

The Preliminary Research Study on the Impact of the 101s: A Guide to Positive Discipline Parent Training on Parenting Practices and Preschooler's Executive Function

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Abstract

The aims of the study were to investigate the impact of The 101s parent training program: the nationally honored program in the US for promoting a child's brain and social-emotional development with positive discipline, on Thai parenting skills and preschoolers' executive function (EF) skills. The sample was 27 parents and their 3-5-year-old preschoolers in the intervention group in which the parents received the 101s training program and 27 parents and their 3-5-year-old preschoolers in the control group in which the parents received no training. A series of MANCOVA was performed to compare the significant differences in mean scores on parenting practices and EF skills between the sample in the intervention and control groups. A bivariate correlation was also utilized to evaluate the significant correlations between the parenting practices and preschoolers' EF skills. The findings showed the significantly positive impact of the 101s parent training program on the parenting practices and preschoolers' EF skills. The implication, limitations, and suggestions are discussed.

Keywords : The 101s: A Guide to Positive Discipline, Positive parenting skills, Executive Function skills, Social-emotional skills

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Introduction and Background

In Thailand, the attention in early childhood development and education is increased. Concerning children development, the findings of the holistic development of Thai children surveyed in 2001 showed that only one-third of children at age 3 to 6 had appropriate-aged development in health, IQ, and literacy skills (Kanchanachitra, 2008). Moreover, the developmental trend tended to decline. The report from Thai Health showed that the percentage of the children who had appropriate-aged development was decreased from 72% in 2005 to 67% in 2008. The findings from Thai health report in 2011 also showed that approximately 25% of Thai students had lower intelligence quotient (IQ) than the normal range specified by WHO (90-110) (Kanchanachitra, 2011). In addition, the survey of PISA also showed that Thai children have lower literacy skills, comparing to the students in other countries (PISA, 2009). Thus, the early childhood development and education programs are on the national agenda. However, in Thailand, the research in applied neuroscience and child development was limited. The notion of the nation's appropriate-aged development has focused on child's height, weight, health, IQ, and literacy skills. The multidisciplinary research in appropriate-aged development regarding social-emotional and cognitive development or executive function skills of the children in Thailand is generally increased but still limited. As a result, the research suggestions guided for policy movement and educational practices are scarce. Therefore, multidisciplinary research in brain and behavioral development that support appropriate practices for promoting children's appropriate-aged development during the critical period is needed.

A substantial amount of research from neuroscience and psychology has suggested for decades that early childhood period is the critical period for the development of specific neural synapses. In 1990s, the facts about the human brain development increased the awareness of early childhood education. The research in brain development has explained that human was born with millions of neurons. In the early years of life, these neurons will connect to the other neurons through electrical signal in order to communicate to each other for conducting behaviors. The places where the neurons connect to each other are called synapses. The density of synapses at the early years is over-productive (Shonkoff, 2000). Regarding the development of brain, Tsujimoto and Sawaguchi (2004) suggested that the

neuroanatomical structure of prefrontal cortex; The front part of the brain has a high rate of maturation during early childhood period and has the highest synaptic density value or complex networks of neurons at age 3.5 years old. When the synapses are repeatedly motivated by being crossed the electrical signal from one neuron to the other neurons, a complex network that later becomes efficient pathways for transmitting the electrical signals is increased and become permanent. However, if the synapses are not repeatedly motivated, the synapses are decreased through the adolescence. Because the function of the prefrontal cortex is related to high-order thinking, emotional control, planning, and decision making, it is important to provide children with positive environment to motivate their neural synapses during the critical period.

Even though children's learning and academic outcomes require every aspect of development, social-emotional and cognitive development is critical to promote during early childhood period (Denham et al., 2012; Rhoades, Warren, Domitrovich, & Greenberg, 2011). Social-emotional and cognitive development is the component of Executive Function (Gioia, Espy, & Isquith 2003); the brain process in the prefrontal cortex (Riggs, Jahromi, Razza, Dillworth-Bart, & Mueller, 2006; Sugimura, Ando, 杉村智子, & 安東綾子, 2010). Executive function (EF) is a higher order encompass cognitive process underlies goal-directed activities (Best & Miller, 2010) aiding in the monitoring and control through an action (Carlson, 2005). EF is understood as an umbrella term of social-emotional and cognitive processes (Riggs et al., 2006); including inhibition, working memory, emotional control, planning and organization, and shifting (Best & Miller, 2010; Sugimura et al., 2010; Liebermann, Giesbrecht, & Müller, 2007). These EF skills have influences on children's learning and academic outcomes (Rhoades, Greenberg, & Domitrovich, 2009; Denham et al., 2012; Blair & Razza, 2007; Kolnik, 2010).

Recently, an increase number of research has showed that a child's nurturing experience is one of the main factors that affect the child's EF development. Briggs - Gowan and Carter (2008) conducted a research study on the relation between parental nurturance and memory development in children. The researchers found that the more nurture the children received, the better memory children acquired in both backward and forward selective analysis. The findings of the research conducted by Bernier, Carlson, and Whipple (2010) to investigate the quality of parent-infant interaction and child executive function, including working memory,

impulse control, and set-shifting, also showed that the nurturing with autonomy-support was the strongest predictor of children's EF skills at each age. The findings of the previous research consistently suggested the significance of intervention programs for promoting children's EF skills at the early age. Taken from the suggestions of previous research, there are relevant research studies on the impact of intervention programs on children's EF skills. Runyon, Deblinger, & Schroeder (2009) conducted a research study on the effective of Combined Parent-Child Cognitive-Behavioral Therapy (CPC-CBT) on parent who engaged in physical abusive behavior and traumatic child at aged 4 to 14. The results showed the significant pre- to post treatment reductions in the use of physical punishment, the improvements in parental anger toward their children, and the decrease in children's posttraumatic stress symptoms and behavioral problems. Moreover, Hiscock et al. (2008) conducted a research in the parenting program for improving children's behavior problems, and parenting and maternal mental health. The results showed that the improvement in parenting factors could predict children's behavioral problems, but not significantly reduce the externalizing-behavioral problems and maternal mental health.

Recently, a group of researchers led by Dr. Katharine C. Kersey, has studied the impact of the 101s Positive Discipline training programs (The 101s), the program for providing children with positive discipline in a nurturing environment in order to promote children's brain and social-emotional development, on caregivers' practices and children's social-emotional skills and academic performance. The findings of the research showed the positive impact on teacher and parent practices and children's social-emotional and academic skills. In her study of 34 preschool classrooms in an urban school district in the United States, Masterson (2008) designed a quasi-experimental pre to posttest control group to investigate the impact of the 101s: A Guide to Positive Discipline techniques on children's social-emotional development and academic skills. The sample was selected by using random simple sampling to assign the intervention and control schools. The teachers in the intervention schools received a half-day session of the 101s teacher training after collecting the pretest data whereas the teachers in the control group received the training after completing the research project. The Teacher Interaction Checklist (TIC) was developed and pilot tested for reliability and validity to observe the teachers to measure the frequency of the 101s techniques used in the preschool classrooms. The checklist of academic and prosocial skills was also developed and pilot

tested to observe the children in the preschool classrooms. There were two trained observers used the checklists to collect the data. The inter-rater reliability was moderate. The Kappa value was between 0.65-0.75. Double-blind procedure was used in which neither the sample nor the observers of the study knew if the school being observed was intervention or control group. The findings showed the efficacy of The 101s: A Guide to Positive Discipline to increased academic competencies and children's prosocial skills including self-control, compliance, emotional regulation, attention, helping, asking, sharing, and cooperation. The researcher suggested that the 101s training program should be offered as a professional development to early childhood educators, leaders, and teachers.

The findings from the previous research were confirmed by the research conducted by Panadda Thanasetkorn (2009a) with 12 teachers and 109 three to four-year-old students enrolling in two private elementary schools in Thailand. A quasi-experimental pre to posttest control group was designed to investigate the impact of the 101s teacher training on the teacher interaction practices, teacher-child relationships, and school adjustment. The two schools were assigned to be intervention school and control school using simple random sampling. For the 101s teacher training group in which the teachers in the intervention school received a one-half day session of the 101s training program consisted of 6 teachers and 59 children. For the control group in which the teachers in the control group received a one-half day session of the 101s training program after completing the research project consisted of 6 teachers and 50 children. The instruments used in the study were TIC, Student-Teacher Relationship Scale (STRS; Pianta, 2001), and Teacher Rating Scale of School Adjustment (TRSSA; Birch & Ladd, 1997). All instruments were translated in Thai and pilot tested for reliability and validity. The results showed that after receiving the 101s training, the trained teachers in the 101s training group significantly had higher scores on positive interaction practices and lower scores on negative interaction practices, comparing to the scores of the teachers in the control group. The children's in the 101s teacher training group also significantly had higher scores on positive teacher-child relationships, school adjustment skills, and academic achievement, comparing to the scores of the children in the control group. The findings supported the significance of the teachers' positive interaction practice to positive teacher-child relationships and children's school adjustment skills. The findings also suggested that replicated research in the impact of the 101s teacher training on child's social-

emotional development with larger sample size and different school districts across Thailand should be encouraged in order to find best practices for child development.

In addition to the 101s teacher training program, Piyavalee Thanasetkorn (2009b) also conducted a research study on the impact of the 101s parent training on parent interaction practices, the quality of teacher-child relationship, and children social-emotional and academic development in Thailand. The sample was divided into two groups. First group was the 101s parent training in which the parents received a one-half day session of the 101s training program consisted of 50 parents, 6 teachers and 50 children. For the control group in which the parent in the control group received a one-half day session of the 101s training program after completing the research project consisted of 55 parents 8 teachers and 55 children. The instruments used in the study were Parent Interaction Practice (PIC), STRS (Pianta, 2001), and TRSSA (Birch & Ladd, 1997). All instruments except the PIC were translated in Thai and pilot tested for reliability and validity. For the PIC, the items were adapted and modified from the TIC under the supervision of experts in early childhood education. It was a self-rating instrument designed for the parents to evaluate their interaction practices. The findings also showed the effectiveness of the 101s parent training program on the parent interaction skills, the quality of the teacher-child relationship, children's school adjustment and children's academic achievement. However, the research did not investigate the children's behaviors at home even though their parents received the 101s training. Therefore, the research suggested that the impact on the change in parental practices on children's behavioral improvement should be further studied.

Although the studies of Masterson (2008), Thanasetkorn (2009a), and (2009b) showed the positive impact of the 101s teacher and parent training on teacher and parent interaction practices, the quality of teacher-child relationships, and children's social – emotional and academic development, some limitations still remained. The researchers suggested that for further research, the protocol of the 101s teacher and parent training should be investigated in larger sample size in order to generalize the results of the research. In addition, the impact of the 101 training on the other aspects of child's development should be studied.

In 2011, the research studies on the impact of the 101s positive training programs on children's self-regulation and EF skills were continually conducted (Pichitkusalachai, Chumchua, Chutabhakdikul, & Thanasetkorn, 2012; Sutipan, Pichitkusalachai, Chumcha, &

Thanasetkorn, 2012). Pichitkusalachai et al. (2012) investigated the impact of the 101s positive discipline teacher training on teacher practices and children's self-regulation in Thailand. The results showed that the teachers in the 101s training group had significantly higher scores on positive interaction practices and significantly lower scores on negative interaction practices, comparing to the teachers in the control group. The results also showed that the children in the 101s training group significantly had better mean scores on self-regulation skills, comparing to the children in the control group. Moreover, Sutipan et al. (2012) conducted a research study on the impact of the 101s positive discipline teacher training on teacher practices and children's EF skills with 7 kindergarten teachers and 60 four to six-year old students in Thailand. The results showed that *The 101s* teacher training had a positive impact on the teacher interaction practices and preschoolers' EF skills. In addition, *The 101s* training also resulted in significant correlations between positive teacher interactions and preschoolers' EF skills.

The findings from the previous research studies showed the positive impact of the 101s positive teacher training on teacher interaction practices, children's self-regulation, and children's EF skills. However, the research studies on the impact of the 101s parent training and children's EF skills were still limited. Therefore, the current study aimed to examine the impact of the 101s parent training on parent interaction practices and children's EF skills in the preschool children in Thailand. 3 research questions were developed to address the objectives: including research questions 1, "Did the parents in the intervention group have significantly higher scores on positive parent interaction practice subscales and significantly lower scores on negative parent interaction practice subscales as measured by PIC?", research question 2, "Did the children in the intervention group have significantly lower scores on Executive Function skills, comparing to the children in the control group, as measured by the BRIEF-P?" and research questions 3, "Were there any correlations between parent interactions practices as measured by PIC and children's executive function skills as measured by the BRIEF-P?"

Methods

Settings and Sample

The parents and preschool children enrolled in two schools participated in this study. The

total sample of the study was 54 parents and their children enrolling in educational year 2011 in two schools. The sample signed and returned the consent form for this research project to agree that they understood the aims of the research project, voluntarily participated in the research project, and had rights to leave the research project whenever they felt uncomfortable to continue to the end of the research project. The sample was divided into 2 groups: intervention and control groups. One school was purposively assigned to be the intervention group because the school had already provided the parents with the 101s parent training program. The sample in the intervention group included 27 parents who had participated in the 101s training for 8 months and their 3-5-year-old preschoolers. The other school was the control group, using simple random sampling and matching method. The sample in the control group included 27 parents and their 3-5-year-old preschoolers. The results from the matching methods showed that the parents and children in both groups had homogenous socioeconomic backgrounds and their schools were also under the supervision of Bangkok Education Service Area office, Thailand. Both schools had the same preschool curriculum. The schools were full-day service from 7:30-16:30. The learning activities of the two schools began with singing national songs, praying, exercising, greeting, doing art, having snack, learning in the circle time, having free play, having lunch, taking shower, taking nap, having snack, reading storybooks, having free play, and going home. Regularly, there was no service for parent training. The parents would meet the teachers in formal meetings twice a year; at the beginning and at the end of the school year for school report. Nevertheless, the intervention school had the 101s training as the extra program for the parents. Yet, the control school had no extra training for the parents before and during implementing this research project.

Interventions

The 101s training school. The parents in The 101s training school were asked to participate in 1 half-day session of the 101s parent training at the school library from 9:00 to 12:00 on Saturday in the beginning of June, 2011. There were two certified trainers, who obtained doctoral degree in Early Childhood Education and the certification of the 101s positive discipline trainer, developed and led the parent training program for Thai parents.

The manual of The 101s: A Guide to Positive Discipline Training was distributed to the parents in the training school. The manual contained 3 parts for the training, record forms for daily report, and the schedule for followed-up sessions. The first part of the training focused on the impact of the nature and nurture on child development; using lecture and question and answer methods. The purpose in the first part was to help the trained parents understand the significance of positive adult-child relationships to children's self-regulation and EF development. The second part focused on the fifteen techniques of The 101s positive discipline related to creating emotional support environment and behavioral adjustment as described in Table 1. The methods used for the training in this part was case studies and question and answer to make sure that the trained parents understood how to use each positive discipline technique and its benefits for child development. The last part of the training used role-play method to provide the trained parents with opportunity to practice the positive discipline techniques and get the feedback from the trainers.

The trained parents were asked to record the 101s techniques they used with their children everyday by using the record forms in the handbook. The record form contained 3 questions; including (1) How did your child behave before using the 101s technique?, (2) Which technique did you decide to use to response to your child's behavior? Please explain how you used it and (3) How did your child behave? Please explain what happened after using the 101s technique. The purposes of the record form were to keep track of using the 101s techniques and to check that the trained parents use the 101s techniques correctly.

Based on the process of the intervention, the two certified trainers also held the followed-up sessions by having weekly meetings every Friday at the school library at 4:00 p.m. to 6:00 p.m. from June, 2011 to the end of March, 2012 to discuss the use of the 101s techniques with the trained parents. The total weekly followed-up sessions were 40 times. The inclusion criteria for recruiting the sample in this research was the trained parents who participated in the weekly meeting at least twice a month in the total of 20 times to share their experience and discuss their understanding of the 101s positive discipline techniques. The followed-up sessions focused on group discussion concerning the feedback, comment, and questions about the use of the 101s positive discipline techniques. The main purpose of the followed-up session was to ensure that the trained parents were able to properly use the 101s techniques to response to their children's behaviors.

Table 1. *The Brief Descriptions of the 15 Techniques of the 101s Positive Discipline*

Type	Positive Discipline Techniques	Description
Emotional Support	1. Belonging and Significant Principle	To help a child to develop his/her sense of belonging to the family and feel important by giving him/her an important job to do and remind him/her that the job could not have been done without him/her. For example, having your child responsible to prepare pajamas for the parents every night.
	2. Get on the Child's Eye Level Principle	To get down to the child's eye level, speak softly, and look him/her in the eyes while talking to him/her.
	3. Validation Principle	To acknowledge the child's feeling. For example, "I know you're upset because you want the new toy. That's why you shout at me."
	4. Change of Environment Principle	To move the child to another room or outside whenever the child cannot stop the misbehaviors.
	5. Encouragement Principle	To give encouragement by helping the child to see the progress he/she has made. For example, "Doesn't it feel good to be able to make your own bed?"
	6. Make a Big Deal Principle	To recognize good behaviors by thanking or praising the specific behaviors the child has made you proud or happy. For example, "Thank you for asking me if I am tired. This is so sweet of you!"
	7. Ask the Child Principle	To ask the child for great suggestions to make things or his/her misbehaviors better. For example, "What do you think could help you in the future to remember to make a better choice?"
	8. Choice Principle	To give the child two choices which are positive and acceptable to you. For example, when your child denies to take a shower, you ask, "Do you want mommy or daddy to take a shower for you?"
	9. When/Then Abuse it/Lose it Principle	To tell the child what he/she needs to do first, then they can do what they want after that have done. For example, "When you finish your dinner, you can go out and play."
	10. I Message Principle	To tell the child your own feeling with 2 steps: 1. What happened that made you feel you do not like, and 2. What you want the child to do to make your feel better. For example, "When you left your toys on the floor after you finished, I feel so upset. I want you to clean up your toys and that would make me feel happy."
	11. Timer Says It's Time Principle	To set a timer to help the child move from one activity to the other activity. For example, "In five minutes, we will need to finish our breakfast and go to school."
	12. Whisper Principle	To whisper to the child whenever you want to scream or need his/her attention.
	13. Cueing Principle	To give the child a hand gesture to remind him/her of appropriate behaviors you want him/her to conduct. For example, teach the child to squeeze your hand when he/she wants to talk with you while you're talking with somebody and you will return your squeeze to let him/her know that you will stop the conversation as soon as possible and find out what he/she wants.
	14. Divide and Conquer Principle	To put an adult between two children when the children seem to reinforce each other misbehavior.
	15. Empowerment Principle	To encourage the child to solve his/her own problem. For example, when the child comes to you and tells that his friend doesn't share, you can say, "What do you think you will do?"

Control school. The parents received no training during implementing the 101s training program at the intervention school and collecting post-test data. The parents in the control group would use their regular school curriculum and services. However, after collecting post-test data, the parents in the control group received The 101s training.

Measures

The 101s Parent Interaction Checklist (PIC). The PIC is designed for self-rating how a parent interacts to his/her child. The items in the PIC were adapted from The 101s Teacher Interaction Checklist developed by Masterson (2008) for observing how often teachers applied the 101s techniques in the classrooms. For using the PIC in Thailand, approval from the Institute Review Board (IRB) was obtained. The items were translated in Thai and field tested under the supervision of six experts: including 2 American and 2 Thai experts in Early Childhood Education, 1 American specialist in the 101s Positive Discipline Techniques, and 1 Thai specialist in English language. The items were modified to be appropriate to Thai culture. Internal consistency was utilized to test the reliability of the items in the PIC using a pilot test with 32 subjects not included in the sample of this study. The reliability coefficient was 0.8-0.9 (Thanasetkorn, 2009b).

The PIC is a self-rating checklist for parents, composing of 2 parts: Positive discipline practice and Negative discipline practice. The items 1 to 15 are written based on the 101s Positive Discipline Techniques; including Emotional Support and Behavioral Adjustment. For example, "I give my child two acceptable choices when I want him/her to do something." "I look in to my child's eyes when I talk to him/her." The items are written in a 4 - point Likert-type scale. Answers range from "Not at all true" (1) to "Very much true" (4). Conversely, items 16 to 25 are written based on the framework of Negative Discipline; including Verbal Punishment, Critical/Harsh, and Physical Punishment. For example, "I say NO! or Stop! when my child conducts inappropriate behaviors." "I intimidate my child when he/she doesn't listen to me" "I spank my child." The items were written in a 4-point Likert-type scale with answers ranging from "Not at all true" (4) to "Very much true" (1) (Thanasetkorn, 2009b).

The Behavior Rating Inventory of Executive Function–Preschool Version® (BRIEF®-P).

BRIEF-P is a standardized rating scale form used by parent, teacher and day care providers to rate a child's executive function. It is designed to measure the range of behavioral manifestations of executive function in preschool age 2 to 5 years within the context of his/her every day environment- home and school. For using the BRIEF-P in Thailand, approval from the Institute Review Board (IRB) was obtained. The items were translated in Thai and field tested under the supervision of 4 experts: 1 Thai Psychologist, 1 Thai pediatrician, 1 Thai expert in Early Childhood Education, and 1 Thai expert in English language. The items were modified to be appropriate to Thai culture and context. The reliability of the items in the BRIEF-P was tested using a pilot test with 35 parent and 35 teacher subjects not included in the sample of this study. The internal consistency reliability was 0.80 - 0.95 for parent sample and 0.90 - 0.97 for teacher sample. The test-retest reliability was 0.78 - 0.90 for parents and 0.64 - 0.94 for teachers. The BRIEF-P also had modest correlations between parent and teacher ratings (0.14 - 0.28).

The BRIEF-P consists of 63 items that measure element of various executive functions: Inhibit, Shift, Emotion control, Working memory, and Plan/Organize. For Inhibitory component, there are 16 items; for example, "This child is unaware of how his/her behavior affects or bothers others." For Shifting component, there are 10 items; for example, "This child is upset by a change in plans or routine (for example, order of daily activities, adding last minute errands to schedule, change in driving route to store)." For Emotional component, there are 10 items; for example, "This child has explosive, angry outbursts." the Flexibility Index (FI) is composed of the Shift and Emotional Control scales, reflects behavioral rigidity and emotional modulation. For Working Memory component, there are 17 items; for example, "When given two things to do, this child remembers only the first or last. For Plan/Organize Component, there are 10 items; for example, "This child cannot find clothes, shoes, toys, or books even when he/she has been given specific instructions."

The items were written in a 3 - point Likert-type scale with answers ranging from "Never" (1) to "Often" (3). It is important to note that the original items are written to describe inappropriate behaviors conducted by preschoolers. If a child is rated as "Often", it is interpreted that the child often conducts the rated inappropriate behaviors. Therefore, the higher scores in the BRIEF-P identify the lower executive function skills whereas the lower

scores in the BRIEF-P identify the higher executive function skills.

Data Analyses

The statistic computer programs were used to analyze the obtained data on the following process: The descriptive statistic for the sample background characteristics was computed to explain general data of subjects. Then, descriptive statistics (means and standard deviations) for the total score from each subscale of the 101s Parent Interaction Checklist were presented separately for each group. The inferential method of data analysis, using a series of multivariate analysis of covariance (MANCOVA), was performed to evaluate the mean differences on dependent variables (Parent Practices and BRIEF[®]-P score) between the target school and control school. Lastly, Pearson bivariate correlation was utilized to evaluate the significant correlations between parent interactions practices as measured by PIC and children's executive function skills as measured by the BRIEF-P.

Results

The Impact of the 101s Parent Training on the Parent Practices

A series of MANCOVA was performed to investigate the mean differences between training and control groups. The multivariate test for group was significant ($F = 59.27$, $p < .05$). The univariate followed-up F-test was performed to examine the effect of independent variables on each individual dependent variable. For school, the univariate F-test for Emotion support, Behavior adjustment, Critical/harsh, Verbal punishment and Physical punishment were significant ($F = 34.436, 176.333, 50.717, 167.572, 72.977$; respectively, $p > .001$). It indicated that the parent interaction practices were significantly influenced by the school factor (See Table 2.)

The descriptive statistic of PIC subscales showed in Table 3 that the parents in the intervention group had significantly higher scores on positive parent interaction practices subscales; including Emotional support ($M = 3.9630$, $SD = 0.11401$), Behavior adjustment (M

= 3.9256 , $SD = 0.13340$), comparing to the mean scores on positive parent interaction practices subscales; including Emotion support ($M = 3.3674$, $SD = 0.48145$), Behavior adjustment ($M = 2.8770$, $SD = 0.40440$) of the parents in the control group. In addition, the descriptive statistic of PIC subscales also showed that the parents in the intervention group had significantly lower scores on negative parent interaction practices subscales; including Critical/harsh ($M = 1.1796$, $SD = 0.19558$), Verbal punishment ($M = 1.5678$, $SD = 0.50547$), and Physical punishment $M = 1.0741$, $SD = 0.26688$), comparing to the mean scores on negative parent interaction practices subscales; including Critical/harsh ($M = 2.0193$, $SD = 0.61217$), Verbal punishment ($M = 3.4515$, $SD = 0.67555$), and Physical punishment ($M = 2.4815$, $SD = 0.80240$) of the parents in the control group.

Table 2. *The Univariate Followed-Up F-Test for Parent Interaction Practices*

Factor	Dependent variables	<i>df</i>	<i>F</i>	<i>P-Value</i>
School	Emotion support	1	34.436***	0.000
	Behavior adjustment	1	176.333***	0.000
	Critical/harsh	1	50.717***	0.000
	Verbal punishment	1	167.572***	0.000
	Physical punishment	1	72.977***	0.000

Table 3 *Descriptive Statistics of PIC Subscales*

	Intervention group(N=27)		Control group(N=27)	
	Mean	Std. Deviation	Mean	Std. Deviation
Emotion support	3.9630	0.11401	3.3674	0.48145
Behavior adjustment	3.9256	0.13340	2.8770	0.40440
Critical/harsh	1.1796	0.19558	2.0193	0.61217
Verbal punishment	1.5678	0.50547	3.4515	0.67555
Physical punishment	1.0741	0.26688	2.4815	0.80240

The Impact of the 101s Parent Training on Children's EF Skills

A series of MANCOVA was performed to investigate the mean differences between training and control groups. The multivariate test for school was significant ($F = 6.459$, p

< .05). The univariate followed-up F-test was performed to examine the effect of independent variables on each individual dependent variable. For School, the univariate F-test for inhibit, shift, emotional control, working memory and plan/organize were significant ($F = 22.269, 7.195, 7.909, 23.961, 29.670, p > .05$). It indicated that inhibit, shift, emotional control, working memory and plan/organize were significant influenced by School. (See in Table 4)

Table 4 *The Univariate F-Test Table of BRIEF-P Subscales*

Factors	Dependent variable	df	F	P-Value
School	Inhibition control	1	22.269***	0.000
	Shift	1	7.195**	0.009
	Emotion control	1	7.909**	0.007
	Working memory	1	23.961***	0.000
	Plan/Organize	1	29.670***	0.000

The descriptive statistic of BRIEF-P subscales showed in Table 5 The children in the intervention group had significantly lower mean scores on executive function subscales; including inhibit ($M = 47.05, SD = 7.203$), Shift ($M = 45.71, SD = 9.247$), Emotion control ($M = 42.95, SD = 10.434$), Working memory ($M = 46.68, SD = 10.148$), Plan/Organize ($M = 40.03, SD = 8.663$), comparing to the mean scores of the children in control group, including inhibit ($M = 58.44, SD = 10.635$), Shift ($M = 51.74, SD = 6.870$), Emotional control ($M = 53.22, SD = 16.109$), Working memory ($M = 63.33, SD = 13.978$), Plan/Organize ($M = 54.37, SD = 10.789$). It is important to note that the BRIEF-P is an instrument to evaluate children's EF disorder. Therefore, the higher mean scores on the subscales mean the lower EF skills.

Table 5. *Descriptive Statistics of BRIEF-P Subscales*

	Intervention group(N=27)		Control group(N=27)	
	Mean	Std. Deviation	Mean	Std. Deviation
Inhibition control	47.05	7.203	58.44	10.635
Shift	45.71	9.247	51.74	6.870
Emotion control	42.95	10.434	53.22	16.109
Working memory	46.68	10.148	63.33	13.978
Plan/Organize	40.03	8.663	54.37	10.789

The Correlations between Parent Interactions Practices and Children' Executive Function Skills

A bivariate correlation was undertaken among the PIC subscales and BRIEF-P subscales. The results in the current research showed that there were significant relationships between the five subscales of The 101s Parent Interaction Checklist (emotional support, behavior adjustment, verbal punishment, critical/harsh and physical punishment) and the five subscales of BRIEF-P (inhibition control, shift, emotional control, working memory and plan/organize) as rated by the parents. In the current study, the results showed the significantly negative correlations between the Positive Discipline subscales and the EF subscales. For Emotional Support, the results showed the negative correlations to Inhibition control ($r = -0.462, p < 0.01$), Shift ($r = -0.503, p < 0.01$), Emotional control ($r = -0.471, p < 0.01$), Working memory ($r = -0.442, p < 0.01$), and Plan/Organize ($r = -0.481, p < 0.01$) (See Table 6.). Likewise, for Behavioral Adjustment, the results showed the negative correlations to Inhibition control ($r = -0.647, p < 0.01$), Shift ($r = -0.575, p < 0.01$), Emotional control ($r = -0.570, p < 0.01$), Working memory ($r = -0.616, p < 0.01$), and Plan/Organize ($r = -0.612, p < 0.01$). The results indicated that the more the parents were likely to use emotional support and behavioral adjustment techniques to interact with the children, the less the children were likely to conduct inappropriate behaviors. It is important to note that the lower scores in BRIEF-P meant that the child never or rarely conducted inappropriate behaviors related to inhibition, shifting, emotional control, working memory, and plan/organization skills. Therefore, the results showed the significantly negative correlation among the Positive Discipline subscales in the PIC and the EF subscales in the BRIEF-P.

Conversely, the results showed the significantly positive correlations between the negative discipline subscales and EF subscales. For Critical/Harsh, it was showed the positive correlations to Inhibition control ($r = 0.745, p < 0.01$), Shift ($r = 0.577, p < 0.01$), Emotion control ($r = 0.714, p < 0.01$), Working memory ($r = 0.680, p < 0.01$), and Plan/Organize ($r = 0.744, p < 0.01$). For the Verbal Punishment, it was showed the positive correlations to Inhibition control ($r = 0.705, p < 0.01$), Shift ($r = 0.715, p < 0.01$), Emotion control ($r = 0.555, p < 0.01$), Working memory ($r = 0.739, p < 0.01$), and Plan/Organize ($r = 0.766, p < 0.01$). Finally, for the Physical Punishment, it was showed the positive correlations to Inhibition

control ($r = 0.711, p < 0.01$), Shift ($r = 0.597, p < 0.01$), Emotion control ($r = 0.526, p < 0.01$), Working memory ($r = 0.695, p < 0.01$), and Plan/Organize ($r = 0.666, p < 0.01$). The results indicated that the more the parents were likely to use critical/harsh, verbal and physical punishment practices to interact with the children, the more the children were likely to conduct inappropriate behaviors related to inhibition, shifting, emotional control, working memory, and plan/organization skills.

Table 6. *Results of the Correlation Between The 101s Parent-Interaction Checklist Subscales and BRIEF-P Subscales on the Parent Ratings*

		Emotion support	Behavior adjustment	Critical/harsh	Verbal punishment	Physical punishment
Inhibition control	<i>r</i>	-0.462	-0.647	0.745	0.705	0.711
	<i>p</i>	0.000	0.000	0.000	0.000	0.000
Shift	<i>r</i>	-0.503	-0.575	0.577	0.715	0.597
	<i>p</i>	0.000	0.000	0.000	0.000	0.000
Emotion control	<i>r</i>	-0.471	-0.570	0.714	0.555	0.526
	<i>p</i>	0.000	0.000	0.000	0.000	0.000
Working memory	<i>r</i>	-0.442	-0.616	0.680	0.739	0.695
	<i>p</i>	0.001	0.000	0.000	0.000	0.000
Plan/Organize	<i>r</i>	-0.481	-0.612	0.744	0.766	0.666
	<i>p</i>	0.000	0.000	0.000	0.000	0.000

Conclusion and Recommendation

The current study investigated the impact of the 101s parent training on parent practices and children's EF skills. Overall, the 101s Positive Discipline training program had a major effect on parents' practices and children's EF skills. Figure 1 presents the comparisons of parents' interaction practices subscale, as measured by the PIC, between the intervention group and control group. For the PIC subscale scores of the parents in the intervention group, who received the 101s Positive Discipline training program, had significantly higher mean scores on Emotion support and Behavior adjustment, and has significantly lower mean scores on Critical/harsh, Verbal punishment, Verbal punishment, comparing to the mean scores on the PIC of the parents in the control group.

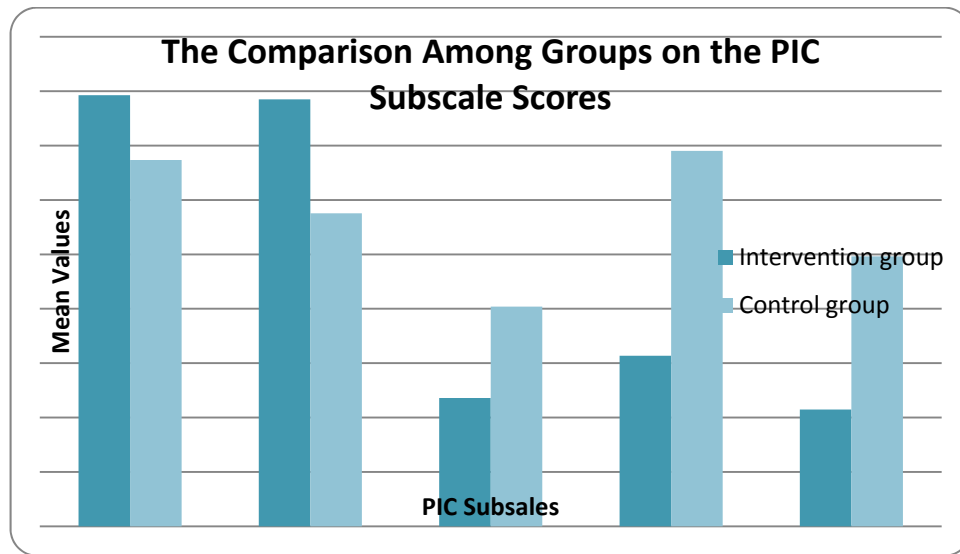


Figure 1. The Comparison among Groups on the PIC Subscale Scores

For children's executive function, Figure 2 presents the comparisons of the children's executive function subscale, as measured by BRIEF-P, between intervention group and control group. For BRIEF-P subscale scores of the children in the intervention group, whose parent received the 101s Positive Discipline training program, had significantly lower mean scores on all subscales of EF; including Inhibition control, Shift, Emotion control, Working memory, and Plan/Organize, comparing to the children in the control group.

In addition, it was evident that the parents' interactions in *The 101s* parent training group were statistically associated with the executive function abilities of children rated by their parents. These results provide the support for the hypothesis that *The 101s* training could result in a positive correlation between positive parent interactions and high EF skills of the children would result in a negative correlation between negative parent interactions and low EF skills of the children.

The findings of this research were consistent with previous research in the 101s training program conducted by Masterson (2008), Thanasetkorn (2009a), Thanasetkorn (2009b), Pichitkusalachai et al. (2012), and Sutipan et al. (2012). The findings from the previous research showed the increase of the teacher and parent positive practices and the reduction of the teacher and parent negative practices. The previous research suggested that The 101s

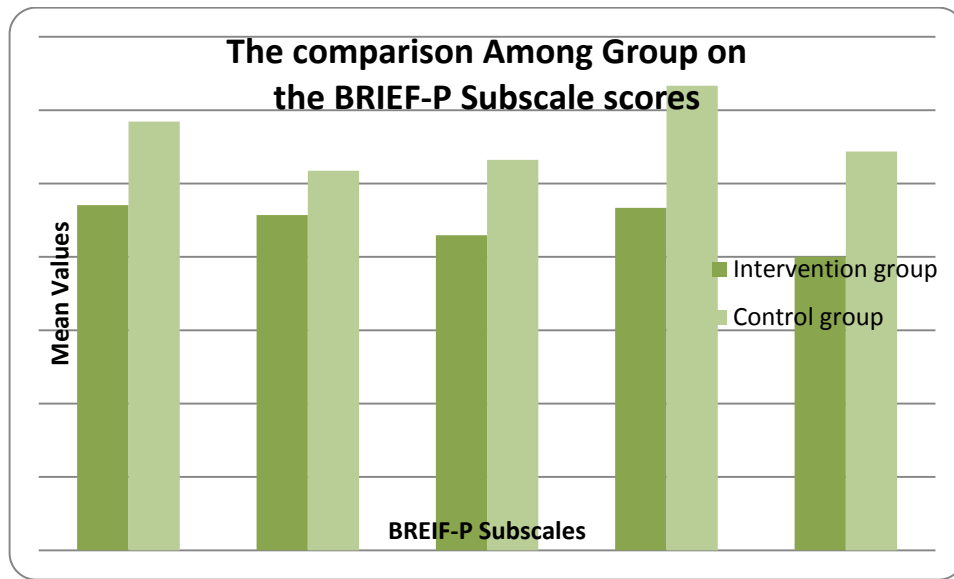


Figure 2. The Comparison among Groups on the BRIEF-P Subscale Scores

training program helped the main caregivers, both teachers and parents, to know how to use the positive discipline techniques to control their own negative emotions and promote their children's social-emotional development. The findings from this research showed that when interacting with the children, the trained parents in the intervention group used the 101s techniques more often and used the negative parenting practices less often than the parents in the control group. It could be possibly explained, based on the previous research, that when the trained parents used the 101s positive discipline techniques, their negative emotions were not likely to be triggered. Thereby, they were able to control their temper tantrum and rarely use negative parenting practices. It could also possibly be explained that the trained parents in this research project were encouraged to use the 101s positive techniques by recording their positive parenting practices and participating in the followed-up sessions. As a result, they became more mindful of the parenting practices they used to interact with their children. However, the findings from this research could not explain the trained parents' changes in their parenting practices. Because the IRB for this research was obtained after implementing the 101s parent training at the intervention school, the research design was changed to ex post facto- posttest only. Without pre-test, the phenomena of the parents' behavioral changes could not be concluded. Nonetheless, this research project was the preliminary research, trying to

make a contribution to the research fields in which the research studies on positive discipline and children's executive function development were still limited. Therefore, for future research, a quasi-experimental pretest-posttest control group is suggested for research design. The findings of this research were also consistent with previous research studies on the impact of the 101s training program on children's social-emotional and EF development. The findings from previous research showed the improvement in social-emotional and EF skills of the children in the intervention groups (Masterson, 2008; Thanasetkorn, 2009a; Thanasetkorn, 2009b; Pichitkusalachai et al., 2012; and Sutipan et al., 2012). The children whose either teachers or parents received the 101s positive discipline training program would significantly have higher mean scores on prosocial skills (Msterson, 2008), School adjustment (Thanasetkorn, 2009a; Thanasetkorn, 2009b), self-regulation skills (Pichitkusalachai et al., 2012), and EF skills (Sutipan, 2012), comparing to the children whose the caregivers rarely used positive discipline techniques. The findings from this research showed that the children of the trained parents in the intervention group had better EF skills than did the children of the parents in the control group.

The phenomena could be explained based on brain development and brain structure. According to brain development, the early years of life is a critical period for brain and behavioral development. It is the period when the neurons are connected together by synapse in order to create the brain network to communicate the information and conduct behaviors. The brain network grows rapidly through attachment with adults in the first three years of life. Neuroscientists suggested that secure attachment is the most significant factor in the more and stronger connections among neurons or synapses. In contrary, insecure attachment caused less and weaker synapse. After the first three years, the synapses that are not used will be pruned. The less brain network the children's brains are likely to form, and the more difficulty in learning the children tend to have. The findings from the previous research conducted by Thanasetkorn (2009a) in the impact of the 101 teacher training on teacher-child relationships also consistently showed that the teachers who received the 101s teacher training were able to establish secure attachment to their children in the classrooms. However, the teachers who often used negative discipline would establish insecure attachment to their children. The findings also further revealed that the children who had positive teacher-child relationship with their teachers were also able to adjust to school better than did the children who had

negative teacher-child relationships. Regarding to the children in this research, it could be possibly explained that when the trained parents used the 101s techniques to interact with the children, the children were stimulated through gentle touch, face-to-face contact, soft voice, and clear communication which, in turn, encouraged warm attachment between the trained parents and the children. As a result, the children's brain might be stimulated to form the more and strong neuron connections and become a complex network of synapses. As a result, the children in the intervention group were able to learn social expectations and conduct appropriate behaviors related to the EF skills. In other words, the 101s positive discipline techniques could possibly be the tool to stimulate the children's brain network in the area of executive function that relates to goal-directed behaviors.

Besides brain development, the findings could be possibly explained by the brain structure. Newman and Harris (2009) explained the brain structure, based on the Paul MacLean's Triune Brain, that human brain has 3 layers, including the reptilian brain in which the core brain stem functions, the paleomammalian brain where the limbic system is located, and the neomammalian brain where neocortex and neocerebellum are located. The reptilian brain is related to human instinct for surviving. The paleomammalian brain is related to emotions, learning, and memories. The neomammalian brain is related to logical thinking, decision making, and problem solving (Newman & Harris, 2009). Therefore, it could be possibly explained that when the trained parents used the positive discipline techniques, the children's basic needs controlled by the reptilian brain was met. The children were able to establish secure attachment to the parents. At the same time, the 101s positive discipline techniques helped the trained parents to teach and train the children's emotional control functioning in the paleomammalian brain and stimulate the emergent metacognition such the plan and organizing skills functioned in the neomammalian brain. As a results, the children in the intervention groups performed better EF skills than did the children in the control group.

Limitations and Suggestions for Future Research

In this research, there were limitations that should be considered with the findings. First, one of the major limitations of this research was the research design. Because the training

program was already existed, the ex-post facto design was utilized. The limitation of the ex-post facto design was that there is no random assignment to treatment so there could be inherent confounds in the variables studies. When the sample cannot be considered random, generalization is limited. However, the control group with matching method was used to reduce the gap of limitation.

Second, another limitation of this research was that the sample size was relatively small. Therefore, the ability to generalize the finding was limited. For the future research, replicated research using larger sample sizes in different school district across the country is suggested.

The findings from the current research made a contribution to the research field, efficient practices, and policy movement for promoting appropriate-aged brain and behavioral development in children. Besides the replicated research across Thailand suggested for further research, the findings also provided new evidence based policy movement and practices. The 101s positive discipline training program should be implemented across the country as an alternative choice for Thai parents, teachers, and caregivers who are interested in helping their children develop EF skills by using the 101s positive discipline techniques. Moreover, the policy movement should also emphasize the significance of EF development as the notion of appropriate-aged development for Thai children. When the attention to the impact of caregiver-child interaction practices and positive environment on children's development is increased and put in the national agenda, the trend of appropriate-aged development in Thai children might be increased.

References

- Bernier, A., Carlson, S. M., & Whipple, N. (2010). From external regulation to self-regulation: Early parenting precursors of young children's executive functioning. *Child Development, 81*(1), 326-339.
- Best, J. R., & Miller, P. H. (2010). A developmental perspective on executive function. *Child Development, 81*(6), 1641-1660.
- Birch, S. H., & Ladd, G. W. (1997). The teacher-child relationship and children's early school adjustment. *Journal of School Psychology, 35*(1), 61-79.

- Blair, C., & Razza, R. P. (2007). Relating effortful control, executive function, and false belief understanding to emerging math and literacy ability in kindergarten. *Child Development, 78*(2), 647-663.
- Briggs - Gowan, M. J., & Carter, A. S. (2008). Social-Emotional Screening Status in Early Childhood Predicts Elementary School Outcomes. *Pediatrics, 121*(5), 957-962.
- Carlson, S. M. (2005). Developmentally sensitive measures of executive function in preschool children. *Developmental Neuropsychology, 28*(2), 595-616.
- Denham, S. A., Hideko, B., Melissa, M., Sara, K., Erin, W., Todd, W., & Yana, S. (2012). Social-emotional learning profiles of preschoolers' early school success: A person-centered approach. *Learning and Individual Differences, 22*(2), 178-189.
- Gioia, G. A., Espy, K. A., & Isquith P. K. (2003). Behavior rating inventory of executive function, preschool version (BRIEF-P). Psychological Assessment Resources, Odessa.
- Hiscock, H., Bayer, J. K., Price, A., Ukoumunne, O. C., Rogers, S., & Wake, M. (2008). Universal parenting programme to prevent early childhood behavioural problems: cluster randomised trial. *BMJ, 336*(7639), 318-321.
- Kanchanachitra, C. (Ed). (2008). Thai Health 2008 ; Nakhon Pathom: Institute for Population and Social Research, Mahidol University, under the Health Information System Development Project of the Health System Research Institute, supported by the Thai Health Promotion Foundation (Thai Health). *Institute for Population and Social Research, Mahidol University, 346*.
- Kanchanachitra, C. (Ed). (2011). Thai Health 2011; Nakhon Pathom : Institute for Population and Social Research, Mahidol University, under the Health Information System Development Project of the Health System Research Institute, supported by the Thai Health Promotion Foundation (Thai Health). *Institute for Population and Social Research, Mahidol University, 388*.
- Kolnik, S. (2010). Predicting School Readiness: Executive Functions, Problem Behaviors and Theory of Mind in Preschoolers. University of Miami. Retrieved August 1, 2011 from http://scholarlyrepository.miami.edu/cgi/viewcontent.cgi?article=1415&context=oa_dissertations
- Liebermann, D., Giesbrecht, G. F., & Müller, U. (2007). Cognitive and emotional aspects of self-regulation in preschoolers. *Cognitive Development, 22*(4), 511-529.

- Masterson, M. L. (2008). The impact of The 101s: A Guide to Positive Discipline training on teacher interaction practices, attitudes and prosocial skill outcomes in preschool classroom. Old Dominion University, Norfolk, VA.
- Newman, J. D. & Harris, J. C. (2009). The scientific contribution of Paul D. Maclean (1913-2007). *The Journal of Nervous and Medical Disease*, 197(1), 3-5.
- Pianta, R. C. (2001). Student - Teacher Relationship Scale: Professional Manual. Psychological Assessment Resources, Inc. Retrieved February 25th, 2010 from http://curry.virginia.edu/uploads/resourceLibrary/STRS_Professional_Manual.pdf
- Pichitkusalachai, P., Chumchua V., Chutabhakdikul, N, Thanasetkorn P. (2012). Self-regulation in Thai preschoolers: The Impact of the 101s positive discipline teacher training on teacher interaction practices and children's self-regulation. *Proceedings: The 1st ASEAN Plus Three Graduate Research Congress*. Paper Presented at the proceedings of the 1st ASEAN Plus Three Graduate Research Congress, Chiang Mai, Thailand (pp. 19-24). Chiang Mai: The 1st ASEAN Plus Three Graduate Research Congress.
- Rhoades, B. L., Greenberg, M. T., Domitrovich, C. E. (2009). The contribution of inhibitory control to preschoolers' social-emotional competence. *Journal of Applied Developmental Psychology*, 30, 310-320.
- Rhoades, B. L., Warren, H. K., Domitrovich, C. E., & Greenberg, M. T. (2011). Examining the link between preschool social-emotional competence and first grade academic achievement: The role of attention skills. *Early Childhood Research Quarterly*, 26, 182-191.
- Riggs, N. R., Jahromi, L. B., Razza, R. P., Dillworth-Bart, J. E., & Mueller, U. (2006). Executive function and the promotion of social-emotional competence. *Journal of Applied Developmental Psychology*, 27(4), 300-309.
- Runyon, M. K., Deblinger, E., & Schroeder, C. M. (2009). Pilot evaluation of outcomes of combined parent-child cognitive-behavioral group therapy for families at risk for child physical abuse. *Cognitive and Behavioral Practice*, 16(1), 101-118.
- Shonkoff, J. P. (2000). *From Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, DC: National Academy Press.
- Sugimura, T., Ando, A., 杉村智子, & 安東綾子. (2010). Relationship between theory of

mind and executive function in young children assessed by class teachers. *Bulletin of Fukuoka University of Education*, 59(4), 23-29.

- Sutipan, P., Pichitkusalachai, P., Chumcha, V., Thanasetkorn, P. (2012). The impact of the 101s positive discipline teacher training on teacher practices and preschoolers' executive function skills, Paper presented at the International Society for the Study of Behavioural Development (ISSBD) 2012 Biennial Meeting Conference, University of Alberta, Edmonton, Alberta, Canada. Retrieved January 26, 2013, from http://www.issbd2012.com/documents/ISSBD2012_AbstractBook.pdf
- The PISA. (2009) Profiles by country/economy. Retrieved August 23, 2011, from <http://stats.oecd.org/PISA2009Profiles/>
- Thanasetkorn, P. (2009a). The impact of The 101s: A Guide to Positive Discipline teacher training on teacher interaction practices, teacher-child relationship quality, school adjustment, and academic outcomes in kindergarten classrooms in Bangkok, Thailand. Old Dominion University, Norfolk, VA.
- Thanasetkorn P. (2009b). The impact of The 101s: A Guide to Positive Discipline parent training: A case study of kindergarteners and their parents in Bangkok, Thailand. Old Dominion University, Norfolk, VA.
- Tsujimoto, S., & Sawaguchi, T. (2004). Properties of delay-period neuronal activity in the primate prefrontal cortex during memory- and sensory guided saccade tasks. *Eur J Neurosci*, 19, 447-57.