Investigating: The Virtues Project™ effects in a preschool

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by Derek Patton

Abstract

This first ever quantitative research of a 20-year-old intervention used widely in 90 countries including more than 100 schools in Australia and New Zealand, introduced The Virtues Project™ (Popov, Popov, & Kavelin, 1995) into a preschool through 12 hours of staff training, and measured changes in children's behaviour through direct observation at pre-intervention, during 3 months of implementation and at a 6-month follow-up. An AB single-subject design used 10-minute observations with high interobserver agreement of social, antisocial and shy/withdrawn behaviour to measure change replicated across 9 children (3 ½ - 4 yrs), 3 with externalising, 3 with shy/withdrawn and 3 without problem behaviours. Parent and teacher ratings using the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997) were collected pre-, post- and follow-up. The Virtues Project trains adults to use a "language of the virtues" to describe, model and create a culture of kindness, helpfulness, gentleness, respect, patience, excellence, curiosity and enthusiasm, to use teachable moments to acknowledge and describe character strengths, consequences and effects on others and to set clear boundaries using virtue words. Post-intervention data at 3 months showed all problem behaviours reduced to below clinical levels, with high and stable levels of social behaviour and at a 6-month follow-up, very long observations found virtually no antisocial behaviour in all 9 children. The time limits of a half-year credit Master's dissertation did not allow direct measurement of teacher-child interaction as the likely mediating variable of child change. I will describe my planned PhD research, which will start to address these limitations by using the Classroom Assessment Scoring System (CLASS) (R. C. Pianta, K. M. La Paro, & B. K. Hamre, 2008) to measure teacher-child interactions of 500 children in 40 classrooms on 10 dimensions shown to create a culture of thinking and learning that has predicted child academic and social gains in US early education. I will also measure child engagement in learning opportunities through observations, teacher-ratings of child behaviour and teacher word use, to fully describe and measure classroom culture influencing child development. The PhD research will not use an intervention to change classroom culture, which would be the next step post-PhD.

Derek Patton derekpatton19@gmail.com
Reg. psychologist in New Zealand
PhD Candidate University of Melbourne

Theory and research changes over 50 years

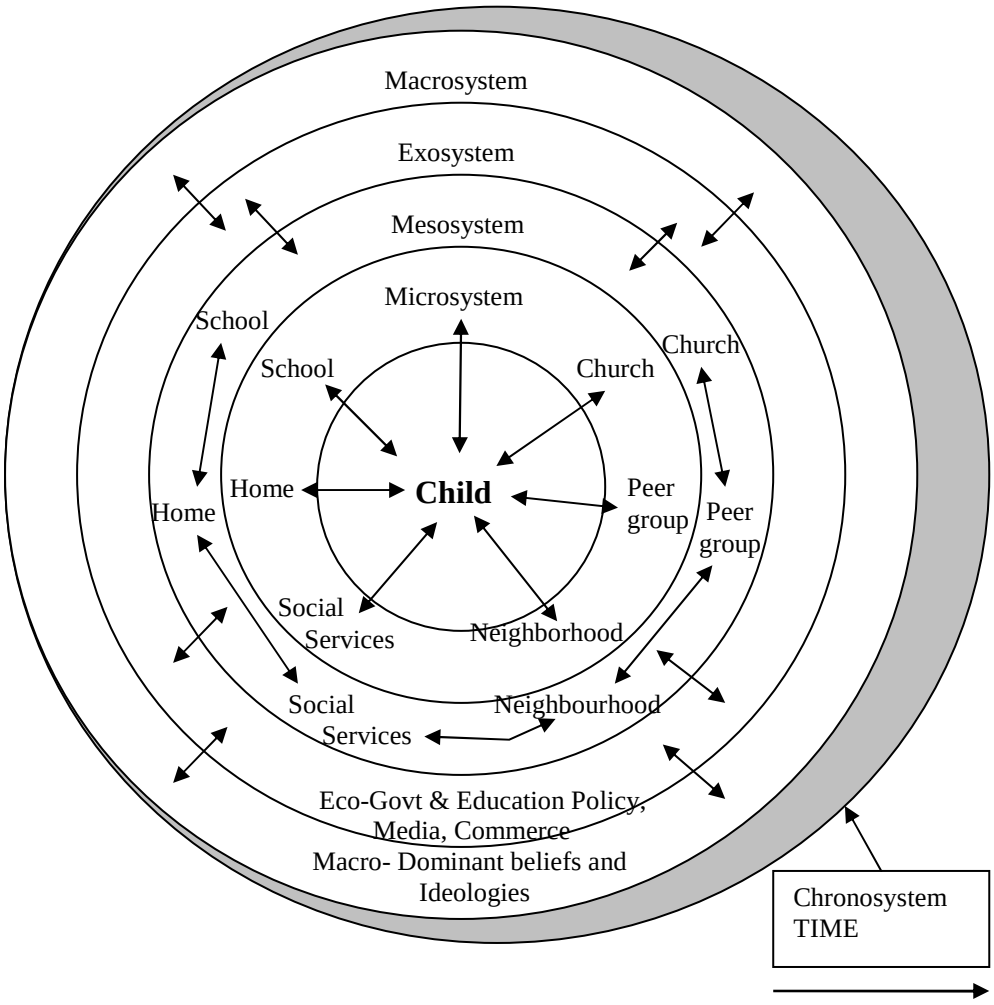
Changing theoretical perspectives in early childhood education

A large shift in perspectives of child development in the 1960s was provided by Piaget's theories of child development which acted as a counter to the pervasive behavioural approach which was already being challenged (Chomsky, 1959).This provided a theoretical rationale for the importance of children interacting with peers in play where interesting materials were available for extended periods. Further changes came with attachment theory (Ainsworth, 1964; Bowlby, 1958) which provided the theoretical and research support for long held beliefs that children needed warm and supportive relationships with teachers. These two perspectives lent support to various streams of practice which focused on early childhood experiences revolving around rich environments for play and social interaction, predictable routines and a variety of activities. However, so called "pre-academic" knowledge, such as letters and numbers was viewed with suspicion partly through association with the challenged behaviouristic views (Dickinson, 2002). Children's acquisition of language, pre-academic and pre-literacy skills where generally not understood as something that needed particular types of nurturing or interactions to develop more fully. This started to change in the 1980s and 1990s with the accumulating contributions of cognitive psychological approaches in education, particularly of Piaget and then in language acquisition (Bruner, 1974; Halliday, 1969), social learning theory (Bandura, 1977), social cognitive theory (Bandura, 1986), Vygotsky's theories (1962; Vygotsky & Cole, 1978) which conceptualized child development in socio-historical terms and Urie Bronfenbrenner's bio-ecological model (1977) of nested influences to understandings of development.

Ecological theory

The framework for most ecological theories is based on Urie Bronfenbrenner's bio-ecological model (1977) where an expanding set of nested relationships radiating out from the family to the community, culture, and the economy provide the context for understanding how environmental and biological contexts of the developing child both influence the child and are influenced by them (e.g., a reciprocal relationship). These interact over time as shown in Figure 1.

Figure 1. Urie Bronfenbrenner's bio-ecological system (Papalia, Olds, & Feldman, 2002).



A further conceptualisation which Bronfenbrenner called the Process-Person-Context-Time Model (PPCT) (Lerner, 2005), posits that the developmental process, the person, the context and time are an integrated developmental system.

Family systems model

An understanding of how children's behaviour is passed down from generation to generation can be partly understood in a multigenerational developmental perspective based on Murray Bowen's theory of transmission of interactive strategies that individuals use to organise their relationships (Anderson & Sabatelli, 2003, p. 60). In this perspective the transmission process involves family members acquiring a set of interpersonal behaviours toward each other from their family of origins that replicates itself in the next generation. This model is useful in that it informs interventions designed to disrupt the transmission of destructive strategies and improve positive strategies. Systems models were also influencing sociology and other fields at the same time (Bernstein, 1988; Minuchin, 1985; Plas, 1986)

Cultural-historical theory

Lev Semenovich Vygotsky's contributions to understanding development during childhood includes understanding how adults scaffold children's learning in what is called the Zone of Proximal Development (ZPD) where strategies to self-regulate complex activities are learned between the lower and upper limits of the learner's competency (Vygotsky, 2004 [1967]). The ZPD is the space between what learners can do independently and what they can accomplish only with the assistance of a competent adult or peer. The ZPD model of learning is implicitly a social constructivist one (Aulls, 2002). Vygotsky also proposed a cultural-historical account of acculturation occurring during the early development of the child's brain and mind by a process of internalising the language system that reflects the social history of the culture (Akhutina, 2003). Both of these levels of learning led Vygotsky to claim that speech is the source of social behaviour and consciousness.

Social psychology of communication

Social psychologists come to many of the same conclusions as Vygotsky from different sources and a separate line of theoretical developments where it is not only seen that culture is transmitted by language which, as a symbol system, constitutes social action (Fiedler, 2007), but also that the psychology of interpersonal communication actually creates and shapes human culture (Conway & Schaller, 2007). This approach also includes a clearly systems approach to understanding the complexity of symbolic transactions between a communicator making meaning and a recipient achieving understanding in groups using language.

Inner speech, neuropsychology and evolution

Alexander Romanovich Luria, a friend and collaborator of Vygotsky and accepted as the founder of the science of neuropsychology in both the USA and Russia (Cole, 2002), wrote the following: "[T]o a large degree we owe this enormous superiority of intellect over instinct to the mechanism of inner speech. . . . Turning from outside inward, speech formed the most important psychological function, representing the external world within us, stimulating thought, and, as several authors believe, also laying the foundation for the development of consciousness" (Luria 1993 as cited in Akhutina, 2003, p. 163). For Luria, neuropsychology was part of cultural-historical psychology and helped explain the interactions of the culture-mind-brain triad (Zinchenko, 2005). This is supported by theories of the reciprocal interactive evolution of language, brain structure, consciousness and group social culture (Lakatos & Janka, 2008). One account is that the human brain and linguistic environment of the group evolved together, first by gesture (including facial movements) and then increasingly by verbally produced sounds (language), and that this is the developmental pathway that the modern child follows from protolanguage to mother tongue (Tomasello, Carpenter, & Liszkowski, 2007).

Psychological "structures"

This was led by Noam Chomsky's idea of a Universal Grammar, which he proposed was needed to account for both the rapid acquisition of language and for the limits of

known variability amongst the world's languages and the limits to mistakes children make in trying to acquire these languages (Chomsky, 2006).

Cognitive psychologists and linguists, following the work of Chomsky, conceptualised cognition as an individual phenomenon and to some extent, ignored its social aspects according to Paul Thibault (2000) and ignored cultural/historical language development (Tomasello, 2005). This lack of articulation between individual cognition and social cognition may have resulted in lopsided models unable to explain the role of discourses in social reproduction (Achugar, 2007). Also, Chomsky and earlier linguistic studies did not consider fully early child communication with primary caregivers and how this protolanguage builds toward acquiring the mother language (Conway & Schaller, 2007).

Early communication and sociolinguist theories

Advances in the conceptual framework for developmental processes have moved from behaviour modification and applied behavioural analysis toward understanding the communicative function of all behaviour (Durand, 1990, 2003). Theories regarding how language works to enhance child development go to a deeper and often ignored level of understanding.

Sociolinguistics is a theoretical approach which started out as an atheoretical examination of language purely through its function and which came to propose a detailed understanding of how culture is transmitted to the child through language while the child is learning language (Halliday & Webster, 2003). The unit of analysis is not words as such, but the transaction between meanings that the child attempts through communication and the response from the adults. John Dewey and Lev Vygotsky both tackled the idea of meaning making as the central issue rather than genes, neurons, parts of speech or concepts at a time when "virtually all psychologists and philosophers considered concept to be the basic unit of meaning" (Prawat, 2002, p. 18). They both came to believe that action was the mediator between the individual and the environment (e.g., meaning making), with a transactional approach that viewed meaning making as something that goes on in the world and not just in the head (Prawat, 2002). This is where the interacting parties are not conceptually isolated from one another, are not independent things and the interaction is not an intervening third "thing". What for Vygotsky had been an organism-action-environment model became an organism/environment co-action model or a unity (Minick, 1986).

Adult-child mutual, shared, connected communications

The child and mother communicate with each other through what can be called a protolanguage from about the child's age of 9 months. This may influence the child's developing capacities by means of the mother/child mutually responsive orientation (MRO) (Kochanska, Forman, Aksan, & Dunbar, 2005). Results of experiments show that MRO has a direct, unmediated effect on these capacities and that MRO works to influence behaviour through two mediated pathways: (a) by increasing the child's enjoyment while interacting with the mother and by (b) increasing committed compliance.

Rosie Ensor and Claire Hughes at the University of Cambridge (2008) have identified what they call “connected conversations” where the mother/child communicative turn takings and mental-state references within these turns were associated with children's social understanding two years later.

A very large study of 3,000 children in preschools by researchers at the Universities of London and Oxford (Siraj-Blatchford, Sylva, Muttock, Gilden, & Bell, 2002) showed that children advancing the most from preschool experience on measures of cognitive, social and educational outcomes attended preschools where clear discipline and behaviour policies promoted talking through conflicts with other children, if necessary, mediated by teachers, and where there was more Sustained Shared Thinking (SST), defined as: “An episode in which two or more individuals ‘work together’ in an intellectual way to solve a problem, clarify a concept, evaluate activities, extend a narrative” (p. 8) and where both parties must contribute to the thinking.

A comprehensive and recent review of research on the child’s neural mechanisms and their interaction with social influences on their development (Fonagy, Gergely, & Target, 2007) suggests the child constructs a sense of a subjective self through acquiring knowledge about the environment through the caregiver's pedagogical communicative acts which relate specifically to the child's thoughts and feelings. The child focuses on the attachment figure as the main source of reliable information about the environment. It has been shown that infants by age 18 months learn words selectively from speakers who clearly refer to certain objects, and avoid learning words from informants who do not display such social cues (Baldwin & Moses, 2001). The ability to evaluate the trustworthiness of an informant is necessary for communication according to Melissa Koenig and Paul Harris (2005). Three and four year olds displayed trust in knowledgeable over ignorant speakers and they trusted only reliable informants when learning both verbal and nonverbal information.

Fivush and Nelson (Fivush & Nelson, 2006) argue and provide a summary of research evidence supporting the claim that until children start to converse with adults about their or others’ past experiences, they are unable to represent themselves in the past or to project themselves into the future. Parent-guided reminiscing about internal states, in particular, scaffolds children’s ability to perceive that their understanding of past events may not be the same as others, and thus appreciate conflicting viewpoints, and develop an inquisitive approach to all learning. They are also able then to empathize with others’ desires about different futures which assists social interactions.

Interventions

Improving interventions

When language’s contributions to both coercive systems and healthy systems of human interaction are understood, then interventions can be designed to specifically take advantage of the power of language in shaping culture. According to Michael Halliday (1990) when interventionists plan a change in language, they are creating an active systemic change that can shape people's consciousness, and are therefore not forging an ideologically neutral instrument. It is therefore important that language

change that accompanies school intervention is based on the highest desired ethical standards, clear and established theoretical perspectives, and is discussed thoroughly by stakeholders.

The Virtues Project

Whole school culture change through language

Combining the need for authoritative communities and what has so far been outlined as the most supportive language features for social/moral development is an intervention called The Virtues Project (VP) (Popov, 2000; Popov, Popov, & Kavelin, 1997) where adults are trained to scaffold children's interactions in their environment in connected conversations using virtue words that are common to all civilizations and successful cultures, and to construct strong boundaries, guidance and correction using the same words.

The Virtues Project's "virtues language" as a possible solution

In a previous report (Commonwealth of Australia, 2003) of 50 case studies in 69 schools, three schools adopted an existing program called The Virtues Project (Popov, 2000), that explicitly teaches a "language of the virtues" and four other strategies of where, how and when to use this language through 12 hours of teacher training. Djarragun College, a Kindergarten to Year 12 (K – 12) Anglican school which specifically caters for Aboriginal and Torres Strait Islander students, had been experiencing significant management difficulties prior to 2001 which resulted in very poor student behaviour and high staff turnover, and ultimately led to a more interventionist approach by the governing body and the appointment of a new principal to the school. The intervention they used was the Virtues Project. "The whole experience with the Virtues Project has been very positive for the college in turning around behaviour" (Commonwealth of Australia, 2003, pp. 96-97).

An investigation of school websites and other government documents accessible on the internet, by this author, found that the Virtues Project (VP) is currently being used in at least 50 schools and school volunteer training organisations in Australia. These include preschools, K – 7 primary schools and high schools, both public and religious of various denominations and schools with specific theoretical orientations such as a number of Montessori schools. Although the VP language is predetermined and not created by the school community, schools seem quite content to choose which of 52 virtues fit their situation through discussion amongst teachers and community, and develop additional resources and customise their approaches. VP is not a manualised or curriculum program but trains teachers in principles, how to use the virtues language (pedagogical practices), and encourages teachers to adapt the system to their context. Some of these schools report that the "virtues language" underpins all their other efforts at creating a whole school ethos. Students in one school report there is no bullying in the school. A number of others report not only parent support, but have noticed a change in parent language. One school published *A Little Book of Virtues* (Forrestfield Primary School, 2005) based on VP learning and was recognised by the then Prime Minister John Howard and won national acclaim (Bedrock Books, 2005).

It was reported (Government of South Australia, 2005) that in 2003, Lonsdale Heights Primary School, with 180 students, 11% indigenous and 65% on school cards (an indication of low socioeconomic status – SES), was struggling with persistent problems of bullying, violence and disenchantment among some of the students. Teachers were challenged and felt disempowered by the constant disrespect for authority and the language being used towards staff and peers, as well as students' disengagement from learning. The school used the Virtues Project strategies and language to help students make amends or restore a relationship after a behavioural issue in the classroom or yard. In addition, a series of four workshops on the "Virtues Project" were conducted with parents who gained a greater understanding of using virtues in parenting and teaching. They also learned about the concept of restorative practice as a non-punitive, educative approach to raising children. The principal says this "marked the beginning of a theoretical shift from punitive-behaviourism to a more educative and humanistic approach to student social and emotional development…and through the implementing of restorative practices within a positive school culture we believe that our students and teachers have a better understanding of themselves and others. It is important to remember that 'Forgiveness alone is not enough' from Linda Popov – The Virtues Project. Repairing the harm forces students to learn from the experience that has led to the conflict and examines the attitudes, beliefs and behaviours which have contributed to it" (Lang, 2005).

There is one school in Australia that may have independent data supporting the efficacy of the virtues language. Unfortunately, the school used more than one intervention. A Wellbeing In Schools Evaluation (WISE) research report attributes part of the changes in the school to these interventions (private communication A/Prof Helen Street, School of Psychiatry and Clinical Neuroscience, University of Western Australia). The teacher who is the coordinator of the school's emotional intelligence program, of which the virtues language is a part, said that: "Our Virtues Program continues to realise long-term positive effects, particularly as younger children, with longer exposure, move up through our school. It was exciting to note that our ex-students, now at xxxHS [high school], have outscored 140 other high schools in their knowledge and understanding of desirable values. WISE Research during 2007, supports our view that the Virtues Program, in combination with our Emotional Intelligence strategies, is effective in reinforcing positive social outcomes at MRPS" (private communication with the VP coordinating teacher).

There are reportedly 70 schools in New Zealand using VP (Virtues Project Trust Board, 2006), and a number of them have been the subject of research. One primary school has good evidence from trained peer mediators, that bullying was eliminated. Another school kept naturally occurring data which has been shown to be valid for research in education (Horner, et al., 2004). Lunchtime detentions for misbehaviour in 2004 rose each term until 4th term, which had 26 detentions. The Virtues Project was implemented early in 2005. Lunchtime detentions in 2005 dropped from 14 in the first term to 0 in Term 4. Reportedly, this was the first time Term 4 had ever had a zero incident rating and the usual trend had been an increase in incidents over the school year. The principal and two deputies reported their experience to a Catholic schools conference in Christchurch NZ in 2007. A Word document of the data is available on request from this author who received it from NZ Ministry of Education Resource Teacher of Learning and Behaviour (RTLB) John Lukkassen.

One example from North America where the Virtues Project originated is taken from the Calgary School District website which shows an increase of schools using VP to nearly a quarter of schools in the district, or approximately 52 schools with 18,400 students involved (Calgary Board of Education, 5 June 2007), and also shows a drop in antisocial behaviour and an increase in student reported perceptions of safety. Another example from Canada is the Parry Sound High School (2009; Skinner, 2008) with 800 students, 50% of whom are First Nations and which was experiencing a lot of intercultural and behaviour problems. The claim is made that it was the Virtues Project intervention that changed this. The high school students have taken it upon themselves to visit the feeder primary schools and train them in the virtues system, which started from the idea that this would make it easier to acculturate the new entrants to the high school.

Researching The Virtues Project™

Research proposal

There would appear therefore to be sufficient evidence to indicate that schools, communities and parents would accept The Virtues Project in their schools as a useful tool for implementing "values education". It is unlikely that random sampling of schools and teacher language will find a school where all teachers use a consistent enough language in the naturally occurring variation of teacher talk to test the hypothesis that a common shared language of values will have had a measurable effect on student outcomes. It is also unlikely that one of the few schools that currently use either a common values language they have created or a school that has adopted the virtues language is doing nothing else to help the situation (i.e., the effect of the virtues language would be confounded by other factors). What would work is to find schools which have adopted neither a common values nor a virtues language and intervene only with the virtues language from VP, which can be studied before and after training. It can be made an even more extreme test by doing case studies of the children with the most problems rather than taking the mean behaviour of the group. These are the children, in any event, who need the most help, often cause the majority of disruption and are likely to continue to do so in the future.

> "When the objective is to achieve the greatest possible amount of information on a given problem or phenomenon, a representative case or a random sample may not be the most appropriate strategy. This is because the typical or average case is often not the richest in information. In addition, from both an understanding-oriented and an action-oriented perspective, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur. Random samples emphasizing representativeness will seldom be able to produce this kind of insight; it is more appropriate to select some few cases chosen for their validity" (Flyvbjerg, 2006, p. 229).

The Virtues Project emphasises using the language of the virtues in all interactions in a context and this, more than anything else, distinguishes the VP from "character education" programs more broadly. Some children have said they do not use the respectful language taught in moral education classrooms in other school activities because that way of talking is for that class, which James Paul Gee (2004, 2005)

explains is simply part of a child learning specialised ways of talking and behaving in different classes, e.g., "situated" language, such as social studies language, sports class language, biology language and so on. To make a pervasive language change in all contexts, a new way of talking must be modelled and used in all activities.

Since its inception the Virtues Project has been taught in 90 countries as an intervention at home, school, businesses and prisons, and in 1993, during the International Year of the Family, the United Nations Secretariat and World Conference of Cities and Corporations listed it as a model global program for families of all cultures (The Virtues Project, 2007). There is anecdotal evidence from my private communications, from accessing training and school websites and through the VP facilitators email chat group, that the "language of the virtues" regardless of specific language does provide a common foundational conceptualisation that is acceptable to all groups and narrows the perceived "gap" between cultures.

My hypothesis is that when all teachers use the VP language, this creates a whole-school culture shift through changing interpersonal interactions. Teachers notice virtuous behaviour in children, the children are acknowledged and the behaviours are reinforced, but even more important the children come to know they have these character traits within them and can use them when called upon which leads to using them on their own accord. If parents are trained as well, then virtually the entire world of the child is constructed to train a culture based on virtuous social interaction. This language-created culture is likely to train cognitive, social and moral capacities in children at a faster rate and with a more complete cognitive schema of social interaction than would otherwise be the case.

It is therefore proposed that The Virtues Project's (VP) "language of the virtues" (Popov, et al., 1997) which is taught not as a curriculum, but as a pervasive language change used by all adults in the child's environment could act as a research tool to investigate the current anecdotal claims that a whole school language shift changes the culture of the school sufficiently to produce benefits for children's behaviour and moral development.

The advantage of using VP as a research tool is that it already has training materials in a variety of languages, trained facilitators and supporting systems widely dispersed around the world which we could use as our "test" language. It has high social validity and acceptance in multiple cultures and language systems. Using VP facilitators and materials, we could design research that includes schools and parents in multiple locations.

Early Childhood Education (ECE): a strategic place to intervene

Malleability of problem behaviors appears to decrease as children grow older (Loeber, 1991). ECE is a good first point of intervention as child peer relations are more modifiable than in later settings and this context is oriented more toward social competence (Vitaro, Tremblay, & Bukowiski, 2001, p. 369). Developing social competence is a key task in early childhood, as it predicts social and academic outcomes later in life (Blair, Denham, Kochanoff, & Whipple, 2004, p. 420). Furthermore, effect sizes for reduction of problem behaviours are almost always larger in ECE children than older children when similar programs are compared

(Wilson & Lipsey, 2005; Wilson, Lipsey, & Derzon, 2003). The US *Head Start* program (Zero to Three Policy Centre, 2005) and the *High/Scope Perry Preschool Studies* (Schweinhart, 2003) show how a well designed ECE program can change life-course antisocial behaviours (Rutter, Giller, & Hagell, 1998, p. 327), especially when it engages both parents and teachers in learning how to extend their children's development and decision making capacity (Schweinhart & Weikart, 1997, p. 137), rather than simply training academic ability. Parents of young children are often open to suggestion about parenting strategies early in their parenthood as can be seen at the parent/teacher interactions at pickup and drop off times in ECE. Teachers are expected by parents to have knowledge about helpful child rearing practices, but these need to be imparted in quick simple advice. Increasing ECE teacher capabilities in effective parenting strategies and their ability to articulate these in simple language is likely to increase parent learning. Parent teacher cooperation has been shown to be effective in programs like Head Start and the Webster-Stratton Dinosaur Program (Fantuzzo, et al., 1997; Webster-Stratton, 1999) and the development of partnerships between the teachers and parents has been shown to have multiple benefits for both parties (Power, 1992). If children hear consistent language and experience similar adult behaviour about expected social norms at both home and school, then they are likely to learn faster and have more resilience in these capabilities.

Pilot study: does it work?

My Master's dissertation was designed as a pilot study to provide the first objective research evidence for the effectiveness the Virtues Project (VP) in reducing challenging behaviours (and increasing social behaviour) in 3- to 4-year-old children in a preschool. Surprisingly, the three most antisocial and the three most shy/withdrawn behaving children with scores close to or in the clinical range had substantial and rapid reductions in these behaviours which were normalised after the 3-month implementation and further improved and maintained at a 6-month follow-up using the SDQ teacher report and by independent observations using the Early Screening Project (ESP) (Walker, Severson, & Feil, 1995).

Data from of the three children with antisocial behaviour is shown in Figure 5. Figure 6 shows an example of a shy/withdrawn behaving child. These examples are typical. Figures 7 and 8 show all the children's Strengths and Difficulties Questionnaire results. See NOTE at end for an explanation of statistical calculations shown in Figures 5 and 6.

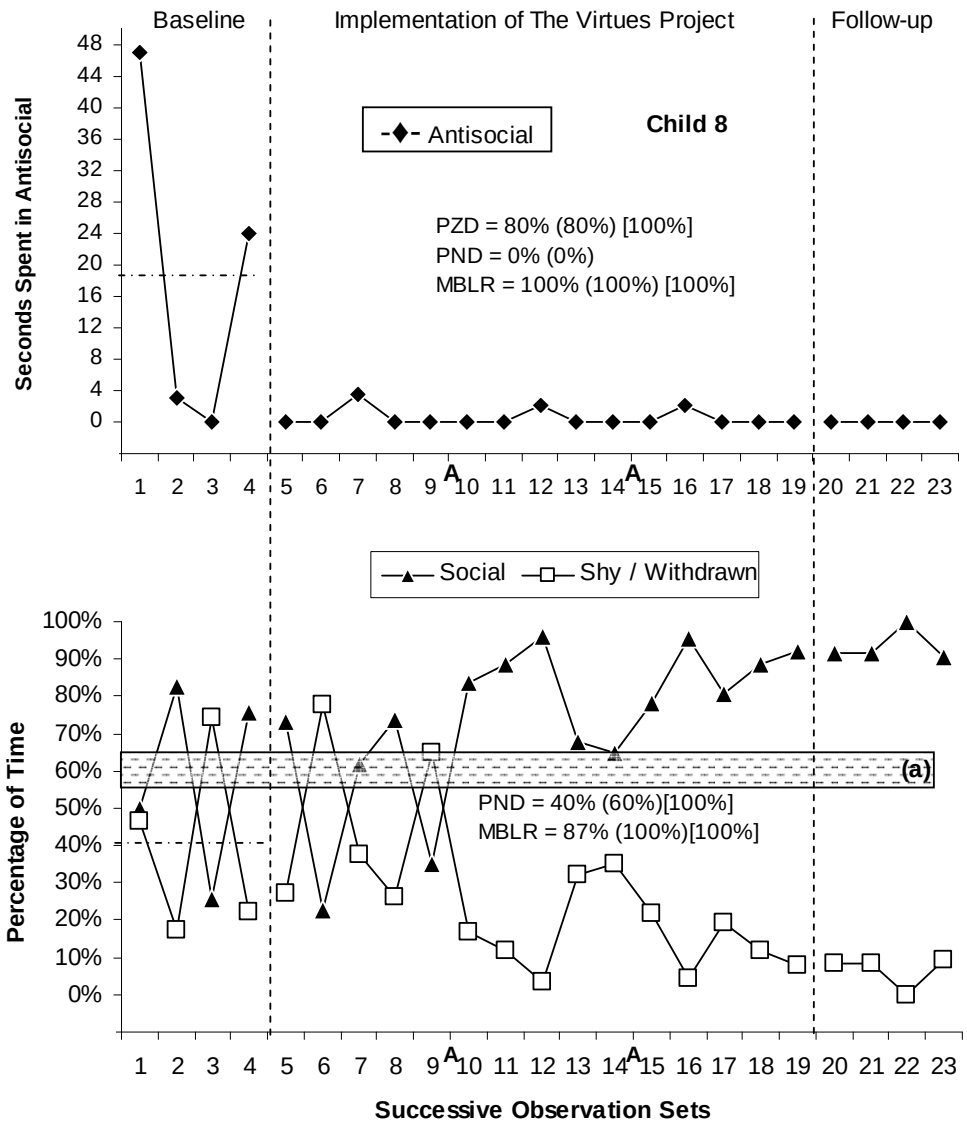


Figure 5. Child 8's duration of antisocial behaviour shown in seconds and social and shy/withdrawn behaviours shown as percentages of the 20-minute total observation time per set of two 10-minute observations. Calculations of percent zero data (PZD), mean baseline reduction (MBLR) and percent nonoverlapping data (PND) are shown for implementation (no parentheses), while figures in parentheses are for the last five data points only and figures in brackets are for follow-up data only. The dot matrix band marked (a) is the "at risk" level of social behaviour above which a child is not at risk (Walker, et al., 1995). The means of baseline data are shown with a dash-dot line. A_1 and A_2 mark the booster session training times**.**

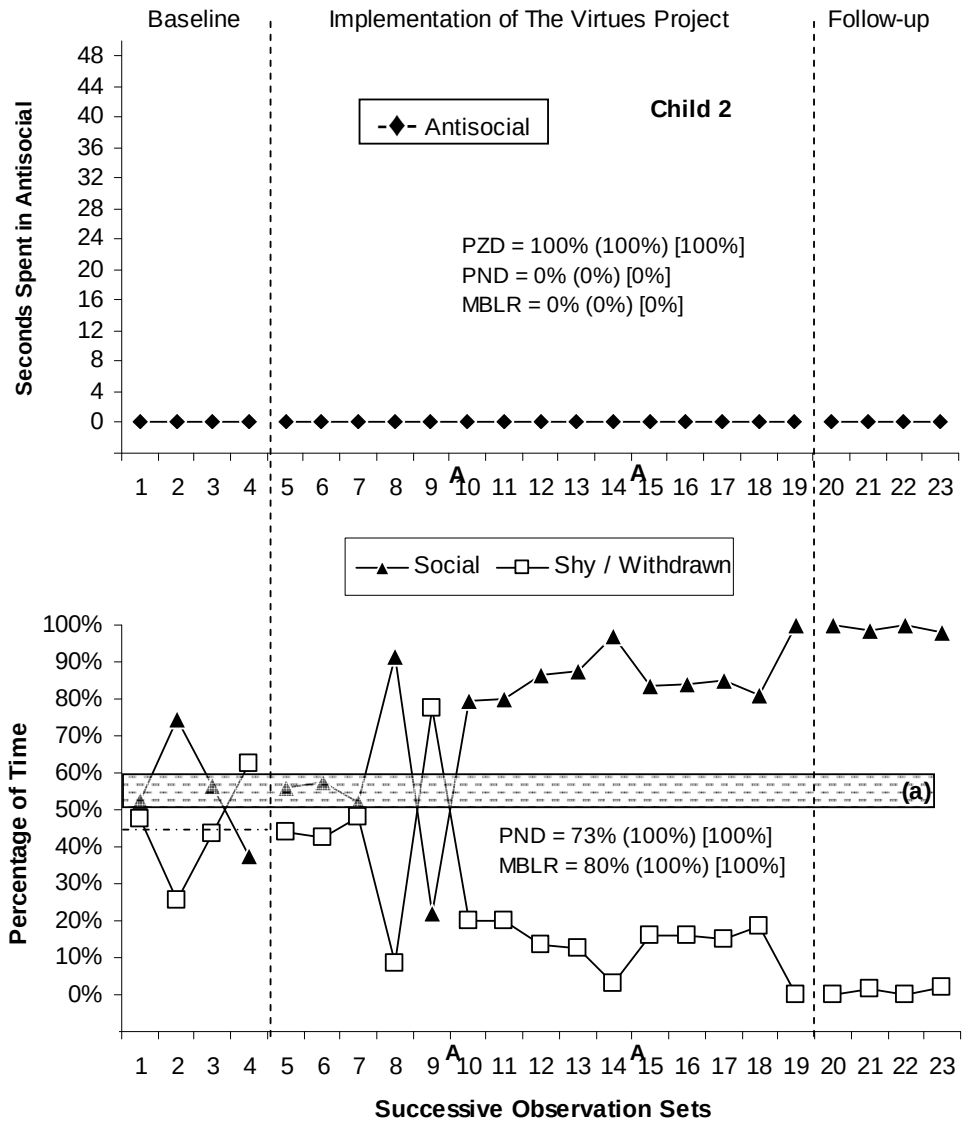


Figure 6. Child 2's duration of antisocial behaviour shown in seconds and social and shy/withdrawn behaviours shown as percentages of the 20-minute total observation time per set of two 10-minute observations. Calculations of percent zero data (PZD), mean baseline reduction (MBLR) and percent nonoverlapping data (PND) are shown for implementation (no parentheses) while the figures in parentheses are for the last five data points only and figures in brackets are for follow-up data only. The dot matrix band marked (a) is the "at risk" level of social behaviour above which a child is not at risk (Walker, et al., 1995). The means of baseline data are shown with a dash-dot line. A_1 and A_2 mark the booster session training times.

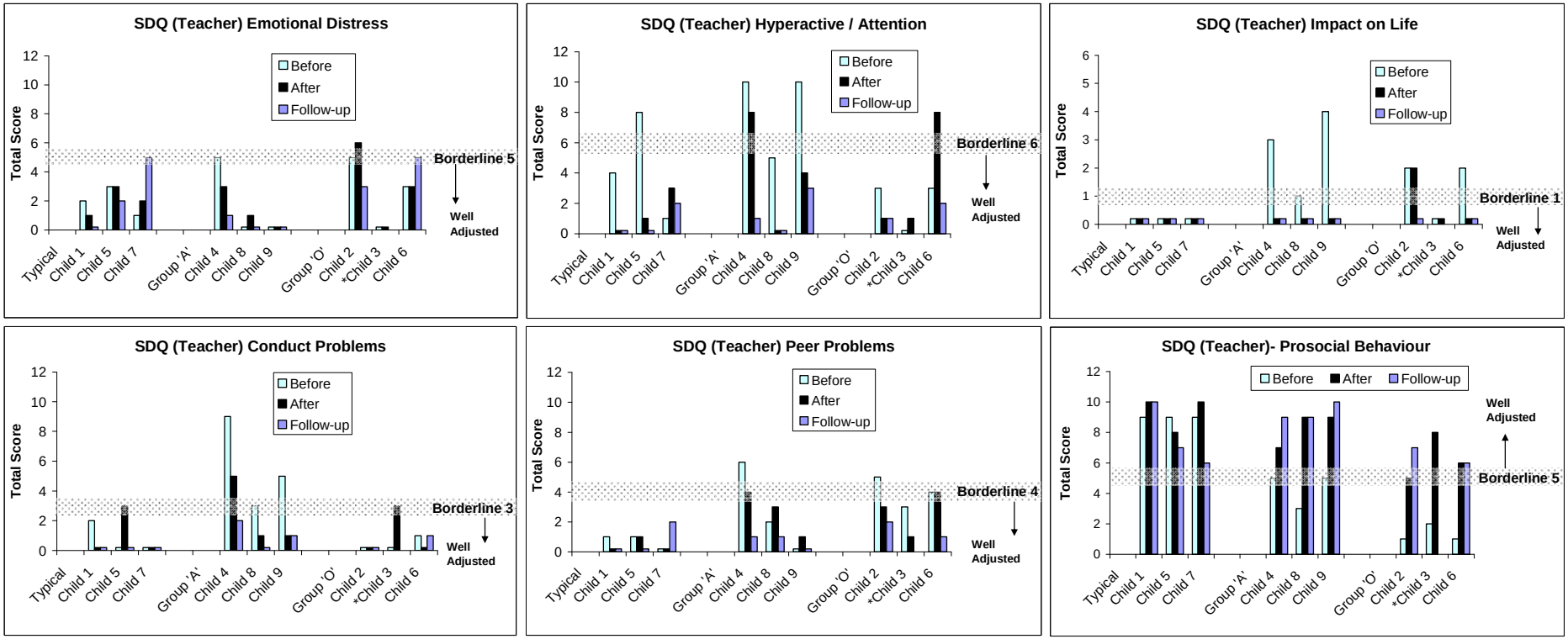


Figure 7. Teacher-report SDQ (Goodman, 2002) subscale scores for all children pre-baseline (before), post-implementation (after) and at follow-up . The borderline clinical score is shown in a dot matrix band and the direction of scores indicating a "well adjusted" child is indicated with an arrow. All scales are in integers on a 10-point scale except Impact on Life, with a 6-point scale. * Child 3 was not attending at follow-up.

A' Group SDQ Teacher

Child 4	Pre-B	Follow-Up	
E	**5**	1	40%
*C	**9**	2	70%
H	**10**	1	90%
PP	**6**	1	50%
*IP	**3**	0	50%
*P	**5**	9	40%

Child 8	Pre-B	Follow-Up	
E	0	0	0%
*C	**3**	0	30%
H	5	0	50%
PP	2	1	10%
*IP	**1**	0	17%
*P	**3**	9	60%

Child 9	Pre-B	Follow-Up	
E	0	0	0%
*C	**5**	1	40%
H	**10**	3	70%
PP	0	0	0%
*IP	**4**	0	67%
*P	**5**	10	50%

O' Group SDQ Teacher

Child 2	Pre-B	Follow-Up	
*E	**5**	3	20%
C	0	0	0%
H	3	1	20%
*PP	**5**	2	30%
*IP	**2**	0	33%
*P	**1**	7	60%

Child 3	Pre-B	Post-Implmnt	
*E	0	0	0%
C	0	**3**	-30%
H	0	1	-10%
*PP	3	1	20%
*IP	0	0	0%
*P	**2**	8	60%

Child 6	Pre-B	Follow-Up	
*E	3	**5**	-20%
C	1	1	0%
H	3	2	10%
*PP	**4**	1	30%
*IP	**2**	0	33%
*P	**1**	6	50%

Typical Group SDQ Teacher

Child 1	Pre-B	Follow-Up	
E	2	0	20%
C	2	0	20%
H	2	0	20%
PP	1	0	10%
IP	0	0	0%
P	9	10	10%

Child 5	Pre-B	Follow-Up	
E	3	2	10%
C	0	0	0%
H	**8**	0	80%
PP	1	0	10%
IP	0	0	0%
P	9	7	-20%

Child 7	Pre-B	Follow-Up	
E	1	**5**	-40%
C	0	0	0%
H	1	2	-10%
PP	0	2	-20%
IP	0	0	0%
P	9	6	-30%

A' Group SDQ Parent

Child 4	Pre-B	Follow-Up	
E	3	2	10%
*C	**6**	**4**	20%
H	**8**	5	30%
PP	2	3	-10%
*IP	0	1	-17%
*P	7	7	0%

Child 8	Pre-B	Follow-Up	
E	3	2	10%
*C	0	0	0%
H	2	3	-10%
PP	0	0	0%
*IP	0	0	0%
*P	7	8	10%

Child 9	Pre-B	Follow-Up	
E	0	1	-10%
*C	**3**	1	20%
H	3	2	10%
PP	0	0	0%
*IP	0	0	0%
*P	9	9	0%

O' Group SDQ Parent

Child 2	Pre-B	Follow-Up	
*E	2	2	0%
C	2	1	10%
H	4	2	20%
*PP	2	0	20%
*IP	0	0	0%
*P	9	7	-20%

Child 3	Pre-B	Post-Implmnt	
*E	3	1	20%
C	1	1	0%
H	1	2	-10%
*PP	1	1	0%
*IP	0	0	0%
*P	7	9	20%

Child 6	Pre-B	Follow-Up	
*E	1	2	-10%
C	1	1	0%
H	4	3	10%
*PP	1	0	10%
*IP	0	0	0%
*P	6	8	20%

Typical Group SDQ Parent

Child 1	Pre-B	Follow-Up	
E	2	0	20%
C	0	0	0%
H	4	5	-10%
PP	1	0	10%
IP	0	1	-17%
P	9	10	10%

Child 5	Pre-B	Follow-Up	
E	1	1	0%
C	1	0	10%
H	0	2	-20%
PP	2	0	20%
IP	0	0	0%
P	10	9	-10%

Child 7	Pre-B	Follow-Up	
E	2	1	10%
C	0	1	-10%
H	1	1	0%
PP	0	1	-10%
IP	0	0	0%
P	10	10	0%

Figure 8. Teacher- and parent-report SDQ (Goodman, 2002) scores showing percentage changes pre-baseline to follow-up (or post-implementation for child 3) for each child for each subscale: Emotional (E), Conduct (C), Hyperactive/attention (H), Peer Problems (PP), Impact on Life (IP), and Prosocial (P). Shaded bold numbers indicate a clinical score, while dot matrix bold numbers indicate a borderline score. Positive scores are improvements while negative scores indicate worsening behaviour. Category labels with an asterisk (*) indicate criteria used for inclusion in that group. Percentages are calculated as (A-B)/10 for problem scales, (-A+B)/10 for Prosocial (both 10-point scales), and (A-B)/6 for Impact on Life (6-point scale).

Conclusion

Summary

The power of giving children rules of interaction in the form of language, at a time in life when they are rapidly acquiring language, developing their social skills, and acquiring their culture, not only helps them as individuals, but can affect a change in the whole culture if enough children adopt the new rules. Systems theory (Anderson & Sabatelli, 2003) and meme theory and its derivatives (Boyd & Richerson, 2000; du Preez, 1996; Shichijo & Kobayashi, 2002) provide one way of understanding the rapid changes in behavior reported by some schools using The Virtues Project.

Peter Fonagy's idea that there exists an Interpersonal Interpretive Mechanism (IIM) (Fonagy & Target, 2003); Noam Chomsky's idea that there is a genetically endowed biological language acquisition system (Universal Grammar) (Chomsky, 2006) which has led some to hypothesise that there is a Universal Moral Grammar (Mikhail, 2007); Jonathan Haidt's Social Intuitionist Model (SIM) of moral judgement (2001) which is much like aesthetic judgment – a rapid intuitive process; C Robert Cloninger's (2004) research showing we inherit an intuitive understanding of compassion, ethics, art, and culture; Marc Hauser's (2006) idea that we are biologically designed to have a moral sense which, according to some researchers can be explained in terms of virtues or character strengths (Peterson & Seligman, 2004); A R Luria's idea (2002) that a neurologically based language system includes the wider and historical social system based partially on Vygotsky's "zone of proximal development" which facilitates moral development (Tappan, 1998); and Michael Halliday's idea that children construct social reality through intersubjective acts of meaning in learning their language and culture from significant adults (Bernstein, 1998; Halliday, 2004), could be investigated in more detail using the virtues language as a research tool to test the effects on children's moral development through changes in adult constructed communicative cultures in schools.

Future research questions

What change in teacher discourse is trained by VP and does this change precede improvements or rates of improvement in child behaviour, Theory of Mind (ToM), executive functioning, inhibitory control, moral reasoning, social functioning and/or language ability? What does the VP training change in teacher discourse that is easily measured and a consistent marker of overall discourse change and is likely to be the main active ingredient as a causal factor in child behaviour change? This is most likely to be found in elements of what the teacher says and how it is said in response to "teachable moments" when there is contextually significant social interaction engaging the child's full attention and emotion, e.g., when the teacher demonstrates for the child "knowledge that is appropriate to a complex social situation couched within a conversational interaction" (de Rosnay & Hughes, 2006, p. 23) or, in other words, moments of sustained shared thinking (Sylva, et al., 2007).

My PhD research Plan

Current theories informing research on child development

Theory and research has been converging in a set of coherent developmental theories that takes into account the various perspectives outlined previously in this paper and will provide the framework for my PhD research.

Developmental Science

In the chapter that introduces Volume one (Theoretical models of human development) of the 6th edition of the Handbook of Child Psychology (Damon & Lerner, 2006), Richard M Lerner's (2006) analysis of current mainstream and cutting-edge theories of human development, asserts that they all contain the centrality of systemic and multidisciplinary thinking which spans and integrates current research across the field. Features of developmental systems theories include:

1. **A relational metatheory** which synthesizes or integrates factors and transcends Cartesian dualism. It rejects splits between components of the ecology of human development, between continuity and discontinuity and between stability and instability. This leads to an
2. **integration of levels** of organization from biological and physiological through cultural and historical levels.
3. This integration means that the regulation of development happens through **mutually influential relations** between all levels (neuron growth ← → experience) or (neighbourhood ← → family ← → child),
4. and where **integrated actions (e.g. individual ← → context)**, are the basic units of analysis within human development (e.g. transactions).
5. **Temporality and plasticity** are possible when the passage of time is considered in systems of integrated actions, with
6. **Relative plasticity** resulting from developmental regulation facilitating or constraining change and from life span or historical differences affecting the range of possible changes.
7. Because of the large number of combinations of variables possible at all levels, developmental processes will vary across individuals and groups making a diversity and plasticity of the systems themselves inevitable. **Intraindividual change within interindividual differences** therefore means that measuring **diversity is substantive and significant** in the description, explanation and optimization of development.
8. System plasticity and diversity being subject to interindividual differences legitimates an **optimistic** and proactive **promotion of positive human development** through policy or community programs by deliberately aligning strengths of individuals and contexts.
9. Achieving this goal will require **multidisciplinarity** and **change sensitive methodologies** able to integrate analysis of trajectories at multiple levels of systems.

The Developmental Science framework implies a key empirical question in: “5 interrelated “what” questions:

1. What attributes (?) of
2. What individuals (?) in relation to
3. What contextual/ecological conditions (?) at
4. What points in ontogenetic, family or generational, and cohort or historical, time (?) may be integrated to promote
5. What instances of positive human development?” (Lerner, 2006, p. 12)

My question, by this formulation would be:

1. What engagement characteristics of
2. children in relation to
3. teacher communicative behaviours in Australian Kindergarten classrooms, at
4. children’s ages of 4 to 5 years old, promote
5. literacy and language development?

Because the age of children is defined within the term *Kindergarten*, item 4 does not have to be stated. So my question is more concisely stated as:

What child engagement characteristics in relation to what teacher communicative behaviours, and the interaction of these two constructs, promote children’s literacy and language development after one year in Australian Kindergarten?

I have chosen the following Developmental Science model for my research:

The Bioecological Model of Human Development

The theoretical model’s orientation

Urie Bronfenbrenner’s Bioecological Model in its most current form (Bronfenbrenner & Morris, 2006) will be used in detail to guide my research primarily because of its interdisciplinary focus on integrating levels of ecosystems with proximal processes, including child ← → symbol transactions, and its clarity in connecting this understanding with research questions and methods for the explicit purpose of informing policies and programs designed for enhancing child development through the creation of both theoretical tools and research design tools, and secondarily, because:

> “Bronfenbrenner not only bore witness to the increasing emphasis on theories of developmental process but has himself been the foremost theoretician of human development over the past half-century… His ideas have been the ones that have stood the test of time to represent the fundamental concepts used in all of the developmental systems theories that constitute the cutting edge models of human development...[H]is singular role in this history has been to lead the way in specifying the necessary linkage between theory and application, between research and practice” (Lerner, 2005, p. xii)

An overview of the model will follow with comments of how this informs or is to be used or not used in my research.

Overview

The Bioecological Model has 4 defining principal components connected by dynamic interactive relationships. The most important and core element is *Process* in the sense of interactions between organism and environment and in particular *proximal processes* operating over extended time periods and which are considered as the primary mechanisms influencing human **development** [bolded for the moment for clarity in the model structure].

The power of these processes to influence **development** depends on the characteristics of the other three components of *Person, Context* and *Time.* In my study, the *Person* is the child, the *Context* is firstly the more global interactions in the classroom created by the teacher and secondly and more proximally, the language environment that engages the child as created and managed by the teacher. The teacher's actions are not considered *Person*, but rather *Context*, because the study is not about her development as a teacher, as interesting as that might be. *Time* is both the *Mircotime* of the moment-by-moment interactions or episodes in literacy lessons, and the *Mesotime* of an entire Kindergarten year which is the periodicity of these *Microtime* episodes.

In my study, the gain in literacy and language abilities of the child, as the *Person* of interest, is the **development** to be assessed as the independent variable influenced by these *Contexts* over the *Time* of a Kindergarten school year.

The classroom *Contexts* of interactions will be measured from videos of one or more literacy lessons of teacher-child interactions and possibly from teacher discourse in an interview. I will not be able to sample the frequency with which these interactions occur over the year, and it will therefore be a limitation and an assumption, supported by other research, that this single sampling is likely to be an accurate assessment of the pervasive characteristics of the ongoing *Context* in the classroom.

From here on, the words person, context, time and development will be as defined within this model, but not italicised for ease of writing, and unless otherwise stated, are as used in the most recent version of the model (Bronfenbrenner & Morris, 2006). New terms with special concise meaning for this model and my research may be italicised for clarity.

Development

The term development is defined to refer to "stability and change in the biopsychological characteristics of human beings over the life course and across generations" (Bronfenbrenner & Morris, 2006, p. 796).

Person

The person characteristics in this model which are considered to have the most influence on shaping the power and direction of development are firstly *dispositions*,

(pre-dispositions or orientations) which include traits such as impulsiveness, explosiveness, distractibility, curiosity, and deferring immediate gratification (Bronfenbrenner & Morris, 1998). These dispositions can set the proximal processes in motion, contribute to the level of engagement and be influential in sustaining their operation. They can also be influenced to change from the processes encountered. Secondly, the person's *resources* of ability, experience, knowledge, and skills contribute to the functioning of the proximal processes. Finally, *demand* characteristics invite or discourage transactions from the social environment or contexts that can assist or disrupt the proximal processes.

Person patterns

These three forms of person characteristics of dispositions, resources and demand, combine into a pattern, or a structure, that itself can further account for differences in the direction and degree of influence of contexts according to this theory. Thus, I will propose in my research an exploration of child characteristics that have been collected through various instruments in the Young Learners Project (YLP) at the Melbourne Graduate School of Education, and an observational measure of the child's engagement in literacy lessons to formulate a child profile, or person pattern. These child profiles will have their as yet unknown variables statistically compared using cluster analysis to test the proposition that most children would fall into a limited number of patterns which will experience the context under scrutiny, in similar ways. Thus part of my research will be exploratory or unfolding.

Context

I have not found a clear definition of context yet in this model. This will clearly require further investigation into the model and research that has used it.

Microsystem structure includes objects and symbols

What has been described so far falls within the microsystem of the Bioecological Model, and this is where my entire study will take place. An additional aspect of the microsystem is that the person may experience proximal processes with objects and symbols rather than just other people. These encounters may assist or interfere with development, such as high noise levels, lack of light, presence of plants, animals, or curriculum material of interest displayed in the environment. These various factors can accumulate into a profile of hectictness, chaos and instability, or an environment of orderliness and smooth operations. In addition to the general effect on the psychology and learning environment, these factors may have significant meaning for the child. This idea justifies my research looking at measuring the preschool's organizational environment or measuring the teacher interactions that organize objects, symbols and persons in the classroom.

Proposition I

The first of the 2 defining propositions of the Bioecological Model is that human development occurs through progressively more complex processes of reciprocal interaction between an *evolving biopsychological human organism* (Person) and persons, objects and symbols in its immediate environment (Contexts). Interactions in

the immediate contexts, or proximal processes, need to occur regularly over extended periods of time to be effective in generating the ability, motivation, and skill to engage in activities with others, objects or symbols on a continuing basis, and particularly in the younger ages, this leads children to become increasingly more competent agents of their own development. Proximal processes are considered to be the primary engines of development.

Proposition II

Proximal processes are characterized by their form, power, content and direction which vary systematically as a joint outcome of the characteristics of the developing person, the context, the developmental outcome that is being considered and the social changes or continuities over the time span under consideration. The idea of *joint outcome* is possibly the same idea that others call *goodness of fit*. This proposition may inform the idea that *engagement* itself is the product of these factors encountering each other and may act as an interim or mediating factor leading to the end of year outcome of literacy gains.

Consequential features of the model that follow from propositions

1. For development to occur, the person must engage in an activity. My research will focus on this by using measures of engagement.
2. To be effective, the activity must recur on a regular basis over extended time periods. My research assumes this to be true, but does not verify it.
3. Activities must continue long enough to become increasingly more complex rather than simple repetition at the same level. In my research I will not be able to measure this, as it would require interval sampling during the year of teacher-child interactions.
4. Developmentally effective proximal processes are bidirectional, or have reciprocity in the case of interpersonal interactions. In my research, I will only measure the child side as outcomes.
5. Proximal processes may include interaction with objects and symbols as well as other people. For objects and symbols to matter, they must invite attention, exploration, manipulation, elaboration and imagination to produce reciprocal interaction with the person. In my research, I will assume there is an invitation from objects and symbols if the child is engaged.
6. The powerful moderating factors specified in proposition II (form, power, content and direction) produce significant changes in the content, timing and effectiveness of proximal processes. For example:
    a. As children grow older and their capacities increase, the proximal process must become more extensive and complex to continue to challenge them and engage them (e.g. stay within their ZPD) if learning is to continue. At the same time, the most effective interval between encounters may change and in particular is likely to increase, but it must occur on a fairly regular basis or development may slow below optimal or even reverse direction. In my research, I will assume this has been achieved if the child is engaged and achieves gains in the literacy and language measures.
    b. The principal persons that children engage with changes over time from parents and siblings to teachers and peers, which changes many

factors in the above model and therefore each time period requires its own research. In my research the significant others are confined to the teacher. I will not investigate peers, and the influence of parents will only be a background influence contributing to my Child Profile.

Detection of factors leading to synergistic effects

Proposition II, which says the power of the Process (engagement in literacy lessons) varies systematically because of interactions between Context (teacher profile) and characteristics of Person (child profile), if operationalized in a research design that succeeds in measuring and comparing the four key components of Process, Person, Context, and Time, can allow patterns of interdependence to emerge whereby the total effect is greater than any one component alone. This is a synergistic interdependence between components and requires specific statistical analyses to be detected.

Verification mode and discovery mode of my research

Part of my research will be to verify or replicate findings already supported in other places and other populations. Theory plays a more important role in discovery mode because it provides the logic of choices necessary in selection of and treatment of the data. Part of this process "involves a series of progressively more differentiated formulations and corresponding data analyses" (Bronfenbrenner & Morris, 2006, pp. 801-802). In my study, this involves using computer software to examine details of teacher vocabulary which may have an influence as Context on child characteristics of Person in the Process of teacher-child interactions. This is an attempt on my part to provide a structured framework that will display the data in a way that reveals more clearly the pattern of interdependencies of the data of Process, Person, and Context over the Time in question.

Ron Ritchhart (2002, pp. 130 - 142) proposes that teacher's more frequent and precise use of process and product thinking words, as opposed to state thinking words, invites the child into different sorts of engagement and more active thinking within a task or question posed for discussion and inquiry. Modeling by the teacher and the invitation to join in conditional thinking using these words shifts the child into trying to make sense of the situation rather than just memorize or do what the teacher expects. As far as I know, this has not been tested empirically, and would require firstly finding a way to collect the word usage data on different teachers and connect this to child gains in literacy and language. Ron Ritchhart has created an observation tool (2003) for assessing classroom cultures of thinking, which may relate to CLASS observations or may be operationalized and tested against the YLP videos. This would be exploratory.

Young Learners Project ← → My Classroom Measurements

Teacher-child interactions

The Young Learner Project (YLP) currently underway at the Melbourne Graduate School of Education, aims to "identify effective personalised teaching strategies for enhancing early literacy for preschool children" where "personalized teaching" is "focused on individual children's strengths and needs" and is "interactive". The

original plan to code interactive teaching strategies from videos of literacy lessons using the Classroom Observation Scale (COS) was not carried out, and it is proposed here to use the Classroom Assessment Scoring System (CLASS; R. C. Pianta, K. M. La Paro, & B. Hamre, 2008) to identify and measure teacher-child interactions to provide part of the answer to my general question: what teacher communicative behaviours and child characteristics and the interaction of these two constructs in Australian Kindergarten classrooms promote children's literacy and language development?

The CLASS is an observation instrument which provides quantitative measures of Emotional Support, Classroom Organization and Instructional Support by rating 11 dimensions of teacher-child interaction for which there is empirical and theoretical evidence for enhancing children's social and academic development and which has been used to code these interactions from videos of preschool literacy lessons (Justice, Mashburn, Hamre, & Pianta, 2008; Pianta, Mashburn, Downer, Hamre, & Justice, 2008). This quantitative data will provide additional information toward creating a teacher profile and may be useful for other YLP researchers investigating other aspects of the classroom experience and make YLP research results comparable to a large and important group of researchers using CLASS. This would be the first use of CLASS in Australian research. These teacher profiles can be tested statistically against child literacy outcomes, as will be discussed in more detail later.

Children's characteristics

Another aim of YLP is to create a child profile and test the goodness of fit between individual children's characteristics and different teaching strategies that result in higher quality child outcomes. I intend to create a child profile using the data from existing YLP child measurements which include: an interview with the child, Choices, Orient, I Can, TOPP, NNAT and CELF.What data to use will have to be explored from the perspective of my theoretical framework and research on what are the important child characteristics contributing to developmentally productive engagement in literacy lessons. How this data will be organized will also have to be informed by limitations of statistical procedures, to be discussed later.

Engagement

Engagement, as a proximal process, is defined in a study that used the Bioecological Model as a theoretical framework (Ponitz, Rimm-Kaufman, Grimm, & Curby, 2009, p. 104) as: "correspondence between the child's observable behavior and the demands of the situation, including attending to and completing tasks responsibly, following rules and instructions, persisting in the face of difficulty and exercising self-control." They also consider this measure to be an indication of whether the child participates in the learning opportunities provided.

These researchers used CLASS to measure classroom quality plus separate direct measures and teacher opinion of child engagement and then used structural equation modeling to compare 4 pathways to child gains and found that, when controlling for sociodemographic risk, there was evidence that high-quality classroom experiences influenced reading achievement "exclusively through behavorial engagement" (p. 115), with engagement acting as a measure of the student uptake of teacher inputs.

The measures of engagement in this study included teacher questionnaires, as well as observer ratings of child engagement. I will use the YLP video to score child engagement by measuring time-off task and include this in the child profile.

Quality of language – Complex vocabulary

The YLP proposal also points to research showing that the quality of language children are exposed to is associated with high child outcomes (Dickinson & McCabe, 2001; Justice, et al., 2008). As the CLASS dimension of Language Modeling includes both this behaviour and others in one score, and therefore does not distinguish this important factor separately, I would propose measuring teacher complexity of language from the existing video and teacher interview transcripts following methods used by Dickinson, Watson and Farran (2008) and Ron Ritchhart (2002, pp. 130 - 142). This is a simple word count process with Dickinson group using Systematic Analysis of Language Transcripts (SALT; Language Analysis Lab, 2006).

Ron Ritchhart (2002) points to explicit word use differences of 41 – 43 thinking words between 2 classrooms as helping direct attention and perception of children to think more often and more deeply which has been shown to lead to critical-thinking abilities and which are markers for conditional thinking, and asks: “why should the simple alteration of language have such a large effect?” (p.140). This may be the same quality-outcome relationship pointed to by findings that the single CLASS measure of Concept Development, which measures the teacher's promotion of students' higher order thinking skills and cognition, was correlated to gains in language and problem solving after one year Pre-K classrooms (Curby, et al., 2009). Also in The Effective Provision of Pre-school Education (EPPE) Project (Siraj-Blatchford, et al., 2003) where the most excellent settings were set apart from good settings by an increase in sustained shared thinking, which is an extended discourse where both parties contribute to thinking and where the conversation must develop and extend thinking. Measuring thinking words, and other teacher word use directly, rather than by rater opinion as part of one of 11 dimensions of CLASS, is likely to be a more accurate, simple and less time consuming method of evaluating this dimension of quality.

Sustained shared thinking

Extended discourse (Snow, Tabors, & Dickinson, 2001) is similar to, if not the same as sustained shared thinking (Sylva, et al., 2007), and has been found to be a key marker of excellent classroom quality leading to better child outcomes with Dickinson (2006) saying “the most powerful classroom predictor [of child language skills] was teacher support for extended discourse. This composite included teachers’ efforts to engage children in analytic thinking about stories while reading books, conversations that provided information during group times and use of strategies to keep the group focused, and efforts to extend 1 on 1 conversations during choice time” (p. 189)

Teachers who engage children in sustained shared thinking in any subject and in any context are creating a culture of thinking which improves child language, learning engagement and behaviour in general (Ritchhart & Perkins, 2008). A culture of thinking is where teachers make thinking visible, valued and sustained, which may be key to concept formation (Ritchhart, 2002). In a counter example, where teachers did not succeed in creating concept development in children (Fleer & Raban, 2006, p. 75),

it was found that concepts were "conscious in the minds of staff, but they had not been made conscious to the children." I will henceforth use the term "sustained shared thinking" (SST) rather than extended discourse or connected conversation, because it more clearly expresses the important concepts from the Bioecological Model related to repeated instances over Time (sustained), the idea that it is an interaction or transaction between Person and Context (shared) and the idea of the child's thinking as the Process under examination which is expected to contribute to the Development of language and literacy abilities.

Comparison of methods and research approaches

Comparisons between the CLASS, which Dickinson considers a global measure of classroom quality (Dickinson, 2006, p. 196) and more fine grained measures of sustained shared thinking, complex vocabulary and thinking word use has never been made that I can find and could be an important contribution to our knowledge.

Because some of the other measures I am advocating do not require observer training which is time consuming and expensive and rely on observer opinion rather than quantitative counting of word use, I may uncover inexpensive and more easily collected markers of quality, such as patterns of word use, which would have large research and teacher training implications. Such markers have been found in other interactive and complex relationship situations where a small and distinct set of communicative behaviours and language use predict important outcomes (Gottman & Levenson, 2002). Ron Ritchhart in his talk at University of Melbourne this year indicated that simple differences in teacher pronoun use such as indicated by "we" and "our" statements were markers of a more inclusive classroom and in a private communication said this information came from Peter Johnston's research (2004). Johnston's book shows how teachers' use of language creates classrooms where children become technically competent, caring, secure and actively literate and how ordinary words, phrases, and uses of language are pivotal in how teachers do this. Differences in pronoun use of "we" and "us" compared to "I" have been found to be markers of more social cultures compared to more individualistic cultures (e.g. Japan versus the US), and when "we" is used more than "I", "other", "they" or "it", there are more feelings of closeness and shared commonalities (C. Chung & Pennebaker, 2007). David Dickinson (2006, p. 197) suggests that research on only small samples of interactive texts provides evidence that teachers may have:

> "considerable individual stability in the details of language such as patterns of syntax use, vocabulary choice, and approaches to supporting children's language use. An appealing feature of transcribed conversations is that they can be coded along many dimensions…The need for careful examination of existing tools and development of new tools is particularly pressing given the enhanced attention being given to preschool by policymakers."

This argument supports my idea of using the YLP data of both teacher talk in video and teacher talk in an interview, to analyze text for details of stable language use which may influence children's learning. This would be in the discovery mode of research in the Bioecological Model (Bronfenbrenner & Morris, 2006, p. 801) and I would propose using the Linguistic Inquiry Word Count (LIWC) software (Pennebaker, Booth, & Francis, 2007) for this purpose because of its extensive

profiling ability to analyse both written and spoken text which has been shown to uncover patterns and markers that distinguish a wide range of complex human behaviours (C. K. Chung & Pennebaker, 2008).

Goodness of fit

I intend to create teacher and child profiles through cluster analysis of CLASS, sustained shared thinking, complexity of vocabulary, and visible thinking words, and YLP data and test goodness of fit between these two profiles as independent variables and test this fit against child outcomes as dependent variables. Engagement will be treated as a possible mediating factor between classroom quality interactions and child outcomes and also as a dependent variable in its own right to see if it alone can act as a proxy of classroom quality. Profiles of teachers using the CLASS dimensions created using cluster analysis has shown correlation to child outcomes and has turned up interesting information regarding what counts as quality for child literacy and language development (Curby, et al., 2009). However, in this study, all child outcomes were tested against the teacher profile without regard to children's characteristics. I argue that this is an important missing comparison that has been mentioned as such by some researchers (Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009) but not yet tested.

Research Questions

General question

What child engagement characteristics in relation to what teacher communicative behaviours, and the interaction of these two constructs, promote children's literacy and language development after one year in Australian Kindergarten?

Specific questions

1. Do any independent variables of teacher-child interaction from existing YLP video of literacy lessons, as measured on CLASS, differ between teachers?
2. Do teachers fall into a limited number of clearly differentiated profiles based on cluster analysis of CLASS scores as has been previously shown?
3. Are any scores on the 3 domains, 11 dimensions or other differences in teacher profiles, systematically associated with differences in child literacy gains?
4. Does child engagement as scored by time-off-task in literacy lessons mediate any associations between classroom quality and child gains?
5. Are any child profile characteristics associated with differences in child gains independently or as an interaction with classroom qualities or teacher profile?
6. Do children with differing patterns of characteristics, benefit differentially from varying aspects of classroom quality? OR: What kind of classroom quality benefits which children?
7. Is teacher quality of language or sustained shared thinking (SST) associated with differences in child literacy gains?
8. Does the amount of SST, complex language or thinking words vary among teachers in a comparable or a different manner than the CLASS measures?

9. Does this examination provide enough evidence to propose a revision of developmental systems theories where: individual ← → context, becomes individual ← concept → context.

Final Conclusion

These tools and skills can be used in future research into the Virtues Project effectiveness in a similar fashion to my PhD proposal. Different aspects of using the virtues language need to be investigated as well as the best methods to train teachers in its use. This apparently useful systematic approach to changing the language of teacher interaction and therefore the culture of the classroom will only be refined by examining how teacher interaction changes in relation to training and to child outcomes.

NOTE: Statistical treatment of graphed data in Figures 5 and 6

Comparing single-case designed studies using visual analysis alone has raised concerns (Thomas E. Scruggs, Mastropieri, & Regan, 2006) and several statistical treatments of the data have been suggested that can supplement and clarify visual analysis. Effect sizes for single subject designs have been calculated to analyse data using: percent nonoverlapping data (PND) (Thomas E. Scruggs, Mastropieri, & Casto, 1987) for interventions reducing antisocial behaviours (T. E. Scruggs & Mastropieri, 1998), increasing compliance (Lee, 2005) and reducing socially withdrawn behaviours (Mastropieri & Scruggs, 1985-1986); using PND and percentage of zero data (PZD) (Scotti, Evans, Meyer, & Walker, 1991); using mean baseline reduction (MBLR) (Campbell, 2004; Faith & Allison, 1996); and using MBLR, PND and PZD for interventions to reduce problem behaviours in persons with autism (Campbell, 2003). Each method has strengths and weaknesses and applicability to certain kinds of data. PND, PZD and MBLR were calculated for antisocial behaviour, and only PND and MBLR will be calculated for shy/withdrawn behaviour, as PZD, which is a measure of behavioural suppression, is inappropriate where zero behaviour is neither expected nor desirable (Campbell, 2004, p. 244). PND is a measure of behavioural reduction and is therefore more appropriate for measuring shy/withdrawn behaviour than PZD. It has been recommended that single-subject designed research using programmes designed to eliminate problem behaviours use both PND and PZD (Campbell, 2004). The three measures were calculated following standard procedures of the researchers who developed them:

Percentage of nonoverlapping data (PND) (Thomas E. Scruggs, et al., 1987) was calculated by counting the number of data points in implementation (or the phase under consideration) that were lower than the lowest data point in baseline, for antisocial and shy/withdrawn behaviours. This number was then divided by the total number of data points in implementation (or the phase under consideration) to arrive at a percentage of data that did not overlap baseline data.

Percentage of zero data (PZD) (Scotti, et al., 1991, p. 238) was determined for antisocial behaviour only. This is calculated by starting at the first data point in implementation (or the phase under consideration) that was zero and calculating the percentage of data points from then on, including the first zero, which remained at zero.

Mean baseline reduction (MBLR) (Campbell, 2004) was determined for antisocial and shy/withdrawn behaviours by calculating the mean score of the baseline data, and then calculating the percentage of data points in implementation (or the phase under consideration) that were below this value.

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