Since Damasio's (1996) paradigm shifting book, *Descartes Error: Emotion, reason and the human brain*, researchers began to apply more attention to this new science, so that today, neuroscience research has exploded. But because it is such a new science it has largely remained within a psychological, psychotherapy world (Cozolino, 2014). Robinson (2011) acknowledges that education is by nature traditional and is slow to adapt to new realities. He sees traditional educational systems and processes as becoming highly irrelevant for the needs of a 21st century, technologically driven society. He describes education as a mass production

system, where standardisation is the intended outcome norm. But the real outcomes are increasingly students who are not motivated to learn, whose innate talents are never recognised, and who feel alienated within a system that is meant to fit them for service and the economic benefit of the larger society (see Robinson, 2011, especially chapter 3; Wetz, 2010). Robinson's panacea for such a dilemma is to have a more creative curriculum for students, especially utilising the arts, but such a solution might not prove to be as transformative as he suggests. The reason being it doesn't take cognisance of the pivotal role of the psychological factors that underpin learning, as discussed in this literature review, namely children need to be securely attached to be able to autoregulate; and being able to self-regulate optimises learning (Geddes, 2003; Neufeld, 2010; 2012; Shanker, 2013). A brain without secure attachment and auto-regulation is a significant limitation for a student being an emergent learner - interested, curious and wanting to learn - despite the student being in a stimulating classroom (Bergin & Bergin, 2009; Neufeld, 2012; Wetz, 2010). The notion sometimes canvassed that technology is the panacea for lifting educational outcomes, is flawed for a valid psychological reason: simply providing a student with an iPad will not overcome this neural deficit! Brains are hierarchical in nature and therefore learning is a subservient priority compared to security, alarm and attachment fears.

Schore's research has shown the primacy of attachment mechanisms that help an individual self-regulate, and today there are researchers who argue that the child's ability to self-regulate is a more important indicator of educational performance than is IQ (Blair & Damond, 2008; Duckworth & Seligman, 2005; Goleman, 1996; Shonkoff & Philips, 2000). Cozolino (2013), a Professor of psychology, appeals to educators to take empirically established psychological principles, like Attachment Theory, and apply them to the classroom. He argues that neurobiological findings need to be applied to the classroom if we are to change education's teachability problems. Unteachable students can't respond to the education system as it currently is, so he gives this challenge, "How do we use

neurobiology and change education? If children don't feel cared for by others they won't care enough about themselves to learn." (Cozolino lecture, UCLA, Lifespan Learning conference, April, 2014). Geddes (2005), Bergin and Bergin (2009), and Bath Spa (2014) agree.

Cozolino (2013) posits that the following Attachment Theory tenets are highly relevant for addressing teachability issues. These tenets are incorporated within Neufeld's *Teachability Factor* learning frame (Neufeld, 2012):

- **The brain is a social organ, always hungry for attachment** (Goleman, 2006; Cozolino, 2006). It's higher functioning cerebral regions are shaped via social interactions (Schore, 2011). Cozolino (2013) refers to the brain as being naturally curious and programmed to learn, and how these learning impulses are

  > nurtured in a context of safety and become habits when associated with being reared by caring others. If a brain is unrewarded or punished for curiosity, it learns to hide, avoid risks, and stick with what is familiar and safe. Having an open or closed mind is something we learn from the emotions, attitudes, and behaviours of those around us (p. 39 - 40).

Therefore, schools need to become places of connection that are organised around social integration.

- **The brain needs neuroplasticity in order to learn new things, and secure relationships trigger neuroplasticity** (Siegel, 2010a; 2007). This process describes the ability of neurons and neural networks to be born, grow, and change how they relate to each other in response to experience (Buonomano & Merzenrich, 1998), or as Siegel (2010a) describes it "what fires together wires together' (p. 40). When the brain is regulated it releases neurogrowth hormones that encourage learning. By establishing secure attachments in the classroom, teachers help their

students to self-regulate. Stress hormones, on the other hand, inhibit neuroplasticity, and thus learning (Cozolino, 2012).

- Lastly, Cozolino (2013) makes an intriguing suggestion: **education should be structured on a tribal process.** In a tribal culture the brain is stimulated to learn by relationships; it is not just dyadic interactions, but the village interconnections that enrich the relationship bonds. He argues much of current education is striving for homogeneity, evidenced by standardised testing that Robinson (2011) forcefully criticises, but human brains are unique and need social environments that they can connect with. Cozolino (2014) provides an apt illustration where he shares as an Italian child coming to America he quickly discovered that education was aiming for homogeneity - that the US school system wanted to make this Italian kid into an American kid. A strongly relevant point for our Maori and Pacifica students. To overcome this learning limitation he envisions classrooms being turned into tribes, "The basic premise is that the more the environment of a classroom parallels the interpersonal, emotional, and motivational components of our tribal past, the more our primitive instincts will activate the biochemistry of learning" (Cozolino, 2013, p. 239). Mary Pipher (2008), feminist psychotherapist author in her best selling book, "The Shelter of Each Other, Rebuilding our Families" quotes an African proverb when she says, it takes a village to raise a family. Emotionally safe schools and teachers are vital 'village' factors for student learning in today's fragmented world.

Cozolino's tribal emphasis has implications for New Zealand's Maori and Pacific Island community who make up a disproportionate number of the under achieving tail in education. In fact, attachment aligns naturally with indigenous traditional family and community structures, as opposed to a standardised, homogenous educational world. The Maori concept of ako in teaching and learning is a cultural construct of attachment by a

different name. Ako has at it's heart the idea of reciprocal relationships between the teacher, student and whanau. Knowing a student in this wider context creates more productive student-teacher relationships and results in higher quality teaching and learning (Bruce, Clelland, Mcfarlane, Mikaere-Wallis, Ruddenklau, Taula, J. Taula, I., 2014).

Cozolino's appeal to apply these new neurobiological findings to education is being heeded. Shanker (2013) is engaged in an extensive self-regulation teaching intervention in the state of British Columbia (BC), Canada (see web site Canadian Self-Regulation Initiative (CSRI)). The British Columbia Department of Education has embraced this initiative and it has become an important part of teacher's professional training in the classroom. Five teacher goals make up the central components of the intervention (Shanker, 2013), p. xiii): 1. Learn to read the signs of when a child is overstressed; 2. Identify the child's stressors; 3. Reduce the stressors for the child, if possible; 4. Help the child learn to identify what it feels like to be calm and what it feels like to be agitated; 5. Help the child learn strategies for returning to being calm when they become agitated. This educational intervention is still relatively new so no empirical research data has been presented. The University of Minnesota has implemented and is conducting longitudinal research into their BrainU program for science teachers (2013); the United Kingdom is conducting teacher education on attachment and neuroscience through partnership with Bath Spa, National College for Teaching and Leadership and the Bath and North East Somerset Council (2014) and Wetz (2009) has written 'Urban Village Schools', a book outlining how attachment villages could practically look and work in a school environment. A cogent argument could be advanced that this new understanding of attachment, informed by neuroscience, is vitally needed in today's schools. The old, traditional approaches are simply not working for a growing number of students (Shanker, 2013).

This research study seeks to empirically test Neufeld's neuroscience attachment based intervention for teachers. *The Teachability Factor* is based and constructed on the

theoretical assumptions discussed in this literature review, and it contends that *The Teachability Factor*, informed by current neurobiological research, will have positive outcomes on student teachability. Fonagy and Target (2005) summarise the importance of this discussion when they state, "If the attachment relationship is indeed a major organiser of brain development, as many have accepted and suggested, then the determinants of attachment relationships are important far beyond the provisions of a fundamental sense of safety or security" (p. 334). In their research writings, Driscoll and Pianta (2010) advise, "Close and supportive relationships with teachers have demonstrated the potential to mitigate the risk of negative outcomes for children who may otherwise have difficulty succeeding in school" (p. 40). There is increasing empirical evidence that convincingly suggests the educational sector cannot ignore the findings of attachment neurobiology. Neufeld's *Teachability Factor* addresses this concern for the education of children.

Neufeld (2011a; 2012b; 2012c) convincingly argues that attachment does play a vital role in helping the unteachable become teachable, and further, he sees attachment as the only panacea for such an outcome in the absence of a mature prefrontal cortex. Why such confidence in Attachment Theory? Bergin and Bergin (2009) summarise:

> Attachment influences students' school success. This is true of students' attachment to their parents, as well as to their teachers. Secure attachment is associated with higher grades and standardised test scores compared to insecure attachment. Secure attachment is also associated with greater emotional regulation, social competence and willingness to take on challenges, and with lower levels of ADHD and delinquency, each of which in turn is associated with higher achievement. These effects tend to be stronger for high-risk students (p. 141).

Neufeld (2012a) sees attachment as both the problem and the solution to unteachable students. Insecure attachment is the cause of their lack of self-regulation, delayed prefrontal cortex development and overactive amygdala. A securely attached relationship

with a trustworthy safe adult is therefore the answer. Because humans are by nature social creatures, they are always hungry for attachment.

The Rhesus Monkey experiment (Harlow & Zimmerman, 1959) indicates that attachment hunger has a priority even over physical hunger. Therefore, when offered a safe person to attach to, a child (or an adult for that matter) will always respond positively, albeit slowly and cautiously. When a child feels safe, they can begin to mature developmentally. Their DNA is ready to help them mature. They just need a safe social environment in which to do so.

Neufeld (2007a) uses the example of a garden. Each child is like a seed with all the DNA in place ready to grow. But an unsafe social environment (lack of water, sun, nutrients, too many weeds) stop the child from becoming what they are genetically programmed to be and do. If we can create a safe social environment, then the child's mind will allow it to do what it is meant to do - grow it up to maturity.

Self-regulation is foundational to maintaining a sense of safety in one's social environment (Shanker, 2013). The significance of the right hemisphere in neural development is that children need a social environment during their early years to promote neurogenesis, a neuro-growth process that builds the child's self-regulatory neural circuitry. The child's ability to develop such capacities has not only vital implications for the child's intrapsychic development, but equally, it has important ramifications for the child's interpersonal world and how they form a constructive alliance with their wider society. Interestingly, Bowlby (1988), before he knew these neuroscience findings, had argued that creating psychological security is an important aspect of public health. As a society, there is a price to pay for insecurely attached children - bullying being one that comes to mind, lack of impulse control, another (Neufeld, 2007; 2010; 2010; 2011).

Recognising the global dimension to being insecurely attached, Neufeld (2009) cautions we are paying a high price as a society if students are not motivated to learn

because of right brain attachment deficits in their developmental history. Children struggle to learn if their defenses against insecure attachment dominate; maintaining defenses is high energy work that deprives the brain of needed resources to learn (Neufeld, 2012). Accordingly, impaired right brain development resulting in dysregulated states for children, has important implications for a child's educational learning outcomes (Commodari, 2013; Cozolino, 2013; Immordino-Yang et al, 2007; Shanker, 2012). As Dr Maggie Atkinson, Children's Commissioner for England aptly said: "Every teacher, and every school, should be so aware and so practicing, because it is the duty of the public body to adapt to the child, not the other way round" (cited in Bath Spa, 2014).

The Caution of Neuromyths

Neuromyths are common misconceptions about brain mechanisms which are taken for granted in today's society (OECD, 2014). There is a long history of neuromyths in the teaching profession, many of which are still alive and actively promoted today. Brain science has become immensely popular in education circles (Robinson, 2011). An amazon.com search for "brain education" returned a staggering 6469 books, 154 of which have been newly released in the last 90 days![8]

Common neuromyths in education (Cozolino 2013; Howard-Jones 2009; 2014; and OECD, 2014)[9] include:

- "Enriched environments" enhance the brain's capacity for learning (*instead, neuroscience shows that impoverished environments can reduce optimised brain development, but does not assert that the opposite is true, with one important qualification: an enriched social attachment environment does enhance learning. Brazelton and Greenspans' (2000) research lead them to conclude that nurturing*

[8] as of 17 November 2014

[9] For a fuller discourse on Neuromyths see Cozolino (2013) and Howard-Jones (2014).

care, not educational learning devices (like technology or learning curriculums, etc.) provided children with the best opportunity for success in life (see p. 1 to 52 for more complete discussion). Their conclusions suggest that giving each child an iPad or open plan classroom isn't going to improve teachability outcomes.

- The brain is only plastic for certain kinds of information during specific "critical periods", with the first three years of a child being decisive for later development and success in life (*instead, neuroscience shows that the brain continues to learn and grow throughout a persons life (Siegel, 2010a). It does affirm sensitive periods, but does not conclude that these mean that once that sensitive period is past that learning cannot occur in the future).*

- Acknowledging different learning styles (Grinder, 1991): there is a visual, auditive and haptic type of learning (visual, audio and kinesetic) and along with this Howard Gardener's Multiple Intelligences (1983) and Edward De Bono's Thinking Hats (1985, 2004), (*instead, neuroscience shows that we learn best with a variety of methods and that identifying a student as having one dominant style may actually hinder their learning).*

- We use only 10 percent of our brains (*Medina's (2008) "Brain Rules" shows this isn't scientific).*

- Myths that bilingualism and classical music can speed up or enhance academic development (*popularised extensively in children's 'educational' toys - e.g. Baby Einstein - and endorsed by many teachers that early bilingual learning and classical music increase intelligence faster than other learning, but this is not supported by neuroscience - neuroscience says all learning is good for the brain).*

- The left brain / right brain myth that physical exercises that cross limbs will enhance development (BrainGym and Perceptual Motor Program).[10] This theory suggests that fine and gross motor activities involving the deliberate crossing of the left and right parts of the body will increase learning ability and connection between the left and right hemispheres of the brain. (*Instead, neuroscience shows that both hemispheres of the brain are active in all learning and the connections between the hemispheres are vast).*

Dr Paul Howard-Jones (2014), author of several authoritative studies on neuromyths, says these ideas are often sold to teachers as based on neuroscience — but modern neuroscience cannot be used support them. These ideas are "biased distortions of scientific fact" (p. 817), have no educational value and are often associated with poor practice in the classroom. Howard-Jones further writes, "to a neuroscientist, such ideas may even provide amusement, but valuable time and money, both of which schools often lack, is being spent in obeisance to these myths" (2009, p. 550). As evidence for money ill-spent, Wellcome Trust survey (Simmonds, 2014) shows that 27- 38 percent of the use of neuromyth techniques in schools are carried out by (paid for) external training providers, the remaining by teachers who have assumedly undergone professional development in the program! Pasquinelli (2012) expresses her thoughts thus: "What strikes us about neuromyths, is that they outlive updates, absence of evidence, and inconsistency with well-established knowledge" (p. 92).

There is a growing desire amongst teachers for more knowledge and understanding about how students learn and why they behave as they do. Educators increased access to neuroscience research is an important factor driving this. As Dubinsky (2010) aptly puts it,

> Their demand to understand neuroscience has generated an explosion of conferences, educational products, and training opportunities that claim to be based on neuro-

[10] A Wellcome Trust teacher survey (Simmonds, 2014) discovered 76 percent of teachers currently using learning styles, 16 percent of teachers are currently using Brain Gym, while 18 percent reported using left/right brain techniques

> science. Commercial educational programs are marketed as based on brain research (p. 8057).

However, with this explosion in information, ethical concerns are rife: "Ethical concern has centred on whether neuroeducation has made empty promises to educators" (Hook & Farah, 2012, abstract, paragraph 1). They elaborate that educators are left:

> susceptible to unrealistic promises about the potential of neuroscience to help with the practical problems of teaching. In the words of Hardiman et al., "teachers, schools, and school districts may waste time and money pursuing so called 'brain-based' interventions that lack a firm basis in research . . . Among the ethical issues raised in connection with the field of neuroeducation is teacher's vulnerability to misinformation concerning neuroscience and it's relevance to classroom practice . . . The plethora of books and courses purporting to inform readers of neuroscience answers to unteachable students is deeply concerning. There is a scarcity of rigorous research from the neuroscience community that is readily translatable into educational practice . . . There is a gulf between current science and direct classroom applications . . . there is an urgent need to close the gap between laboratory neuroscience research and teachers' practice in their classrooms (introduction, p. 1).

In the absence of good science and good professional development, the pop psychologists, motivated often by monetary concerns, are ready to supply their resources to stressed teachers. Is this reason, therefore to dismiss attachment theory and neuroscience? Quite the contrary! It is the belief of this researcher that the popularity of these programs shows a teacher 'hunger' for knowledge and accessibility in this research area, and provides an even greater impetus to teachers' colleges, research backed professional development groups, and the neuroscientists themselves to provide evidenced based, quality courses that give teachers the science about these matters. In the absence of this scientific application of theory to practice, Hook and Farah (2012) rightly warn, "Neuroethicists have expressed concern that the popularity of neuroeducation may lead teachers to a premature and

uncritical acceptance of "brain-based" teaching methods" (conclusion, paragraph 1). Simmonds (2014) notes, "Teachers love practical classroom-based strategies which are easy to implement, but quite often they use them simply because they have been told they work. My experience is that teachers often employ the strategies but do not check their validity or scientific basis" (p. 7). Thus, neuromyths provide good reason to be cautious when teaching neuroscience to teachers. In 2007, Hirsh-Pasek and Bruer argued that the path from neuroscience to education is 'a bridge too far'… and stated that this knowledge "cannot provide much guidance for educational policy, classroom practice or early childhood education" (cited in Hook & Farah, 2012, p.2).

Hirsh-Pasek and Bruer have been strongly critical of teaching neuroscience to teachers and contend, "A debate rages concerning the ability of neuroscience to inform prekindergarten-12 teaching practice" (Hirsh-Pasek and Bruer, 2007, Varma et al., 2008, cited in Dubinsky, J. 2010 p.8057). Much has happened since Hirsh-Pasek and Bruer wrote this in 2007 and their quest to delay this application to education has been lost, but their cautious approach should be seriously weighed.

In a research interview of 13 teachers who had attended "Learning and the Brain" Conferences, Hook and Farah (2012) discovered that the teachers' classroom practice had changed, but that much of the changes they attributed to the conference were not directly supported by neuroscience research. When these approaches fail, what will become of teachers' perceptions of and attitude towards this promising science?

This calls for an urgent need to integrate quality training on these matters into both new and existing teacher's practice and theory, something that is being called for by much of the neuroeducational community (Cozolino, 2013; Howard-Jones 2009; 2010; 2014).

As Hook and Farah (2012) advise:, "…Increased collaboration between neuroscientists and practicing educators (is needed) before the field of neuroeducation can realise it's potential for influencing educational practice" (introduction, paragraph 5).

The prevalence of neuromyths, not only gives credence to what Hirsh-Pasek and Bruer (2007) feared, but also provides impetus to the education sector to ensure quality, evidence-based neuro-education courses are available to counteract the prevailing pop-psychology. *The Teachability Factor* answers this need.

Schore (2005) affirms that the cognitive methodologies must give way to emotion and relationships. More recent neuromyths, are tending to make cognitive methodologies out of neuroscience, neglecting the role of affect and secure attachment relationships. Neurobiological research has created a paradigm shift from the cognitive to the emotional, highlighted by Schore (2005) where he says, "Clinical psychology and psychiatry are moving from cognition to emotion as the central force in psychopathology and psychotherapy" (p.205). When neuroscience and attachment theory are kept together, the risk of distorting the theories into a mythology is reduced.

Literature Review Summary

Attachment theory and neuroscientific research have changed the way we see children and their behaviour. Research suggests that it is vital for those who take care of a child's psychological, social and academic learning to have an understanding of attachment (Cozolino, 2013; Shanker, 2013). There are highly significant findings from the new field of attachment neurobiology that need to be integrated into education. Ryan (2007) asserts,

> After three decades of the dominance of cognitive approaches, motivational and emotional processes have roared back into the limelight. Both researchers and practitioners have come to appreciate the limits of exclusively cognitive approaches for understanding the initiation and regulation of human behaviour (p. 1).

Neurobiological research processes are complex, but that should not preclude their basic tenants from being transplanted from the scientific laboratory into the pragmatic educational environment. To adequately and effectively address teachability challenges,

educators need the insights and tools that science has now provided to psychology and psychotherapy. "At present, scientists are not operating together with educators at the common production of educational theories and practices inspired by how the mind-brain works and compliant with educational aims. It is likely that in such a framework, the proliferation of neuromyths would be significantly reduced" (Pasquinelli, 2012, p. 92).

The importance of the child-parent and child-teacher dyads are reinforced by both attachment theory and neuroscience. Furthermore, the highly significant role of affect regulation in preparing a student to be teachable is highlighted and contrasted with an historical cognitive and behavioural approach which is shown to be increasingly limited. The challenges teachers are experiencing with teachability issues and problematic behaviours are best made sense of in the light of these recent attachment neurobiological findings. Neuroscience without an adequate attachment framework tends to create neuromyths based on techniques and methodologies that are relationally deprived and unlikely to work. A systemic understanding of the attachment and neuroscience link keeps the teacher and researcher firmly rooted in the foundation of safe emotional attachments as the engine of maturation, not technique or methodology.

Teacher training and professional development for existing teachers needs to be utilised if education is to make the best use of this research and improve the behaviour and academic outcomes of our most vulnerable children. This needs to be done in a way that avoids giving teachers misinformation in the form of neuromyths. Credible, evidence-based, professional development programs, such as *The Teachability Factor,* are therefore highly beneficial and relevant to the education sector.

Methodology

This chapter provides information on the intervention workshop, *The Teachability Factor,* research design, selection of subjects, how the research was carried out, and the testing of subjects.

The Teachability Factor: The Intervention on which the Research Study is Based

Dr. Gordon Neufeld, founder of the Neufeld Institute, Vancouver, Canada developed an eight session workshop to give teachers 'new eyes' to see students through the lens of neuroscience, attachment and developmental psychology and to bring these factors into consciousness when working with so-called 'unteachable' students. Joining the dots between the key insights these theories support, the workshop considers three distinct maturing processes a child needs in order to be teachable: emergence, adaptation and integration. It then considers two factors that can enhance or slow down the maturation process, vulnerability and attachment. In attachment literature, these maturing children are identified as securely attached, and those who are not maturing at a developmentally appropriate level are considered insecurely attached (Geddes, 2003). *The Teachability Factor* then suggests that if these maturational processes are not present (i.e an insecurely attached child), then attachment holds the relational power to overcome the deficit and enable the child to learn, mature and grow.

Key to the receptivity of this course is the use of accessible language for teachers. Gordon Neufeld (2007a) expresses it this way,

> My objective in my teaching is to use language and terminology that is accessible, that can be addressed to both parents and professionals simultaneously, and that help build

> bridges rather than create a divide… My goal is to use language that is common and closer to natural intuition (p. 4).

1. The three maturation processes.

Neufeld's basic premise is that the psychological processes of maturation (involving emergence, integration and adaptation) form the engine of learning. He contends that teaching has focused it's pedagogical energies on the emergent process, where a child possesses curiosity, a desire to know and learn more, and a sense of agency. This is good practice for a securely attached child who make up between 55 - 65 percent of the population (Wetz, 2010). But when teachers encounter an insecurely attached child they need to be informed with knowledge of the processes that give birth to these emergent energies and thus a teachable child.

> The maturing processes (emergence, integration, adaptation) play a critical role in learning and behaviour. Instead of one singular growth force as was formerly believed, there appear to be three distinct maturing processes. Another misconception, previously held, was that these maturing processes were active in all children and could be engaged by developmentally-friendly teaching. For example, all children were assumed to be interested and curious about their world; the teacher's challenge was to tap into it. This optimistic view has turned out to be hopelessly naive. It is true that all children possess the potential to mature, but these processes need to be active in the child BEFORE they can be engaged for the purposes of education. When children are missing these processes, teachability is restricted accordingly (Neufeld, 2012, introduction ii).

Emergence.

An emergent child is one who possesses the desire and energy to venture forth and explore their world (Bowlby's secure base). These children display a vitality of life, a desire for autonomy, a creative mind. They want to try new things, think for themselves, value uniqueness and originality, assume responsibility for their actions and impact on others, and are full of plans, goals and aspirations. Emergence develops in a child when they are

free from attachment needs and hunger; when they have a close, warm relationship with a significant other. Neuroscience findings indicate that it is a secure attachment that brings forth the emergent energy in a child (Bergin & Bergin, 2009; Geddes, 2003; Neufeld, 2007a; 2009; 2012a; 2012c).

Adaptation.

Adaptation is the fruit of a well working alarm system (Neufeld, 2010a; Porges, 2011; Schore, 2005; 2008; Siegel, 2012). A child whose brain is able to learn from feelings of frustration, learn from trial and error, benefit from correction, be resilient in challenges and transcend handicaps and disabilities, is an adaptive child (Neufeld, 2012a). Human learning is predominantly trial and error. As Albert Einstein (1879-1955) so eloquently put it, "We can't solve problems using the same kind of thinking we used when we created them." The ability to adapt when something doesn't work is a key competency needed to learn. Adaptation also fuels self control and prevents immature eruptions of frustration. Therefore a non-adaptive child usually displays behavioural immaturity in the classroom. The ability to recognise that a course of action is futile is essential to adaptation.

When a child continues to repeat the same action hoping for a different result they are failing to adapt and therefore unable to learn from trial and error. Children must adapt to futilities every day; the inability to control their friends, getting ones way all the time, being first or best, avoiding failure, getting things perfect, turning back time (Neufeld, 2012). If adaptation does not occur their resourcefulness and resilience will be handicapped by their frustrations and failures. The ability to adapt therefore is vital to the learning process. Vital to adaptation is the feeling of futility (Neufeld, 2012). If adaptation is the fruit of a working alarm system, resilience is the fruit of adaptation. It comes about as a result of a non-defended state where a child's emotions are fully accessible to them. These children are safe to feel vulnerable, because they are protected by the attachment relationship. Neufeld calls this protection, 'the attachment shield'. If a child can safely feel their feelings,

then they can learn from them. If, on the other hand a child is defended against feeling these emotions, then they cannot learn from them, and thus cannot adapt. Sadly, the human alarm system works best when it is not overworked (Neufeld, 2007; 2009; 2010). Thus, children who have experienced insecure attachments and threats to their emotional safety have alarm systems that are overworked.

Integration.

Integration is the role of the pre-frontal cortex. The role of this region of the brain is relatively new to neuroscience, but it's impact on understanding human endeavour is profound. Daniel Siegel (2010a) has identified ten functions of the pre-frontal cortex[11], functions that are unique to the human race. It has been shown that children are not born with these functions, rather they are gradually wired through attachment attunement with a primary caregiver. The average age for these functions beginning to be practiced is between five to seven years of age (corresponding to Piaget's 5-7 year shift (Crain, 2011)), and they have to be exercised regularly to form part of habitual human behaviour. MRI scans of the human brain have shown that the pre-frontal cortex is not wired or developed adequately in persons who show lack of impulse control. This has clear application for example, to the frequency of temper tantrums in young children: simply put, their pre-frontal cortex is not yet functioning. The pre-frontal cortex gives rise to, amongst other things problem solving, self discipline and the capacity to process conflicting thoughts and feelings ("you took my toy, but I won't hit you because it is wrong to hit"). The pre-frontal cortex is considered the moral centre of the mind and it helps a person deal fairly, co-operatively and in a civil manner with other people.

Paying attention, a common challenge in many classrooms, is the role of integration of the OMPC. Thus, attention deficits, distractibility, restlessness, ADHD symptoms, are all connected to an improper functioning of the OMPC. While we can expect young preschool

[11] See literature review under heading "orbital medial prefrontal cortex" and the 10 functions of the OMPC

children to exhibit many of these behaviours, we expect older students to have the ability to concentrate and sit still! Once again, neuroscience has shown how this distractibility is related to attachment state (Bergin & Bergin, 2009). The child's OMPC is wired correctly through attachment rich experiences. Conversely, an insecurely attached student is statistically more likely to exhibit negative impulse control, mood swings and behaviours because their OMPC is not optimally functioning; their amygdala will tend to be the dominating influence. Neufeld argues that children who don't possess these three maturing processes are developmentally *stuck* and that this leaves only one tool for learning in a teacher's toolbox: attachment. Attachment is the panacea (Neufeld, 2006; 2007; 2012).

When a child is safely attached they will seek to please the adult they are attached to and therefore their behaviour is more likely to conform to social expectations. In addition, attachment *unsticks* the child from the alarm and insecurity that has impeded their maturity leading to the natural processes of maturation beginning to develop and grow.

> Students who are not maturing psychologically are rendered creatures of attachment by default. In other words, these children, regardless of age, are only equipped to learn from those they are attached to or about that which serves their attachment needs. Anything else is psychologically irrelevant. This would not be a problem for education if these children were attaching spontaneously to their teachers or using their teachers as their compass points. There have always been children who failed to grow up and still are very capable of learning. In fact, attachment-based learners are highly motivated in ways that other students are not. For example, attachment-based students are much more predisposed to learn through imitation, modelling, memorising, cue-taking, mapping, orienting and classification. Attachment-based students are also more likely to be motivated to measure up and to compete as well as to learn for reasons of recognition and status (Neufeld, 2012, introduction p. ii)

Stuckness, he argues is caused by a defence against vulnerability, something that a close, safe attachment can heal.

2. Vulnerability.

"All human brains are equipped to defend against a sense of vulnerability that is too much to bear" (Neufeld, 2007, p. 27). When a child experiences too much emotional wounding, e.g. feeling insignificant, being rejected, experiencing loss etc. they begin to defend. Defenses create a flight from vulnerable feelings and thus inhibit the ability to self - regulate and learn. Schore writes, "Psychoanalysis, psychiatry and developmental traumatology are all now converging on dissociation, the bottom-line survival defence against overwhelming, unbearable, emotional experiences" (Schore, 2009, p. 195).

Blair (2009) quoted in Bergin and Bergin (2009) discovered that "children repeatedly exposed to anxiety early in life may be at risk for over-activation of the amygdala, which can lead to chronic problems with attention and thought" (p. 148). The ability to feel one's overwhelming feelings and to grow from them diminishes as a person is over exposed to painful experiences. What helps an individual cope with these overwhelming experiences? Attachment! As Sroufe (1996) stated: "Attachment is the foundation of emotion regulation" (cited in Bergin & Bergin, 2009, p. 148).

Neufeld's presentation on vulnerability aligns with Allan Schore's understanding of "early forming defenses against overwhelming affect" (Schore, 2009, p. 189), and puts it into teacher-friendly terminology labelling three defence states as 1) numbed out (emotional defenses), 2) tuned out (attentional defenses) and 3) reversed out (motivational defenses) (Neufeld, 2007a). Thus Neufeld explains why teachers experience these defenses in their daily interactions with students, and helps teachers make sense of the etiology of these problematic student behaviours.

The flight from vulnerability has an associated effect on learning. As Laub and Auerhaun write, "Trauma overwhelms and defeats our capacity to organise (knowledge)" (cited in Schore, 2009, p.195). Neufeld (2007a) cites support of this concept when he writes,

> Vulnerability is a common and foundational assumption to theories of Freud, Erikson, Jung, Adler, Rank, Winnicott, Fairborn, and Maslow . . . dealing with the impact of early experience. The idea that the human brain has defenses to keep a person from being overwhelmed by a sense of vulnerability is central to psychoanalytic theory as was the concept of an inverse relationship between defenses and maturation … As the understanding of the role of emotion in development has increased, so has the appreciation that our vulnerability lies in our emotion, not our perceptions, and that emotional defence is indeed the brain's first line of defence (p. 27).

In the absence of a safe, warm attachment figure a child must defend in order to cope. Bergin and Bergin (2009) explain it this way:

> In self-defence, the child must shut off negative emotions so they are not overwhelming. Unfortunately, the strategies children use to protect themselves in insecure relationships can be carried over to prevent healthy future relationships with peers and teachers at school. As a result, insecure children tend to show ambivalence and contradiction in their relationships, a false self, emotional disturbance (withdrawal or aggression), fearfulness, or hyper-vigilance. Some are indiscriminate in their friendliness and attention seeking, and have difficulty forming close relationships (p. 149).

Thus, once the defenses are raised, a child stops growing emotionally and is unable to mature in ways that help them both socially and academically. The defenses that protect their emotions have a side affect; defenses harm their social and academic success. Neuroscience findings are in agreement that emotions are a key to overcoming both anti-social and academic challenges. Children need to be vulnerable in order to feel their emotions, but they can only be vulnerable when they have secure attachments. Thus attachment is the answer to maturity.

3. Attachment.

Attachment is that drive or relationship characterised by the pursuit and preservation of proximity (Neufeld, 2012). When a child is attached to an adult they seek to be near

them, to become like them, and to seek guidance from them. Attachment creates a role model in a child's mind and therefore the child moulds their behaviour according to the desires and expectations of the one to whom they are attached. As Neufeld (2012a) poignantly affirms, attachment is the singular solution for rendering the immature teachable.

The power of this model is that it completes a cycle: If a child is not well attached it will limit their ability to mature in the areas of emergence, adaptation and integration. Further, attachment enables the retention of a soft and vulnerable heart that is able to feel vulnerable emotions and not defend. Attachment then becomes the solution for developing in a child these three pivotal factors needed in order for the child to be teachable as is illustrated in Figures 4 and 5 below.

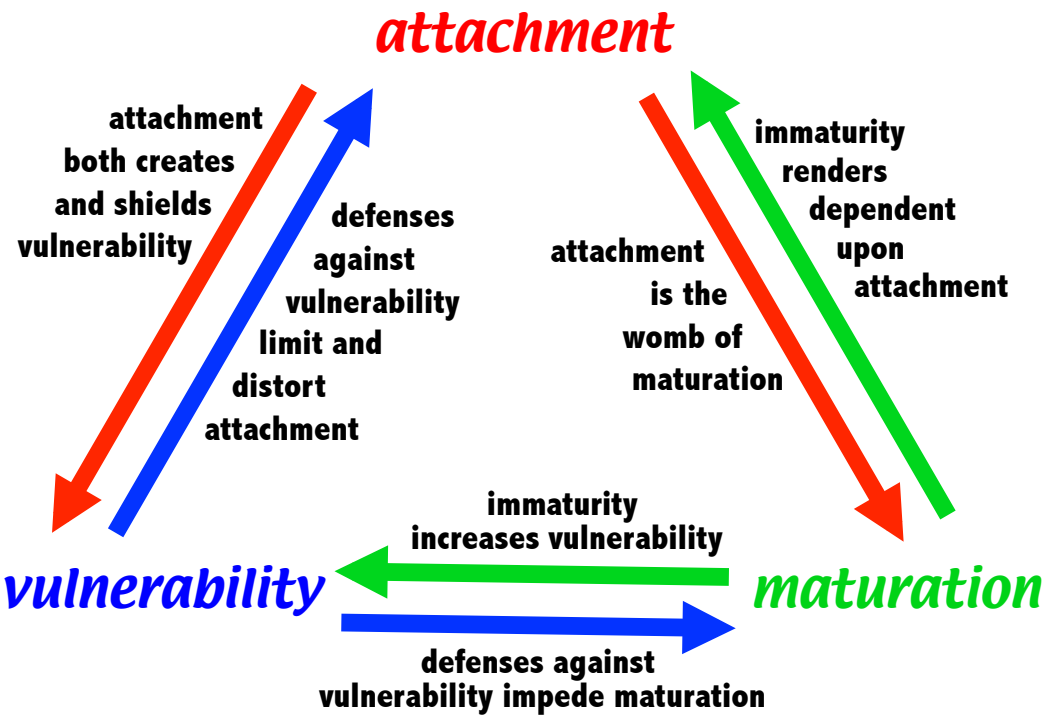


Figure 4 **The Attachment Cycle** (Copyright © Neufeld, 2008)

Neufeld (2012c) has synthesised the different theories of attachment into a cohesive model that integrates them all. He theorises that attachment deepens and strengthens over time, optimally developing to a sixth level depth by six to seven years of age, just as the pre-frontal cortex ideally begins to function with regular consistency and aptness.

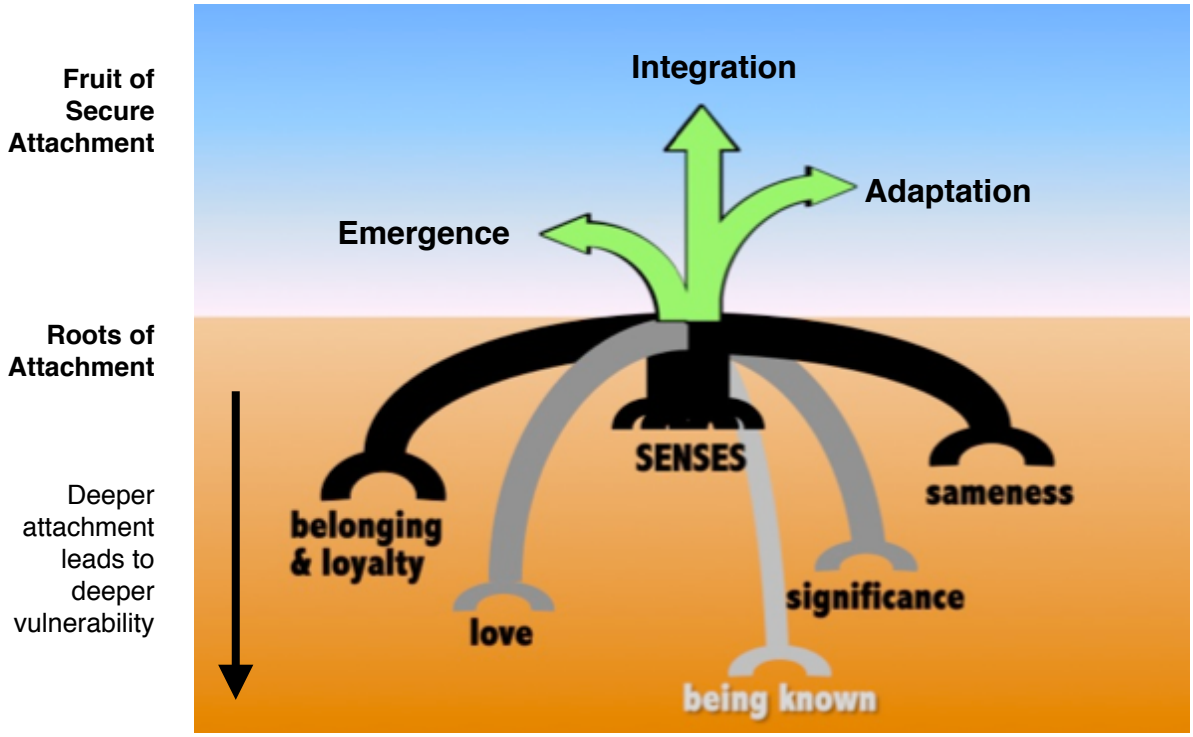


Figure 5 **The Six Roots of Attachment** (Copyright © Neufeld, 2012c)
The Six Roots of Attachment give rise to the three processes of maturity: Emergence, Integration and Adaptation. Attachment is the root of maturity. Therefore the solution to immaturity and unteachable students is attachment. Neufeld suggests that children attach chronologically through these six stages: 1) senses, 2) sameness, 3) belonging and loyalty, 4) significance, 5) love and 6) being known. Each stage ideally, will roughly correspond to a child's chronological age rendering a child deeply and securely attached by age 6 - 7 when their prefrontal cortex has begun independent functioning and when they are ready to separate from the primary caregiver and attend school.

Figure 6 below demonstrates how attachment is both the problem and the solution to developing teachable student. A mature, fully functioning, securely attached brain is able to learn through natural emergent energy (left hand column). When attachment is insecure, learning and maturity are interrupted. To improve learning and maturity, an attachment

with a teacher or parent can provide the emotional rest needed to allow maturity so that learning can take place.

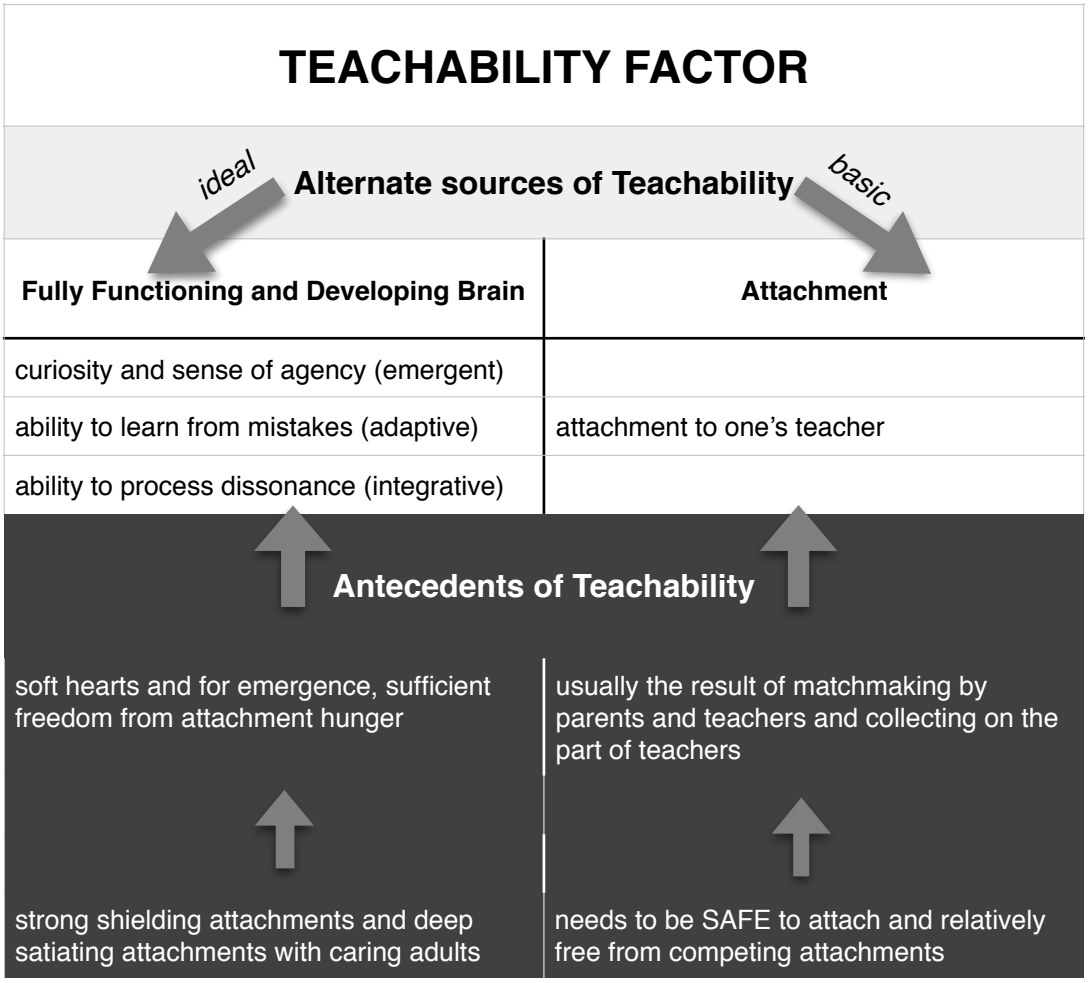


Figure 6 **The Two Sources of Teachability (Copyright © Neufeld, 2012c)**
Teachable students either come from securely attached individuals, with developmentally mature brains (left hand column) or through the proxy channel of attachment to one's teacher. While the second alternative is more basic, it works to create safety and soft hearts where students are willing to take the risk to be curious and learn, and to mix their vulnerable feelings.

While this eight session workshop gives participants understanding regarding the maturation process and the importance of attachment in the teaching of challenging children, it is not a methodological intervention, nor is it a list of ideas or 'to-do's' that participants can use to work with their students. Rather it is a process of enlightenment and learning where teachers gain new insights into the antecedents of a child's stuckness and

draws on teacher intuition to build a relationship whereby the child can grow and mature as they are already genetically wired to do. Neufeld (2007a) writes,

> I am also most interested in the interventions that are natural and not contrived. Interventions that are counter-intuitive or require special training tend to create greater distance between the expert and those that parent and teach our children. I do not wish to contribute to the dumbing down of parents or teachers nor to divorcing children from those that carry the weight of responsibility for them… I am most interested in creating the insight that leads to the restoration of natural intuition and in providing the conceptual underpinnings for that intuition… Furthermore, I find that children have no regard for experts or expertise and are not receptive to methods of treatment that are contrived or intrusive. They do not like be parented out of a book, nor operated upon as if they were objects. In this regard, they generally have more integrity and sense than we do as adults (p. 4).

The Teachability Factor course has six distinctive advantages over alternative models currently being promoted in credible circles.

1. It has developed a **vocabulary** that is easily accessible to teachers who, in the main, do not have a science or psychological background (Neufeld & Mate, 2005 for glossary). Therefore it is able to act as a **translator** between the neuroscientists and the teachers.

2. It is not promoting a methodology or program, but rather honours the neuroscientific evidence that firmly asserts the importance of a **safe emotional relationship** as the primary means of 'unsticking' a child. Thus it empowers teachers to use a myriad of self initiated methodologies, so long as they provide an emotionally safe environment for the child. Other models, as discussed in the literature review, have succumbed to a 'program' model whereby, once a student has 'completed the program' the initiative stops. This is not in alignment with the evidence of what is needed for insecurely attached children.

3. The course is available **internationally**. The Neufeld Institute has international chapters in German, French, Spanish, Hebrew, Swedish and Russian languages in addition to English and it has chapters of people in each of these countries and individuals in more, including New Zealand.

4. **Course facilitators** have undergone a 2 year internship program through the institute, so they are well informed in evidence-based neuro-educational theory. Well trained facilitators are a safeguard against neuromyths.

5. In the absence of a local course facilitator, a teacher, school or teachers' college has the opportunity to join the Neufeld Institute's **online campus** where they will be taught via internet technology with international facilitators. Another alternative is to purchase their extensive **DVD** range for use in small group discussion groups for personal interest.

6. For those who want to learn even more, the institute offers a **2 year internship program** that will enable the teachers to become trainers and facilitators of the material themselves supported by training in 3 parts: Intensive I, Intensive II, and Intensive III.

These six factors make this a desirable course to educate today's teachers in attachment and neuroscience.

The researcher is one of the few in New Zealand (only two at the time of the research) licenced to present and teach *The Teachability Factor.* In an attempt to reduce demand characteristics and also in order to enable consistency in any future research, the researcher chose to present the 8 weeks using the DVD presentations which participants watched rather than presenting herself. While this will not remove bias, it may go a step towards reducing it.

Research Design

The increasing demand for neuro-education by teachers and the plethora of potentially ineffective neuromyths gives rise for the need of evidence-based teacher professional development. This research was designed to determine if *The Teachability Factor* provides an answer for this need, and to determine it's effectiveness for a teacher.

Testing the effectiveness of teacher professional development is always a difficult measure. The use of students as testing subjects raises significant ethical complications which can be difficult to overcome. Thus this research was designed to measure the teacher's perceptions of the efficacy of the course, with a specific child as the focus.

Early Childhood Teachers were chosen as the subjects. While *The Teachability Factor* course is suitable for teachers across the education spectrum, early childhood teachers potentially spend longer with their students (up to 40 hours per week, compared to say five hours for a secondary teacher), increasing the time a teacher has to form close connections with a student (see Bergin & Bergin, 2009, especially page 150). Further research of this program in primary and secondary education is an obvious next step.

A within-subject pre and post intervention test design was selected combined with some open ended qualitative questions at the end of the intervention.

Two independent, A-rated psychological inventories were chosen (ITS and BASC-2) as the pre and post test because of the researcher's idealistic determination to conduct robust quantitative research. It was anticipated that the combination of a good sample size, two valid and reliable quantitative testing measures, and qualitative feedback from participants would produce scientific evidence to establish if an attachment approach was applicable to an educational environment. Disappointingly, the small sample size has weakened the possibility of this, but nevertheless, the results are strong and consistent, albeit with a small sample.

The within-subject, pre and post test enabled the participants (*n=14*) to each be their own control group in the pre-test and the post-test providing the comparison to measure effectiveness and change. The eight week intervention workshop was followed by identical post tests to measure variance within and between each subject.

Within-subject designs have met with varying degrees of support and criticism as Rosenthal (1976) and White (1977), cited in 'Experimental Methods: Between-subject and within-subject,' point out:

> Within designs may lead to spurious effects, through respondents expecting to act in accord with some pattern, or attempting to provide answers to satisfy their perceptions of the experimenter's expectations. This is known as a "demand effect"—according to which participants in experiments interpret the experimenter's intentions and change their behaviour accordingly, either consciously or not (Charness, Gneezy, Kuhn, 2011, p. 2).

While 'demand effect' is possible in this research data, it is somewhat mitigated by the use of professionally validated, normed and scaled psychological tests. If the researcher had developed her own instrument of measurement, this might be of more concern. Possibly the 'demand effect' does have some impact on the qualitative results from the open ended questionnaire given at the end of the intervention as respondents used superlatives in their praise and gratitude for the course. Notwithstanding this however, the qualitative responses are congruent with the quantitative data and therefore suggests that the methodology is justified for the purposes of this research. The nature of the research is well suited to a within-subject experimental design as it was hoped and anticipated that participants would change, and that the change could be measured. Also, the respondents were reporting their perceptions of a challenging focus child in their classroom and not their perceptions of the course itself. There was no need for them to ingratiate themselves in their survey responses, they were reporting their own sense of efficacy in working with this specific focus child.

A within-subject research design is further supported as twice as much data with the same number of individuals has been gathered as compared to a between-subject design (Charness, Gneezy, Kuhn, 2011). The scope of research at this level of study does not necessitate a more in-depth rigorous study with additional participants, as desirable as this may be.

Charness et al. (2011) go on to comment that "one should avoid these designs when the experimenter is interested in behaviour in the absence of practice, when exposure to multiple treatments makes the individual overly sensitive to variations between the treatments, and when treatments have persistent effects" (p. 3). In the instance of this particular research, practice is desirable and exposure to the approach only increases the effect which is being measured.

> The methodological issue of within versus between designs is ubiquitous in experimental work. Between designs are more conservative in nature, but have limitations in some cases, while within designs have more power but potentially suffer from confounds. It is important to point out that researchers can combine the two designs in simple ways to access the advantages of both methods (ibid, p. 7).

While a combination of between and within subject methodology is desirable, it was not possible within the scope of this study.

Instead of using a questionnaire designed by this researcher, two psychometric tests were selected for their rigorous validity and reliability (PAR, 2014), and recognition in the education-psychology fraternity (both are A-rated for reliability). Both are suitable for a preschool population. Further consideration was made to ensure that the tests considered the context of emotion and attachment in their appraisal of the teacher, and his or her view on the child they had in mind. This was important because *The Teachability Factor* intervention focused on this domain and therefore it needed to be tested for. In order to maximise reliable results two different tests were selected, each measuring similar effects.

The children themselves were not tested, nor were they identified to the researcher. Only their age, gender and ethnicity were recorded. It was not necessary for the purposes of this research study to identify or test each individual child. No experimentation was conducted on children. The data measured the teacher's attitude and perception towards a specific child in their classroom, thus allowing the research to remain firmly grounded in real, pragmatic classroom experience. Having a focus child in the teacher's mind allowed the theory of the research intervention to be measured in as real a situation as possible without having children participants in, or an experiment of the research. The teacher participant was the focus of the study and impact of the intervention on the teacher's attitude to and perception of the focus child was the major consideration.

Instrumentation and Measurement

Three measurement methods were selected: two psychological inventories, used by professionals, and a third open ended questionnaire provided at the end of the intervention to allow for additional qualitative information to be shared. The choice of two third-party designed and graded psychological instruments was deliberate as a means to reduce demand characteristics to avoid skewing participant responses.

Description of Instruments

Test 1: Index of Teaching Stress (ITS).

Challenging children create stress for teachers. The Index of Teaching Stress (ITS) measures the stress a teacher experiences by way of the interactions he or she has with a specific student (Abidin, Greene, Konold, 2004). Teachers are asked to answer a survey of 90 questions about their views of their work and the student they have in mind. The results are complied into two broad categories: student characteristics and teacher characteristics which, when combined, give a total stress score. Results are compared to percentiles of the

population norm. Specific child domains tested for are: attention deficit hyperactivity disorder (ADHD), emotional lability / low adaptability (ELLA), anxiety / withdrawal (ANXW), low ability / learning disability (LALD), aggressive / conduct disorder (AGCD). Teacher domain scores tested for are sense of competence / need for support (SCNS), loss of satisfaction from teaching (LSFT), disruption of the teaching process (DTP), frustration working with parents (FWP). Both the individual and the combined scores indicate areas that are causing the teacher stress and give focal points for therapeutic action. Within the context of the research study, the results were never discussed with participants, but were used to analyse the possible effects that the intervention had on these nine domains. The researcher herself did not enter the pre-test data nor did she see the results of the questionnaires until after the eight week intervention. This helped to remove researcher bias during the intervention phase. There was no therapy for the teachers other than the workshop itself, consisting of the DVD and group discussion facilitated by the researcher.

The ITS takes approximately 25 minutes to complete and scores are analysed using a marking template. The percentile results provide information about the respondent's score relative to the scores of other participants. A raw score of 75 indicates that the respondent's raw score is equal or greater than the raw scores of 75 percent of participants in the normative sample. A normal range of scores is within the 15th to 79th percentile and scores from 90th to 100th percentile are considered "clinically significant", thereby suggesting potential dysfunctional behaviour, thoughts and decisions (Abidin, Greene, Konold, 2004). In terms of reliability of the ITS, Adidin et al state:

> . . . both the teacher and student factors have been shown to demonstrate internal consistency estimates equal to or greater than 0.95. Moreover, these factors align with previous theoretical postulates regarding the characteristics that contribute to teacher stress. Thus, the results . . . satisfy each of the evaluation criteria and lend strong empirical and theoretical support for this domain (Abidin, Greene, Konold, 2004. p. 35).

Validity is primarily concerned with whether a test measures what it purports to measure. The ITS was not only tested for validity within it's own test and sample range but was also compared to other tests to measure correlations. In each instance the results reinforced the evidence that the ITS gives reliable, credible and consistent results (Abidin, Greene and Konold, 2004).

Test 2: Behaviour Assessment System for Children, 2nd Edition (BASC-2).

"The Behaviour Assessment System for Children is one of the most widely used tools for assessing behavioural and emotional problems in children and adolescents ages 2 1/2 through 21 years in both school and clinical settings" (Reynolds, 2010, p. 1). The instrument has three forms: one for teachers, one for parents and one as a self test for the child (Reynolds & Kamphaus, 2004). These can be used individually or in combination with each other. For the purposes of this research, only the Teacher Rating Scales for Preschool were used. The instrument itself consists of 100 questions which the teacher answers, ranking their response as 'never', 'sometimes', 'often', or 'almost always'. Responses are entered into a computer program which generates a report comparing the teacher's observation of the child with norms of that particular age group. The responses generate data relating to fifteen traits of the child's behaviour and emotion. Percentiles are generated so that this particular child can be compared to a norm population group. Percentiles under 60 are within the population norm, 61 - 69 are of medium concern, whilst scores over 70 are of clinical concern. The fifteen traits are: hyperactivity, aggression, externalising problems, anxiety, depression, somatization, internalising problems, atypicality, withdrawal, attention problems, behavioural symptoms index, adaptability, social skills, functional communication, adaptive skills. Finally, these fifteen traits are summarised into four categories of externalising problems, internalising problems, behavioural symptoms index and adaptive skills being the summary of the other traits (see Appendix F for a detailed description of each domain scale).

Open Ended Questionnaire.

At the conclusion of the Teachability training teachers were given an open ended questionnaire and were invited to respond with their insights and observations of the learning experience. Pertinent aspects of this questionnaire will be discussed in the results section. The full responses are recorded in Appendix G.

Participant Process and Selection

Ethics approval was granted by Otago University and a one page flyer (Appendix H), along with an introductory letter and information sheet (Appendix I) was posted and emailed to over one hundred early childhood centres on Auckland's North Shore, as this was the region closest to the venue the intervention was to be held in. Following a slow response rate, the research course information was posted to early childhood centres in Greater Auckland. The Early Childhood Forum also posted a notice regarding this in their weekly email to subscribers.

The research proposal had optimistically hoped for 20 or more participants. While 20 applied to do the course four were unable to attend, two for personal reasons and two because they did not meet the research criteria.

Research participant criteria:

Participants were required to meet the following criteria:

Fully registered New Zealand teacher, teach full time in a New Zealand Early Childhood Centre, have minimum of three years teaching experience and have a specific emotionally or behaviourally problematic student in their classroom aged between two to five years of age.

Using a within subject research design enabled each participant to be their own control group. However, greater controls were sought by the researcher and it was deemed

sensible to limit participants to those who had academic qualifications and work experience in working with children. Both these criteria help to ensure that the responses to the questionnaires are based on an academic and experiential understanding of what is and is not normal childhood behaviour. The age for the child was based on the parameters of the psychological instruments themselves, being tested and validated for children over the age of two.

A classroom at Westlake Boys High School, Forrest Hill was selected as the venue for the intervention workshops. Workshops were held every Wednesday night for eight weeks from seven pm to nine pm. The first hour was spent watching the DVD presentation by Dr. Neufeld. The second hour was spent in discussion of the DVD content in the context of participants' own experience as early childhood teachers. Tea, coffee and snacks were provided.

Fewer participants than originally desired formed the research group *(n=14).* The targeted number did apply for the course, however two failed to turn up and another two failed to meet the research participant criteria in terms of qualifications and years worked. Of the 14 participants who began the course, all remained for the entire eight weeks. One participant disclosed, some weeks into the course, that the challenging child they had in mind was under the age of two, but turning two during the course. The results of this particular participant are inconsistent with the results of others and it is possible that the age of the child is a significant factor in this. The child was included in the study however, as the data results pulled the data in the negative, not the positive direction. Should this data have been excluded the statistical results for this research would have strengthened the argument for attachment and neuroscientific intervention in education. The qualitative responses from this teacher were consistent in trend with the other participants.

Prior to the workshop beginning, participants were required to fill in and sign a consent form (Appendix J) and receive written permission from their centre management

to participate in the course. They were then posted a welcome letter, instructions (Appendix K) and the two psychological surveys which were to be filled in prior to attending the course. The surveys were to be completed with a specific challenging focus child from the teacher's classroom in mind. This child was to remain in conscious thought for the eight week intervention.

Procedures

Upon enrolling in the course participants were sent a welcome letter (Appendix K) and the two psychological inventory questionnaires to complete.

The Teachability Factor workshop (Neufeld, 2012a) is available on DVD from the Neufeld Institute. Those who have undertaken a two year internship through the Neufeld Institute are licensed to either facilitate teacher workshops using this DVD material or present the material themselves if they have presenter status. While this researcher does have presenter status, the DVD format was chosen to enable future research on this course to have valid consistency i.e. the presentation of material would be identical, coming from a DVD recording of Dr. Neufeld himself. Having graduated from the two year internship, permission was granted that I might use this course as an intervention for the research of it's impact on teachers of challenging children.

Each week the workshop began with a five to ten minute welcome and recap of the previous week's material. Participants then watched the one hour DVD presentation by Dr. Gordon Neufeld, followed by a one hour discussion and question time where participants shared their experiences and applied the learning to their classroom situation and the particular student they had in mind. Refreshments were served between the DVD and the discussion.

At the conclusion of week eight, participants were given repeat psychological inventories to fill in as at the beginning of the course and were instructed to answer the questions with the same challenging child in mind. Further they were given an open ended questionnaire in which they could write their individual thoughts, experiences and feedback regarding the efficacy of the course.

Statistical Analysis

A within subject repeated measure, pre and post intervention test model was used. Frequencies and Paired t-test samples and Cohen's *d* effect size (Coe, 2002; Durlak, 2009) were calculated using SPSS software comparing the pre test and post test results. Statistical significance and medium to large effect size was found in many instances, but not all. Multivariate MANOVA calculations were run to determine the effect that the child's age and the teacher's years of teaching experience might have. Results showed there was no significance in either dependant variable on the impact of the intervention, the statistical power being too small.

Consideration was also given to including ANCOVA analysis. However, after seeking advice from Otago University statisticians, the results were deemed unreliable because of the small sample size.

Single group pre post test designs have significant weaknesses, most notably they give larger effect sizes than designs using a control group. In a meta analysis of 45 training based research designs effect sizes were 0.29 standard deviations larger than those with a control group or a comparison group (Carlson, 1999). These magnified effect sizes did not however rule the research invalid and Carlson concludes that these studies should still be included in meta analysis research as they add to the volume of data and help to form a bigger understanding of the research subject.

Notwithstanding this the task force on Statistical Inference of the American Psychological Association recommends that "researchers should *always* provide some effect size estimate when reporting a *p* value" (cited in Durlak, 2009, p. 197). Durlak goes on to affirm that effect size should be calculated "irrespective of the *p*-value" (p. 198) and recognises that most paediatric studies use very small sample sizes just as this research does. The magnitude of an effect cannot be based only on the results of statistical significance testing. Through using this calculation, the small sample size and the natural upwards bias of the paired t-sample is partially accounted for. Durlak continues to note that effectiveness testing is not common in the social sciences, yet is important:

> Moreover, advances are continually being made in our understanding of the application and interpretability of ES's, and little guidance on these matters is available in most statistical texts, which do not devote much attention to ES's . As a result, many researchers are not well versed in incorporating ES's into their own work and most research reports in the social sciences do not contain ES's. . . . In sum, including and interpreting ES's should not be viewed as just another editorial hurdle to pass for publication purposes, but as an essential component of good research. ES's achieve an important purpose because they help to assess the overall contribution of a study (p. 197).

It is for these reasons, despite the small sample size, that I have chosen to include an effectiveness score (Coe, 2002; Durlak, 2009).

Results

Data results are presented first as demographics and frequency descriptions, then research question data, separated into the teacher domain and the student domain are presented. Finally the structured, open ended question results are summarised for their pertinent additions to the findings of this research, as they relate to the summative questions.

Demographics and Frequencies

Fourteen teachers [*n=14*] comprised the research group, female [*n=13*], male [*n=1*]. Six ethnicities were self described by participants, NZ European [*n=7*], Asian [*n*=3], South African, South American, Indian, Portuguese [*n=1*] each. Ten were married, 2 single, 2 separated or divorced (one separated during the eight week intervention).

Academic qualifications of the teachers were Bachelor's Degree [*n=10*], Post Graduate [*n=3*], Certificate [*n=1*] and all were fully registered teachers. The range of years teaching was from 3 - 29 years with six teachers teaching for over 10 years and only two teaching for the minimum 3 years required by the study.

Each teacher reported their perceptions of a specific child. The children's age range was two to four years, [*n*=7] were four years of age, [*n*=6] were three years of age and one child was two years of age (turned two during the eight week intervention). The young child, in addition to a child identified during the course with Autism, may have impacted on the validity of these results. The data for both these children shows inconsistent trends when compared to the other 12 students (both the autistic focus child and the two year old produced more negative data and the statistical results would have been more in favour of the benefits of using *The Teachability Factor* had the data been removed). Due to sample

size concerns and the qualitative data these subjects provided, they were included in the study. Ethnicity of the children was reported as NZ European [*n=9*], while Maori, Brazilian, Latin American accounted for [*n=1*] each, while two teachers chose not to disclose the ethnicity, or did not know. The demographics are not representative of the ethnic mix within the New Zealand population and were limited by those who responded to the research promotion.

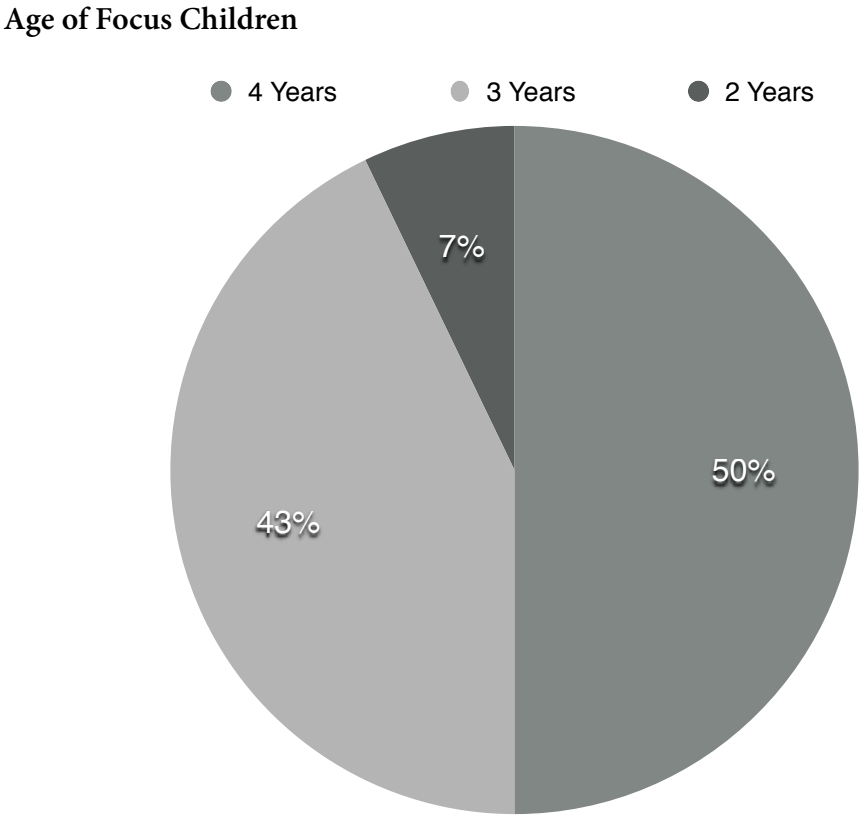


Figure 7 **Age of Focus Children**

The MANOVA results of teacher qualifications, years of work experience and child's age and ethnicity, compared to changes pre and post test each showed no significance on the outcome of the study. The small sample (*n*=14) made these statistics irrelevant as the power of the test was low.

While the number of participants in this study is small, the tests employed (ITS and BASC-2) have been validated and normed over a large population. Both inventories are A-rated for validity and reliability. In other words, a single assessment carried out by an individual teacher on one child gives valid and consistent results because the test itself is internally validated. It is a reliable test for testing the domains indicated. This does not mean that the results can be extrapolated to *The Teachability Factor* course, but it does mean that the reported results for each teacher and child in each domain are validated.

Teacher domain.

The teacher domain is related to research questions 3 - 6 and considers changes to teacher's self reporting of their overall teacher stress (TEACH CHAR), sense of competence and need for support (SCNS), satisfaction from teaching (LSFT), and disruptions of the teaching process (DTP). These were measured using the Index of Teacher Stress (ITS). In each instance, the dependent variable is the ITS score for that particular measure and the independent variable is the eight week *Teachability Factor* course. Percentile statistics are compared and paired t-test statistics show significant results at the $p=.05$ level as all data are well under .05 Sig. 2-tailed. Cohen's d effect size is also reported where a small effect is $d= 0.2$, a medium effect $d= 0.5$ and a large effect $d= 0.8$ or greater (some statisticians use 0.5 or greater as a large effect measure). The summative and specific agreement between the p scores and the d scores further strengthens the validity of this study albeit the small sample size significantly reduces the weight that can be applied to any individual statistic. Notwithstanding this, the overall weight of the statistics makes the research credible and recommendations are given in the discussion chapter to enhance further research in order to enhance validity and reliability of the statistics. The normed percentile scores on the ITS are interpreted as: >90 = clinical significance, while scores between 80 - 90 are of some significance. Scores under 80 are in the normal range (see Appendix L for example of individual pre and post test results).

Table 8 summarises the statistics for the Teacher Domain.

Table 8 **ITS Teacher Domain Teacher Stress Scores**

Teacher Domain Teacher Stress Scores

	Pre Test		Post Test			
Dependent Variable	Mean	Standard Deviation	Mean	Standard Deviation	Cohen's *d* Effect Size	Sig. (2-tailed)
Overall Teacher Stress (TEACH CHAR)	71.64	14.058	54.50	17.199	1.0	.000**
Sense of competence and need for support (SCNS)	77.36	13.397	61.93	14.568	1.06	.003**
Loss of satisfaction from teaching (LSFT)	65.71	15.414	47.50	17.359	1.05	.000**
Disruption of teaching process (DTP)	67.00	23.875	39.29	14.751	1.88	.000**

* $p = <.05$ ** $p = <.01$

Note: a decrease in mean scores means a decrease in reported teacher stress. Decrease in SCNS mean score demonstrates less need for support and more teacher confidence. Decrease in LSFT mean score indicates teachers have higher job satisfaction. In all four domains the post test mean scores are less than 80 showing that teachers are now in the normal range of the population in all domains. For some individual teachers this represents a highly significant decrease in overall teacher stress.

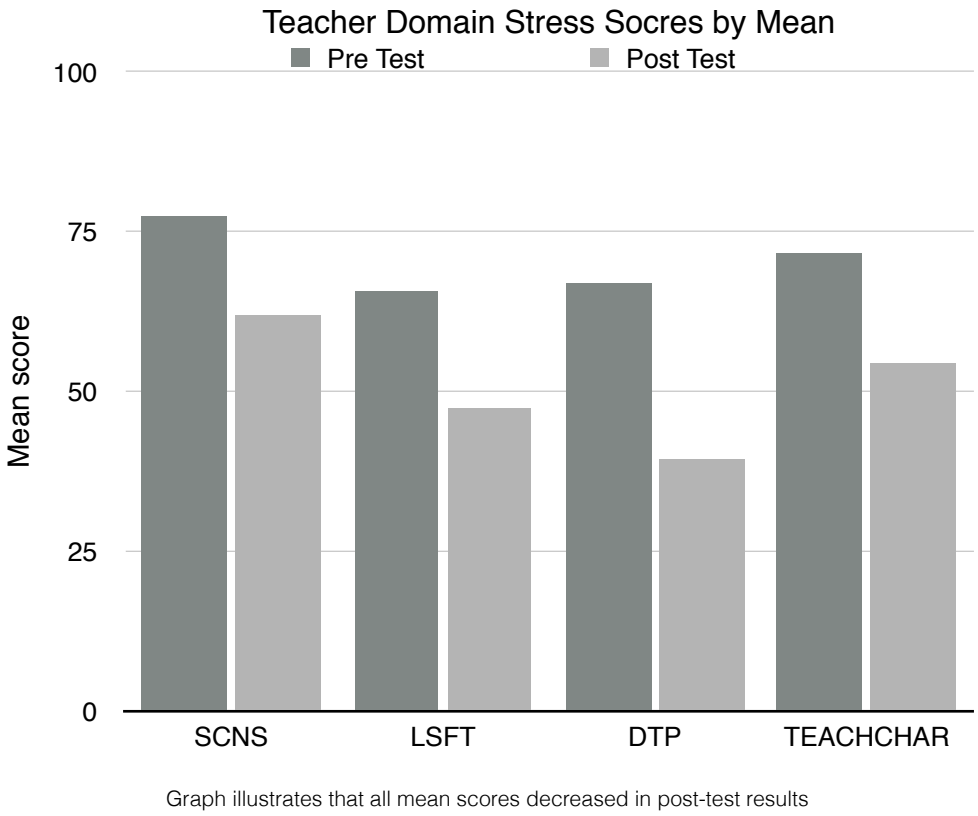


Figure 8 **Teacher Domain Teacher Stress Scores by Mean**

Analysis of teacher domain.

While the sample size is small [*n=14*] the results are highly significant. Teacher's self reporting of their teaching stress has shown significant improvement with all teacher scores now within a normal range on the ITS instrument. These results would lend weight to further studies of the same course and it may be possible to infer that a repeated study of a larger sample might also show lower teacher stress following *The Teachability Factor* intervention. Each statistic will be considered in order of the research questions.

Question 3. Teacher overall stress levels (TEACH CHAR). An overall highly significant reduction in teacher stress is indicated [*p=.000*]. The TEACH CHAR score is a summary score of the three domains listed below it. Both the overall (TEACH CHAR) and individual dependent variable scores for teacher stress suggest a highly significant reduction in teacher stress following the intervention. The TEACH CHAR overall effect size is also

large [*d*=1.0] and all individual teacher domains have large effect. There was a significant difference in the TEACH CHAR scores for pre test [*m*=71.64, *sd*=14.085] and post test [*m*=54.50, *sd*=17.199]. Therefore this adds weight to rejecting the null hypothesis.

Question 4. Teacher sense of competence and reduction in their need for support (SCNS). Table 8 and figure 8 show a highly significant improvement in SCNS [*p=.003*]. Mean scores were close to the 80th percentile pre-test [*m*=77.36, *sd*=13.39] and the reduction of this to well within normal range at [*m*=61.93, *sd*=14.568] is a large change. The large effect score of [*d=1.06*] reflects this significant change.

Question 5. Teacher sense of teaching satisfaction (LSFT). Teachers satisfaction from teaching increased significantly pre-test [*m*=65.71, *sd*=15.414] to post test [*m*=39.29, *sd*=14.751] showing mean percentile improvement of 18.21 percentile points, a highly significant improvement [*p=.000*] and a large effect of [*d=1.05*]. As teachers discovered the importance of a warm, nurturing relationship with children in order to optimise their brain development and to regulate their emotions and behaviour their sense of teaching satisfaction increased. The importance of their role in helping a child mature, and the impact that this will have on a child's future, likely played an important role in affirming their job as early childhood teachers.

Questions 6. Disruptions in the teaching process (DTP). A decrease in DTP is significant in light of findings showing that the time a teacher actually teachers is the best predictor of a student's academic achievement (Keith & Fine, 2005; Vannest & Hagan-Burke, 2010). Mean percentile scores decreased a highly significant 27.71 percentile points from [*m*=67, *sd*=23.875] to post test [*m*=39.29, *sd*=14.751] giving a highly significant [*p=.000*] score and a large effect size [*d=1.88*].

Overall, the improvements in the teacher domain are consistent, strong and highly positive. Teachers reporting indicates that all measures have improved significantly. This is

likely to improve teacher motivation and impact positively on their relationships with the challenging children in their classroom.

Student domain.

The Student Domain measures changes in teachers' perceptions of the same specific challenging student pre and post intervention. Ten domains are measured from two psychological tests, the ITS and the BASC-2. Percentile differences, pre and post test were compared and significance (Sig. 2-tailed), mean, standard deviation and Cohen's *d* effect size are reported in Table 9.

In each instance, the dependent variable is the ITS or BASC-2 score for that particular measure, and the independent variable is the eight week *Teachability Factor* course. Percentile statistics are compared and paired T-test statistics show significant results at the $p=.05$ level. Cohen's *d* effect size is also reported where a small effect is $d= 0.2$, a medium effect $d= 0.5$ and a large effect $d= 0.8$ or greater. The summative and specific agreement between the *p* scores and the *d* scores further strengthens the validity of this study albeit the small sample size significantly reduces the weight that can be applied to any individual statistic. Notwithstanding this, the overall weight of the statistics makes the research worthwhile, and recommendations to enhance the validity and reliability of the statistics for future research are given in the discussion chapter. ITS percentile scores between 15- 79th percentile are within the normal population range; BASC-2 percentile scores are within the normal range if they are less than the 60th percentile.

Table 9 **ITS Student Domains and BASC-2 Domains**

Student Domain Scores

	Pre Test		Post Test			
Dependent Variable	Mean	Standard Deviation	Mean	Standard Deviation	Cohen's *d* Effect Size	Sig. (2-tailed)
ITS DOMAINS						
STU CHAR	77.3571	15.31519	61.50	13.546	1.17	.004**
ADHD	65.71	20.708	55.36	11.738	0.88	.026*
ELLA	80.50	12.781	66.86	9.445	1.44	.001**
ANXW	71.50	20.747	67.71	19.249	0.2	.409
LALD	65.79	21.170	57.00	17.867	0.49	.077
AGCD	76.64	15.485	64.29	12.970	0.95	.005**
BASC-2 DOMAINS						
Externalising Problems	*87.29*	*21.370*	*74.93*	*26.633*	*0.46*	*.050**
Hyperactivity	83.86	21.336	68.93	23.348	0.64	.014*
Aggression	87.36	22.096	77.86	26.082	0.36	.079
Internalising Problems	*85.08*	*14.975*	*79.46*	*13.636*	*0.41*	*.209*
Anxiety	85.71	15.662	85.86	14.448	0.01	.972
Depression	85.79	17.551	78.43	11.099	0.66	.093
Somatization	60.77	34.279	54.38	25.022	0.26	.498
Behavioural Symptoms Index	*90.71*	*10.593*	*79.36*	*17.701*	*0.64*	*.050**
Atypicality	87.07	13.499	80.21	17.093	0.40	.080
Withdrawal	81.50	17.239	72.43	23.454	0.39	.122
Attention Problems	70.00	25.179	59.64	25.827	0.40	.135
Adaptive Skills	*29.00*	*22.814*	*34.57*	*28.672*	*0.19*	*.432*
Adaptability	23.29	16.675	26.79	21.326	0.16	.695
Social Skills	43.00	28.914	42.71	27.639	0.01	.949
Functional Communication	34.86	28.780	42.29	31.881	0.23	.138

Student Domain Scores

* $p = <.05$ ** $p = <.01$

Note: a decrease in mean scores indicates a decrease in perceived problem behaviour on that score. Domains in shaded italics denote sub heading summation of domains listed below the subheading from the psychological inventory's internal data analysis.

ITS percentile mean scores under 80 are within the normal range, between 80 - 90 are of medium clinical significance, whilst above 90 are highly clinically significant. BASC-2 percentile scores under 60 are within the normal range, scores between 60 - 70 are of medium clinical concern while scores over 70 are clinically concerning.

Analysis of student domain.

Because the results between the two psychological tests varied, analysis of them is separated into the two appropriate categories. These results are related to research questions 7 - 15.

Index of Teaching Stress results analysis.

The ITS considers research questions 7 - 12.

Question 7. Overall improvement in the challenging focus child (STU CHAR). Table 9 shows a highly significant improvement in STU CHAR teacher perception of the focus child [$p=.004$]. There was a significant difference in the scores for STU CHAR pre-test [m=77.357, sd=15.315], post-test [m=61.50, sd=13.546]. The STUCHAR is a summary score of the 5 domains listed below it (ADHD, ELLA, ANXW, LALD and AGCD). There is an improvement in the mean scores of all five domains that this figure is based on. In each instance the mean score has reduced in the post test. This gives weight to rejecting the null hypothesis.

Question 8. Improvement in reported student distractibility, impulsivity, restlessness and attention span (ADHD).

ADHD mean percentile scores reduced by 10.35 percentile points showing significance at the [p=.026] range. Pre-test [m=65.71, sd=20.708], post-test [m=55.36, sd=11.738]. Bergin and Bergin (2009) state that "anxious attachment is linked to ADHD and that insecurely attached students are more likely to be diagnosed with ADHD. Secure children, on the other hand have longer attention spans and higher cognitive test scores" (pp 149). Therefore a reduction in the ADHD symptomology following *The Teachability Factor* suggests that attachment and neuroscientific focused interactions may be beneficial in lowering ADHD behaviour. This is meaningful in light of the use of medication to reduce ADHD symptoms and it's significant side effects. If ADHD symptomology can be improved with an attachment approach the need for medication may be reduced (Bergin & Bergin, 2009; Neufeld, 2007, 2009).

Question 9. Improvement in reported student emotional and adaptive behaviour (ELLA). The Emotional Lability/Low Adaptability (ELLA) score is highly statistically significant [p=*.001*]. This scale measures characteristics that make the task of teaching more difficult by virtue of the student's unpredictable and inappropriate emotionality and / or inability to adjust to changes in the class (Abidin et al. 2004). Clinically significant improvement is demonstrated in the ELLA domain where a pre test average mean score was clinically significant at the 80.50 percentile [m=80.50, sd=12.781]. This was reduced post test [m=66.86, sd=9.445], well within the normal range. The decrease in mean score on this scale means that teachers are experiencing less crying, explosive anger, difficulty in soothing or calming and less resistance to change and transitions. The ITS Professional Manual states that teachers scoring high in this domain also report "*avoidance behaviour on their part toward the student and a tendency not to develop a personal relationship with the student*" (p. 16). Therefore this highly significant result suggests the teachers are now willing to relationally invest in the focus child, something that attachment theory strongly supports. Cohen's large effect size [d=*1.44*] is a very positive result from an eight week course.

Question 10. Improvement in reported student anxiety and withdrawal in the classroom (ANXW). Overall, *p* scores showed significance with the exception of Anxiety (ANXW) [*p*=.409] and Low Ability / Learning Disorder (LALD) [*p*=.077].

ANXW mean percentile scores reduced post test (pre-test [*m*=71.50, *sd*=20.747], post-test [*m*=67.71, *sd*=19.249]) but showed no statistical significance. Effect size is small [*d*=0.2]. The small decrease in the reported anxiety trait is likely to represent the teachers' transference of previously reported behaviours to anxiety. This could happen as a result of the course instruction, that teachers are to interpret the child's misbehaviour as communicating stress, anxiety and an insecure state, rather than other misbehaviours. Teachers were taught that "children who are repeatedly exposed to anxiety early in life may be at risk for over-activation of the amygdala, which can lead to chronic problems with attention and thought" (Bergin & Bergin, 2009, p. 148).Teachers responses may show that they are now considering the underlying causes of their focus child's behaviour and recognising the anxiety that is inherent in a flight or fight response to stress. Anxiety is an emotion that humans can more easily empathetically respond to compared to deliberate misbehaviour. Little change in this score, given the above explanation is plausible and acceptable and indicates a positive result from the course.

Question 11. Improvement in reported teacher ability to cope with and successfully teach given the student's specific learning challenges (LALD).

The LALD mean percentile score has reduced by 8.79 percentile points, but statistical significance is [*p*=.077]. Pre-test [*m*=65.79, *sd*=21.170], post-test [*m*=57.00, *sd*=17.867] One focus child was referred to Special Education for diagnosis of suspected Autism during the eight week course which might account for the anomaly in the LALD score which is only minor (this teacher reported improvement in other domains but this domain remained in the clinically significant range). While symptomology of Autism is alleviated with an

attachment focus, the disorder itself cannot be cured by it[12] (Neufeld, 2010; Porges, 2004). The range of percentile scores in this category was from <30 to >99 which makes effect size calculations and statistical significance difficult to measure with a small sample size. The mean reduction in percentiles shows that teachers are more able to cope with specific learning challenges and while many teachers reported significant improvement on this scale the combined results do not indicate the same strength.

Question 12. Improvement in reported distress caused by aggressive behaviour (AGCD). The AGCD score measures the distress caused to teachers by a student's aggressive behaviour. The mean percentile score has reduced by 12.35 percentile points and most notably teacher reports of aggression / conduct disorder (AGCD) show very high statistical significance [$p=.005$]. There was a significant difference in the AGCD scores for pre-test [m=76.64, sd=15.485] and post-test [m=64.29, sd=12.970] With aggression an increasing problem in education today the impact of this intervention on this scale deserves further investigation. The Cohen's effect size [$d=.95$] is large. Aggression is one of the most highly reported challenges for early childhood teachers. So a large effect on this scale has the potential to impact many teachers and students following professional development.

Overall effectiveness measured on the STUCHAR domain is very large [d=1.17] while individual scores vary. *The Teachability Factor* has had a large effect on teacher's perceptions of the focus child. The null hypothesis - that the teacher professional development workshop, *The Teachability Factor*, will have no effect on a teacher's perception of a specific challenging child in the classroom - can be confidently rejected as questions 7- 12 show a positive relationship.

Figure 9 below shows the mean scores on all ITS and BASC-2 domains have decreased except Adaptive Skills. This shows teachers perceived improvements in 9/10 summative student domains.

[12] Porges is making remarkable advances in his work with autism. See stephenporges.com for more information.

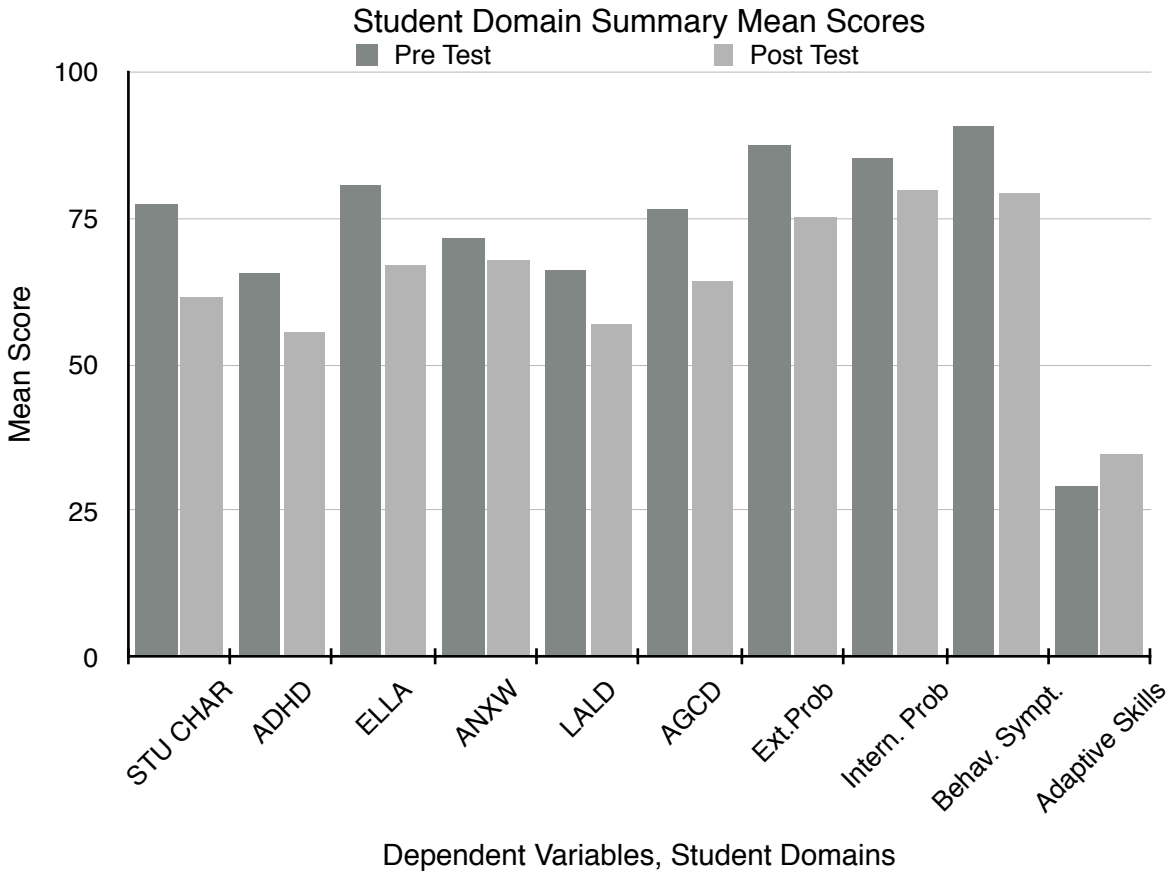


Figure 9 **Student Domain Summary Mean Scores from ITS and BASC-2**

BASC-2 results analysis.

BASC-2 results are related to research questions 13 to 15. The BASC-2 results give an encouraging, but slightly less significant picture than the ITS scores. Summary scores answer the three research questions related to this measure.

Question 13. Reduction in reported student externalising problems. Externalising Problems is a summary score of two domains: hyperactivity and aggression. Hyperactivity showed the greatest improvement, pre-test [*m=83.86, sd*=21.336] and post test [*m=68.93, sd*=23.384], with a medium effect score [*d=0.64*] and high significance [*p=.014*]. Aggression had a decrease in mean percentile scores of 9.5, pre-test [*m=87.36, sd=22.096*], post-test

[*m=77.86, sd=26.082*]. Externalising Problems category shows a medium effectiveness [*d=0.46*] while the significance score is [*p=.050*]. There was a significant difference in externalising problems pre-test [*m*=87.29, *sd*=21.370] compared to post-test [*m*=74.93, *sd*=26.633]. The standard deviation increased reducing the overall statistical significance and effect. Both hyperactivity and aggression were measured in the ITS scale (research questions eight and twelve respectively) and, while the ITS showed greater improvement, the downward trend is consistent. The importance of these scales for improving both teacher satisfaction and student behaviour has already been discussed.

Question 14. Reduction in reported student internalising problems. Internalising Problems is a summary score of three domains: anxiety, depression and somatization. Internalising problems summary score shows medium effect [*d=0.41*], and no significance [*p=.209*], although there was a small difference in internalising problems pre-test [*m*=85.08, *sd*=14.975] compared to post-test [*m=85.08, sd*=13.636]. Individual scores within this domain showed the depression measure had a small difference, pre-test [*m=85.79, sd*=17.551], post-test [*m=78.43, sd*=11.099] a medium effect [*d=0.66*], while somatisation [*m=60.77, sd*=34.279], post-test [*m=54.38, sd*=25.022] had a small effect [*d=0.26*] and anxiety actually increased marginally from [*m*=85.71, *sd=15.662*] to [*m*=85.86, *sd=14.448*] (For comments on anxiety, see analysis on research question 10 above).

Question 15. Reduction in reported student behavioural symptoms.

The Behavioural Symptoms Index showed significant difference in the scores. Pre-test [*m=90.71, sd=10.593*], a clinically significant percentile score to post-test [*m=79.36, sd=17.701*] a substantial improvement [*d=0.64*] indicates medium effectiveness and significance at [*p*=.050]. The Behavioural symptoms Index is a summary of three domains: atypicality, withdrawal and attention problems. Whilst none of these individual scores showed significance and only small effect size, the combined score gives a significant result and a medium effect. In each case the mean percentile score reduced but the range of scores

and the standard deviations were too large to give statistical power. The difference in atypicality was pre-test [*m=87.07, sd*=13.499], post-test [*m=80.21, sd*=17.093]. The difference in withdrawal was pre-test [*m=81.50, sd*=17.239], post-test [*m=72.43, sd*=23.454] and attention problems was pre-test [*m=70.00, sd*=25.179], post-test [*m=59.64, sd*=25.827]. Once again, individual responses show a significant variation and with a small sample size, a variation of one teacher's responses has a large impact on the overall results.

A comment on the adaptive skills domain. Adaptive skills form part of the BASC-2 questionnaire but were not a focus of this study. The results have been included for the purposes of full reporting but the results do not align with any goal or purpose of this study - *The Teachability Factor*, attachment theory or neuroscience. These mostly record developmental milestones such as speaking and social interaction, which are not well measured with an eight week interval of time. Therefore the results in this category are irrelevant to this research.

Summary. The BASC-2 mean domain scores relevant to this research have all shown improvement with the exception of Anxiety, measured in both the ITS and the BASC-2. Anxiety has not shown statistical significance in either test. Possible reasons for this have been advanced above. It would thus appear that the course has given teachers the ability to more accurately identify the cause and solutions to children's misbehaviour. The course considers developmental immaturity as a key factor in childhood behaviour and points out that in young preschool children teacher expectations are not always aligned with developmental psychology findings. James Wetz (2010) in his report on the changes needed to initial teacher training argues that "a deeper understanding of child development and attachment theory would support teachers to address these implications" (p.8). These results indicate that as teachers learned about the importance of attachment and worked over the eight week course to strengthen the attachment relationship with their focus child that the overall challenging behaviour decreased. Thus these results support the findings of

other researchers (Bergin & Bergin, 2009) and reject null hypothesis one - teacher perceptions of their focus child have improved considerably following *The Teachability Factor* course and research questions 13 - 15 have shown that teachers report a meaningful improvement in their challenging focus child.

Structured open ended questions.

The following is a summary and analysis of the open-ended question survey that participants filled in at the end of the eight week intervention. Full responses can be viewed in Appendix G. The results will be summarised according to the research questions 16 - 18 and will be numbered accordingly and summarised in the context of hypothesis two.

Research Question 16. Is there a change in teachers' approach to challenging student behaviour after participating in *The Teachability Factor* course?

Teachers responded to the question "*What approaches / techniques / methods did you use prior to this course to deal with problematic student behaviour in your classroom?"*

The common responses to this question included the use of time out or thinking chairs, removing children from the social situation, use of reward charts and praise. Teachers also reported spending positive individual time with the child where they made comments on the child's desirable behaviour. In all instances the interaction was focused on changing the behaviour, not on discovering the internal motivators or antecedents of the undesirable behaviour. Developmental immaturity was not suggested. Two respondents commented on their frustration with continually changing methods and rules for working with these children.

> I used time out many years ago, as time out method seemed ok at that time. Then we were told time out method was not positive to children. We used reward charts instead, which worked well for some children and not for others.

Another commented:

> Lots has changed over the years I have taught. I feel like ways to deal with problematic student behaviour is changing all the time and it confuses teachers and some teachers don't know what they can or can't do anymore. I've been told we are not allowed to do time out or reward charts anymore. We mostly talk to child and direct them and guide them to another area of play.

The next question in the open ended questionnaire asked teachers to *comment on their use of these techniques now,* following the eight week course. Overall the focus of teachers had changed from an external behavioural focus to an internal emotional focus. This is inline with the literature on primary emotions being the driver of behaviour. Pertinent comments include:

> Now I give the child much more of myself. Letting them know they are important to me, that I'm on their side.

> This child often looks tired, sad and slow with his movements.

> Sitting on the chair was not necessary anymore . . . the child is sleep deprived.

> Getting to know the child and form a connection where the child is able to trust me and know that "I am on their side".

> No child fits the same mould.

> No more time out, fewer discussions, not focussing on the problem, rather I have focused on strengthening the attachments to children in the classroom.

> I am now much more thoughtful and I can understand better what the child might be feeling and why; and therefore I have become much more patient and understanding. I have also learned to use collecting, bridging, matchmaking.

> I feel sorry for this child.

While some teachers still reported the use of time out occasionally, this was used more to protect other children in the class and was not seen as a way to help a child correct

their behaviour or 'learn from their mistakes'. The focus on a child's emotions and developmental levels and abilities significantly reduced teacher's frustrations with the child. Where teachers had previously seen children's behaviour as deliberate and 'on purpose' they now recognised the emotional 'stuckness' and developmental immaturity of the child and were able to make appropriate responses to the child to help them get 'unstuck' and mature. One participant commented:

> I look at children with challenging behaviours with fresh eyes. Instead of impatience I find myself considering the whole child's circumstances, for example, home life, peer relationships and teacher relationship. I do not consider any challenging behaviour now to be 'on purpose' or to 'push my buttons.' There is a deeper reason in my eyes of these behaviours which makes me reflect on my practice.

Interestingly, the teachers also reported a spill-over effect where their positive changes were seen not only in their child of focus, but in other children in the classroom as well:

> At work it has been encouraging to see a change in a few children that I personally have struggled with, thinking it was me they didn't like - I now know it was just gaining those bonds - attachment makes all the difference.

During course discussions several teachers became aware of other children in their class who they now saw with new eyes. The extroverted, aggressive children are often the children who get the most attention in the classroom. But this course helped teachers also identify the withdrawn child and the anxious child and how to respond appropriately. These children, because of their more introverted behavioural or emotional challenges, often get overlooked. One teacher commented:

> This course has not only made me look at children with behaviour problems, but also the crying children, the quiet children, the reserved children. Not just behaviour problem children and needy children.

Another two teachers commented on the benefits of this new understanding compared to previous behavioural techniques:

> Very relevant! It explained why we hit 'walls', why time-out doesn't work and most importantly what works and why.

> I feel like you learn about finding out the cause of a child's behaviour and how to deal with their behaviour in a loving, caring, gentle way. Not a strict way or reward chart that does not solve the problem or find out cause of problem, just fixes problem short term and not long term.

Teachers' responses have answered research question 16 in the affirmative. They have outlined significant ways in which their approach and attitude towards the challenging focus child changed over the eight week course.

Research Question 17. Can teachers benefit from an understanding of what has predominantly been a theory in the psychological world?

The need for a credible translator between psychology and education has been discussed in the literature review. Teachers often find themselves ill-equipped to work with a child's emotional issues and struggle to teach them. As Wetz (2010) so eloquently puts it,

> How many of our teachers and school leaders understand the importance of anxiety - 'an unavoidable part of learning and development'? How many understand that the challenge is to 'harness anxiety in the interest of learning and creativity' . . . attachment theory could provide teachers with a deeper insight into why children learn, and why for some, learning becomes a significant challenge which from time to time defeats them causing them to retreat into unmanageable behaviour (p. 18).

So should teachers be equipped to understand and support the emotional world of a student or should they simply refer the child to expert counsellors and therapists? Master teachers of folklore have well been recognised for their ability to bridge the gap between education and psychology. The master teacher movies, "To Sir With Love" (1967), "Mr

Hollands Opus" (1995), "Dead Poet's Society" (1989), "The Marva Collins Story" (1981), etc. all stress the teacher-child relationship as key in educating. So without being trained as counsellors and psychologists, without becoming defacto social workers (Bergin & Bergin, 2009, Wetz, 2010), can teachers be given a language and practice of psychology that can inform them in the every day situations that confront them, and make them more capable and confident teachers? That is essentially the question that needs to be answered. Will teaching them this psychological attachment theory confound them and complicate their role as teachers, or will it support and strengthen their impact on the education process and make them more effective teachers?

Can a broad understanding of neuroscience and attachment give teachers a theoretical framework to help them navigate their working relationship with the students in their care? The responses to this eight week course would suggest that it is not only possible, it is also effective and that teachers are highly receptive to it.

Teachers responded to the question: *what have you learned and liked about the course?:*

> I have learned about how and what a child needs to thrive and about attachment theory.
>
> I have loved the deeper understanding of true attachment. I have learned that in most cases problematic behaviours arise from lack of connection between child and teacher and through a child physically (brain development) being unable to understand their intense emotions.
>
> I love that we need to form attachments with both parent and child to be successful in all manner of teaching. Being aware that some children are still learning and require help in getting or providing ways around barriers.
>
> Wonderful content! What a revelation!
>
> I liked everything! But mostly about attachment and how it affects not just at preschool.

> The entire course has enlightened me on how easily a child can become 'teachable' through simple steps. In promoting the opportunity to establish a relationship of attachment. I have found no challenges in what I have learned.

> Key for me would be the importance of attachments and being aware of the different stages. Attachment to parents and how to maintain these while they are in our centre and of course supporting teacher's attachments with children. The idea of collecting children has always been instinctive to me, but I didn't realise what it was, how it worked and the importance of it. Likewise with bridging and matchmaking - I have and will continue to develop these in my practice and support our teaching team in doing the same.

> I have enjoyed every aspect of this course. Especially the high level of importance of attachments with teachers rather than peers.

> I have learned that the relationship between students and teachers is the foundation of learning and teaching. Every student is teachable but they need to be taught differently based on their background. Teachers need to build a good relationship with their students to create a context within which to teach. This course has given me lots of information to reflect on my own practice.

> Learning about 'tears of futility', the defence mechanisms, the value of attachment not only with children in our care, but also people in life in general.

> The strategies (principles) learned can be used with many different children in many different ways and that is helpful.

Further, those who benefitted most from the course were those for whom the material was new and transformational:

> Very relevant! It explained why we hit 'walls', why time-out, charts etc. don't work and most importantly what works and why. I would recommend the course to others. I wish all our teachers could do this course.

> This course is inspirational and I have learned so much from this course. This is a fantastic course! I believe this workshop should be one of the papers that students have to take when completing their teaching degree

> Yes, I would recommend the course to other people. I feel like you learn about finding out the cause of a child's behaviour and how to deal with their behaviour in a loving, caring, gentle way, not a strict way or reward chart that does not solve the problem or find out cause of problem - just fixes problem short term not long term

> Thank you - this course was amazing for both personal life - it has enabled me to look at my own blended family in a different context and be more tolerant when dealing with issues. But also at work it has been encouraging to see a change in a few children that I personally have struggled with thinking it was me they didn't like - I now know it was just gaining those bond / attachment makes all the difference.

> Session 8 was very instrumental to my child. It was a great conclusion and I feel that my thinking has completely changed. Sadly she is off to school soon, if anything I have become a friend.

Significantly, the teacher who claimed to have benefitted least from this course and who's focus child changed least, was a teacher who was already well educated in an attachment paradigm and who claimed to have already been using this while working with students:

> For me this course has been an affirmation of my own pedagogical approach and techniques with a reinforcement and reminder to engage the child first.

Teachers' have affirmed their answer to research question 17. Their responses show that they believe they have significantly benefited from learning about attachment theory and neuroscience.

Research Question 18. Can the insights and understandings from neuroscience and attachment psychology be translated into an effective pedagogy in the classroom?

Wetz (2010) expresses his frustration at the lack of teacher training in attachment:

> This is not a marginal issue of course content on teacher training courses when we realise that it is part of our failure to equip our teachers with the skill and understanding they need as professionals to support our vulnerable and less resilient young people in the UK. The situation is nothing short of a scandal which we constantly sidestep, despite a plethora of research reports which reveal difficulties which our major institutions find difficult to respond to … The outcomes of a successful childhood should be central to the educational project and to informing the training of our teachers. These outcomes would include enabling young people to have the capacity to trust, to be open to learning and manage the inherent risks involved in learning, to contain anxieties in the face of threat, and to regulate emotions (p. 17).

A comment is necessary regarding the specific terms and phrases teachers used in some responses: Over the eight week course teachers were given an academic understanding of 3 key neuroscientific, attachment and developmental understandings (Maturation [Emergence, Adaptation, Integration], Vulnerability and Attachment). These were taught by translating the psychological terminology into a language that teachers could use. Words such as 'bridging', 'match-making', 'collecting', were used to describe ways to strengthen the emotional bond. Pre-Frontal cortex functions were described as the 'mixing bowl' of the mind and attachment was described as 'roots' of attachment that give birth to the 'shoots' of emergence, adaptation and integration (Neufeld and Mate, 2005, for a glossary of Neufeld's terminology). Using a metaphor rich language to describe these psychological insights teachers were able to grasp them, share them and integrate them into their classroom practice. Some of this language is used in the responses below. Teachers reported on the question "*what will you take home / back to work and use?"* Insights gained varied:

> My understanding from this course of how attachment grows and strengthens. The strategies (principles) during this course are interesting. Admittedly I will have to reflect

> on all 8 sessions again through my notes to evaluate how best I can use these strategies in my teaching.
>
> We are all working on letting children attach to one of the three teachers in one classroom.
>
> Encouraging relationships, building and integrating the child's family into the centre, continue to immerse the emergent child into learning, meet non adaptive child and build on what they have to extend them on. So much to do . . .
>
> I will do a presentation on the course at a staff meeting. Re-visit attachment theory, winning the hearts of those stuck students.
>
> Making great connections / bridges between home and the centre. Making strong efforts to connect with all the children / people in my family. Using the power of attachment to motivate.
>
> Eyes, smile, nod (collecting) - how important it is to support transition from attachment person to the next (brilliant)!!!
>
> I will take back the qualities that a child needs to have to learn. How we as teachers can help our children. How our relationships with parents start us off on the right track. How our knowledge enables us to bring out the potential in children.
>
> I've learned that crying is ok - children need to let it out, don't stifle it. Also the importance of (developing) curiosity in young children.

Teachers also responded to the question, "*What have you learned and found challenging*". The purpose of this question was to give teachers an opportunity to criticise the course, to say that it was 'above their heads', or 'beyond the description of their job' as has been suggested by some that teachers are not counsellors or scientists (Wetz, 2010.

Instead of overwhelming teachers, the qualitative responses show that the course re-engaged teachers in the teaching and caring process. This qualitative response is supported by the lower stress levels in teachers as reported in the post tests results (all teacher domain

results are highly significant). The course made them feel more confident and energised to work with the children who were causing them stress and deepened their desire to impact their focus child. Insights teachers gained from the course gave them new ideas as to how to approach their focus child, which challenged their thinking and pushed them to try new, relationship strengthening ideas. They repeatedly asserted the need for more professional development of their teaching team and for parents too:

> This has been a fabulous professional learning experience. I wish our whole team could do it - and our families / parents. It has given me a whole new understanding of how I can support our non emergent, non adaptive, non integrative and poorly attached children - and this can be achieved at any stage in our lives. Thank you so much!
>
> I would love to share this with my colleagues and develop strategies and a 'way of being' with children to ensure that attachment and relationships are at the forefront of what we do, how we think and how it propels our planning and learning
>
> I have learned about how and what a child needs to thrive and about attachment theory. What is challenging is to share all this information with colleagues and get them to be on the same page as I am.
>
> That in order for children to be independent their dependency needs have to be met. I have found it challenging to help colleagues and parents to understand this.
>
> Time to do all this and to pass my new found knowledge on to staff who have no learning of this.
>
> I have learned that I should make an effort to work with those children who are not attached to me.
>
> Working with parents is key - but I find it challenging to approach some subjects with them. Learning about all of this and seeing how it reflects on my family situation.
>
> All children need a safe place and because 'my kids' are with me more than their parents we have to be a (substitute) parent and teacher at the same time. Dealing with their emotional wellbeing, and knowledge and learning without forgetting that their parents

> are their world and need to be mentioned and praised on a daily basis. I don't think any teacher in my room thinks about this and neither did I until this course.
>
> One particular child . . . I thought she might become too attached to me . . . to the point that I was irritated and annoyed. . . that she will cry and become upset when I leave the room . . . I have learned to give her more attention . . . I now invite her and ask her . . . I give her lots of hugs . . . this is working and I also use these techniques to settle in new children to preschool and it is working.

This comment is particularly revealing. It demonstrates how a faulty understanding of a child's clinginess and anxiety may have led to the teacher doing the opposite of what the child needed to mature. Once the teacher changed her understanding of what the child was communicating, the problematic behaviour began to decrease. Wetz (2010) puts it this way:

> Our teacher training needs to be predicated on these ideas . . . developing in teachers an understanding that behaviour is a communication about need; that anger and rage may represent a primate anxiety about survival in the face of threats and might also be seen a defensive and protective behaviour that separation and loss in a child's life can lead to a fear of destruction and to panic. This might enable a more informed professional response to such behaviours (p. 18-19).

Two teachers commented that the content had been challenging to learn and incorporate. When answering what they had learned and found challenging they wrote:

> The aspect of neuroscience in relation to the early childhood setting and how development unfolds.
>
> Ability to process dissonance. I need more examples to understand how to support children to gain this ability.

Teachers also responded to the question: *"What aspect of the course was least significant?"* Responses varied from "Nothing!" to comments about being a little tired at the

end of the day and facing a two hour evening course, to being overwhelmed by the thought of a one hour video presentation:

> I found the video a little overwhelming - a light discussion before helped me settle into the information that was being taught then discussion after was great!
>
> At the end of a long day I sometimes found the discussions initiated by others were tedious and irrelevant. I would have preferred discussions revolving around the presentation instead.
>
> I feel like I need more practical ways of dealing with a child's behaviour. Being shown in a preschool. Examples and stories that you, Kaye, and Dr Gordon Neufeld have done to deal with behaviour problems were really helpful.

While teachers acknowledge some challenges with internalising their learnings and in sharing their learning with others, they affirm their answer to research question 18 that attachment theory and neuroscience can be effectively translated into an education setting.

Thus teachers affirm that *The Teachability Factor* course can be translated into an effective pedagogy in the classroom, a partial answer to hypothesis two. The null hypotheses are 1) that the teacher professional development workshop, *The Teachability Factor,* developed by Dr. Gordon Neufeld, Neufeld Institute, Canada, will have no effect on the teacher's perception of a specific challenging child in the classroom and 2) That the teacher workshop, *The Teachability Factor,* will not be an evidence-based professional development course for teachers who work with challenging children in the classroom. The following chapter will discuss ways in which the hypotheses have been rejected and the research questions answered using the combined evidence of the literature review and the research data.

Discussion and Recommendations

This section will discuss the research results in light of the literature review, hypotheses and research questions. It will identify connections, implications and insights. The discussion will have four sections: A) a general overview, B) an examination of the hypotheses and research questions in light of the research results and literature review, C) an identification of the methodological limitations and suggestions for improving the robustness of future research, and D) recommendations for further research, for colleges of education and for schools / early childhood centres.

Overview

The prolific increase in the number of brain education resources being produced is evidence of teacher demand for knowledge in these areas. The extensive use of neuromyths is therefore of considerable concern because they are not based on good science. While some neuroscientists such as Hirsh-Pasek and Bruer (2007) have argued that the education sector should ignore neuroscience findings, such advice is not being heeded, and rightly so. The educational challenge now lies in distinguishing neurofact from neuromyth and this isn't straightforward for uninformed teachers and educators. The need for evidence-based neuroscience professional development for teachers is vital because of the potential impact an informed understanding of neuroscience and attachment may have on under achieving and poorly behaved students. The literature review has identified and highlighted the potential that these understandings have for education. Accordingly, Cozolino (2013) is right in contending that there is a strong need for teachers to have access to credible, authentic, evidence-based neuroscience and attachment research. The findings of this research study suggests that *The Teachability Factor* is an effective course to fill this pressing

need and that neuroeducation significantly improves teacher perceptions of challenging children in their care.

This chapter will consider the hypotheses, and each research question, in the context of the research and literature review. The evidence for rejecting the two hypothesis will be discussed together in light of this research and the literature review.

Hypotheses and research questions.

Hypothesis 1: That the teacher professional development workshop, The Teachability Factor, will have no effect on a teacher's perception of a specific challenging child in the classroom.

This hypothesis can be rejected because the research data has found there is a significant relationship between the two: a teacher's improved perception of student characteristics has correlated strongly with the eight week course. Research questions 3 - 16 have been substantially answered in the Results chapter. Summative comments follow.

Questions 3 - 6: The teacher domain.

Teachers reported highly significant levels of improvement in all four ITS domains. Overall teacher stress reduced, teachers felt more competent and expressed a reduced need for support, satisfaction from teaching increased, and finally teachers reported a highly significant reduction in disruptions of the teaching process.

Furthermore, teachers qualitative responses reported that their own attitudes and engagement in the teaching process had significantly improved. Attachment is a two way relationship with reciprocal benefits for both parties. This has positive ramifications for staff retention and teacher engagement in the classroom. If a teacher is motivated to connect with his or her students, and the student's behaviour becomes more manageable, it has a flow on effect in creating a positive classroom environment. Thus the research

supports the call of other researcher to teach neuroscience and attachment to teachers (Bergin & Bergin, 2009; Dubinsky, 2010; Geddes, 2003; 2005; Hook & Farah, 2012; Howard-Jones, 2014; Wetz, 2010).

Questions 7 - 16: The student domain.

Sixteen out of seventeen student domains showed improved mean scores and the one that increased was only small. This reinforces the neuroscientific theories that espouse the strengths of attuned emotional attachment as a precursor to improved learning and behaviour (Bergin & Bergin, 2009; Commodari, 2013; Dubinsky, 2010; Geddes, 2003; 2005; Hook & Farah, 2012; Howard-Jones, 2014; Wetz, 2010). The adaptive skill scale has shown a small mean increase but was not the focus or intent of this study. Adaptability is something that preschoolers naturally struggle with because they have not yet reached the 5 - 7 year shift where the OPMC begins to function outside of an attachment relationship. An increase in this adaptability scale could be attributed to better informed teachers, who now have a more realistic expectation of what their students are capable of, given their emotional and chronological challenges.

Hypothesis 2: That The Teachability Factor is not an effective evidence-based professional development course for teachers who work with challenging children in the classroom

Neuroscience has provided biological evidence for the theory of attachment. Thus attachment theory is now empirically established and inextricably linked to neuroscience. In a beautiful attachment metaphor, 'the two have become one'.

The Teachability Factor professional development course considered three major facets of neuroscience and attachment research 1) Maturation's three processes of emergence, adaptation and integration, 2) the role of Vulnerability, and 3) Attachment. The research data will be compared to the literature review to determine if it is evidence-based, and effective for teachers of challenging children.

Maturation.

Maturation is the three fold process of developmental maturity that all securely attached individuals experience.

Emergence.

The research results support attachment as a way to increase emergence: as teachers strengthened their attachment relationship with their students, the students improved on all but one of the 17 domains tested. Teachers reported that overall student behaviour on both the ITS and the BASC-2 improved. The literature states that there is a connection between attachment and motivation, interest, curiosity and social competence (Bath Spa, 2014; Bergin & Bergin, 2009; Carlson & Collins, 2009; Geddes, 2003; 2006; Shanker, 2012; Siegel, 2010a; 2012; Sroufe, Egeland, Wetz, 2010). Bergin and Bergin (2009) state, "insecure children are less curious, more dependent, less empathetic, less compliant, lower in self-esteem, less emotionally positive, and less socially competent than secure children" (p. 146). Children vary in how much they need to attach to teachers. "Children who have secure attachment to parents are not likely to need additional secure adult-child relationship, yet they are easier for teachers to attach to" (Bergin & Bergin (2009) p. 156). As problematic behaviours decrease, teachers are able to spend more time teaching and less time disciplining, thus learning is enhanced (Keith & Fine, 2005, Vannest & Hagan-Burke, 2010).

Adaptation.

The need to feel one's emotions in order to have a flexible response to stressful situations has been well demonstrated by Siegel's (2010a; 2013) and Schore's (2005; 2014) research on affect-regulation and the amygdala. The lack of adaptation, is a key cause of aggression in students. It occurs when a student does the same thing over and over again, expecting different results. The build up of frustration leads to aggression if a student

cannot feel the disappointment of failure and adapt by trying a different way of doing something. Neufeld (2012a) advises if the teacher can soften the heart and re-engage the emotions, aggression will likely decrease.

In *The Teachability Factor* course teachers were taught the importance of attuned communication (Porges, 2011; Schore, 2014) with their students and the power of providing a safe emotional relationship for the student (Bowlby's secure base).

The results showed a highly significant decrease in reported aggressive behaviour (AGCD) and a significant decrease ADHD symptomology. Teachers also reported improvement in students' emotional and adaptive behaviour (ELLA) and their anxiety and engagement in the classroom (ANXW) mean score also decreased. This provides a good starting point for future research to establish a significant relationship between a student's secondary attachment with their teacher and a reduction in anti-social behaviour.

Integration:

Schore (2005; 2014) has articulated the relationship between the OMPC and the amygdala in affect regulation and in helping individuals work towards a goal. Neufeld (2010a), in his effort to translate the technical language for teachers, calls it the 'mixing bowl' of emotions. The impact of a well functioning OMPC cannot be underestimated when it comes to effort, hard work and moral behaviour. Whilst young children are yet developing the OMPC, adults to whom they are attached can act as the mixing bowl for their emotions.

A poorly functioning OMPC is the root of affect regulation challenges and therefore has significant impact on aggression, bullying and other anti-social behaviour. Quoting research studies, Commodari (2013) reports:

> Attachment, as well as the interaction between attachment and emotion regulation emerged as important contributors to most social information processing steps. This result suggests that children with secure attachments and effective emotion-regulation skills have better social information processing capabilities compared with a reference group (p. 124).

Often in early childhood education teachers expect children to behave with more social skills than is developmentally appropriate. The OMPC ideally starts it's functioning between the ages of five to seven years of age - once a child has left the early childhood centre in New Zealand[13]. Thus early childhood teachers should not expect stressed children to react to distressing situations in the same way that an older child with a developed OMPC behaves. Stressed preschoolers can manage one emotion at a time, but not two conflicting emotions while under stress. Significantly, the OMPC is not engaged by chronological age, but rather by secure attachment and attunement (Schore, 2014). Thus, it is common to find under-functioning OMPC's in persons of any age who have not had attachment rich relationships (Neufeld, 2007; 2012; Siegel, 2010a).

The results this study of *The Teachability Factor* show that early childhood teachers have appropriately recognised the developmental stages of their preschool children and are now attributing some of their focus child's behaviour to immature development, rather than anti-social behaviour. This is shown by the changes in mean BASC-2 scores in the adaptive skills category: adaptability, social skills and functional communication. Teachers reported adaptive skills had deteriorated (an indication of a more informed and realistic expectation of preschooler's capabilities), while externalising problems (aggression and hyperactivity), internalising problems (withdrawal, attention problems, atypicality) and overall behaviour had improved - areas that attachment enhanced teacher-child relationships could be expected to improve, regardless of chronological age as the teacher contains the student's emotions (Geddes, 2003; Neufeld, 2012).

13 New Zealand children typically begin their formal education in the week they turn five

Vulnerability.

"Bowlby began the systematic study of the brain's defenses against the vulnerability of early separation experiences in children" (Neufeld, 2007a, p. 27). Schore's (2005; 2007; 2014), work has expanded this understanding while Neufeld has simplified it into a language that is easily accessible to teachers without taking away the significant theoretical underpinnings. Vulnerability is, in a very positive sense, our ability to feel our emotions. Thus it helps a person mature and cope with the various challenges life gives. Flight from vulnerability happens when a person experiences too much trauma and wounding. Instead of feeling emotions, they are defended against them, which creates behavioural and learning challenges in students (Bergin & Bergin, 2009). Freud succinctly summarises this process when he states, "Unexpressed feelings never die; they are buried alive and come forth later in uglier ways" (cited in Covey, 1992). Reductions in the ADHD domain indicate that there could be a relationship between softening a student's defenses through secure attached relationships, and improved attention, distractibility, impulsivity and restlessness. Thus *The Teachability Factor* course is further supported by evidence-based literature.

Attachment: the problem and the solution.

Emergence, Adaptation and Integration are impeded by lack of secure attachment while a lack of vulnerability defends against attachment. Attachment remains the solution because humans are creatures of attachment and continually pursue it, even in the face of defendedness. Therefore, when a student is exhibiting poor adaptation and integration, Neufeld contends safe attachment is the panacea. A child's attachment state directly impacts their behaviour and academic performance (Bergin & Bergin, 2009; Geddes, 2003; 2005; Hook & Farah, 2012; Wetz, 2010). Therefore, attachment is a vital consideration for teachers of challenging children.

During the *Teachability Factor* course, as teachers learned of the importance of attuned relationships, their interactions with their focus child changed. Teachers reported using less behavioural techniques, less reward and consequences, and more warmth and engagement. One teacher, who had experienced the frustration of a clingy child, had invited the child to be emotionally closer; prior to the training she had tried to teach the child independence by remaining aloof and professional. She reported positive behavioural outcomes as a result of her change in her focus. Other teachers had similar results.

While not empirically established by this research because of statistical limitations, there is also anecdotal evidence from the research data to suggest that the teachers' attuned, engaging behaviours may have had an influence on improved behavioural symptoms of their focus child. Certainly the teachers reported perceived improvement.

Question 17. Can teachers benefit from an understanding of what has predominantly been a theory in the psychological world?

Teachers have expressed overwhelming support for *The Teachability Factor* and have indicated their sharing of the material with their colleagues, their desire to have more learning themselves, their enjoyment of and practical use of their learning, and their suggestion that every teacher needs to know this information. Literature and anecdotal comments within the teaching fraternity support these opinions (Bergin & Bergin, 2009; Dubinsky, 2010; Geddes, 2003; 2005; 2006; Hook & Farah, 2012; Howard-Jones, 2014; Wetz, 2010). The proliferation of neuro-education tools and resources reveal a growing demand for neuroscientific research in the education sector. Courses such as *The Teachability Factor* which translate the scientific terms into easily accessible language mean that these theories can quickly benefit teachers.

Question 18. Can the insights and understandings from neuro-science and attachment psychology be translated into an effective course for teachers?

The overall results of this research indicate that this material can be taught to teachers in a way that they can understand and translate into every day practice in their classrooms. The results, while lacking statistical power, followed the same consistent trend, and had significant effect scores on many domains. When coupled with the qualitative results this indicates teachers' strong desire to learn more about this field of science. The literature review highlighted the critical need for evidence-based courses, as opposed to pop-psychology and neuro-myths (see Appendix B which outlines principles of effective prevention programs). This research supports this finding in order to prevent damaging the reputation of such a new and well validated science. Teachers can understand this material when it is put into a language that is accessible to them. *The Teachability Factor* has provided a language that informs and equips teachers to translate science and theory into classroom practice. To illustrate, an initial reading of Schore's research findings can be daunting to someone outside a psychological frame; hence Neufeld's approach is more acceptable for an education audience.

Summary.

The Teachability Factor professional development course recognises the need for affect-regulation and attunement while focussing on the role of emotional attachment to achieve this. Neufeld differentiates himself from Cozolino (2014) and Shanker (2014) as he does not believe that self-regulation can be taught to students as part of the curriculum or as a methodology. Rather, he argues self-regulation is *caught* as the safe brain rests from alarm and is allowed to mature. Adults can help the child's regulation though secure attachment relationships. Helping a child mix their feelings in their prefrontal cortex is Neufeld's solution to self-regulation. So while the biological processes are agreed upon by Neufeld, Shanker and Cozolino, Neufeld is consistent with the affect research findings of

neuroscience that these traits form through emotional security, not cognitive learning. Neufeld (2012a) therefore rejects having a curriculum approach to teach self-regulation to students, or methodological steps for teachers to follow. Instead he focuses more on an adult attachment figure helping a child truly feel their emotions and to learn to mix them with other emotions (e.g mix fear of failure with a desire to achieve and you get effort and courage), thereby achieving self-regulation. Shanker's (2013) Canadian model tends more towards a didactic approach and a focus on rational process, minimising the role of emotion in self-regulation. The mechanics of neuroscience cannot be divorced from the very personal and emotional human nature so well expressed in attachment theory. While less precise and structured, the Neufeld approach honours the primary role of emotion as the engine of maturation, and promotes teachers and parents as the safe attachment models that allow a student to reach their full potential, as they are genetically programmed to do.

The links between neuroscientific literature, attachment theory and *The Teachability Factor* have demonstrated that this course is an evidence-based, scientifically credible program. The content of the course is in synchrony with the academic literature, while providing a much needed translation of jargon. Simmonds (2014) asserts the need for just this kind of course:

> Many neuroscientists emphasise the potential of their research to improve education, although they rarely have the impetus or educational or methodological expertise to translate the findings into practical education interventions. Likewise, main educators are interested in how neuroscience might advance their practice, but few are equipped to judge the best approaches to take (p. 1).

The teacher friendly vocabulary enables easy comprehension, personalised internalisation of the content and ready application of theory to practice making this program an effective intermediary between the scientific and psychological worlds and the education sector.

The results, while based on a very small sample size, indicate that the findings of neuroscience and attachment may be effective as a teacher professional development program in both the teacher and student domains. One could have some reserved confidence that a larger sample size may have yielded more significant results; to more strongly reject both null hypotheses.

Limitations

This study has several limitations. First, caution must be used when interpreting any findings. Challenging children present with multiple, complex variables and each child is unique. So applying a one-size fits all approach to improving behavioural and academic outcomes is naive. In addition, the instruments chosen, while beneficial and informative, were not designed primarily to test for attachment. While this research has some limitations, namely, the small sample population (resulting in a loss of statistical power), the absence of a control group, and the lack of a longitudinal study to better test for relationships, nevertheless there are significantly consistent statistical trends and qualitative indications that this professional development course has had a positive impact both on teachers and the students they reported on. The results are consistent and robust enough that they can guide future research and teacher practice in this important area. Accordingly, the following recommendations are made:

Significant modifications to future research:

- This research needs to be repeated, using the same eight week course, and the same two psychological testing instruments (BASC-2 and ITS) with more teacher participants. Having a large population sample would increase the power of the statistical procedures.

- Research would be stronger if it were repeated within early childhood, primary and secondary education contexts to test for any commonality of neuroeducational attachment processes, as well as any variance within these populations.

- An improved focus child sample base representing an ethnic mix that matches the population would be of interest to researchers, particularly in light of the under achieving tail having significant Maori and Pacific Island representation.

- An external control group should be used.

- A comparative study would be helpful between *The Teachability Factor* and other educational behavioural and cognitive evidence-based approaches to test for effectiveness.

- A comparative study would be insightful between *The Teachability Factor* and other education attachment and brain-science models (Brain U, for example).

- The study could be more longitudinal: post test measures might be repeated at 16 and 24 weeks in addition to the eight week post test.

- In the current research study percentile scores were used for the statistical analysis. In future studies, with a larger population sample, using raw scores or T scores to do the statistical analysis may enable more powerful statistical procedures to be employed.

The Teachability Factor has shown to be an overall effective professional development course that significantly helped reduce teacher stress and symptomology of behavioural problems in children.

While the sample size for the research was small, the high degree of significance and consistency of data trends suggests that the course made a very positive contribution to both reducing teacher stress and alleviating challenging behaviour in children. That the teacher participants expressed positive regard and overall passionate enthusiasm for the course is further evidence that teachers both want and need evidence-based courses on attachment, neuroscience and developmental processes. It also illustrates that *The Teachability Factor* course has enough user friendly translatable material for teachers to implement their newfound knowledge and understanding into their classrooms with excellent outcomes.

The results have only considered the impact on early childhood teachers and thus application to all education sectors must be made with significant caution. However, the neuroscience and attachment research asserts the validity of this approach with all students, and therefore an assumption that similar effects may be experienced in primary and secondary schools is not without a foundation.

Implications for future use of The Teachability Factor course and neuroscience in education

The results of this research provide support and encouragement that further investigation may be scientifically beneficial. While limitations have been acknowledged, the integration of the research study data with the literature review suggests that attachment processes in education results in positive outcomes. Recommendations will be outlined in three sections: implications for future research, implications for teacher training, implications for education policy and practice.

Implications for future research.

The relationship between an understanding of neurobiologically validated attachment theory and improved teacher and student outcomes creates a persuasive argument for the need for further research. Many research opportunities are apparent, with training teachers and testing the effectiveness of such, just the beginning.

In order to accurately assess the effectiveness of neuroscience in the teacher training process, a more thorough research assessment needs to be employed. For example, it may be possible to do comparative research study utilising three sample groups: A) The eight week *Teachability Factor* course, B) A control group, and C) A validated behavioural or cognitive approach. Testing for effectiveness and significance amongst these three groups may provide more robust evidential support for an attachment approach, in line with what neuroscience is finding. This would help mitigate the criticism that different methods can beget different results (Charness, Gneezy, Kuhn, 2011).

It would also be important research to test how neurophysiological reactions of cortisol and adrenalin levels from the child's perceived threat of danger (the student has what Porges would term an activated mobilisation system - fight or flight response), impacts teachability. If there is a relationship between the two, and it seems probable, teachers may well be confronted with a teaching challenge before they even attempt to begin teaching (Cozolino, 2013; Neufeld, 2012).

Finally, one of Neufeld's unique contributions to the area of attachment is his warning about the dangers of peer attachment. Neufeld (2005; 2010a; 2012a; 2012c) cautions that in the absence of a secure adult attachment, children attach to each other. This creates wounding in children, as other children are not safe attachment figures due to their immaturity. When an attachment figure wounds, it is much more damaging than being hurt by someone outside your attachment world. This has implications for bullies and their victims as Neufeld poignantly illustrates (Neufeld 2009). Neufeld would therefore argue

that while schools could be more social, they should be centred around the adults children are safe with, not around peer attachment where further wounding and defenses occur (Neufeld & Mate, 2005, especially chapters 1 - 3). Research to test this theory would be a very valuable contribution to a thorough understanding of attachment in an educational setting.

Implications for education: teacher training.

It would be wrong to assert that attachment theory is completely ignored in modern teacher training programs. Most teachers will have heard the name "Bowlby" and know of Mary Ainsworth's "strange situation" experiment. But few would be able to articulate the implications that this research could have on their every day teaching practice and few understand the links between attachment theory and neuroscience. Few teachers would highlight that a key to teaching troubled children is creating a safe emotional bond with them. Most would rely on behavioural techniques, rewards and consequences which only act to heighten a student's already felt alarm. Indeed, my final instruction from teachers' college in 1999 was "don't smile until Easter!"[14]

The significance of neurobiological attachment research is that the default teaching perspective be through the lens of attachment theory (Bath Spa, 2014; Bergin & Bergin, 2009; Hook & Farah, 2012; Wetz, 2010). Thus neuroscience needs to be both implicit and explicit in teachers' colleges, and society as a whole could benefit from it being an inherent part of classroom management, teaching and practice. The need for the application of theory to the classroom is evident and the potential for positive behavioural and academic outcomes is exciting. Wetz (2010) points out the current inadequacy of teacher education:

> This language of 'attachment theory' (with its key concepts of a 'secure base in relationships', 'containing anxiety', and a 'holding environment') plays little if any part in initial teacher training at secondary level though it is significant in the training for 'early years

[14] This is a common instruction historically given in teachers' college as a way of instructing teachers to be stern and strict with their students in the interests of classroom management.

> teachers'. My belief is that it is an essential theoretical framework that should be at the very heart of initial teacher training for secondary school teachers - informing its policy and practice. Without such understanding our teachers at best become little more than technicians transmitting knowledge and competencies in an emotional vacuum and at worst find themselves in a disruptive maelstrom which may be damaging for themselves as teachers as well as for their pupils (p. 16).

In addition to the need for further research, the evidence of neuroscience and attachment research is now so substantive on a world wide scale, that it is appropriate that it be extensively taught in mainstream teacher education and offered to existing teachers as professional development.

Recommendations.

- The introduction of an attachment and neuroscience paper for teacher trainees in teacher's colleges from preschool through to secondary school training (Bath Spa, 2014; Simmonds, 2014; Wetz, 2010).

- The incorporation of an attachment, developmental and neuroscience framework into classroom management / discipline teaching in colleges of education.

- Offer *The Teachability Factor* course as professional development through organisations like Kohia Teachers Centre (Auckland University, College of Education, Professional Development Unit) etc. for existing teachers (Bath Spa, 2014; Geddes, 2003; 2005; Simmonds, 2014; Wetz, 2010).

- Bring Dr. Gordon Neufeld, and other like minded experts, (Dr. Allan Schore, Dr. Dan Siegel, Dr. Louis Cozolino to name a few) to NZ to speak to our University Education Departments (and others) to inform those training our teachers so they are all 'singing from the same song sheet.'

- Perhaps a symposium for teachers, subsidised by universities and/or government, and then supported and followed up through on site (school) attachment experts who can help teachers translate their learning into practice. The use of internet technology and social media could also provide discussion forums for teachers where they can seek the advice of experts in these areas.

- Targeted intervention training for those who deal with challenging students the most: classroom teachers, guidance counsellors, school deans, etc.

- The use of the New Zealand Government's recently announced Investing in Educational Success, Community of Schools teachers (MOE, 2014) as trainers and mentors in attachment theory.

Implications for education policy and practice.

Schools and teachers often fail our most vulnerable students. The bottom 20 percent of students, commonly referred to as "Priority Learners" in New Zealand (MOE, 2014; Stoop, 2012) who need the most support, often get further alienated by school policy that punishes students for their emotional and developmental immaturity. Research now reveals this simply elevates their insecure attachment state and reinforces their belief that they are emotionally unsafe. Wrongly supposing that chronological age always equals emotional ability and self control, schools can unintentionally exacerbate the problems of these vulnerable students. A quick review of a problematic high school student's detention record will quickly show that detentions are not helping the student to improve their behaviour - they are not 'teaching a lesson' or helping the student make better choices in the future. Equally, time out chairs and reward charts are ineffective long term strategies in early childhood. Teachers are wanting more effective solutions. Neufeld (2011a) cautions against using interventions on a child (like yelling or punishments like time-out) that will increase arousal levels for a child who is already stressed. He reasons, if a child's stress is already causing problematic behaviours why would you want to increase their stress state!

A valid insight, yet that's often what teachers do. "While attachment research has altered other major institutions such as hospitals for the better, it has not influenced schools sufficiently" (Bergin & Bergin, 2009, p. 158).

Teachers need to become experts in two roles: (1) stimulating a student's neuroplasticity processes and it's resultant motivation to learn, and (2) inhibiting amygdala defense reactions that hinder learning. Both factors are meditated through attachment mechanisms. The teacher becomes a secondary attachment figure for their students by stimulating within the student neuroplasticity, while at the same time soothing the student's amygdala. Neufeld's *Teachability Factor* provides powerful insights and tools to achieve this. Neufeld (2012a), Geddes (2003; 2005; 2006) and Bath Spa (2014) all outline ways that schools can become emotionally safer places for children to enable them to have the environment needed for learning to take place.

The Teachability Factor, supported by neuroscience literature, says that there is a different way to enhance teachability, and that individual teachers, early childhood centres and schools can and must do better for these children. In an education setting where students exist in large numbers, policies, rules and disciplinary procedures must be in place to protect the majority. However, the traditional approaches we have used in education to try to change, solve or cure the challenging student needs to be transformed into more effective practice informed by attachment theory. Some change will come about as a result of better teacher education as recommended above. However, the impact of teacher training is limited to those who attend and internalise the new understanding. Schools also need to adapt at a policy and practice level to give students who lack teachability the best chance to mature and learn (Bergin & Bergin, 2009; Cozolino, 2013; Geddes, 2003; 2005; Neufeld, 2012; Wetz, 2010).

Recommendations.

- Because of the serious implications of infant interrupted attachment in the inadequate development of the orbital medial prefrontal cortex and the wiring of fight or flight neural pathways, that serious consideration be given to current practices of infant care in early childhood settings (Carroll-Lind & Angus, 2011). "The principle that early disruption of the mother-infant attachment relationship has a negative impact on brain plasticity and predisposes to later psychopathology is well established" (Schore, 2005, p. 210). Early childhood education needs to create new and better ways to integrate home life with the centre, to create a 'village of attachment' (Neufeld & Mate, 2005).

- The use of a consistent caregiver for the early childhood years so that young, vulnerable children have less attachment interruption (Bergin & Bergin, 2009). This would lower a child's separation defenses giving them what Neufeld (2010a) calls a soft heart (where they can feel the emotions they are experiencing). As Bergin and Bergin (2009) state,

> Attachment takes time to develop. This requires that teachers and students stay together long enough to form relationships. In a preschool that emphasised relationships by having teachers move with children to older classrooms, researcher found that it took at least nine months with an expert teacher before the children developed secure teacher-student relationships. This is probably an underestimate of the time needed for high-risk children, older children or children with insecure attachment histories to establish secure relationships. In a childcare setting for homeless children in New York, attachment to teachers took from several months to a few years, even though bonding was given priority, and one-on-one time was regularly scheduled between teacher and child. Thus we might not expect bonding to occur until the end of a typical school year, when relationships are normally ended (p. 160).

Too many competing attachment figures caused by large classrooms, staff turnover and regular classroom moves (as children get older they move to another classroom with new teachers) may be interrupting a child's OMPC development and their ability to self-regulate. Research needs to be conducted to test whether children develop better with a constant caregiver, and whether a consistent caregiver protocol should be part of the description of quality early childhood education.

- The frequently used term, 'quality childcare' needs re-defining in light of the research now available. This researcher suggests it's use be limited by regulation, to those childcare centres that have long term attachment relationships at the heart of their staff-child policies and procedures.

- The re-positioning of the early childhood education sector with a safe, nurturing and caring environment being the highest priority and academic education being subservient. Neurobiology again shows the developmental inappropriateness of formalising education for preschoolers; emergent play should trump a formalised curriculum (Hughes, 2009; Hughes & Baylin, 2012; Neufeld, 2011; Panksepp, 1998; Siegel & Payne Bryson, 2011). As Nel Noddings (1992) argues

> The first job of schools is to care for children. It is morally and practically wrong to assert that schools should only concentrate on academic goals; children do not learn academically if they are not cared for. All students want to learn, although not necessarily the content they are asked to learn in school. Caring for children prepares them to be receptive to learning such content (cited in Bergin & Bergin, 2009, p. 161).

- Re-educating parents in the important function of a loving, warm bond between parent and child. The importance of early education has been promoted to the detriment of parental nurture.

- Transferring government early childhood funding to the parents rather than the Early Childhood centre to financially enable parents who wish to stay at home with their preschooler to do so (to reduce attachment interruption). As Schore (2005) affirms,

> . . . there is no attachment without the mother . . . a large and consistent body of developmental neuroscience research across both human and animal species confirms the central role of the early relationship with the mother in the neurobehavioral development, and therefore, future social-emotional and stress-regulation capacities of the developing individual (p. 210).

- Family or 'tribal' groupings of students in early childhood education, primary and secondary school with consistent teachers over a period of years (Cozolino, 2014; Wetz, 2019).

- The use of a master teacher who has a proven track record of working successfully with challenging students and who has undergone specific professional development (the newly announced Community of Schools and Teachers of Excellence roles could fulfil this).

- The regular monitoring of student offences / challenging behaviour to identify the patterns of individual students. If the traditional behavioural intervention is not transformative, the student needs a new attachment intervention.

- The regular monitoring of teachers' record of punishments (e.g. use of detentions, time out) to identify if there are individual teachers who are not connecting with students, and to target them for professional development.

- Guided group teacher meetings for the specific purpose of discussing challenging children and sharing insights and ideas (again, appropriately trained COS teachers could do this).

- Teachers to prioritise knowing about the developmental history and home life of challenging children in the classroom. Possibly the return of home visits for younger students for the purposes of linking home and school.

Adequacy of the course

The need for attachment and neuroscience to become integral to teacher education is demonstrated by numerous researchers (Bergin & Bergin, 2009; Cozolino, 2013; Geddes, 2005; Howard-Jones, 2010; Wetz, 2010).

How this is best accomplished is still being researched. Because of the potential benefits for the student, their teacher, and the larger society such integration is imperative.

In the lag time between recognising a gap in education's understanding and practice, and actually formally incorporating it into classrooms and teachers' colleges, contemporary brain entrepreneurs are making their impact known in the form of neuromyths. Neuroscience is now well established in counselling and psychotherapy practice. Schore (Schore & Schore, 2008; 2012) has argued of its relevance and suitability for social work (discussed fully in 2012, p. 28) (his wife Judith has a PhD in social work). Through community programs like The Circle of Security (Cooper, Hoffman & Powell, 2009) the attachment paradigm is becoming widely acknowledged as an effective, empirical intervention. This research contends that New Zealand students and teachers need to benefit from this approach as well. Pasquinelli (2012) agrees:

> A bridge should be established between education and mind-brain sciences, with the double aim of devising educational methods that work and of understanding why they work. The success of this encounter depends, among other conditions, on getting the science *right*; otherwise, neuroeducation and science informed policies risk doing more harm than good (abstract, p. 89).

The Teachability Factor is an evidenced-based program that is aptly suitable for educators. It ticks the boxes for accessibility, academic rigour, translatable language and options for deeper study, and has produced favourable results in this small research study. Further, it is currently being used internationally and thus is suitable for consideration in further research studies, as well as being incorporated into professional development programs for teachers.

Conclusion

This research has identified a gap in education for the integration of neurobiological attachment knowledge in teacher training, professional development and classroom practice. From this research study there is a strong desire and motivation from teachers to learn this material in a language that is accessible to them, and in a manner that they can accurately translate into classroom practice. The benefits of an attachment approach to education are established through neuroscience findings and anecdotally supported by this small research study. While further research is needed, one could postulate that there is sufficient empirical evidence today to incorporate neurobiological attachment teaching in teachers' colleges and teacher professional development courses. This needs to be done in a well managed way to ensure that teachers are not confused by the popular neuromyths that are so pervasive.

Students, particularly the under achieving tail, have significant gains to make as a result of attachment informed teaching. If anti-social behaviour can improve, as this research study has found, there is significant hope for the future of these students, academically, behaviourally and socially. Attachment theory is culturally nuanced (van IJzendoorn & Kroonenberg, 1998) and therefore works well with indigenous / minority cultures such as New Zealand's Maori and Pacific Island communities that contribute disproportionally to our under-achieving educational statistics. In fact, attachment aligns

naturally with their traditional family and community structures, as opposed to a standardised, homogenous educational world.

Future benefits to society can also be predicted, as improvements in student behaviour and academic attainment enrich the wider society.

Thus the research unreservedly recommends that *The Teachability Factor* has beneficial potential to education, teachers, students and society and is an effective, evidence-based professional development program.

"Child, give me your hand, that I may walk in the light of your faith in me."

Hannah Kahn (cited in Ginott,2003)

References

Abidin, R. R., Greene, R. W., & Konold, T. R. (2004). *Index of Teaching Stress, Professional Manual*. Florida, USA: PAR Psychological Assessment Resources, Inc.

Adey, P., & Dillon, J. (2012). *Bad Education: Debunking myths in education.* Berkshire, England: Open University Press, McGraw-Hill Education.

Adolphs, R. (2003). Is the human amygdala specialised for processing social information? *Annals of the New York Academy of Sciences, 985,* 326 - 340.

Ainsworth, M. D. S. (1967). Infancy in Uganda: Infant care an the growth of love. Baltimore: John Hopkins University Press.

Ainsworth, M. D. S. (1972). Attachment and dependency: A comparison. In J. L. Gewirtz (Ed.), *Attachment and dependency* (pp. 97-137). Washington, DC: V. H. Winston.

Ainsworth, M. D. S. (1989). Attachments beyond infancy. *American Psychologist, 44*, 709-716.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of Attachment: A Psychological Study of the Strange Situation*. Hillsdale, NJ: Erlbaum.

Allen, G. (2011). *Early Intervention: the next steps.* An independent report to Her Majesty's Government. UK. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/284086/early-intervention-next-steps2.pdf

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition.* Arlington, VA: American Psychiatric Publishing.

Amituanai-Toloa, M. (2010). Get a twenty inch frying pan: Enhancing success for Pasifika bilingual education. *MAI Review, 2010*:1-11

Anderson, S. W., Bechara, A., Damasio, H., Tranel, D., & Damasio, A. R. (1999). Impairment of social and moral behaviour related to early childhood. *Developmental Neuropsychology, 18*, 281-296.

Anthes, K. (2002). *No child left behind policy brief: School and district leadership.* Education Commission of the States. Retrieved online from http://ecs.org/clearinghouse/34/62/3462.pdf

Atwool, N. (1999). Attachment in the School Setting. *New Zealand Journal of Education Studies, 34*:2, 309-322.

Baker, S. C., Frith, C. D., & Dolan, R. J. (1997). The interaction between mood and cognitive function studied with PET. *Psychological Medicine, 27*, 565-578.

Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind.* Cambridge, MA: MIT Press.

Bath Spa University. (2014). *An introduction to attachment and the implications for learning and behaviour.* National College for Teaching and Leadership and Bath and North East Somerset Council and Bath Spa University. Retrieved from http://www.bathspa.ac.uk/Media/Education/attachment-and-the-implications-for-learning-and-behaviour.pdf. Contains public sector information licensed under the Open Government Licence v3.0.

Baumeister, R. F., & Vohs, K. D. (Eds.). (2011). *Handbook of self-regulation: Research, theory, and application.* New York: Guilford Press.

Bell, D.C. (2009). Attachment without fear. *Journal of Family Theory and Review, 1, 177-197.*

Bergin, C., & Bergin, D. (2009). Attachment in the Classroom. *Educational Psychology Review, 21*, 141-170.

Berk, L. E. (2009). *Development Through the Lifespan.* New York: Pearson.

Best, M., Williams, J. M., & Coccaro, E. F. (2002). Evidence for a dysfunctional prefrontal circuit in patients with an impulsive aggressive disorder. *Proceedings of the national Academy of Science of the United States of America, 99,* 8448-8453.

Blair, C., & Diamond, A. (2008). Biological processes in prevention and intervention: The promotion of self-regulation as a means of preventing school failure. *Development and Psychopathology, 20,* 899-911.

Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment.* New York: Basic Books.

Bowlby, J. (1973). *Attachment and loss, Vol. 2: Separation.* New York: Basic Books.

Bowlby, J. (1979). *The making and breaking of affectional bonds.* London: Tavistock.

Bowlby, J. (1980). *Attachment an loss: Vol. 3. Sadness and depression.* New York: Basic Books.

Bowlby, J. (1988). *A secure base (2nd Ed.).* New York: Basic Books.

Bowlby, R. (2014). *Affect regulation and the healing of the self: Bowlby on Schore: How Allan Schore changed our views of childhood and old age.* Los Angeles: Lifespan Learning Institute lecture.

Brazelton, T. B. (2006). *Touchpoints: Your Child's Emotional and Behavioral Development.* Cambridge: MA: Da Capo Press.

Brazelton, T. B., & Greenspan, S. I. (2000). *The Irreducible Needs of Children: What every child must have to grow, learn and flourish.* New York: Perseus Publishing.

Bretherton, I., & Munholland, K. A. (1999). Internal working models in attachment relationships. In J. Cassidy & P. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 89-111). New York: Guilford

Brown, J. W., & Jaffe, J. (1975). Hypothesis on cerebral dominance. *Neuropsychologia*. *13*:1, 107-110.

Bruce, J., Clelland, T., Macfarlane, S., Mikaere-Wallis, N., Ruddenklau, Kl, Taula, J., Taula, I., (2014). *Positive Youth Development through Education: Addressing Issues of (Dis) Engagement in Aotearoa / New Zealand Schools.* Wellington: Ministry of Education and University of Canterbury.

Buonomano, D. V., & Merzenrich, M. M. (1998). Cortical plasticity: From synapses to maps. *Annual Review of Neuroscience, 21*, 149-186.

Cairns, K. (2002). *Attachment trauma and resilience: Therapeutic caring for children.* London: B.A.A.F.

Carlson, K. (1999). Impact of Experimental Design on Effect Size: Findings from the Research Literature on Training. *Journal of Applied Psychology*, 1999, Vol 84, No. 6, 851-862. Retrieved from http://www.management.pamplin.vt.edu/directory/Articles/Carlson5.pdf

Carroll-Lind, J., & Angus, J. (2011). *Through their lens: An inquiry into non-parental education and care of infants and toddlers.* New Zealand: Office of the Children's Commissioner.

Carter, C. S. (2005). Biological Perspectives on Social Attachment and Bonding. In Carter, C. S., Ahnert, L. A., Grossman, K. E, Hrdy, S. B. Lamb, M. E., Porges, S. W. & Sashser, N. (Eds.), *Attachment and Bonding: A new synthesis* (pp. 85-100). Cambridge, MA: MIT Press.

Cassidy, J. (1999). The nature of a child's ties. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical implications* (pp. 3 - 20). New York: Guilford.

Cassidy, J., & Shaver, P. (1999). (Eds). *Handbook of Attachment.* New York: Guilford.

Charness, G., Gneezy, U., & Kuhn, M. (2011). Experimental methods: Between-subject and within subject design. *Journal of Economic Behaviour and Organisation, 81* (2012), 1-8.

Chiron, C., Jambaque, I., Nabbout, R., Lounes, R., Syrota, A., & Dulac, O. (1997). The right brain hemisphere is dominant in human infants. *Brain, 120,* 1057-1065.

Coe, R. (2002, 12-14 September). *It's the Effect Size, Stupid: What effect size is and why it's important.* School of Education, University of Durham, Annual Conference Paper.

Commodari, E. (2013). Preschool teacher attachment, school readiness and risk of learning difficulties. *Early Childhood Research Quarterly 28*, 123-133.

Cooper, G., Hoffman, K., & Powell, B. (2009). *Circle of Security, Facilitator Manual.* USA: Circle of Security International.

Covey, S. R. (1992). *Principle-Centred Leadership Week Manual.* Provo: UT: Covey Leadership Centre.

Cozolino, L. (2006). *The Neuroscience of Human Relationships: Attachment and the Developing Social Brain.* New York: W.W. Norton and Company.

Cozolino, L. (2013). *The Social Neuroscience of Education: Optimizing Attachment and Learning in the Classroom.* New York: Norton.

Cozolino, L. (2014). *Attachment-based Teaching: Enhancing Learning Through Human Connection.* Los Angeles: Lifespan Learning Institute Conference.

Crain, W. C. (2011). *Theories of development: concepts and applications.* Boston: Prentice Hall.

Crabbe, J.C., & Phillips, T.J. (2003). Mother nature meets mother nurture. *Nature Neuroscience, 6,* 440-442.

Dallal, G. (n.d). Analysis of Pre-test Post-test Experiments [Web log post]. Retrieved 10 July, 2014 from http://www.jerrydallal.com/LHSP/prepost.htm.

Damasio, A. (1996). *Descrates error: Emotion, reason, and the human brain.* New York: Putnam.

Damasio, A. R. (1994). *Descrates' error.* New York: Grosset/Putnam.

Damon, W. (1983). *Social and Personality Development: Infancy through adolescence.* New York: W.W. Norton.

Davidson, R. J., Jackson, D. C., & Kalin, N. H. (2000). Emotion, plasticity, context and regulation: Perspectives from affective neuroscience. *Psychological Bulletin, 126,* 890-909.

Davis, M., & Whalen, P. J. (2001). The amygdala: vigilance and emotion. *Molecular Psychiatry, 6*,13-34.

Davison, I. (2013). Significant drops in NZ Educational Achievement - OECD Report. *New Zealand Herald*, December 3, 2013. Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11166346

De Bono, E. (2004). *How to have a Beautiful Min*d. London: Vermilion.

De Bono, E. (1985). *Six thinking hats.* New York: Little Brown and Company.

Dead Poets Society. (1989). Touchstone Pictures.

Dekker, S., Lee, N. C., Howard-Jones, P., & Jolles, J. (2012). Neuromyths in education: Prevalence and predictors of misconceptions among teachers. *Frontiers in Psychology*, October 2012.

Derryberry, D., & Tucker, D. M. (1992). Neural mechanisms of emotion. *Journal of Clinical and Consulting Psychology, 60,* 329-338.

Driscoll, K. C., & Pianta, R. C. (2010). Banking Time in Head Start: Early efficacy of an intervention designed to promote supportive teacher-child relationships. *Education and Development, 21,* (1), 38-64.

Dubinsky, J. M. (2010). Neuroscience Education for Prekindergarten-12 Teachers. *The Journal of Neuroscience, 30,* (24):8057-8060.

Duckworth, A. L., & Seligman, M. E. P. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science, 16,* 939-944.

Durlak, J. A. (2009). How to Select, Calculate and Interpret Effect sizes. *Journal of Paediatric Psychology.* Retrieved from http://jpepsy.oxfordjournals.org/content/34/9/917.full

Dykema, R. (2006). "Don't talk to me now, I'm scanning for danger." How your nervous system sabotages your ability to relate (an interview with Stephen Porges about his polyvagal theory). *Nexus,* March/April, 30-35.

Dykema, R. (2006). How your nervous system sabotages your ability to relate: An interview with Stephen Porges about his polyvagal theory. *Nexus,* March/April, 2006.

Education Counts. (2014). *Stand-downs, suspensions, exclusions and expulsions from school.* Retrieved from http://www.educationcounts.govt.nz/indicators/main/student-engagement-participation/Stand-downs-suspensions-exclusions-expulsions

Education Review Office. (2008). *School's provision for Students at Risk of Not Achieving.* Retrieved from http://www.ero.govt.nz/National-Reports/Schools-Provision-for-Students-at-Risk-of-Not-Achieving-August-2008

Ellingham, J. (2014, 25 June). Dairy Stabbing: 12 year old charged with manslaughter. *New Zealand Herald.* Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11281500

Elliot, R., Frith, C. D., & Dolan, R. J. (1997). Differential neural response to positive and negative feedback in planning and guessing tasks. *Neuropsychologia, 35,* 1395-1404.

Fieldman, R., Greenbaum, C. W., & Yirmiya, N. (1999). Mother-infant affect synchrony as an antecedent of the emergence of self-control. *Developmental Psychology, 35,* 223-231.

Fonagy, P., & Target, M. (1997). Attachment and reflective function: Their role in self-organization. *Development and Psychopathology, 9,* 679-700.

Fonagy, P., & Target, M. (2005). Bridging the transmission gap: An end to an important mystery of attachment research? *Attachment and Human Development, 7,* 333-343.

Fonagy, P., & Target, M. (2002). Early intervention and the development of self regulation. *Psychoanalytic Inquiry, 22*, 307-335.

Fonagy, P., Steele, M., Steele, H., Leigh, H., Kenendy, R., & Mattoon, G. (1995). Attachment and the reflective self and borderline states: The predictive specificity of the adult attachment interview and pathological emotional development. In R. Muir., J. Kerr, and S. Goldberg (Eds.), *Attachment theory: Social, developmental and clinical perspectives* (pp. 233-278). Hillsdale, NJ: The Analytic Press.

Fosha, D. (2000). *The Transforming Power of Affect.* New York: Basic Books.

Freud, S. (1973). A*n Outline of Psychoanalysis.* London: Hogarth.

Fuster, J. M. (1985). The prefrontal cortex and temporal integration. In A. Peters & E. G. Jones (Eds.), *Cerebral cortex: Vol. 4. Association and auditory cortices* (pp. 151-171). New York: Plenum Press.

Fuster, J. M. (1996). Frontal lobe and the cognitive foundation of behavioural action. In A. R. Damasio, H. Damasio, & Y. Christen (Eds.), *The Neurobiology of decision-making* (pp. 47-61). New York: Springer-Verlag.

Fuster, J. M. (1997). *The prefrontal cortex: Anatomy, physiology, and neuropsychology of the frontal lobe* (3rd ed.). Philadelphia: Lippincott-Raven.

Gaensbauer, T. J., & Seigel, C. H. (1995). Therapeutic approaches to posttraumatic stress disorder in infants and toddlers. *Infant Mental Health Journal, 16,* 292-305.

Garavan, H., Ross, T. J., & Stein, E. A. (1999). Right hemisphere dominance of inhibitory control: An event-related functional MRI study. *Proceedings of the National Academy of Sciences of the United States of America, 96,* 8301-8306.

Gardener, H. (1983). *Frames of mind: The theory of multiple intelligences.* New York: Basic Books.

Geddes, H. (2003). Attachment and the child in school. Part 1. *Emotional and Behavioural Difficulties*, *8*:3, 231-242, DOI: 10.1080/13632750300507021

Geddes, H. (2005). Attachment and Learning. Part 2. The Learning Profile of the Avoidant and Disorganised Attachment Patterns. *Emotional and Behavioural Difficulties,* 10:2, 79-93, DOI:10.1177/1363275205054161

Geddes, H. (2006). *Attachment in the classroom: The links between children's early experience, emotional well-being and performance in school.* United Kingdom: Worth Publishing.

Giedd, J., Stockman, M., Weddle, C., Liverpool, M., Alexander-Block, A., Wallace, G., Lee, N., Lalonde, F., Lenroot, R. (2010). Anatomic magnetic resonance imaging of the developing child and adolescent brain and effects of genetic variation. *Neuropsychology Review, 20,* 349-361.

Ginott, H. G. (2003). *Between Parent and Child.* New York: Three Rivers Press.

Goleman, D. (1996). *Emotional intelligence.* New York: Bantam Books.

Goleman, D. (2006). *Social intelligence: The new science of human relationships.* New York: Bantam Books.

Gottman, J. M., & Gottman, J. (2007). *And Baby Makes Three*. New York: Crown Publishing.

Greenberg, L. S., & Goldman, R. N. (2008). *Emotional-Focused Couples Therapy: The Dynamics of Emotion, Love and Power.* Washington, DC: American Psychological Association.

Greenspan, S. I. (1981). *Psychopathology and adaptation in infancy and early childhood: Principles of clinical diagnosis and preventive intervention.* New York: International Universities Press.

Grinder, M. (1991). *Righting the Educational Conveyor Belt* (2 Ed.). Portland OR: Metamorphous Press.

Gross, J. J., & Thompson, R. A. (2007). Emotion regulation: conceptual foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation.* New York: Guilford Press.

Grossman, K. E., & Grossman, K. (1999). Mary Ainsworth: Our Guide to Attachment Research. *Attachment and Human Development, 1,* 224-228.

Harlow, H. F., & Zimmerman, R. (1959). Affectional responses in infant monkey. *Science, 130*, 421-432.

Harris, J. R. (2009). *The Nurture Assumption.* New York: Free Press.

Hattie, J. (2003). *Knowledge Wave Conference.* Retrieved from http://www.educationalleaders.govt.nz/content/download/48020/401086/file/John%20Hattie.pdf

Hazan, C., Gur-Yaish, N, & Campa, M. (2004). What does it mean to be attached? In W. S. Rholes & J. A. Simpson (Eds.), *Adult attachment: Theory, research, and clinical implications* (pp 55 - 85). New York: Guilford.

Heard, D., & Lake, B. (1997). *The challenge of attachment for care-giving.* London: Routledge.

Helmeke, C., Ovtscharoff, W., Poeggel, G., & Braun, K. (2001). Juvenile emotional experience alters synaptic inputs on pyramidal neurons in the anterior cingulate cortex. *Cerebral Cortex, 11,* 717-727.

Hesse, E., & Main, M. (2000). Disorganized Infant, Child, and Adult Attachment: Collapse in Behavioral and Attentional Strategies. *Journal of the American Psychoanalytic Association*, *48,* (4): 1097-1127.

Hirsh-Pasek, K., & Bruer, J.T. (2007). The Brain/Education Barrier. *Science,* 317 (5843), p. 1293. DOI: 10.1126/science.1148983

Holmes, J. (1993). Attachment theory: a biological basis for psychotherapy? *British Journal of Psychiatry, 16*, (3), 430-438.

Holmes, J. (2001). *The search for a secure base: Attachment theory and psychotherapy.* Sussex: Brunner Routledge.

Hook, C. J., & Farah, M. J. (2012). Neuroscience for Educators: What are they seeking and what are they finding? *Centre for Neuroscience,* University of Pennsylvania. DOI 10.1007/s12152-012-9159-3

Howard-Jones, P. (2009). Scepticism is not enough. *Science Direct*, Cortex *45*, p. 550-551.

Howard-Jones, P. (2010). *Introducing Neuroeducational Research: Neuroscience, education and the brain from contexts to practice.* New York: Routledge.

Howard-Jones, P. (2014). Evolutionary perspectives on mind, brain and education. *International Mind, Brain and Education Society* and *Wiley Periodicals, Inc., 8,* No. 1., 21-33.

Howard-Jones, P. (2014). Neuroscience and education: myths and messages. *Nature Reviews Neuroscience,* October 15, 2014. DOI 10.1038/nrn3817

Hughes, D. A. (2009). *Attachment-Focused Parenting.* New York: Norton.

Hughes, D. A., & Baylin, J. (2012). *Brain-Based Parenting: The neuroscience of caregiving for healthy attachment.* New York: W. W. Norton and Company.

Human Rights Commission. (2014). *Section Four: The right to education*. Human Rights in New Zealand Today Report.

Immordino-Yang, M. H. and Damasio, A. (2007), We Feel, Therefore We Learn: The Relevance of Affective and Social Neuroscience to Education. *Mind, Brain, and Education,* 1: 3–10. doi: 10.1111/j.1751-228X.2007.00004.x

Immordino-Yang, M. H. & Fischer, K. W. (2010). Neuroscience Bases of Learning. *International Encyclopaedia of Education,* p.310-316. DOI: 10.1016/B978-0-08-044894-7.00500-5

Joe, S., Romer, D. & Jamieson, P. E. (2007). Suicide Acceptability is Related to Suicide Planning in U.S. Adolescents and Young Adults. *Suicide and Life-Threat Behavior,* 37: 165–178. doi: 10.1521/suli.2007.37.2.165

Johnson, S. C., Dweck, C. S., & Chen, F. S. (2007). Evidence for infant's Internal Working Models of Attachment. *Psychological Science, 18*, (6), 501-502.

Johnson, S. M. (2004). *The Practice of Emotionally Focused Couple Therapy.* New York: Brunner-Routledge.

Johnson, S. M. (2004). Attachment Theory: A guide for healing couple relationships. In J. Simpson & S. Rholes (Eds.). *Adult attachment: New directions and emerging issues.* New York: Guilford Press.

Johnson, S. M. (2008). *Hold Me Tight: Seven conversations for a lifetime of love.* New York: Little, Brown and Company.

Johnson, S. M., & Whiffen, V. (2003). *Attachment processes in couple and family therapy.* New York: Guilford Press.

Johnston, M. (2011, March 28). Child alcohol abuse up nearly 20pc. *New Zealand Herald.* Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10715367

Kagan, J. (2009). *The Long Shadow of Temperament.* Boston: Belknap Press.

Karen, R. (1998). *Becoming Attached: First relationships and how they shape our capacity to love.* New York: Oxford University Press.

Keith, T. Z., & Fine, J. G. (2005). Multicultural influences on school learning: Similarities and differences across groups. In C. L. Frisky & C. R. Reynolds (Eds.), *Comprehensive handbook of multicultural school psychology* (pp. 457-482). New York: Riley.

Kirby, A., Woodward, A., & Jackson, S. (2010). Benefits of Omega-3 Supplementation for Schoolchildren: Review of the Current Evidence. *British Educational Research Journal, 36.5, 699-732.*

Knudson-Martin, C. (2012). Attachment in Adult Relationships: A Feminist Perspective. *Journal of Family Theory and Review, 4,* No. 4.

Korthagen, F., Loughran, J., & Russell, T. (2006). Developing fundamental principles for teacher education programs and practices. *Teaching and Teacher Education.* 22:1020-1041. DOI: 10.1016/j.tate.2006.04.022

La Grand, R., Mondloch, C., Maurer, D., & Brent, H. P. (2003). Expert face processing requires visual input to the right hemisphere during infancy. *Nature Neuroscience, 6,* 1108-1112.

Laxton, A. (2013, February 23). It just doesn't add up: Why can't New Zealand kids do basic maths? *New Zealand Herald*. Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10867109

LeDoux, J. E. (2003). The self: Clues from the brain. *Annals of the New York Academy of Sciences, 1001,* 295-304.

Leevers, H. (2014, January 7). Myths about how the brain works have no place in the classroom. *The Guardian*. Retrieved from http://www.theguardian.com/science/blog/2014/jan/07/myths-brain-education-teaching

Lesk, A. (2011, April 4). Crime shock: NZ's little thugs. *New Zealand Herald*. Retrieved from http://www.nzherald.co.nz/bay-of-plenty-times/news/article.cfm?c_id=1503343&objectid=11024267

Lesk, A. (2011, April 5). Misbehaviour by kids rated No. 1 social issue. *New Zealand Herald*. Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10717133

Luria, A. R. (1980). *Higher cortical functions in man* (2nd ed.). New York: Basic Books.

Magai, C. (1999). Affect, imagery, and attachment: Working models of interpersonal affect and the socialisation of emotion. In J. Cassidy and P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications.* New York: Guilford.

Main, M. (2000). The Organized Categories of Infant, Child, and Adult Attachment: Flexible vs. Inflexible Attention Under Attachment-related stress. *Journal of the American Psychoanalytic Association. 48*: 1055-1095.

Main, M., & Hesse, E. (1990). Parent's unresolved traumatic experiences are related to infant disorganised attachment status: Is frightened and/or frightening parental behaviour the linking mechanism? In M. Greeberg, D. Cicchetti, and M. Cummings (Eds.), *Attachment in the preschool years: Theory, research and intervention* (pp. 161-182). Chicago: University of Chicago Press.

Main, M., (1999). Attachment theory: Eighteen points with suggestions for future studies. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 845-887). New York: Guilford press.

Main, M., & Hesse, E. (2003). *Adult attachment Scoring and Classification Systems (unpublished manuscript).* Berkeley, CA: Department of Psychology, University of California at Berkeley.

Main, M., & Solomon, J. (1986). Discovery of a new, disorganised/disorientated attachment pattern. In Brazelton, T.B. and M. Youngman, M. (Eds.). *Affective development in infancy* (pp 94 - 124). Norwood, NJ: Ablex.

Main, M. & Solomon, J. (1990). Disorganization and disorientation in infant Strange Situation behavior during the Ainsworth strange situation. In Greenberg, M., Cichetti, D., and Cummings, M. (Eds). *Attachment in the Preschool Years: Theory, Research, and Intervention* (pp. 121-160). Chicago: University of Chicago Press.

Manning, B. (2014, June 25). Stabbing: More than 'boys will be boys'. *New Zealand Herald.* Retrieved from http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11280984

Medina, J. (2008). *Brain Rules: 12 Principles for Surviving and Thriving at Work, Home and School.* Seattle; Pear Press.

Merikangas, K.R., He J., Burstein M., Swanson, S., Avenevoli, S., Cui,, L., Benjet, C., Georgiades, K., Swendsen, J. (2010). Lifetime Prevalence of Mental Disorders in US Adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry. 2010; 49 (10)*: 980-989. doi:10.1016/j.jaac.2010.05.017.

Mikulincer, M. (1998). Attachment working models and the sense of trust: An exploration of interaction goals and affect regulation. *Journal of Personality and Social Psychology, 74*, 1209-1224.

Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioural system in adulthood: Activation, psychodynamics, and interpersonal processes. In M. P. Zanna (Ed.). *Advances in experimental social psychology, 35* (pp. 53 - 152). San Diego, CA: Academic Press.

Mikulincer, M., & Shaver, P. R. (2007). *Attachment in Adulthood: Structure, Dynamic, and Change.* New York: The Guilford Press.

Mikulincer, M., & Shaver, P. R. (2012). Adult Attachment Orientations and Relationship Processes. *Journal of Family Theory and Review, 4,* 259 - 274.

Mingagawa-Kawai, Y., Matsuoka, S., Dan, I., Naoi, N., Nakamuram, K., & Kokima, S. (2009). Prefrontal activation associated with social attachment: Facial-emotion recognition in mothers and infants. *NeuroImage, 21,* 583-592.

Ministry of Education. (2010). *Modern Learning Environments.* Retrieved from http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/PropertyToolBox/StateSchools/Design/ModernLearningEnvironment.aspx

Ministry of Education. (2011). *Ministry of Education Position Paper: Assessment [Schooling Sector],* Wellington. Retrieved from http://www.minedu.govt.nz/~/media/MinEdu/Files/TheMinistry/MOEAssessmentPositionPaper_October11.pdf

Ministry of Education. (2011). *New Zealand School Property Strategy, 2011- 2021*, Retrieved from http://www.minedu.govt.nz/~/media/MinEdu/Files/EducationSectors/PrimarySecondary/PropertyToolbox/StateSchools/SchoolPropertyStrategy201121.pdf

Ministry of Education. (2013, 23 August). *Ministerial Cross-Sector Forum on Raising Achievement.* Retrieved from http://www.minedu.govt.nz/~/media/MinEdu/Files/TheMinistry/CrossSectorForum/ForumMeetings/23August2013MeetingSummaryRecord.pdf

Ministry of Education. (2014). *Focus on Priority Learners*. Retrieved from http://www.minedu.govt.nz/theMinistry/EducationInitiatives/InvestingInEducationalSuccess/Report/Part2/FoundationElements/Focus.aspx

Ministry of Education. (2014). *Investing in Educational Success.* Retrieved from http://www.education.govt.nz/ministry-of-education/specific-initiatives/investing-in-educational-success/

Ministry of Education. (2014). *New Zealand Education System Overview*. Retrieved from http://www.minedu.govt.nz/NZEducation/EducationPolicies/InternationalEducation/ForInternationalStudentsAndParents/NZEdOverview/International_Comparisons.aspx

Moir, J. (2013). *Experts appalled as literacy rates continue to flatline*. Retrieved from http://www.stuff.co.nz/national/education/9006588/Experts-appalled-as-literacy-rates-continue-to-flatline

Morgan, M. A., Romanski, L. M., & LeDoux, J. E. (1993). Extinction of emotional learning: Contribution of medial prefrontal cortex. *Neuroscience Letters, 163,* 109-113.

Mr Holland's Opus. (1995). Metro-Goldwyn-Mayer.

Munari, A. (1994). Jean Piaget (1896-1980). *Prospects: the quarterly review of comparative education XXIV.* (1/2): 311-327.

Neufeld, G. (2007a). *Working With Stuck Kids: Study Guide.* Vancouver: Neufeld Institute.

Neufeld, G. (2007b). *Bullies: Their making and unmaking* [DVD]. Vancouver: Neufeld Institute. Available from http://www.neufeldinstitute.com

Neufeld, G. (2008). *The Teachability Factor* [DVD]. Vancouver: Neufeld Institute. Available from http://www.neufeldinstitute.com

Neufeld, G. (2009). *Challenging Childhood Problems Manual.* Vancouver: Neufeld Institute.

Neufeld, G. (2010a). *Challenging Childhood Problems: Course material.* Vancouver: Neufeld Institute.

Neufeld, G. (2010b). *Making Sense of Aggression* [DVD]. Vancouver: Neufeld Institute. Available from http://www.neufeldinstitute.com

Neufeld, G. (2011a). *Making Sense of Discipline: The ins and outs of imposing order on children's behaviour* [DVD]. Available from http://www.neufeldinstitute.com

Neufeld, G. (2011b). *Making Sense of Play: Why children need to play and what they need for true play to result* [DVD]. Available from http://www.neufeldinstitute.com

Neufeld, G. (2012a). *The Teachability Factor* [DVD]. Vancouver: Neufeld Institute. Available from http://www.neufeldinstitute.com

Neufeld, G. (2012b). *Making Sense of Preschoolers* [DVD]. Available from http://www.neufeldinstitute.com

Neufeld, G. (2012c). *The Teachability Factor: Study Guide.* Vancouver: Neufeld Institute.

Neufeld, G. & Mate, G. (2005). *Hold on to Your Kids: Why parents need to matter more than peers.* New York: Vantage.

New Zealand Parliament Select Committees. (2008). *What is 21st Century Education*? Retrieved from http://www.21stcenturyschools.com/what_is_21st_century_education.htm

New Zealand Parliament. (2012). I*nquiry Into 21st Century learning Environments and Digital Literacy.* Retrieved 16 July, 2014 from http://www.parliament.nz/en-nz/pb/sc/business-summary/00DBSCH_INQ_11275_1/inquiry-into-21st-century-learning-environments-and-digital

New Zealand Principals Association. (n.d). *What to do about New Zealand's Under Achieving Children.* Retrieved from http://www.nzpf.ac.nz/list/%252FWhat%20to%20do%20about%20New%20Zealand's%20underachieving%20children

Noriuchi, M., KiKuchi, Y., & Senoo, A. (2008). The functional neuroanatomy of maternal love: Mother's response to attachment behaviours. *Biological Psychiatry, 63*, 415-423.

O'Sullivan, L., & Ryan, V. (2009). Therapeutic Limits From An Attachment Perspective. *Clinical Child Psychology and Psychiatry, 14* (2): p. 2315-235.

Organisation for Economic Co-operation and Development (OECD). (2014). *International Student Assessment (PISA).* Retrieved from http://data.oecd.org/pisa/mathematics-performance-pisa.htm

Organisation for Economic Co-operation and Development (OECD). (2014). *Neuromyths.* Retrieved from http://www.oecd.org/edu/ceri/neuromyths.htm

Ovtscharoff, W., & Braun, K. (2001). Maternal separation and social isolation modulate the postnatal development of synaptic composition in the infralimbic cortex of Octodon degus. *Neuroscience. 104,* 33-40.

Panksepp, J. (1998). *Affective Neuroscience: The foundations of human and animal emotions.* New York: Oxford University Press.

PAR. (2014). *Catalogue of Professional Testing Resources.* January, 2014. Lutz: Florida, USA.

Partnership for 21st Century Skills. (n.d.). *Framework for 21st Century Learning.* Retrieved 16 July, 2014 from http://www.p21.org/about-us/p21-framework

Pasquinelli, E. (2012). Neuromyths: Why do they exist and persist? *Mind, Brain and Education. 6*:2. p. 89 - 96.

Peters, D. W. (1999). Attachment. In D. Benner & P. Hill (Eds.). *Baker Encyclopedia of Psychology and Counselling* (pp. 102-104). Grand rapids: Baker Books.

Pipher, M. (1996). *The Shelter of Each Other: Rebuilding our families.* New York: Grosset and Dunlap.

Pittman, J. F., Keiley, M. K., Kerlpelman, J. L., & Vaughn, B. E. (2011). Attachment identity and intimacy: Parallels between Bowlby's and Erikson's paradigms. *Journal of Family Theory and Review, 3,* 32-46.

Popik, B. (n.d.). *Insanity Quote*. Retrieved June 6, 2014, from http://www.barrypopik.com/index.php/new_york_city/entry/insanity_is_doing_the_same_thing_and_expecting_different_results/

Porges, S. W. (1993). The infant's sixth sense: Awareness and regulation of bodily processes. *Zero to Three*, *14*(2), 12-16.

Porges, S. W. (1995). Orientating in a defensive world: Mammalian modifications of our evolutionary heritage. A Polyvagal Theory. *Psychophysiology, 32*, 301-318.

Porges, S. W. (1997). Emotion: An evolutionary by-product of the neural regulation of the autonomic nervous system. In C. S. Carter, B. Kirkpatrick & I. I. Lederhendler (Eds.). *The integrative neurobiology of affiliation* (pp. 62-77). Annals of the New York Academy of Sciences, *807*.

Porges, S. W. (1998). Love: An emergent property of the mammalian autonomic nervous system. *Psychoneuroendocrimology, 23*, 837-861.

Porges, S. W. (2001). The Polyvagal Theory: Phylogentic substrates of a social nervous system. *International Journal of Psychophysiology, 42*, 123-146.

Porges, S. W. (2004). Neuroception: A Subconscious System for Detecting Threats and Safety. *Zero to Three,* May, 19-24.

Porges, S. W. (2005). The Role of Social Engagement in Attachment and Bonding: A Phylogenetic Perspective. In C. S. Carter, L. Ahnert, K. E. Grossman, S. B. Hardy, M. E. Lamb, S. W. Porges, and N. Sacher (Eds.). *Attachment and Bonding: A New Synthesis* (pp. 33-54). Cambridge MA: The MIT Press.

Porges, S. W. (2011). *The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self-regulation.* New York: WW Norton & Company.

Powell, B., Cooper, G., Hoffman, K., & Marvin, B. (2014). *The Circle of Security Intervention: Enhancing Attachment in Early Parent-Child Relationships.* New York: The Guilford Press.

PPTA. (2014). *Threats to New Zealand's Public Education System.* Prepared by Executive. Retrieved from http://www.ppta.org.nz/resources/publications/doc_view/1488-threats-to-new-zealand-s-public-education-system

Radio New Zealand News. (2013, December 4). *New Zealand well down in education rankings.* Retrieved 10 November from http://www.radionz.co.nz/news/national/229756/nz-well-down-in-education-rankings.

Raikes, H.H., & Pope-Edwards, C. (2009). *Extending the Dance in Infant and Toddler Caregiving.* Baltimore, MD: Brookes Publishing.

Reynolds, C.R., & Kamphaus, R.W. (2004). *Behaviour Assessment System for Children.* 2nd Edition.NCS Pearson Inc. MN, USA.

Reynolds, C.R., & Kamphaus, R.W. (2010). *BASC-2 Manual.* MN, USA: NCS Pearson. Retrieved 14 June, 2014 from http://images.pearsonclinical.com/images/ca/BASC2_Manual.pdf

Robinson, K. (2006). *Do schools kill creativity?* [Audio visual recording]. Retrieved from www.ted.com./talks/sir_ken_robinson_do_schools_kill_creativity

Robinson, K. (2010). *Bring on the learning* [Audio visual podcast]. Retrieved from www.ted.com/talks/sir_ken_robinson_bring_on_the_learning_revolution

Robinson, K. (2011). *Out of Our Minds.* Westford, MA: Capstone Publishing.

Rolls, E. T. (1986). Neural systems involved in emotion in primates. In R. Plutchik & H. Kellerman (Eds.). *Emotion: Theory, research, and practice* (pp. 125-143). Orlando, FL: Academic Press.

Ryan, R. (2007). Motivation and emotion: A new look and approach for two reemerging fields. *Motivation and Emotion, 31,* 1-3.

Scalaide, S. P., Wilson, F. A. W., & Goldman-Rakie, P. S. (1997). Areal segregation of the face-processing neurone in prefrontal cortex. *Science, 278,* 1135-1138.

Schiller, P. (1999). *Start Smart! Building Brain Power in the Early Years.* Beltsville: Gryphon House.

Schore, A. N. (1994). *Affect Regulation and the Origin of the Self.* Hillsdale: Lawrence Erlbaum Associates.

Schore, A. N. (1997). Early organization of the nonlinear right brain and development of a predisposition to psychiatric disorders. *Development and Psychopathology, 9,* 595-631.

Schore, A. N. (2000). Attachment and the regulation of the right brain. *Attachment and Human Development, 2* (1), 23-47.

Schore, A. N. (2001). The effects of relational trauma on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal, 22,* 201-269.

Schore, A. N. (2002). Regulation of the right brain: A Fundamental Mechanism of Attachment, Trauma, and psychotherapy. Audio lecture from *Attachment from early childhood through the lifespan* conference, Lifespan Learning Institute, Los Angeles, March, 2002.

Schore, A. N. (2003a). *Affect Regulation and the Repair of the Self*. New York: W. W. Norton.

Schore, A. N. (2003b). *Affect Dysregulation and Disorders of the Self*. New York: W. W. Norton.

Schore, A. N. (2003c). Early Relational Trauma, Disorganized Attachment, and the Development of a Predisposition to Violence. In M. F. Solomon & D. J. Siegel, (Eds.), *Healing Trauma: attachment, Mind, Body and Brain.* New York: W.W. Norton.

Schore, A. N. (2005). Attachment, Affect Regulation, and the Developing Right Brain: Linking developmental neuroscience to paediatrics. *Pediatrics in Review, 26*, Number 6, June, 204-217.

Schore, A. N. (2009a). Relational Trauma and the Developing Right Brain: An interface of psychoanalytic self psychology and neuroscience. *Annals of the New York Academy of Sciences. 1159*, p. 189 - 203. doi: 10.1111/j. 1749-6632.2009.04474.x

Schore, A. N. (2009b). Attachment trauma and the developing right brain: Origins of pathological dissociation. In P. F. Dell & J. A. O'Neil (Eds.), Dissociation and the dissociative disorders: DSM-V and beyond (pp. 107-141) New York: Rutledge.

Schore, A. N. (2009c). Working in the Right Brain: A Regulation Model of Clinical Expertise for Treatment of Attachment Trauma. Conference: *Current Approaches to the Treatment of Trauma: The shift from cognition to affect regulation.* Los Angeles: Lifespan Learning Institute.

Schore, A. N. (2010). Therapeutic Enactments: Working in Right Brain Windows of Affect Tolerance. Wholeness of Mind, Brain and Body and Human Relatedness. Los Angeles: Lifespan Learning Institute Conference.

Schore, A. N. (2012). *The Science of the Art of Psychotherapy.* New York: W. W. Norton.

Schore, A. N. & Schore, J. R. (2012). Modern Attachment Theory: The Central Role of Affect Regulation in Development and Treatment. In A.N. Schore (Ed.). *The Science of the Art of Psychotherapy* (pp. 27-51). New York: W.W. Norton.

Schore, A. N. (2014). Affect Regulation and the healing of the Self: Looking back and looking forward. Audio lecture Affect Regulation and the healing of the Self, Lifespan Learning Institute, Los Angeles, March, 2014.

Schultz, N. (2009). Time to banish the neuromyths in education? *New Scientist, 203*, Issues *2726*, p 8-9.

Sears, W. & Sears, M. (2001). *The Attachment Parenting Book: A commonsense Guide to Understanding and Nurturing Your Baby.* New York: Little Brown and Company.

Shanker, S. (2010). Building Healthy Minds: It takes a Village. S. Oldman (Ed.), *Drugging our Children.* New York: Praeger.

Shanker, S. (2012). Building Healthy Minds: It takes a Village. In S. Olfman (Ed.), *Drugging Our Children.* New York: Praeger.

Shanker, S. (2013). *Calm, Alert, and Learning: Classroom Strategies for Self-Regulation.* Toronto: Pearson.

Shanker, S. (2014). *Canadian Self-Regulation Initiativ*e. Retrieved from http://www.self-regulation.ca/about-us/canadian-self-regulation-initiative-csri/

Shin, L. M., Wright, C. I., Cannistraro, P. A., Wedig, M. M., McMullin, K., & Martis, B. (2005). A functional magnetic resonance imaging study of amygdala and medial prefrontal cortex responses to overtly presented fearful faces in posttraumatic stress disorder. *Archives of General Psychiatry, 62,* 273-281.

Shin, L. M., Wright, C. I., Cannistraro, P. A., Wedig, M. M., McMullin, K., & Martis, B. (2005). A functional magnetic resonance imaging study of amygdala and medial prefrontal cortex responses to overly presented fearful faces in post traumatic stress disorder. *Science, 299*, 117-120.

Shonkoff, J. P., & Phillips, D. A. (2000). *From neurons to neighborhoods: The science of early childhood development.* Washington, DC: National Academies Press.

Siegel, D. J. (1999). *The developing mind: Toward a neurobiology of interpersonal experience.* New York: Guilford Press.

Siegel, D. J. (2001). Memory: An Overview with Emphasis on the Developmental, Interpersonal, and neurobiological Aspects. *Journal of the American Academy of Child and Adolescent Psychiatry, 40,* 997-1011.

Siegel, D. J. (2003). An Interpersonal Neurobiology of Psychotherapy: The Developing Mind and the Resolution of Trauma. In M. F. Solomon & D. J. Siegel (Eds.), Healing Trauma: attachment, mind, body, and brain. (pp. 1-56). New York: Norton.

Siegel, D. J. (2007). *The Mindful Brain.* New York: W.W. Norton.

Siegel, D. J. (2010a). *Mindsight: The new science of personal transformation.* New York: Bantam Books.

Siegel, D. J. (2010b). *Human Attachments: relationship, mind and brain*. Retrieved June 6, 2014, from http://www.drdansiegel.com/uploads/webinar006.pdf

Siegel, D. J. (2012). *The Developing Mind: How relationships and the brain interact to shape who we are.* New York: Guilford Press.

Siegel, D. J., & Brazelton, T. B. (2005). *Helping Parents to raise Children Who Thrive.* Two day conference [CD recording]. Los Angeles: Lifespan Learning Institute.

Siegel, D. J., & Bryson, T. (2011). *The Whole-Brain Child.* New York: Delacorte Press.

Siegel, D. J., & Hartzell, M. (2003). *Parenting from the Inside Out.* New York: Jeremy P. Tarcher/Penguin.

Siegel, D. J., & Sroufe, L. A. (2013). *The Verdict is in: The case for attachment theory.* Los Angeles: Lifespan Institute manuscript.

Simmonds, A. (2014). *How Neuroscience is affecting education: report of teacher and parent surveys.* Wellcome Trust, London. Retrieved from http://www.wellcome.ac.uk/stellent/groups/corporatesite/@msh_peda/documents/web_document/WTP055240.pdf

Simpson, J. A. & Howland, M. (2012). Bringing the Partner Into Attachment Theory and Research. *Journal of Family Theory and Review, 4*, p. 282 - 289.

Simpson, J. A., & Rholes, W. S. (Eds.). (1998). *Attachment theory and close relationships.* New York: Guilford.

Sroufe, L. A. (1988). The role of infant-caregiver attachment in development. In J. Belsky & T. Nezworski (Eds.). *Clinical implications of attachment* (pp. 18 - 38). Hillsdale, NJ: Erlbaum.

Sroufe, L. A. (1996). *Emotional development: The organization of emotional life in the early years.* New York: Cambridge University Press.

Sroufe, L.A., Egeland, B., Carlson, E., & Collins, W. (2009). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood.* New York: Guilford Press.

Stalker, C. A., & Davies, F. (1995). Attachment organization and adaptation in sexually abused women. *Canadian Journal of Psychiatry, 40*, 3-10.

Statistics New Zealand. (2014). *New Zealand in the OECD*. Retrieved from http://www.stats.govt.nz/browse_for_stats/government_finance/central_government/nz-in-the-oecd/education.aspx

Stern, D. N. (1985). *The interpersonal world of the infant.* New York: Basic Books.

Stern, D. N. (1992). *The Interpersonal world of the infant.* Two day conference of Sterns [from CD recording], Los Angeles: Lifespan Learning Institute.

Stoop, G. (2012). *Evaluation at a Glance: Priority Learners in New Zealand Schools.* Retrieved from http://ero.govt.nz/National-Reports/Evaluation-at-a-Glance-Priority-Learners-in-New-Zealand-Schools-August-2012

Strathearn, L., & Fonagy, P. (2009). Adult attachment predicts maternal brain and oxytocin response to infant cues. *Neuropsychopharmacology*, *34*, 2655-2666.

Sturrock. F., & May, S. (2002). *PISA 2000: The New Zealand Context. The reading, mathematical and scientific literacy of 15 year olds.* Wellington: Learning Media.

Stuss, D. T., Gow, C. A., & Hetherington, C. R. (1992). 'No longer gage': Frontal lobe dyscfunction and emotional changes. *Journal of Consulting and Clinical Psychology, 60,* 349-359.

Te Kete Ipurangi (TKI). (2014). *Modern Learning Environments.* Retrieved from http://elearning.tki.org.nz/Technologies/Modern-learning-environments

Te Kete Ipurangi (TKI). (n.d.). *Priority Learners.* Retrieved from http://nzcurriculum.tki.org.nz/Priority-learners

Te Kete Ipurangi (TKI). (n.d.). *The Concept of AKO.* Retrieved from http://tereomaori.tki.org.nz/Curriculum-guidelines/Teaching-and-learning-te-reo-Maori/Aspects-of-planning/The-concept-of-ako

The Marva Collins Story. (1981). Warner Bros Television.

Thompson, R. A. (2000). The legacy of early attachments. *Child Development, 71*(1): 145-152.

Thrupp, M. (2013, 28 November). National Standards data fixation barrier to useful change. *New Zealand Herald.* Retrieved from http://www.nzherald.co.nz/opinion/news/article.cfm?c_id=466&objectid=11163764

Thrupp, M. (2013). *Putting investing in educational success into context.* Retrieved from http://www.scoop.co.nz/stories/HL1406/S00060/putting-investing-in-educational-success-into-context.htm

To Sir with Love. (1967). Columbia Pictures.

Trevarthen, C. (2003). Reflections on the Nature and Emotional Needs of infant Intersubjectivity. In C. S. Carter, L. Ahert, K. E. Grossman, S. B. Hrdy, M. E. Lamb, S. W. Porges, & N. Sachser, (Eds.). *Attachment and Bonding: A New Synthesis* (pp. 55-84) Boston: MIT Press.

Tronick, E. (2007). *The neurobehavioral and social-emotional development of infants and children*. New York: Norton.

U.S. Department of Education, Office of Educational Technology. (2004). *Helping Practitioners Meet the Goals of No Child Left Behind.* Washington, D.C.

University of Minnesota Department of Neuroscience and Department of Curriculum and Instruction. (2013). *BrainU, The Neuroscience Teacher Institute.* Retrieved from http://brainu.org

van IJzendoorn, M. H., & Kroonenberg, P. M. (1998). Cross Cultural Patterns of Attachment: A Meta-Analysis of the Strange Situation. *Society for Research in Child Development.* DOI: 10.2307/1130396

Vannest, K. J., & Hagan-Burke, S. (2010). Special education teacher time use. *Remedial and Special Education.31*(2), p.126-142.

Vasey, M. W., & Thayer, J. F. (1987). The Continuing Problem of False Positives in Repeated Measures ANOVA in Psychophysiology: A Multivariate Solution. *Psychophysiology. 24. Issue 4:* 479-486.

Voeller, K. K. S. (1986). Right hemisphere deficit syndrome in children. *American Journal of Psychiatry, 143*, 1004-1009.

Waters, E., Crowell, J., Elliott, M., Corcoran, D., & Treboux, D. (2002). Bowlby's secure base theory and the social/personality psychology of attachment styles. *Attachment and Human Development,* September 2002, *4*, Number 2, 230-242.

Watt, D. F. (2003). Psychotherapy in an age of neuroscience: Bridges to affective neuroscience. In J. Corrigall & H. Wilkinson (Eds.), *Revolutionary connections. Psychotherapy and neuroscience* (pp. 79-115). London: Karnac.

Welsh, P. (2013, September 27). Four Decades of Failed School Reform. *The Washington Post.* Retrieved from http://www.washingtonpost.com/opinions/four-decades-of-failed-school-reform/2013/09/27/dc9f2f34-2561-11e3-b75d-5b7f66349852_story.html

Wetz, J. (2009). *Urban Village Schools: Putting relationships at the heart of secondary school organisation and design.* United Kingdom: Calouste Gulbenkian Foundation.

Wetz, J. (2010). *Is initial teacher training failing to meet the needs of all our young people?* Bristol, UK: CFBT Education Trust.

Wong, S. (2013, December, 3). New Zealand's Global Education Rankings Drop, *New Zealand Herald.* Retrieved from http://www.3news.co.nz/NZs-global-education-rankings-drop/tabid/423/articleID/323793/Default.aspx

Wylie, C. (2012). *Impact of Education Reforms*. New Zealand Council for Educational Research. Retrieved from http://www.nzcer.org.nz/research/impact-education-reforms

Appendices

Appendix A Stressors That Are Now Part of the Cultural Fabric

Shanker, S. (2012) Building Healthy Minds: It takes a Village

1. Exposure to neurotoxicants and endocrine disruptors in utero and early childhood (such as mercury, lead, pesticides and pthalates)

2. In utero exposure to alcohol, cigarettes, and drugs (which disrupt the neurosystems that subserve self-regulation)

3. In utero exposure to excessive maternal stress

4. Loss of stability of family life

5. Declining availability of extended family systems

6. Decline of stable neighbourhoods and communities

7. Loss of opportunities for parents and children to interact meaningfully such as the family dinner hour

8. The loss of opportunity for unstructured creative play

9. Over exposure to TV, video games and other forms of artificial stimuli

10. Limited contact with nature

11. Limited exercise

12. Sleep deficits

13. Fast food and junk food diets

14. Developmentally inappropriate 'educational' stimulation

15. Overly programmed days that stress parents and children alike

Appendix B Principles of Effective Prevention Programs

Principles of effective prevention programs

(Adapted from Small, Cooney and O'Connor. (2009) Evidence-Informed Program Improvement: Using Principles of Effectiveness to Enhance the Quality and Impact of Family-Based Prevention Programs).

Four categories, 11 principles

Category 1 PROGRAM DESIGN

Principle 1: **Theory driven.** The intervention is based on well-established, empirically supported theory and the program's activities relate to clear, identified, and achievable outcomes.

Principle 2: **Of sufficient dosage and intensity.** This principle describes the number of contact hours, duration of the program, and intensity and complexity of the program's activities.

Principle 3: **Comprehensive.** Family dynamics are complex and effective programs need to integrate multiple factors.

Principle 4: **Actively engaging.** Programs achieve better outcomes when they utilise active learning techniques that engage participants to learn and practice new skills.

Category 2 PROGRAM RELEVANCE

Principle 5: **Developmentally appropriate.** Effective programs target specific life span stages, rather than dealing with global dimensions of family.

Principle 6: **Appropriately timed.** Programs need to be times when families are most receptive to change.

Principle 7: **Socioculturally relevant.** The programs language and content should be relevant to the people participating.

Category 3 PROGRAM IMPLEMENTATION

Principle 8: **Delivered by well-qualified, trained, and supported staff.** The effectiveness of a program is related to the staff's experience, confidence, training and commitment to the intervention.

Principle 9: **Focused on fostering good relationships.** Effective programs create a safe, trusting climate among participants and staff, as well as between participants.

Category 4 **PROGRAM ASSESSMENT AND QUALITY ASSURANCE**

Principle 10: **Well documented.** Keeping accurate records of what occurs in a program is important to understand and maintain the programs effectiveness.

Principle 11: **Committed to evaluation and refinement.** This principle describes the process of the staff being committed to monitor and evaluate the program to learn how well a program is being implemented.

Appendix C Infant Strange Situation Behaviours

Infant strange situation behaviours

(Adapted from Main, M. (2003) Adult Attachment Scoring and Classifications Systems, Department of Psychology, University of California at Berkeley.)

SECURE Child

Behaviours:

Explores room and toys with interest in pre-separation episodes. Shows signs of missing parent on separation, often crying by the second separation. Obvious preference for parent over stranger. Greets parent actively, usually initiating physical contact. Usually some contact-maintaining by second reunion, but then settles and returns to play.

AVOIDANT Child

Behaviours:

Fails to cry on separation from parent, often continues to play even when left entirely alone. Actively avoids and ignores parent on reunion, i.e. by moving away, turning away, or leaning out of arms when picked up. Little or no proximity or contact seeking, no distress, and no display of anger. Response to parent appears unemotional. Focuses on toys or environment throughout procedure.

ANXIOUS Child

Behaviours:

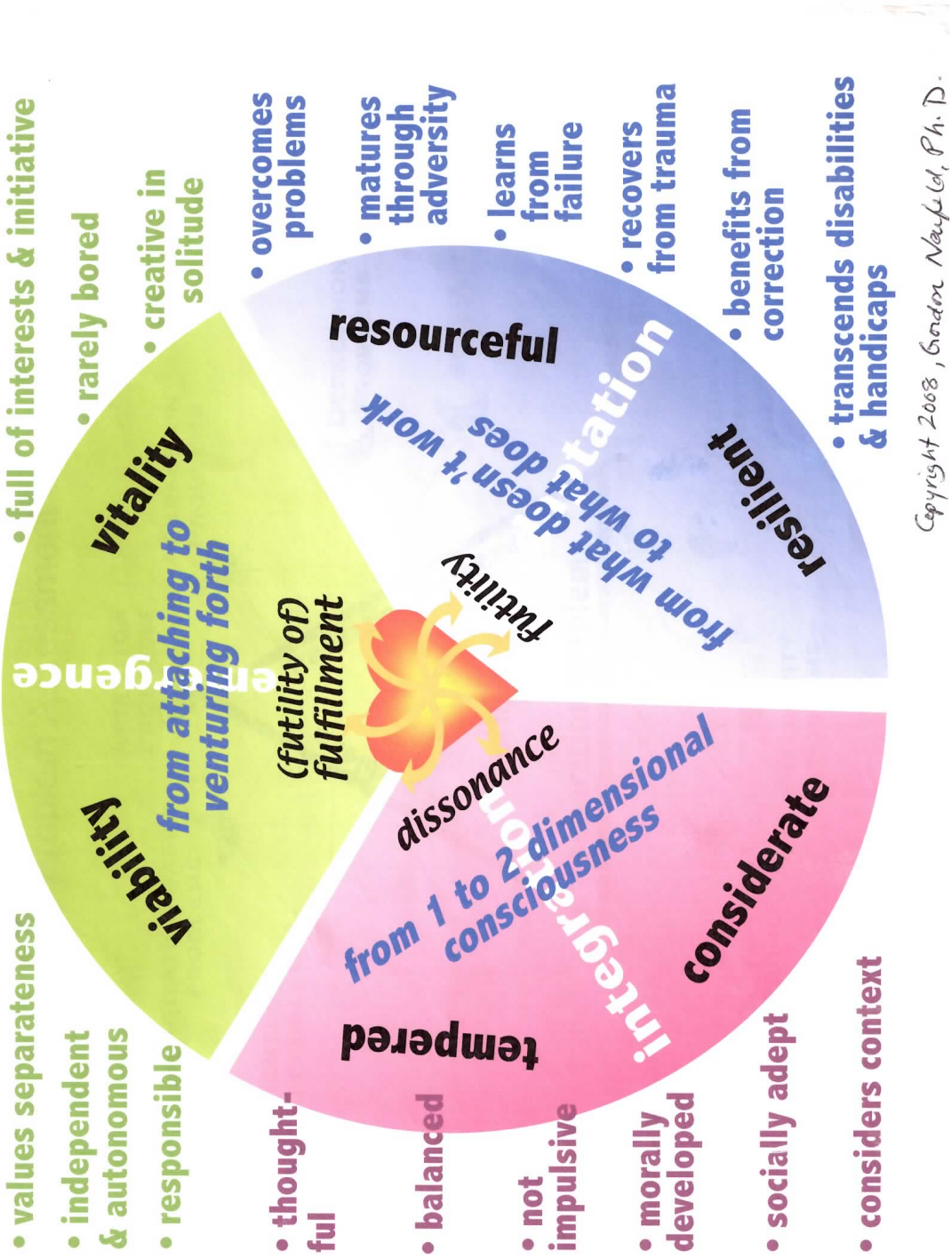
May be wary or distressed even prior to separation, with little exploration. Preoccupied with parent throughout procedure, may seem angry or passive during reunion. Following reunion, fails to settle and take comfort from parent, usually continuing to focus on parent and crying. Fails to return to exploration.

DISORGANISED/Disorientated Child

Behaviours:

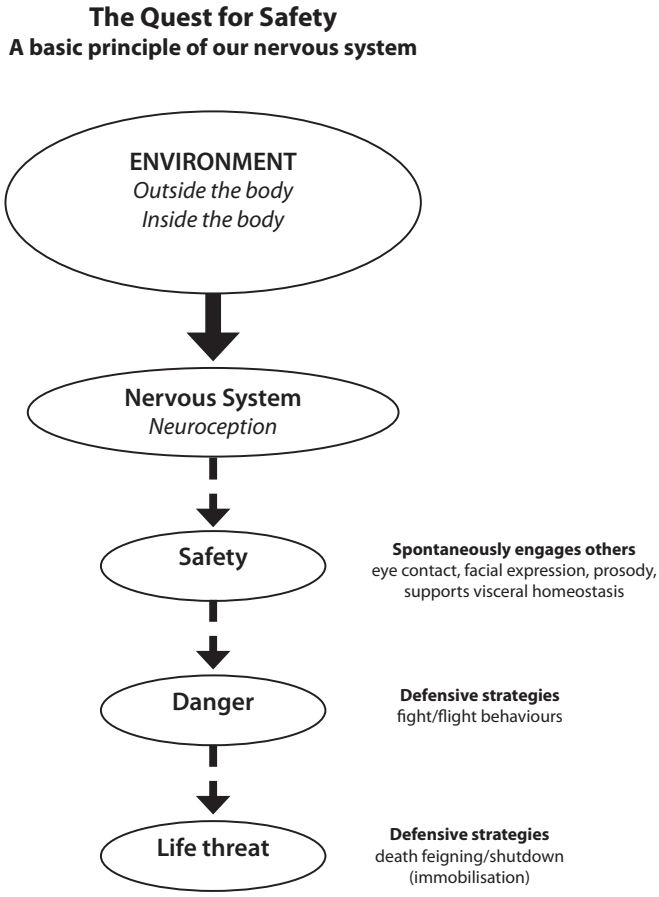
The infant displays disorganised and/or disorientated behaviours in the parent's presence, suggesting a lapse of behavioural strategy. For example, the infant may freeze with a trance-like expression, hands in air; may arise at parent's entrance, then fall down and huddle on the floor; or may cling while crying hard and leaning away with gaze averted. Infant may otherwise fit to Secure, Avoidant or Anxious categories.

Appendix D **The Securely Attached, Mature Child (Copyright © Neufeld, 2008)**



Appendix E **The Neuroception Model**

Porges, S.W., 2004



Appendix F **BASC-2 Behaviour Cluster Definitions**

(Reynolds & Kamphaus, 2004)

BASC-2 Behaviour Clusters

INTERNALISED BEHAVIOURS	Represented by those emotions, personal conditions, or behaviours that are experienced by the child individually, including the child's feelings, shyness, anxiety, lack of energy, or social withdrawal
Anxiety	Anxious, may have difficulty controlling worries. Clingy, or easily frightened, may cry easily; feelings may be easily hurt. May have sleep problems or nightmares. Insecure, very nervous, cries a lot, grouchy. Nervousness, fearful, worried about real or imagined fears.
Depression	Sad for long periods of time, appetite & sleep disturbances; thoughts of harming self; lack of energy, emotional change (lability); moodiness. Sadness, being overwhelmed. Unhappy. Negativity.
EXTERNALISED BEHAVIOURS	Behaviours acted out by the child and more easily seen by others.
Anger	Verbally expressed anger (argumentative); physically expressed anger Tendency to become irritated or get angry quickly and impulsively together with an inability to control their emotions and self control.
Aggression	Antisocial actions; Minor: becoming upset with little reason, Moderate: acts impulsively; Severe: explosive temper, cruel to other kids, destroys others' property. To act in hostile manner (verbal/physical); defiant,threats, hitting others
Bullying	Actions intended to insult, intimidate, extort, manipulate, threaten, or hurt others. Often used to gain power or control over others. Tendency to be intrusive, cruel, threatening, or forceful to get what is wanted through manipulation or coercion.
Conduct problems	Rule breaking, ignoring rules; defiant of people in authority, dishonest, cannot be believed; antisocial behaviours
Hyperactivity	Overly active; rush through work; act without thinking. Bothering` other children; difficulty staying seated; easily excited; impulsive; poor self-control.
Attention problems	Difficulty with control of attention and/or behaviour. Poor concentration; lose interest quickly, difficulty finishing things. Gives up easily, easily distracted; unable to concentrate.
Somatisation	Overly sensitive to physical problems. Headaches, general aches & pain. May have eating issues; may have sleep difficulties.
Atypicality	Odd & unusual; Repetitive body movements or play; May be rigid or inflexible; May appear disinterested in social interactions; May have limited emotional expression. Easily sidetracked, repetitive thoughts. Behave in 'odd' ways.
Social withdrawal	Poor social skills for age; may seem unfriendly, or rude; may have no friends, be unliked, unaccepted, or ignored by peers. Shyness, avoidance. Evade others to avoid social contact.
STRENGTHS	
Adaptability	Ability to adapt readily to changes in environment; Difficulty switching tasks, difficulty adjusting to change.
Social skills	Ability to socially interact with peers & adults; Inappropriate responses, unwilling to volunteer.
Functional communication	Ability to express ideas so others understand. Unclear communication, inappropriate responses to questions.

Behaviour & Emotional problems

Learning problems
Adaptability
Aggression
Anxiety
Attention problems
Conduct problems

Depression
Functional communication
Hyperactivity
Leadership/social skills

Inattention/Hyperactivity
Defiant/Aggresive
Social Functioning/Atypical
Anxiety
Mood & Affect
Physical symptoms

Appendix G **Qualitative Questions and Answers**

	***Q1.** What approaches / techniques / methods did you use prior to this course to deal with problematic student behaviour in your classroom?*	
Participant ID#	**Response Before**	**Response After**
1	Rewards, praise, identifying positive behaviour, getting to know the child better, give the child responsibility, state what behaviour is appropriate, redirection, supporting interests.	Now I give the child much more of myself. Letting them know they are important to me, that I'm on their side.
2	Spending more one on one time with the problematic student.	Spending time with problematic student, giving lots of support and compliments.
3	Made efforts to get to know child better, learn about their interests to engage them and develop relationship with them. Talk about appropriate way to behave 'here' and how other child / children feeling. consistent with addressing problematic behaviour.	Still use these when appropriate for the child and integrate strategies learned in these workshops.
4	A gentle approach with the child in question. Trying to get this child involved in day to day group tasks with other children has been an issue. The technique I use is to approach this child and encourage him after which he may or may not respond.	I do feel that this child has slightly improved. I need to keep addressing him and recognising him to include him in activities. He still finds it difficult to make friends, often looks tired, sad and slow with his movement.

5	Reward stickers, give them high-five at mat time. Mention their name at mat time. Tell their parents how good they are in day care, what they did nicely.	works very well.
6	Lots of one on one contact, building relationship with child and parents and teacher.	Still as before.
7	I used time out many years ago, as time out method seemed ok at that time. Then we were told time out method was not positive to children. We used reward charts instead. which worked well for some children and not for others.	Nil
8	Outside to calm down, positive child guidance, “hit - you sit”, a lot of praise when positive behaviour.	With consistency and ‘warming up’ charts sitting on the chair was not necessary anymore. Calming down outside has been necessary on the odd occasion usually when child is sleep deprived.
9	Distraction, time out in extreme cases.	I use these less now and try to focus more on getting to know the child and form a connection where the child is able to trust me and know that “I am on their side.”
10	We have a thinking chair in our room - this enables a child to stay involved with other children around them but time to re-evaluate what they were doing that wasn’t right (behaviour etc).	We still have this chair but use it less as I am more aware that sometimes a different approach will work for each individual child (no child fits the same mould).

11	Discussions, time-out, explaining boundaries.	No more time-out, fewer discussions and not focusing on the problem, rather I have focused on strengthening the attachments to children in the classroom. I have been working on discussion my learning with my colleagues.
12	Time out, stickers, redirection, talking to the child, ‘saying ‘no’ sometimes.	I believe now I am much more thoughtful and I can understand better what the child might be feeling and why and therefore I have become much more patient and understanding. I have also learnt how to use different strategies (collecting, bridging, match making).
13	Time out or leaving child alone to think.	I feel sorry for this child, she has been in day-care all her life and I think her parents just want her to grow up quickly. She needs someone to hear her out, someone to cuddle and to understand her, but at the same time she needs to be told that sometimes there is not always a choice. And we must stick to this and follow through.

14	Lots has changed over the years I have taught. I feel like ways to deal with problematic student behaviour is changing all the time and it confuses teachers and some teachers don't know what they can or can't do anymore. I've been told we are not allowed to do time out or reward charts anymore. We mostly talk to child and direct them and guide them to another area of play.	I have learnt other strategies to deal with problematic student behaviour now. Children need attention and to be close to a teacher. Teachers need attachment with children.Children need an want to be like you and like everything about you. Teachers need to give children attention not always child looking for your attention.
	Q2. What have you learned and liked in this course?	
1	All of it, and I've learned so much, Key for me would be importance of attachments and being aware of the different stages. Attachment to parents and how to maintain these while they are in our centre and of course supporting teachers attachments with children. The idea of collecting children always has been instinctive to me but I didn't realise what it was, how it worked and the importance of it. Likewise with bridging and matchmaking - I have and will continue to develop these in my practice and support our teaching team in doing the same.	
2	Everything!!! This doesn't just apply to children but adults too!	
3	I have enjoyed every aspect of this course. Especially the high level of importance of attachments with teachers rather than peers.	
4	For me this course has been an affirmation of my own pedagogical approach and techniques with a reinforcement and reminder to engage the child first.	
5	The attachment theory or approach, I use it mainly in my own personal life. The matchmaking strategy is very useful. I think after parents introduce teacher to their children, the children easily accept the teacher.	
6	Absolutely everything - it has opened my mind to other challenges and made me aware of how to handle these issues.	

7	I have learned that relationship between students and teachers is the foundation of learning and teaching. Every student is teachable but they need to be taught differently based on their background. Teachers need to build a good relationship with their students to create a context within which to teach. This course has given me lots of information to reflect on my own practice.
8	Learning about ‘tears of futility’ all the defence mechanisms, the value of attachment not only with children in our care but also people in life in general.
9	I have loved the deeper understanding of true attachment. I have learned that in most cases problematic behaviours arise from a lack of ‘connection’ between child and teacher and through a child physically (brain development) being unable to understand their intense emotions.
10	Very informative - I love that we need to form attachments with both parent and child to be successful in all manners of teaching. Being aware that some children are still learning and require help in getting or providing ways around barriers.
11	The wonderful content - what a revelation! The great way in which Kaye delivers the course. She makes it interesting, informative and facilitates great discussions.
12	The strategies learned can be used with many different children in may different ways and that is helpful.
13	Everything!!! But mostly about attachment and how it affects not just at preschool age but if attachment is not felt in adults we can just about always find something in childhood or early adulthood that has caused detachment or an inability to make commitments.
14	Have learned lots. Learned about different parts of the brain and children haven’t developed their prefrontal cortex yet. Not to confuse children, deal with one problem at a time. Children cannot register more than one feeling at one time and still learning problem solving.
	Q3. What have you learned and found challenging
1	That in order for children to be independent their dependency needs have to be met. I have found it challenging to help colleagues and parents to understand this.

2	I have learned about how and what a child needs to thrive and about attachment theory. What is challenging is to share all this information with colleagues and get them to be on the same page as I am.
3	Retaining all that I have learned - so much valuable information.
4	The aspect of neuroscience in relation to the early childhood setting and how this development unfolds.
5	Ability to process dissonance. I need more examples to understand how to support children to gain this ability.
6	Time to do all this and to pass my new found knowledge on to staff who have no learning of this.
7	I have learned that I should make an effort to work with those children who are not attached to me.
8	Working with parents is key - but I find it challenging on approaching some subjects with them. Learning about all of this and seeing how it reflects on my family situation.
9	The entire course has enlightened me on how easily a child can become ‘teachable’ through simple steps. In promoting the opportunity to establish a relationship of attachment I have faced no challenges in what I have learned.
10	Understanding that some times a child can’t ‘just get over themselves’ as they haven’t learned this - supporting and acknowledging the change / challenge.
11	I have learned that attachment is so very important, that is critical throughout al the years of school (and daycare) and beyond. How attachment works and how we can strengthen our bonds with parents and children.
12	Nil
13	All children need a safe place and because my kids are with me more than their parents we have to be a parent and teacher at the same time, dealing with their emotional well-being and knowledge and learning without forgetting that their parents are their world and need to be mentioned and praised on a daily basis. I don’t think any teacher in my room thinks about this, and neither did I until this course.

14	One particular child at preschool has an attachment with me and so did I with the child. The child is always looking for my attention to the point where she will do anything to annoy and irate me. i have learned to give her more attention which I have been scared to do in the past because I've thought she might become too attached to me that she will cry and become upset when I leave the room. I tried it and am still giving her more attention and it is starting to work and she isn't so attached that she cries when I leave the room. Instead of her coming to join activities I've set up I now invite her and ask her if she will like to help me with things / jobs that only her and I do together - our bonding time. I give her lots of hugs and cuddles too. This is working and I also use these techniques to settle in new children to preschool and it's working.
	Q4. What will you 'take home' / back to work to use
1	All of it.
2	Attachment theories, Share with colleagues all I have learned.
3	All that I can. I intend to revise notes from workshop. Forming more effective attachments, developing more relationships with parents / caregivers. Letting children know that I'm thinking of them and their loved ones are thinking of them.
4	My understanding from this course of how attachment grows and strengthens. The strategies during this course are interesting. Admittedly I will have to reflect on all 8 sessions again through my notes to evaluate how best I can use these strategies in my teaching.
5	I have (been) promoting the attachment theory a year before in our centre. We all working on letting children attach on one of the three teacher in one classroom.
6	Encouraging relationships, building an integrating the child's family into the centre, continue to immerse the emergent child into learning, meet non adaptive child and build on what they have to extend them on. So much to do . . .
7	I will do the presentation on the course at a staff meeting. Re-visit attachment theory, winning the hearts of those stuck students.

8	Making great connections / bridges between home and the centre. Making strong efforts to connect with all the children / people in my family. Using the power of attachment to motivate.
9	Attachment! The basis of learning.
10	Eyes, nod, smile - how important it is to support transition from attachment person to the next (brilliant)!!!
11	I will take back: the qualities that a child needs to have to learn. How we as teachers can help our children. How our relationships with parents start us off on the right track. How our attachment knowledge enables us to bring out the potential in children.
12	I have always tried to form strong relationships with the children I teach and with their families and I will definitely continue doing that, especially after understanding why attachment is so important.
13	Frustration and crying is ok, let it out, don't stifle it, importance of curiosity in young children.
14	Nil
	Q5. How relevant was the course to your needs? would you recommend the course to others?
1	Very, very relevant and would definitely recommend it to others.
2	I would highly recommend this course to all teachers and even parents.
3	Highly relevant, Yes, Absolutely.
4	Extremely relevant to my needs and affirmation of my own pedagogical practice. Yes, I would recommend this course to others.
5	Yes, even though we knew the attachment theory before, still really enjoyed listen(ing) to the lecture.
6	Not so much with my specific special needs child (that I wrote my survey's on) but very good for every other child in the centre.
7	This course helped me understand more about children's needs and helped me to be a better teacher. Definitely will recommend this course to others.
8	Very relevant / would recommend it to everyone at work / life.

9	This course will definitely be recommend by me to other early childhood educators! Relationships within early childhood education has high value to me and this course has reinforced and extended my beliefs in child- teacher relationships.
10	Yes it would be great for other teachers to hear some of this it would support teachers with building relationships not just a number (child).
11	Very relevant! It explained why we hit 'walls', why time-out, charts etc. don't work and most importantly what works and why. I would recommend the course to others. I wish all our teachers could do this course.
12	Yes, I do recommend the course.
13	I have highly praised this course to everyone I know.
14	Yes, I would recommend the course to other people. I feel like you learn about finding out the cause of a child's behaviour and how to deal with their behaviour in a loving, caring, gentle way not a strict way or reward chart that does not solve the problem or find out cause of problem just fixes problem short term not long term.
	Q6. What aspect of the course was least significant?
1	None
2	Nil
3	I found all aspects of this course very relevant and thought provoking.
4	At the end of a long day I sometimes found the discussions initiated by others were tedious and irrelevant. I would have preferred discussions revolving around the presentation instead.
5	Nil
6	Nil
7	The course was relevant to my current teaching.
8	Nil
9	I found the whole course relevant.
10	I found the video a little overwhelming - a light discussion before helped me settle into the information that was being taught then discussion after great!
11	I can't think of anything that was irrelevant.
12	Nil
13	Nothing, all good.

14	I just feel like I need more practical ways of dealing with a child's behaviour. Being shown in a preschool. Examples and stories that you, Kaye and Dr Gordon Neufeld has done to deal with behaviour problems were really helpful.
	Q7. Share about any changes to your understanding of challenging children in your classroom
1	The importance of loving and accepting them for who they are and that no one has to stay stuck forever. With the necessary support their back packs can be filled in preparation for life long learning.
2	Working with challenging children is actually less stressful now as I have learned about the importance of attachment.
3	Forming deep level attachments with them. Letting them know through actions / relationships, collecting them etc. that I am on their side.
4	There is always a way to overcome these challenges of challenging children through patience and perseverance as well as attachment and the theories and strategies presented during this course.
5	I practiced one strategy to the challenging children. Before he starts throwing a tantrum I said that you are about to throw a tantrum. He soon said he was not going to. I feel really surprised how effective the strategy is.
6	Recognising 'stuck' children are difficult to have and having an awareness of this makes teaching not as frustrating.
7	Nil
8	Children that are particularly attached have coped a lot better with bridging. All children are showing great contribution in all areas.
9	I look at children with challenging behaviours with fresh eyes. Instead of impatience I find myself considering the whole child's circumstances for example home life, peer relationships and teacher relationships. I do not consider any challenging behaviour now to be 'on purpose' or to 'push my buttons'. There is a deeper reason in my eyes of these behaviours which makes me reflect on my practice.
10	This course has not only made me look at children with behaviour problems but the crying children, the quiet children, the reserved children. Not just behaviour problem children and needy children.

11	I have come to appreciate how children that are challenging are ‘stuck’ and how strong attachments to parents and teachers can help to get them ‘unstuck’. I have already experienced seeing children become ‘unstuck’ at my centre as a result of this course.
12	Nil
13	They are not able to tell you why they are stuck and are not just being defiant, we need to have a deep understanding of where they have come from and how their parents deal with them. Then go forward as a team to help the challenging child.
14	I feel like I’ve said most of it. Two children we have been finding hard to deal with their behaviour we’ve found out have other factors that have caused these behaviours. One boy ages 4.5 parents are going through a divorce. Now they live in different houses it has helped a lot and child’s behaviour has improved a lot. Parents living in the same house and not getting along is not nice for a child.
	Q8. Other comments / feedback
1	This has been a fabulous professional learning experience. I wish our whole team could do it - and our families / parents. It has given me a whole new understanding of how I can support our non-emergent, non adaptive, non integrative and poorly attached children - and that this can be achieved at any stage of our lives. Thank you so much.
2	This course is inspirational and I have learned so much from this course. This is a fantastic course! I believe this workshop should be one of the papers that students have to take when completing their teaching degree.
3	Nil
4	Nil
5	For the children who have any difficulty in life, the attachment theory is definitely the place to look for answer or help.
6	Nil
7	Nil
8	Nil
9	A very big “Thank you Kaye!” I have loved and learned so much from your course and hoping to do part 2!

10	Thank you - this course was amazing for both personal life - it has enabled me to look at my own blended family in a different context and be more tolerant when dealing with issues. But also at work it has been encouraging to see a change in a few children that I personally have struggled with thinking it was me they didn't like - I now know it was just gaining those bond / attachment makes all the difference.
11	I would love to share this with my colleagues and develop strategies and a 'way of being' with children to ensure that attachment and relationships are at the forefront of what we do, how we think and how it propels our planning and learning.
12	Thank you ver much for the course. It was wonderful to learn so much in such a short period of time and to be able to share experiences with other teachers and also learn from the other teachers experiences.
13	Session 8 was very instrumental to my child. It was a great conclusion and I feel that my thinking has completely changed. Sadly she is off to school soon, if anything I have become a friend.
14	Nil

The Teachability Factor



"Finally, something that makes sense of why things work when they do and why they don't when they don't

This should be an essential part of every teacher's training"

TOPICS INCLUDE :

1. Three natural contexts that empower the teacher
2. How kids get 'stuck' and what that does to learning & teaching
3. Why the immature need to be attached to their teachers
4. What the power of attachment can do in the classroom

Teaching is getting harder, not easier. This, despite the fact that teachers have never been more educated, technology has never been more advanced, curriculum has never been so refined and pedagogy has never been so honed. The "teachability factor" refers to those determinants of learning that are psychological in nature: developmental, relational, motivational and emotional. Cultural change has altered these factors, making the teacher's job much more difficult than it used to be or needs to be. In this 8 part workshop you will learn key insights into why teaching is getting harder, why praise, star charts, time out and other techniques are not working, why aggression, frustration, anger & fear are more common in young children and what we, as teachers can do about it. It is an insight approach bringing the best of attachment-based developmental science to bear on the issues and challenges of educating our young. This course focuses on the two most significant factors in learning and behaviour: developmental stuckness and the student-teacher relationship. You will gain new eyes for seeing the challenging children in your class. This course is based on the work of Dr Gordon Neufeld. You can find more about the Neufeld approach at www.neufeldinstitute.com



ABOUT THE FACILITATOR

Kaye McKean is a secondary school teacher, guidance counsellor, teacher & parent consultant and Mother of 4. An advocate of developmental and attachment based approaches to teaching and parenting, she is eager to bring this program to New Zealand educators. Kaye is a Master's student at Otago University and is bringing this course to teachers as part of her research thesis. To participate in the course you must meet certain criteria. This criteria can be found on the information sheet attached.

University of Otago
Te Whare Wānanga o Otāgo
New Zealand

REGISTRATION

DATES: 8 consecutive Wednesday evenings, May 8 - June 26

TIME: 7:00 - 9:15 pm

LOCATION: Westlake Boys High School. 30 Forrest Hill Rd, Forrest Hill, North Shore, Auckland

TO REGISTER: complete and post the ***consent*** form

Limited to 30 persons or email: mckean@ihug.co.nz

Appendix I **Introductory Cover Letter and Information Sheet**



Dear

As part of a Masters of Social Work Research Project, through Otago University, we seek suitable applicants from your Early Childhood Centre to attend a workshop designed for teachers of emotionally and behaviourally challenging children entitled, ***"The Teachability Factor".***

This DVD facilitated workshop considers the latest research in attachment, neuroscience & developmental psychology and combines it with an effective yet gentle approach to understanding the challenging child in an educational setting. Suggestions of unique and workable ways to overcome this serious societal issue will be discussed. The workshop has been prepared by world renowned child psychologist, Dr Gordon Neufeld, Neufeld Institute, Canada.

We are ***seeking applicants who are motivated to be a part of the learning while participating in a research project*** that considers the workshop's impact on teachers attitudes towards the challenging children they teach. The commercial price of this course is $350. As it is part of the research project, it is offered to suitable applicants ***free of charge***. Those who complete the course will receive a ***certificate*** of completion for professional development purposes.

If this is of interest to you or your teaching staff, please read the detailed information sheet & advertisement attached, and if you qualify, fill in the application form (also attached).

Sincerely,

Kaye McKean
Otago University
Masters Student

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

What makes a child teachable?
The Teachability Factor Workshop
INFORMATION SHEET for PARTICIPANTS

Thank you for showing an interest in this research project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

RESEARCH AIM:
The research intends to measure the effects of **"The Teachability Factor" workshop** on teachers with emotionally and behaviourally challenging children in the classroom.
It will test the effect of educating teachers about attachment and neuroscience in children to determine if a better understanding creates a better relationship between teachers and the challenging children in their class.

TEACHER PARTICIPANT REQUIREMENTS:
Participants will need to meet **ALL** the following criteria:

✓	**Criteria:**
	Be a fully registered NZ teacher
	Be teaching full time (30+ hours per week) in a NZ Early Childhood Centre
	Have taught in NZ for a minimum of 3 years
	Have a specific challenging child in their classroom (aged between 2 - 5 years)
	Be willing and able to fill in pre and post test questionnaires in their own time
	Have the permission of the appropriate authority from their Early Childhood Centre
	Be available for **8 consecutive Wednesday nights** in term 2, 2013: **Wednesday:** May 8, 15, 22, 29, June 5, 12, 19, 26 **Venue:** To be advised. North Shore, Auckland. **Time: 7:00 - 9:15 pm**
☛	**Note:** The confidentiality of all participants (Early Childhood Centre, the teacher, and the student) will be protected. No individual nor their place or work will be identified in the research report. The identity of all 3 will remain confidential and will not be published. This research is low to nil risk and no discomfort of participants is expected. All data that could personally identify a participant will be held securely for the duration of the research; will be stored according to stringently secure Otago University policy for 5 years and will be disposed of thereafter.

Persons who do not meet the above criteria may not participate in the research study.

Should you agree to take part in this project, you will be asked to:
1. Fill in a pre-workshop questionnaire, with a specific challenging child from your classroom in mind. You will not be asked to identify the child.
2. Attend & participate in 8 evening workshops

▮ Dr Nicola Atwool. Otago University, PO Box 56, Dunedin 9054 ▮ kaye.mckean@me.com

3.Fill in post-workshop questionnaires, with the same specific challenging child from your classroom in mind.

Please be aware that you may decide not to take part in the project without any disadvantage to yourself of any kind.

DATA COLLECTION:

The written information you provide on the pre-workshop and post-workshop questionnaires will be the only data that is collected from you. In the publishing of the research you will not be identified in any way. Only the results of the data, as they pertain to the research questions will be published.

The data collected will be securely stored in such a way that only those mentioned below will be able to gain access to it. Data obtained as a result of the research will be retained for **at least 5 years** in secure storage. Any personal information held on the participants may be destroyed at the completion of the research even thought the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely.

PUBLICATION:

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand), but every attempt will be made to preserve your anonymity.

You may receive an electronic version of the final research by requesting it from the researcher or by borrowing it from the University of Otago's library.

WITHDRAWAL FROM PROJECT

You may withdraw from participation in this project at any time and without any disadvantage to yourself of any kind.

Interested applicants should apply on the attached consent form by ***April 10, 2013***.

If you have any questions about our project, either now or in the future, please feel free to contact either:

Kaye McKean (student researcher) ***and / or*** **Dr Nicola Atwool (supervisor)**

Department of Sociology, Gender and Social Work

Phone: 021 324446
email: kaye.mckean@me.com

Ph. 03 479 5442
email: nicola.atwool@otago.ac.nz

This study has been reviewed and approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph. 03 479 8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

Appendix J **Participant Consent Form**



"THE TEACHABILITY FACTOR" RESEARCH
CONSENT FORM for PARTICIPANTS

❑ I wish to apply to participate in the above Research. I have read the information sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:
I know that my participation in the project is entirely voluntary
I am free to withdraw at any time without disadvantage
Personal identifying information will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for at least five years
This research is low to nil risk and no discomfort of participants is expected. The burden of the research is the pre and post questionnaires and attendance at the workshop.
There is no financial renumeration or compensation for participants time and participation. However participants who complete the workshop will be entitled to receive a certificate of completion.
The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my anonymity.
I understand that neither the Early Childhood Centre, the teacher, nor the student will be identified in the research report. All data collected will be kept in secure storage according to Otago University Policy and disposed of 5 years following the study.
I understand that the results of this study may be published but my identity and that of my Early Childhood centre and the student will remain confidential. Only those who are members of the research team will have access to my data and they are bound by confidentiality rules and agreements.
I will be given access to the finished research when it is published.
I fulfill the following criteria:
I am a fully registered NZ teacher
I teach full time in a NZ Early Childhood Centre
Have taught in NZ for minimum 3 years
I have a specific emotionally or behaviourally problematic student in my classroom (aged between 2 - 5 years)
I am willing and able to fill in a pre and post test questionnaires. I understand that these may take 1 - 2 hours in duration.

I know that:
I have the permission of the appropriate authority from my Early Childhood Centre (their signature is below)
I am available for **8 consecutive Wednesday nights** in term 2, 2013: May 8, 15, 22, 29, June 5,12, 19, 26 **Venue:** Auckland, North Shore, Milford. **Time: 7:00 - 9:15 pm.** I can make my own way to the venue.

Teacher Name: _____

Address: _____

Email: _____

Centre: _____

Principals Name: _____

Principal's signature authorisation: _____ **Date:** _____

Teacher's signature: _____ **Date:** _____

Post or email this form to

Kaye McKean
C/- Dr Nicola Atwool
Otago University
PO Box 56
Dunedin, 9054

This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph. 03 479 8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.

Appendix K **Welcome Letter and Instructions to Participants**



Dear [redacted]

Thank you for registering to attend "The Teachability Factor" workshop and for participating in this Otago University Research Project. Your participation will not only inform research for the future of early childhood care and education, but I believe you will thoroughly enjoy and benefit from it also. Thank you for committing to this course.

Enclosed is the pre-workshop information and instructions for the research project. Please take the time to read this two page letter and follow the instructions carefully.

PRE-COURSE QUESTIONNAIRES: ***INSTRUCTIONS***

You will find ***enclosed*** two Pre-course questionnaires to fill in before May 8.

❶ **Select a child:** Before you fill in these questionnaires take some time to think about and select a child in your classroom who is behaviourally / emotionally problematic in some way. This child needs to be between the ages of 2 - 5 years. It is important that you are the teacher of this child.

❷ **Fill in the forms:** As you fill in the forms have this one, same child in mind as you answer the questions.
You will notice that I have written YOUR name in the 'child's name' place to ensure anonymity for the child. You may place a 3 letter code (initials for example) next to this space to remind you which child you have selected.

❸ Please **follow all other instructions on the questionnaires**, fill in all other categories and answer all questions, keeping this one child in mind as you answer the questions.

❹ Please **bring these two questionnaires to the first workshop** on Wednesday 8 May. They will be used for research purposes.

Kaye McKean. C/- Dr Nicola Atwool. Otago University. PO Box 56, Dunedin, 9054. Email: kmckean@me.com

WORKSHOP DETAILS:

☑ **Dates:**
The workshop runs for 8 consecutive Wednesday evenings beginning May 8 (May 8,15, 22, 29, June 5, 12, 19, 26). You need to attend all 8 evenings.

☑ **Time:**
7 pm - 9:15 pm

☑ **Address:**
Westlake Boys High School. 30 Forrest Hill Rd, Forrest Hill, North Shore, Auckland. Classroom B10.
Please use the Tennis Court Drive way and use the car park at the end of this drive. There will be signs & lighting to direct you to the classroom, which is close to the car park. A ***map*** of the school is enclosed to assist you. (For those coming via the motorway, take the "Tristram Ave" exit, turn UNDER the motorway, go up the hill and turn RIGHT at the lights onto Forrest Hill Rd).

COURSE SYNOPSIS:

Teaching doesn't always result in learning and this discrepancy seems to be widening. This, despite the fact that students have never been smarter, teachers have never been better trained, our curriculum has never been more honed, and our technology has never been so advanced. According to Dr. Neufeld, the problem has to do with the diminishing teachability of our students. The teachability factor refers to those determinants of learning that are psychological in nature: developmental, relational, motivational and emotional. Cultural change has altered these factors, making the teacher's job much more difficult than it used to be, or needs to be. According to Dr. Neufeld, the teachability factor is the most overlooked, least understood and potentially the most promising of the factors in the learning equation. Current educational methods and curriculum assume teachability, setting teachers up for considerable frustration when this assumption is not realized. The Teachability Factor was developed by Dr. Neufeld with the purpose of making sense of students to the teachers, administrators and supporting professionals responsible for them. It is an insight approach bringing the best of attachment-based developmental science to bear on the issues and challenges of educating our young. This course focuses on the two most significant factors in learning and behaviour: developmental stuckness and the student-teacher relationship. Interventions flow logically and directly from an understanding of these factors. The video material for the course is divided into eight 1-hour sessions. The course is relevant to all educators and supporting professionals.

I'm looking forward to meeting you and getting to know you over our 8 weeks together. See you on Wednesday, May 8!

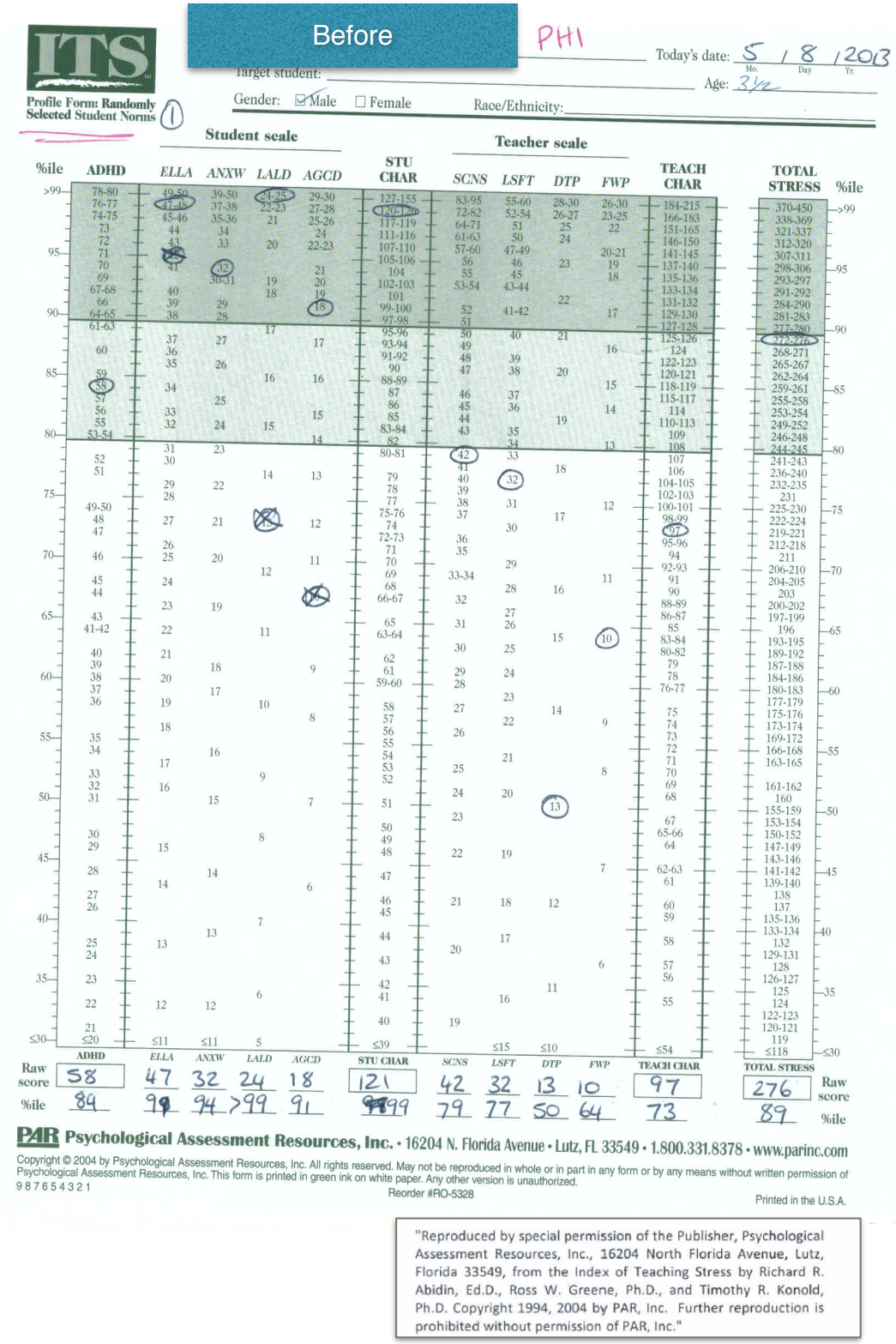
Warmly,

Kaye McKean

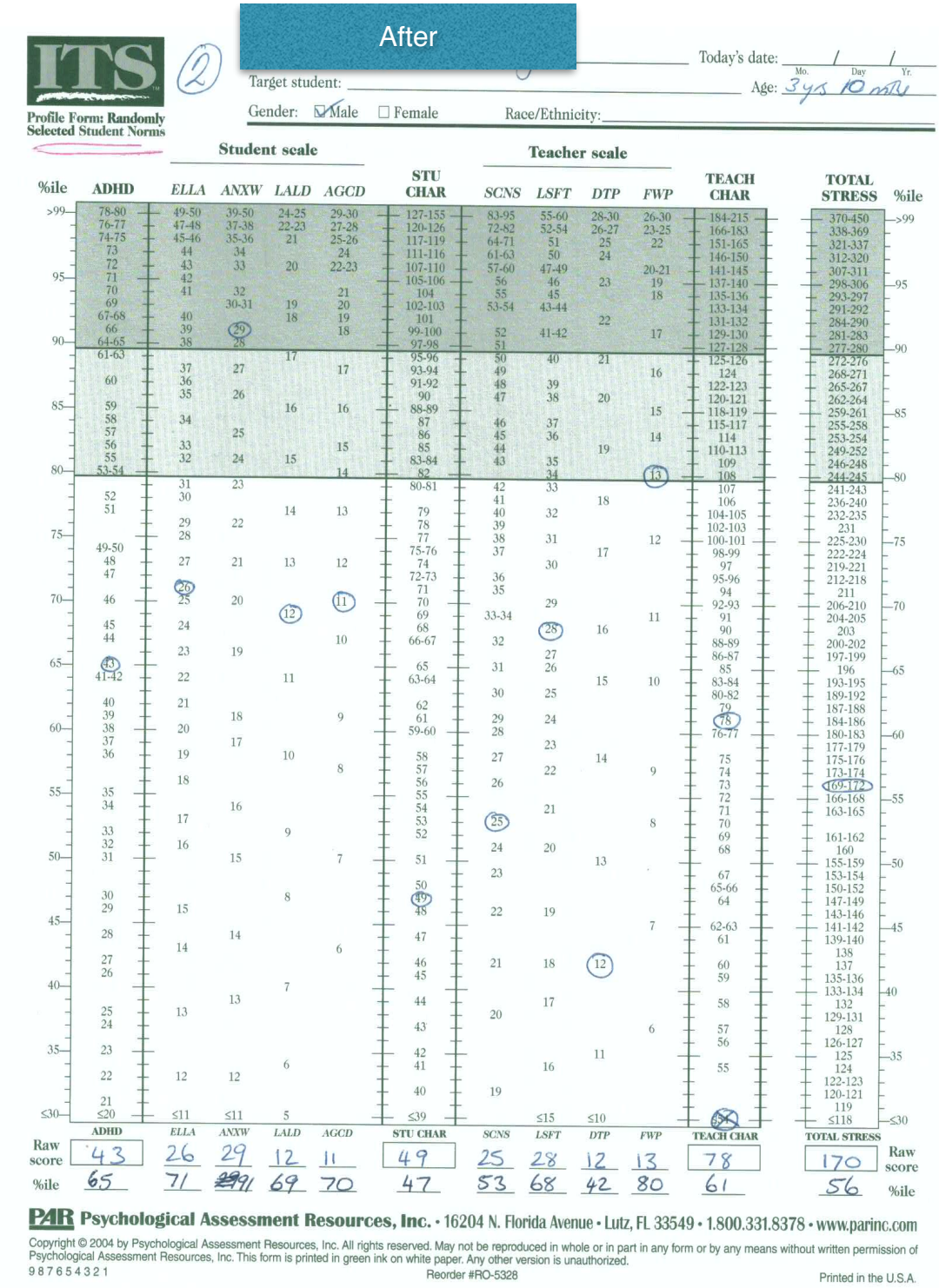
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Appendix L **Individual Subject Responses (ITS) Samples**

Index of Teacher Stress



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