ความสัมพันธ์ระหว่างการประยุกต์ใช้กลยุทธ์การประมวลผลข้อมูล
และความสามารถทางสังคมในเด็กไทยที่มีความบกพร่องทางการเรียนรู้

The relationship between information processing strategies application
and social competence in Thai children with learning disabilities

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บทคัดย่อ

บทนำ: ผลสัมฤทธิ์ทางการเรียนต่ำเป็นปัญหาสำคัญที่พบในเด็กที่มีความบกพร่องทางการเรียนรู้ (แอลดี) เป็นผลจากความบกพร่องของความสามารถในกระบวนการประมวลผลข้อมูล หลายงานวิจัยยังพบว่า ความสามารถทางสังคมของเด็กกลุ่มนี้ยังเป็นสิ่งสำคัญที่ควรคำนึงถึง

วัตถุประสงค์: เพื่อศึกษาความสัมพันธ์ระหว่างการประยุกต์ใช้กลยุทธ์การประมวลผลข้อมูลและความสามารถทางสังคมในเด็กไทยที่มีความบกพร่องทางการเรียนรู้

เครื่องมือ: เครื่องมือที่ใช้ในการศึกษาคือแบบประเมิน พีอาร์พีพี ซิสเต็มฉบับภาษาไทย และแบบประเมินโซเชียลคอมพีเทนซ์ สเกล ฉบับภาษาไทย

วิธีการ: กลุ่มตัวอย่าง ได้แก่ เด็กที่มีความบกพร่องทางการเรียนรู้จำนวน 30 ราย อายุระหว่าง 6-12 ปี คัดเลือกด้วยวิธีการแบบเฉพาะเจาะจง และครูของเด็กกลุ่มตัวอย่างจำนวน 21 ราย ผู้วิจัยให้ครูทำแบบประเมิน โซเชียล คอมพีเทนซ์ สเกล ฉบับภาษาไทย และประเมินเด็กกลุ่มตัวอย่างด้วยแบบประเมิน พีอาร์พีพี ซิสเต็ม ฉบับภาษาไทย ในขณะเด็กทำกิจกรรมประเภทวิชาการ จากนั้นทดสอบหาความสัมพันธ์ระหว่างคะแนนจากสองแบบประเมินด้วยวิธีการของ เพียร์สัน โมเมนต์ คอร์รีเลชั่น

ผลการศึกษา: พบความสัมพันธ์ระหว่างคะแนนในทุกควอดรันต์ (perceive, recall, plan, perform) ของแบบประเมินพีอาร์พีพี ซิสเต็มกับคะแนนในการทดสอบย่อยด้าน ทักษะพฤติกรรมทางการเรียน (academic behavior skills) ของแบบประเมิน โซเชียล คอมพีเทนซ์ สเกล ในระดับสูง

สรุป: ความสามารถในการประยุกต์ใช้กลยุทธ์การประมวลผลข้อมูลมีความสัมพันธ์ในระดับสูงกับความสามารถทางสังคมในด้านทักษะพฤติกรรมทางการเรียนในเด็กไทยที่มีความบกพร่องทางการเรียนรู้

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คำสำคัญ: เด็กที่มีความบกพร่องทางการเรียนรู้ กลยุทธ์การประมวลผลข้อมูล ความสามารถทางสังคม พีอาร์พีพี ซิสเต็ม ฉบับภาษาไทย โซเชียล คอมพีเทนซ์ สเกล ฉบับภาษาไทย

Abstract

Introduction: Low academic achievement resulting from low ability in information processing is not the only major problem found in children with learning disabilities (LD). Many studies indicated that social competencies of these children are also important.

Objectives: To investigate the relationship between information processing strategies and social competence in Thai children with LD.

Instruments: Perceive, recall, plan, and perform system of task analysis (PRPP system): Thai version, and Social competence scale (SCS): Thai version were used in this study.

Materials and methods: Thirty children with LD aged between 6-12 years (n=30) and their teachers (n=21) were recruited by a purposive sampling method. All teachers completed a full assessment of SCS. PRPP System was administered to children while they performed the academic tasks. Pearson product-moment correlation was used to test the relationship between two assessment tools.

Results: Relationship between information processing strategies and social competence occurred in all quadrants of PRPP System with high correlation occurring in the academic behavior skills subtest of SCS.

Conclusion: Information processing strategies have a high correlation with social competence in academic behavior skills subtest in Thai children with LD.

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Keywords: Children with learning disabilities, information processing strategies, social competence, perceive recall plan and perform system: Thai version, social competence scale: Thai version

Introduction

Currently, learning disabilities (LD) is seen as one of the most significant factors that limit ability to learn in school. These problems are based on ineffective information processing used in learning that takes place in the four stages of input, integration, storage, and output.[1] It can lead to difficulties in academic activities.[2] Low academic achievement is not the only major problem found in children with learning disabilities. Many researches indicated that social competences of these children can be affected as well.[3-8] Punyo stated in her study that children who were identified with LD generally had difficulties in social-emotional development.[6] The problem was a consequence of continuously unaccomplished learning activities. As a result, they tended to lack self-esteem, had high anxiety, and displayed a variety of adverse emotional reactions. Because of these tendencies, they could easily lose their temper and

become depressed. Thus, many psychologists noticed that these disabled children had a greater possibility to be affected by lacking of development in social skills than by their unaccomplished academic learning skills. The studies of Haager and Vaughn[4] and Wight and Chapparo[7] found that those who were closed to children with LD such as their parents, teachers, and peers believed that these disabled children had relatively lower social competences than their age-level peers. Furthermore, a study done by Kavale and Forness[5] and Wong[8] also claimed that children with LD tended to participate less in social activities compared to other children of the same age. Chapparo[9] stated in her study that these disabled children tended to be frequently rejected and ignored by peers. As a result, they have less opportunity to participate in activities with their friends. In summary, children with LD are frequently found to display low levels of social competency and low academic

achievement. Therefore, information processing strategies and social competences are seen as significant problems in children with LD. Many researchers have conducted studies on the relationship between information processing abilities and social competence in psychiatric patients. It was found that cognitive ability could significantly predict social competence.[10-13] Similar studies have been conducted on children with attention deficit hyperactivity disorder (ADHD) and typical children.[14-16] Nevertheless, there has been very few studies conducted on a direct relationship between information processing strategies and social competence on children with LD.

Perceive, recall, plan, and perform (PRPP) system of task analysis was used for assessing information processing strategies application in this study. This assessment is one of occupation-focused assessments that measures both task performance skills and cognitive information processing strategies over time in a specific context.[17] Many researchers have conducted studies on the PRPP system of task analysis that has been used to assess cognitive deficits in typical children,[18-20] children with LD,[21-24] and children with autism.[25] Lowe focused on cognitive strategies that may be critical to successful participation in school.[23] The occupational performance of students with learning difficulties enrolled in mainstream primary (elementary) schools in Australia was determined by PRPP @SCHOOL-1 (TQ & PQ). Additionally, Wight and Chapparo focused on studying the relationship between information processing and social competence abilities during task performance at school.[26] Convenient samples of 22 male children with LD, aged between 5 and 11 years were selected. The instruments used in this study included Teacher Skill-streaming Checklist[27] and PRPP system of task analysis teacher questionnaire.[23] The findings reported a significant relationship between information processing abilities of children with LD and their proficiency in all areas of social performance. Although Wight and Chapparo's study found a relationship between information processing abilities and social performance,[26] there were differences in inclusion criteria of the samples. They considered the social difficulties of these children as indicated by their respective classroom teachers, whereas the present study considered only the learning disabilities condition. Moreover, Wight and Chapparo's study used teacher skillstreaming checklist for assessing social performance, whereas we used social competence scale (SCS): Thai version, which contains different assessment criteria. Therefore, the researcher was interested in investigating the relationship between information processing strategies application and social competence in Thai children with LD by using PRPP system of task analysis: Thai version, and SCS: Thai version.

Materials and methods

Research methodology

A correlational study was used to examine relationship between information processing strategies application and social competence in Thai children with LD by using the PRPP system of task analysis: Thai version and SCS: Thai version.

Participants

Children

Total of 30 children diagnosed with LD were participated in this study. The inclusion criteria were as follows:

1) Children could communicate without visual, hearing, and speaking impairments. Students having demonstrated these impairments in the past could be determined using a clinical profile, but these impairments must have been adequately repaired before participation.

2) Their parents had to agree to sign an informed consent to participate in study. Participants who could not complete assessment were excluded.

Participants included 25 males and 5 females aged ranging from 9 to 12 years old (mean age 10.8). Six inclusion schools located in the Chiang Mai Province, Thailand, that had children diagnosed learning disabilities in grades four through six were used in this study. All participants had reading disabilities and had never been exposed to any interventions, or had received interventions of less than one session per week.

Teachers

Total of 21 teachers participated in this study. All teachers had the most contact with students and were lead teachers in each classroom of students in the sample group. Teachers were 19 females and 2 males. The age range of teachers were 28 to 57 years old (mean age = 46).

Instruments

Research instruments used in this study were the PRPP system of task analysis: Thai version and SCS: Thai version.

PRPP system of task analysis: Thai version

PRPP system of task analysis was developed by Chapparo and Ranka in 1997 to meet the requirements of occupational therapists. PRPP system of task analysis is a custom-made, flexible, and ecological assessment of occupational performance that corresponds to the structure of occupational performance model (Australia), and tenets of cognitive ethology and macro-cognition. Furthermore, it is one of the occupation-focused assessments that measures both task performance skills and cognitive information processing strategy over time in a specific context.[17] Program consisted of two analytical stages. Stage One Analysis employs a standard behavioral task analysis to indicate person's mastery for specific and relevant occupations. Stage Two Analysis adopts a cognitive task analysis describing cognitive processes underlying task performance and cognitive strategies in complex situations. This stage of PRPP system of task analysis is conceptually divided into four quadrants: perceive (sensory perception), recall (memory), plan (response planning and evaluation), and perform (performance monitoring). Each quadrant is broken down into three sub-quadrants and several underlying information processing strategies termed 'descriptor' (Figure 1). Descriptor behaviors are rated by an observer on a 3-2-1 scale. Children will receive a score of 3 if the task is completed safely without assistance and prompts within a reasonable time. Children will receive a score of 2 if the task is completed safely, but there are some concerns and deficits in behavior indicated. For example, prompts may be needed and time of completion is questionable. Children will receive a score of 1 if the task

is uncompleted and a deficit in behavior is indicated. Also, patient may engage in unsafe behaviors while completing the tasks, take too much time, or require too many prompts.[28]

In this study, Stage Two Analysis was applied because results from this study were used to explore the relationship between information processing strategies application and social competence in Thai children with LD.

Many researchers have conducted studies using PRPP system of task analysis to assess cognitive deficits in a variety of samples such as adults with traumatic brain injuries,[29-31] persons with schizophrenia,[32] men with HIV-1 dementia,[33] typical children,[18-20] children with LD,[21-24] and children with autism.[25] In Thailand, PRPP system of task analysis was translated into Thai and has been studied for reliability and validity by Munkhetvit as part of doctoral thesis.[30] Later, PRPP system of task analysis: Thai version was used in Thailand for clients with strokes,[34] people with schizophrenia,[35] and elderly with dementia.[36]

Present study used Thai version of PRPP system of task analysis as a research instrument for assessing information processing application in Thai children with LD.

SCS: Thai Version

SCS was developed by the Conduct Problem Prevention Research Group (CPPRG) in 1995 and was further applied by the Fast Track's project, Pennsylvania University, USA. This assessment is used to evaluate the development of social competence in elementary-age children. SCS covers several components including:

1) Pro-social and communication skills
2) Emotion regulation skills an
3) Academic behavior skills.

The assessment consists of two versions. The first one for teacher contains 25 questions that fall into three components: 1) pro-social and communication skills, 2) emotion regulation skills, and 3) academic behavior skills. The second test for parent consists of 12 questions that fall into two components: 1) pro-social and communication skills, and 2) emotion regulation skills. Five-point Likert scale is applied to scoring tests such that 0 = not at all, 1 = a little, 2 = moderately well, 3 = well, and 4 = very
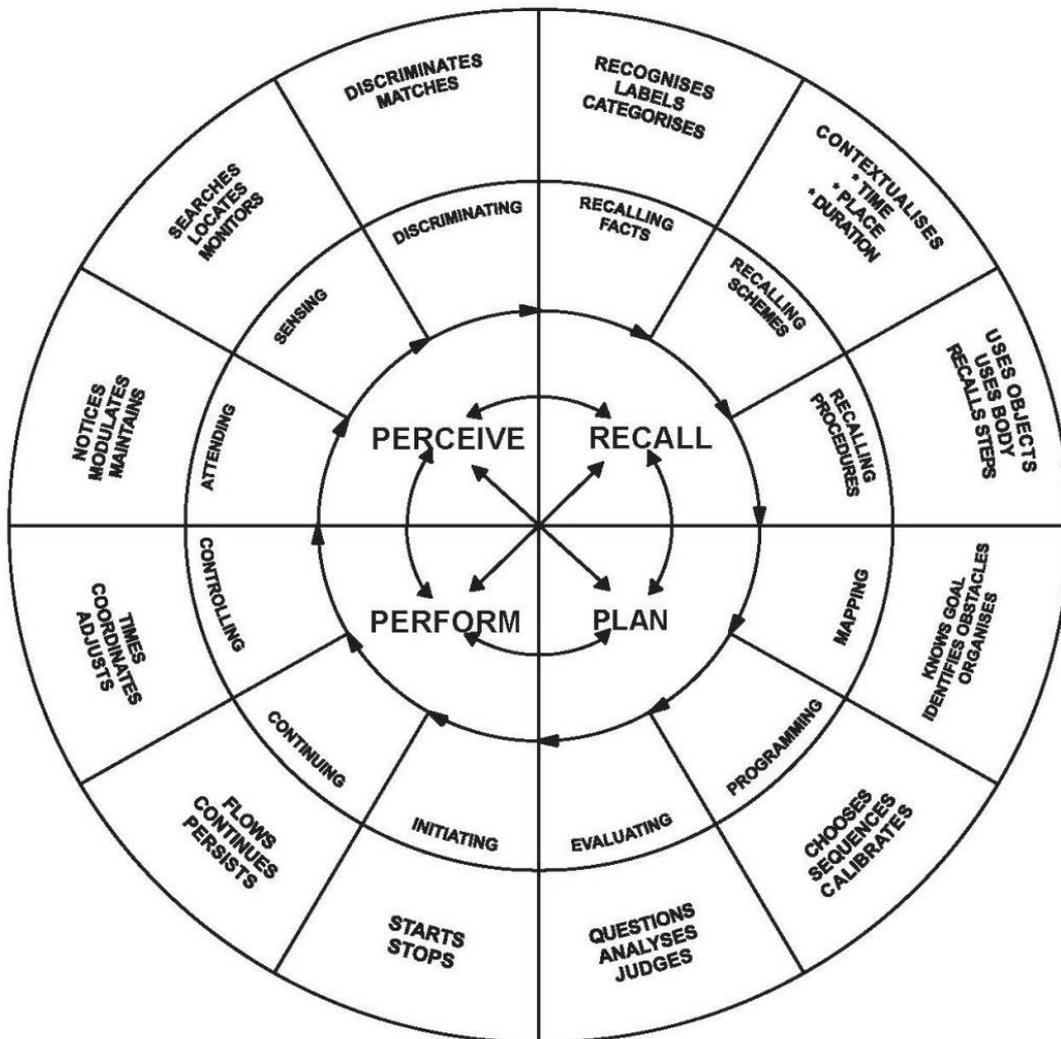
Figure 1. The PRPP system of task analysis: conceptual model of information processing behaviors.[33]

well. SCS has been studied for psychometric properties such as internal consistency, factor analysis, construct validity, concurrent validity, reliability, and discriminant analysis. The studies found that psychometric properties of SCS were high.[37-40] The original version of SCS was translated into Thai and was examined for its reliability in Thai children with LD before being used in present study by this researcher. SCS: Thai version showed high test-retest reliability (r=0.84-0.98). Although SCS has two versions, this research focused only on the perspective of teachers so only teacher version was used.

Procedure

The proposal was sent to the Ethics Committee of the Faculty of Associated Medical Sciences, Chiang Mai University for approval. All participants (children and teachers) agreed to sign an informed consent to participate in the study. Next, children in sample group (n=30) were rated by their current classroom teacher using teacher version of SCS in all three subtests, including pro-social/communication skills, emotional regulation, and academic behavior subtests. Ratings were completed by teacher who had the most contact with student. Afterward, PRPP

system of task analysis: Thai version was administered to all children in the same sample group (n=30). Students were observed while performing the academic tasks. Performances of children were videotaped during assessment. Videotaped performances were later assessed. Scores from Stage Two Analysis of PRPP system: Thai version (3-2-1) was entered for each of thirty-four descriptors for each task the children performed.

Data Analysis

Pearson product-moment correlations was used to examine the relationship between information processing strategies as measured by PRPP system of task analysis:

Thai version and social competence as measured by SCS: Thai version.

Results

Demographic characteristics of children in the sample group are shown in Table 1. Thirty children with LD who met the inclusion criteria were selected to participate in the study. Their average age were 10.8 years old. Most of them were males (83.33%) and were in the 5th grade (36.67%). Demographic characteristics of teachers in the sample group are shown in Table 2. The majority of teachers were female (n=19) with mean age was 46 years (SD = 7.94).

Table 1 Demographic characteristics of the children in the sample group (n=30).

General data		n=30	Percentage (%)
Gender			
	Male	25	83.33
	Female	5	16.67
Age	9.0 – 9.11	1	3.33
(Years)	10.0 – 10.11	12	40.00
	11.0 – 11.11	11	36.67
	12.0 – 12.11	6	20.00
Grade	4	10	33.33
	5	11	36.67
	6	9	30.00

Table 2 Demographic characteristics of teachers (n=21) in the sample group.

General data		Teachers (n=21)
Gender		
	Male	19
	Female	2
Age		
(Years)	Mean	46
	SD	7.43

Table 3 contains means, standard deviations, and mean percentage scores of PRPP system: Thai version for academic task. The results showed that plan quadrant posed the most problems for children with LD in this sample (mean 53.33%). Perceive quadrant was the next most problematic in the sample (mean 68.88%), followed by recall quadrant (mean 75.56%), and perform quadrant (mean 80.96%) being the least problematic.

Table 3 PRPP Stage Two Quadrant percentage scores of Academic task.

PRPP Quadrant	Min. Score	Max. Score	Mean Score	Mean% Score	Std. Dev.
Perceive	10.00	25.00	16.53	68.88	13.00
Recall	17.00	24.00	20.40	75.56	2.04
Plan	9.00	23.00	14.40	53.33	5.00
Perform	18.00	23.00	29.43	80.96	1.74

Table 4 contains means, standard deviations, and mean percentage scores of social competence scale (Teacher version): Thai version. The results showed that academic behavior subtest contained the lowest scores (mean 48.82 %). Pro-social and communication skills subtest showed the highest scores (mean 58.13 %).

Table 4 Mean score of social competence scale (teacher version): Thai version.

SCS Subtest	Full Score	Min. Score	Max. Score	Mean Score	Mean% Score	Std. Dev.
Pro-social/communication	32	6.00	30.00	18.60	58.13	6.25
Emotional regulation	40	6.00	36.00	20.57	51.43	9.23
Academic behavior	28	4.00	24.00	13.67	48.82	6.91

From Table 5, it can be seen that there was a correlation between each subtests of teacher version of SCS: Thai version and particular quadrants of PRPP System: Thai version. High correlation occurred between academic behavior skill subtest of SCS and perceive (r=0.87), recall (r=0.67), plan (r=0.82), and perform (r=0.71) quadrants. Pro-social/communication skill subtest of SCS showed no correlation with recall quadrant (r=0.03) and low correlation with perceive (r=0.15), plan (r=0.22) and perform (r=0.20) quadrants. Emotional regulation subtest of SCS showed no correlation with perceive (r=0.05) and recall (r =0.02) quadrants and low correlation with plan (r=0.21) and perform (r=0.27) quadrants.

Table 5 Pearson's moment product correlation subtests of SCS: Thai version and each quadrant of PRPP system: Thai version on academic task.

PRPP Quadrant	SCS Subtest	r value	Level of correlation
Perceive			
	Pro-social/communication	0.15	low
	Emotional regulation	0.05	no correlation
	Academic behavior	0.87	high
Recall			
	Pro-social/communication	0.03	no correlation
	Emotional regulation	0.02	no correlation
	Academic behavior	0.67	high
Plan			
	Pro-social/communication	0.22	low
	Emotional regulation	0.21	low
	Academic behavior	0.82	high
Perform			
	Pro-social/communication	0.20	low
	Emotional regulation	0.27	low
	Academic behavior	0.71	high

*Correlation is significant at the 0.05 level (2-tailed)

Discussion

The relationship between social competence (measured by SCS: Thai version) and information processing strategies application (measured by PRPP system: Thai version) occurred only in academic behavior skill subtest of SCS Thai version, with all quadrants of PRPP system: Thai version showing high correlation (r=0.67-0.87). On the other hand, areas of pro-social skills and emotional skills showed no correlation to low correlation with information processing strategies in the sample group (r=0.02-0.27). This study focused on information processing strategies application during academic tasks. Children with LD struggling with academic performance applied poor information processing strategies. While these students performed academic tasks, they could not work in response to commands, could not complete their work, and took a long time to complete it. These problems are consistent with the questionnaire of Academic behavior

skill subtest of SCS: Thai version which focuses on student's attention, initiation, performance, persistence, and efforts in learning. Therefore, these students need to use high level information processing strategies for success in classroom. Academic behavior skill shows high correlation with perceive quadrant because strategies for gathering sensory information from environment or perceive stage of PRPP system are the first stage in receiving information and correlate with learning problems. Attention is important for perception because of its effect on receiving information from teacher and environment in classroom. If children pay more attention to important information, they can learn to process information more efficiently. This result confirmed previous report suggesting a relationship between attention and academic achievement.[41-42] Some studies have shown that attention is an important predictor for academic achievement in children and adults.[41] Moreover, Jimmerson and colleague

found that attention problems contribute negatively to academic achievement and may impair academic competence.[42] Aside from attention, monitoring is one component in perceiving process related to academic performance[43] because it governs student's ability to evaluate their work and behavior in real time.[44] Scores of academic behavior skill were highly related to recall quadrant because strategies required for storage, extension, and retrieval of information or recall stage of PRPP system is a component of working memory skills. A short-term storage of information for current thinking appears to affect everyday classroom performance, especially the ability to focus on tasks and accomplishment. Impairment of working memory skills is a common feature found in a wide range of disorders and specific learning difficulties. Major signs of working memory impairment include poor academic progress, difficulties regarding complex instructions, and an inability to store large amount of information in the mind.[45] Some researchers suggested a link between working memory capacity and children's ability to acquire knowledge and new skills.[46] Children with low working memory capacity often commit 'place-keeping' errors; repeating or skipping words, letters, numbers, or whole steps of an assigned task. They may frequently abandon tasks altogether because of losing track of what they are doing.[47] For written expression skills, children with low working memory capacity might demonstrate problems in writing sentences. For instance, after finishing spelling the first few words, they forget what they intended to write. Similarly, they often experience problems in reading comprehension because they usually lose track of overall gist of the text. Many studies found that working memory capacity has a significant impact on learning in children with reading disabilities.[48] The findings corresponded with previous report that the scores on working memory tasks related to reading achievement[49] and school achievement[50] differ from typically developing children. Likewise, academic behavior skill shows high correlation with plan quadrant because the strategies for manipulating, applying, and evaluating information or plan stage of PRPP system are another important component of information processing strategies. Planning ability requires the child to prepare

multiple steps of action in advance, to evaluate those actions, and to change course, if necessary.[51] It is used during academic tasks in order to succeed in class work or to decrease negative behavior towards others.[52-53] A previous study found that planning ability predicts for academic performance in elementary school children.[54] Academic behavior skill show high correlation with perform quadrant because the strategies to monitor, regulate, and refine performance or perform stage of PRPP system allows children to control actions. After children interpret and internalize the information from teacher or environment, they respond accordingly. Inappropriate responses may be observed when children don't understand an instruction or comment. If the child has really tuned out, they might not react at all even when a response is required or expected from them. For these reasons, it is not surprising that the information processing strategies application affects academic behavior.

However, social competences in areas of pro-social skills and emotional skills showed no to low correlation with information processing strategies in the sample group. This finding is compatible with Miles and Stipek's research which found a weak correlation between social and academic skills in a sample of low-income children attending the third and fifth grades.[55] Additionally, Caprara and colleagues used a longitudinal design and structural equation modeling to test the relative impact of early pro-social and aggressive behaviors on children's academic achievement and social ties to their peers 5 years later.[56] The results showed that early aggression had no significant effect on later academic achievement. In addition, Clore studied the correlation between cognitive ability (measured by IQ test including Wechsler Intelligence; WISC-III or Slosson Intelligence Test®; SIT-R) and social competence (measured by social skill rating system; SSRS) in adolescents with learning disabilities.[57] Results indicated that cognitive ability and social skills were not related in these participants.

From these findings, it could be stated that there are many factors affecting social competence besides cognitive processes. In fact, Lavoie reported that there are both internal and external factors that affect social competence.[58] Self-awareness is considered to be an

important internal factor that influences the relationship with others.[59-60] External factors that affect social competence included friendships, family, peers, and teachers.[58]

Self-awareness is a part of positive self-identification; a factor affecting social competence. Children who have good self-awareness also have good emotional intelligence because self-awareness helps children to control their emotional ability, and also supports their relationship to others. It is the first step to become a self-advocate, and bring about positive outcomes necessary for later success in life. Preparation of individualized education program (IEP), a specific learning plan for each child and services, indicated that child should play a role in increasing self-esteem to children with disabilities. Besides creating IEP focus on their academic achievements, the program also aims to encourage children to learn positive behavior, emotional, and social skill for children. Students' strength is referenced in IEP goals by searching for each student talent, interests, passion, or expertise to promote students' self-esteem.[61] Recent study found that IEP can help identify areas of weakness, allows children to develop their own talents, and reduces risk of social and emotional problems in the future.[62,63] This finding is consistent with Merlone & Morain's research who observed IEP with fifth grade students.[64] After these students had received IEP, they felt positive about their learning strengths, and were empowered to take on new challenges as they advanced to middle school. Moreover, a lot of researches has shown that IEP can help children with LD to develop self-awareness of their learning styles, to identify their strengths, and can help the student develop and achieve personal goals.[65-67] which allows them to overcome negative self-attribution,[66] and make positive choices.[68] Teachers, friends, parents and school staffs play roles in preparation of IEP system to encourage children to participate in school activities and promote self-awareness for children. Teachers are crucial roles in providing information about students' strengths and weaknesses, special talents, or interests that are not always directly associated with academic achievements. Teacher supports accommodation and modification which helps children develop self-awareness,

and adjusts teaching to suit the educational needs of child.[69] Another researcher found that children with LD have better self-awareness because they can compensate with strengths in other areas than academic skills,[70] and that academic ability is not as important to children with LD compared to typically developing children.[71] These reports are also consistent with the study of Reis and colleagues which stated that children with LD in elementary and secondary school can learn their strengths to help them achieve success.[72] For example, some children have severe reading problems, but have excellent development of auditory memories that enables them to remember contents of books and passages, while some children with LD have a good ability in non-academic areas. On the other hand, if children have no support from their school to express their strengths and talents, they may not know about these talents because their high ability was obscured by learning disability. All of these are consistent with Chissom & Mcclean's report which stated that talents are unlimited and recognizing them can help children gain self-esteem.[73] Also, abilities that bring success for children with LD can also make them work harder in their own area of interests. It is also the best way to apply compensation strategies which reduces their disability.[74]

From the above-mentioned support, there is a possible explanation why scores of pro-social or communication skills and emotional regulation subtests of SCS showed no to low correlation with information processing strategies. This may be due to the fact that all samples in this study came from a school that equally supported children who have disabilities to participate in all kinds of school activities. Even though sample group in this study composed of different age and grade level, apart from IEP, everyone also has been under individualized instructional plan (IIP) that have been specifically designed and adapted to each particular student based on his or her talent.[75] IIP is used in planning and deciding the learning goals and alternative programs including activities that encourage a student to express his/her own talent and activities that can lead to the future career, such as making dessert, handcraft, and flower arrangement. As a result, each child is able to realize how to live his/her own life and gaining positive thinking

for the future. Additionally, there was no separation of samples from mainstream students in performing classroom activities. Children in the sample group performed all activities with their friends. They had opportunity to be both leaders and followers in activities. The system of teaching that is conducive to child's ability, as mentioned above, this corresponds to model of function, which is to focus on perspective of function, quality of life or participation in the mainstream environment, to the ability to perform specific, necessary activities. Concept of model stems from perspective of school professionals which state that effective school performance depend on a student's ability to perform a variety of functional tasks that enable child to participate in various learning activities of school day. These functional tasks are referred to nonacademic tasks.[76] Therefore, even the emotional, social, and environment development of children in each grade level were different, school teaching system encouraged children to participate in school activities, to express in order to gain their aware strength, pride, and increased self-awareness. As a result, emotional and social developments of children are improved equally at all levels, ages, and classes.

Although previous research of PRPP system reported a significant relationship between information processing abilities of children with LD and their proficiency in all areas of social performance,[26] there was differences recognized in social competence subtest and inclusion criteria of samples in this study. Wight and Chapparo's study used teacher skill-streaming checklist which includes 5 subtests: classroom survival skills, friendship-making skills, skills for dealing with feelings, skill alternatives to aggression, and skills for dealing with stress.[26] This study used social competence scale which includes 3 subtests for teacher version (pro-social/ communication, emotional regulation, and academic behavior). In addition, inclusion criteria of the samples in Wight and Chapparo's study considered social difficulties of children as indicated by their respective classroom teachers, whereas this study considered only learning disabilities condition.

Limitation of this study was that most of samples came from a school that supports children with disabilities. They were supported in expressing their special abilities in many ways. This makes children able to do school activities according to their abilities, makes them feel proud of themselves, aware of their strengths, and enhances self-esteem. Implication for future research requires children who are not supported by their respective schools, as this may show more social competence problems occurring in this sample group. Moreover, given the relationship found between information processing strategies application and academic behavior in the present study, there is a real possibility that the interventions aimed at improving children's ability of information processing strategies appli-cation, could eventually improve academic achievement.

Conclusion

The findings of this study showed the relationship between information processing strategies application (measured by PRPP system: Thai version) and social competence (measured by SCS: Thai version) occurring in all quadrants of PRPP system with academic behavior subtest of SCS, with high correlation. However, areas of pro-social skills and emotional skills showed no to low correlation with information processing strategies in the same sample group.

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