Comparison of IQ derived from Objective and Projective Human Figure Drawing

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Abstract

Intelligent testing for some groups of children is difficult because of their lacking of attention or trustworthy to the psychologist. Therefore, drawing for intelligence testing has been easily used since it is simple, unthreatening and interesting. Drawing test can be divided into intelligence and personality test. Although both tests are different based on theory and practice, they show the same pictures of human. Only one time for drawing human picture with projective technique can produce both personality signs and intelligence quotient (IQ) level. Thus, to learn some limitations or possibilities of applying projective drawing to assess children's intelligence, this study then aimed to compare IQ derived from objective and projective drawing test interpreted with the criteria of Draw A Person test for IQ by Jack A. Naglieri. Four hundred and thirty seven participants with 7-16 years of age were recruited from primary and secondary schools located in Meung district, Meung Amphur, Phitsanulok Province. All samples were divided by age into 10 age-ranged groups: 7-7 years and 11 months, 8-8 years and 11 months, 9-9 years and 11 months, 10-10 years and 11 months, 11-11 years and 11 months, 12-12 years and 11 months, 13-13 years and 11 months, 14-14 years and 11 months, 15-15 years and 11 months and greater than, or equal to 16 years. IQ derived from two techniques showed moderately correlation (r=0.60, p=0.00). In addition, the significant higher mean IQ scores obtained from projective drawing compared to objective drawing in group aged 13-13 years and 11 months (p=0.001) 15-15 years and 11 months (p=0.01) and greater than, or equal to 16 years (p=0.04) were found.

In conclusion, projective human figure drawing may have the possibility to be used for screening IQ in children. In practice, however, due to the significant different IQ found in older children group we recommended practitioners to assess - IQ from projective human drawing figure interpreted by Nagleiri's criteria should recognize the overestimation of interpreted IQ in this children group.

Keywords : Psychological test, intelligence test, projective test, Human figure drawing test, IQ

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Introduction

Psychological testing is considered as an important job for psychologists. However, psychologists often encounter with some problems involving lack of attention or trustworthiness from some groups of children such as ADHD or abused child, especially in intelligent testing (Valerie, 1994:2). If the data collected is not sufficient due to confusion, fear, lack of trust or lack of cooperation, then the other psychological tests should be used. Drawing test is a good choice for solving these

problems due to its easy to use, unthreatening and also interesting for children and could be used to screen children intelligence quotient (IQ) (Uthairattanakit, 1995). In psychological testing, drawing test can be divided into two techniques namely intelligence and personality test (Disayawanich, 2001). For intelligence testing, objective drawing is often used with limited time to test the highest capability while personality testing, a projective test, is now in common clinical use and it draws materials from basic psychoanalytic theories (Petot, 2000). In 1926, human figure drawing for IQ test developed by Florence Goodenough based on the developmental stages and drawing steps were the expressions of learning and training and the use of muscles. Thus, what is drawn can identify their thought toward things because young children draw what they know, not what they see, so their realism was said to be intellectual, not visual (Di Leo, 1973:27) while projective tests, are unstructured, elusive and indeterminate. The idea is that the respondents express themselves in symbols that represent something in their mind, using their imagination, and it is the task of the test administrators to interpret such symbolic representation based on their experiences and expertise (Valerie, 1994: 2). Although both techniques are different in theory based on and testing administration, both techniques produce similar human pictures. For this reason, only one time for projective human figure drawing may produce both personality and intelligence quotient (IQ) and will be useful for assessing children in limited time and also reduce repetitive testing. Therefore, to learn some limitations or possibilities of projective drawing to assess children's intelligence, this study then aimed to compare IQ derived from projective and objective drawing test interpreted with the criteria of Draw A Person: a quantitative scoring system (DAP: QSS) developed by Jack A. Naglieri that is an nonverbal intelligence test which has clear scoring system, high standard and reliability (Cosden, 1992 cited by Gregory, 1996). The results of this study may reveal underlying properties of projective drawing in evaluating both personalities and intelligence which would have benefits the work of psychologists in clinical setting or limited conditions.

Objective

To study the possibilities and limitations of applying projective drawing to assess children's intelligence by testing correlation and differences mean score between IQ derived from projective and objective human figure drawing

Definitions

1. Intelligence Quotient (IQ) is IQ score derived from objective and projective hu man figure drawing interpreted by criteria of Draw A Person: a quantitative scoring system (DAP:QSS) developed by Jack A. Naglieri. This kind of IQ based on general factors (Di Leo, 1973: 30) that is to assess the abilities of learning, memory, general problem solving including the abilities of notice, reasoning, abstract, sequential thinking and accuracy of learning.

2. Human figure drawing used in this study is human picture drawn by the following;

2.1 The objective human drawing is Draw A Person: A Quantitative Scoring System (DAP: QSS) developed by Jack A. Naglieri was used for this study. In 1988 Naglieri established DAP: QSS developed to use with children age 5 to 17years. This test also requires children to draw three pictures, but Naglieri developed a new scoring system that included one for the self drawing. The same 14 scoring criteria are used for all three drawings (man, woman, and self): the arms, attachment (of limbs), clothing, ears, eyes, feet, fingers, hair, head, legs, mouth, neck, nose, and trunk. Points are awarded for the presence, detail, and proportion of each body parts and a

bonus point is also awarded if all features for that body part are scored as correct. Accordingly, each of the three drawings can produce a maximum score of 64, yielding a maximum total raw score of 192. The age-based norms for the DAP: QSS were standardized on a sample of 2,622 children age from 5 to 17 years. The author would introduce the subjects to draw 3 human pictures namely male, female and oneself. The subject will receive an order to draw picture at his/her full ability for 5 minutes and complete the human whole body. The paper size used is 11 ½ x 8 ½ inches. In the DAP: QSS (Naglieri, 1988), children were given a pencil and an eraser and were asked to draw three pictures (a man, a woman, and oneself). Each picture was drawn on a separate piece of white construction paper, and a maximum of 5 minutes was allowed to complete each drawing. The scores from the three drawings were then summed up and converted into a standard score according to the guidelines set in the DAP: QSS manual (Naglieri, 1988).

2.2 The projective human drawing is freely drawing human figure based on psychoanalysis theory. It is similar to objective drawing that children were given a pencil and an eraser and were asked to draw three pictures (a man, a woman, and oneself). Each picture was drawn on a separate piece of white construction paper. Unlimited time use was allowed to complete each drawing. Children's drawings of a man, a woman, and oneself were coded using Nagleiri's criterion. It's note that if human picture is incomplete, complete human body will be required again.

Hypothesis

IQ scores derived from objective drawing will correlate with IQ derived from projective drawing.

Methods

Population and Samples

Four hundred and thirty seven students aged 7-16 years from 9 primary and 7 secondary schools in Meung district, Meung Amphur, Phitsanulok Province who can read and draw a picture were included in this study Exclusion Criteria:

(1) IQ below 65 measured by Progressive Matrices

(2) Human drawing that cannot be scored due to having lower score than criteria of DAP: QQS. The numbers of the sample group came from being determined size by using Taro Yamane table for 396 students and were also added more 41 sparing students. All participants were recruited by simple random sampling from 41,237 students in Meung district, Meung Amphur, Phitsanulok Province (OTBEC, 2009) with error accepted in randomization at 0.05 and reliability at 95%. Subjects were divided into 10 groups by Jack A. Nagleiri's criteria consisting of 7-7 years and 11 months, 8-8 years and11 months, 9-9 years and 11 months, 10-10 years and 11 months, 11-11 years and 11 months, 12-12 years and 11 months, 13-13 years and 11 months, 14-14 years and 11 months, 15-15 years and 11 months and greater than, or equal to 16 years.

Primary schools were randomized from 90 schools. Nine schools were selected. Two hundred and fifty three subjects were classified by age group consisting of 7-7 years and 11 months, 8-8 years and11 months, 9-9 years and 11 months, 10-10 years and 11 months, 11-11 years and 11 months, 12-12 years and 11 months (Table 1)

Table 1 : The number of primary school students classified by age group

age / school	7-7 years and 11 months	8-8 years and 11 months	9-9 years and 11 months	10-10 years and 11 months	11-11 years and 11 months	12-12 years and 11 months	Total
1	7	5	4	7	7	4	34
2	3	5	4	5	5	3	25
3	4	4	7	4	5	5	29
4	5	4	2	4	4	3	21
5	3	3	5	6	6	5	28
6	4	7	4	6	4	5	32
7	2	5	10	6	2	5	30
8	7	2	4	5	5	4	27
9	3	6	4	5	5	5	26
Total	**38**	**41**	**44**	**48**	**43**	**39**	**253**

For secondary schools, 7 schools were selected. One hundred and eighty four subjects were classified by age group consisting of 13-13 years and 11 months, 14-14 years and 11 months, 15-15 years and 11 months and greater than, or equal to 16 years. (Table 2)

Table 2 : The number of secondary school students classified by age group

age / schools	13-13 years and 11 months	14-14 years and 11 months	15-15 years and 11 months	≥16	Total
1	5	7	6	7	25
2	12	9	2	5	28
3	6	6	4	5	21
4	12	2	9	10	33
5	7	4	4	9	24
6	5	6	9	6	26
7	6	7	4	10	27
Total	**53**	**41**	**38**	**52**	**184**

Variables

Independent variable

Age of the subjects were classified into 6 groups for primary schools: 7-7 years and 11 months, 8-8 years and11 months, 9-9 years and 11 months, 10-10 years and 11 months, 11-11 years and 11 months, 12-12 years and 11 months and 4 classes for secondary schools: 13-13 years and 11 months, 14-14 years and 11 months, 15-15 years and 11 months and greater than, or equal to 16 years

Dependent variable

IQ derived from Objective and Projective Human figure Drawing

Tools

1. Handbook of DAP: Quantitative scoring system developed by Jack A. Naglieri

This test is used for the child ages 5 to 17 years and 11 months. The DAP requires the child to draw three pictures (man, woman, and oneself) on three separate pages of the Response Form. Allowing the child a maximum of 5 minutes for completion of each drawing. If the child finishes in less than 5 minutes, go on to the next drawing, The test can be administered in either a group or individual, The scoring system is devised to reduce the influence of current styles of dress, especially in area that might differentially influence the scores obtained from the man and woman drawing (Naglieri, 1998:2). The assessment of the intellectual ability is used by the total drawing score of 3 pictures and converts them into standard scores. From the literature reviews, the DAP is praised for its clear scoring system, strong reliability, and careful standardization (Cosden, 1992 cited by Gregory, 1996:245). The DAP scoring system is organized into three major components consist of criteria, categories, and items. Fourteen criteria in the child's drawing, Most of which are parts of the body, that are scored on a number of specific characteristics of the drawing, or items. These items generally are in four types or categories: Presence, Detail, Proportion, and Bonus. The 14 criteria include 12 parts of the body such as arms, ears, eyes, feet and so on and 2 criteria are placement of certain body parts in relation to each other and clothing. Within these criteria, items are organized into four categories as follows;

1) Presence: Thirteen of the criteria are scored for Presence. A point is given if the drawing includes a particular body part or a piece of clothing.

2) Detail: Twelve criteria are scored for at least one detail. Credit is earned if the child includes specified details in the drawing of the particular body part or a piece of clothing. The detail score is intended to credit the elaboration of the criterion beyond a simple representation.

3) Proportion: Ten criteria are scored for proportion. This category is intended to credit relatively realistic productions of the body parts. For example, credit is given for the item Trunk Proportion 1 if the trunk is longer than its wide.

4) Bonus: For each of the 14 criteria, additional credit is given if all items for that criterion are scored as correct. For example, in order to give credit for Arms Bonus, the previous items must all be scored as correct.

For scoring, maximum total scores are 64. The assessment of the intellectual ability uses the total drawing scores of 3 pictures and converts them into standard scores or level of intellectual by using the table of normal range of DAP test.

Naglieri studied about internal consistency of the DAP test by Cronbach alpha Coefficient with 14 criteria found a high level of reliability from the man woman, and oneself, and the total scores of 0.83-0.86, which was 0.86 of mean and a study on statistical properties of DAP test. Internal consistency coefficient was 0.56-0.78 and test-retest reliability was 0.60-0.89. Moreover, when compared inter-rater reliability with Goodenough-Harris by the 2 testers. High level of correlation was found at 0.93-0.95 which is good (Naglieri, 1988).

2. The Colored Progressive Matrices (CPM) and the Standard Progressive Matrices (SPM) developed by JC Raven in 1936, are nonverbal group test typically used in educational settings. It is the most common and popular test administered to the groups ranging from 5-year-olds to the elderly. It is made of 36 multiple choice questions for the Colored Progressive Matrices used with primary school students (Raven, 1995) and 60 items for the Standard Progressive Matrices used with secondary school students, it is listed in order of difficulty. This format is designed to measure the test takers reasoning ability or, component of Spearman's g, which is often referred to as general intelligence. (Raven, 1995)

3. Paper sized 8 ½ x 11 ½ inches for human figure drawing and an answer sheet for Progressive Matrices test

4. Pencil, eraser and stopwatch

Collecting data

Data was collected during December, 2010 - January, 2011.

1. Firstly, to screen and learn about IQ of the subjects, all subjects were tested by CPM for primary school students and SPM for secondary school students.

2. Secondly, objective drawing was drawn first following this instruction: draw a man, draw a woman and yourself, please draw a picture with full ability if time is up, drawing have to stop immediately.

3. Next to 1-2 weeks, projective drawing was drawn following this instruction: draw a man, a woman and yourself. You can draw a person freely upon your satisfaction.

4. All data were analyzed to compare statistical correlation and difference.

Data analysis

All data were presented by percent, mean, and standard deviation. The correlation between IQ scores from projective and objective drawing were done by Pearson Product Moment Correlation Coefficient. The difference between IQ scores from projective and objective drawing were done by student t-test. P value<0.05 was used to be statistical significant for this study.

Results

Demographic data showed the number of subjects with percent of subject classified by age groups (Table 3). Initially, we analyzed the correlation between IQ from projective drawing and Progressive Matrices and found correlation in group aged 7-7 years and 11 months (r=0.31, p=0.02), 9-911 (r=0.34, p-0.02) and 11-11 years and 11 months (r=0.46, p=0.00) (Table 4). We analyzed the correlation between IQ scores from the 2 techniques and found positive moderate correlation in every age groups except group age greater than, or equal to 16 years (r=0.39, p=0.00), however, the correlation of average IQ scores in all groups between 2 techniques showed significantly moderate correlation (r=0.63, p=0.00) (Table 5). The difference between IQ scores form the 2 techniques was analyzed by student t-test and found significant differences in group age 10-10 years and 11 months (t=2.11, p=0.39), especially IQ scores derived from projective drawing in group age 13-16 years showed significantly higher IQ scores than IQ scores derived from objective drawing: 13-1311(t=-3.74, p=0.00), 15-1511(t=-2.63, p=0.01) and greater than, or equal to 16 years (t=-2.06, p=0.04). When compared the different of average IQ scores in all groups, there was a significant difference (t=-2.59, p=0.01) (Table 6). Time used in projective drawing and IQ scores derived from projective drawing were found no correlation in all age groups. There was no correlation between average time used and IQ scores (r=-0.05, p=0.3) of all groups. (Table 7)

Table 3 : The number of subjects classified by education levels, genders and age group (n=437)

	Genders			Genders (%)		
	male	female	Total	Male	Female	Total
primary schools						
7-7 years and 11 months	12	26	38	2.75	5.95	8.70
8-8 years and 11 months	12	29	41	2.75	6.64	9.39
9-9 years and 11 months	23	21	44	5.26	4.80	10.06
10- years and 11 months	12	36	48	2.75	8.24	10.99
11- years and 11 months	23	20	43	5.26	4.58	9.84
12-12 years and 11 months	20	19	39	4.58	4.35	8.93
Total	102	151	253	23.35	34.56	57.91
Secondary schools						
13-13 years and 11 months	18	35	53	4.12	8.00	12.12
14-14 years and 11 months	22	19	41	5.04	4.35	9.39
15-15 years and 11 months	14	24	38	3.20	5.49	8.69
≥ 16	18	34	52	4.11	7.78	11.89
Total	72	112	184	16.47	25.62	42.09
Total	**174**	**263**	**437**	**39.82**	**60.18**	**100**

This table shows that the subjects were from primary and secondary schools aged between 7-16 years, there were 174 males (39.82%) and 263 females (60.18%). There were 253 subjects from primary schools (57.91%), and 184 subjects from secondary schools (42.09%)

Table 4 : The correlation between IQ scores from projective drawing test and IQ scores from progressive matrices test

	IQ scores from projective drawing test			IQ scores from progressive matrices test			
Age Ranged	Mean	SD		Mean	SD	r	sig.
7-7 years and 11 months	111.6	12.00		97.47	10.93	0.31	0.02*
8-8 years and 11 months	107.46	10.04		97.65	12.31	0.00	0.98
9-9 years and 11 months	102.97	9.20		100.05	11.09	0.34	0.02*
10-10 years and 11 months	97.25	11.12		104.97	9.60	0.05	0.69
11-11 years and 11 months	97.02	9.70		107.51	7.69	0.46	0.00**
12-12 years and 11 months	99.02	10.13		109.00	5.05	0.05	0.74
13-13 years and 11 months	100.98	10.93		108.03	7.35	0.88	0.53
14-14 years and 11 months	99.21	9.47		110.58	7.47	0.08	0.60
15-15 years and 11 months	103.78	9.26		109.34	8.76	0.32	0.33
≥ 16	99.59	9.22		107.71	5.11	0.05	0.69
Total	**101.59**	**10.94**		**105.38**	**9.81**	**- 0.11**	**0.28**

*p<0.05, **p<0.01

This table shows correlation between IQ scores from projective drawing and IQ scores from progressive matrices in 3 group aged below 11-11 years 11 months. IQ from projective drawing is higher than objective drawing in group age over 10 years.

Table 5 : The correlation between IQ scores from Objective and projective drawing tests

	IQ scores from objective drawing test		IQ scores from projective Drawing test			
Age Ranged	Mean	SD	Mean	SD	r	sig.
7-7 years and 11 months	109.84	12.87	111.6	12.00	0.67	0.00**
8-8 years and 11 months	108.34	11.06	107.46	10.04	0.71	0.00**
9-9 years and 11 months	101.56	12.57	102.97	9.20	0.77	0.00**
10-10 years and 11 months	100.41	13.24	97.25	11.12	0.65	0.00**
11-11 years and 11 months	97.95	12.28	97.02	9.70	0.47	0.00**
12-12 years and 11 months	99.43	13.51	99.02	10.13	0.61	0.00**
13-13 years and 11 months	94.64	15.33	100.98	10.93	0.60	0.00**
14-14 years and 11 months	97.46	12.38	99.21	9.47	0.59	0.00**
15-15 years and 11 months	99.34	11.51	103.78	9.26	0.51	0.01*
≥16	96.53	10.12	99.59	9.22	0.39	0.04*
Total	**100.28**	**13.18**	**101.59**	**10.94**	**0.63**	**0.00****

* p<0.05,**p<0.01

This table shows IQ scores from object drawing were moderately correlated with IQ scores derived from projective drawing, however, it was gradually decreased when subjects were older.

Table 6 : The difference between IQ scores from objective and projective drawing tests

	IQ scores from objective drawing test		IQ scores from projective drawing test			
Age Ranged	Mean	SD	Mean	SD	t	sig.
7-7 years and 11 months	109.84	12.87	111.60	12.00	-1.07	0.28
8-8 years and 11 months	108.34	11.06	107.46	10.04	0.70	0.48
9-9 years and 11 months	101.56	12.57	102.97	9.20	-1.16	0.24
10-10 years and 11 months	100.41	13.24	97.25	11.12	2.11	0.03*
11-11 years and 11 months	97.95	12.28	97.02	9.70	0.53	0.59
12-12 years and 11 months	99.43	13.51	99.02	10.13	0.23	0.81
13-13 years and 11 months	94.64	15.33	100.98	10.93	-3.74	0.00**
14-14 years and 11 months	97.46	12.38	99.21	9.47	-0.38	0.75
15-15 years and 11 months	99.34	11.51	103.78	9.26	-2.63	0.01**
≥16	96.53	10.12	99.59	9.22	-2.06	0.04*
Total	**100.28**	**13.18**	**101.59**	**10.94**	**-2.59**	**0.01****

* p<0.05,**p<0.01

This table shows significant difference between IQ scores derived from objective and projective drawing tests in group aged >10 years. Moreover, IQ scores derived from projective drawing test is significantly higher than IQ scores derived from objective drawing test in group aged >13 years.

Table 7 : The correlation between time used and IQ scores from projective drawing test

	IQ scores from projective drawing test		Time					
Age Ranged	Mean	SD	Min (Sec)	Max (Min)	Mean (Min)	SD	r	sig.
7-7 years and 11 months	111.6	12.00	.25	14.15	2.21	1.75	-0.03	0.85
8-8 years and 11 months	107.46	10.04	.41	7.17	2.38	1.15	-0.12	0.43
9-9 years and 11 months	102.97	9.20	.25	10.34	3.11	1.16	-0.01	0.99
10-10 years and 11 months	97.25	11.12	.16	10.11	2.76	1.97	-0.1	0.48
11-11 years and 11 months	97.02	9.70	.25	15.30	2.95	2.16	-0.03	0.83
12-12 years and 11 months	99.02	10.13	.21	17.16	3.37	2.79	-0.15	0.43
13-13 years and 11 months	100.98	10.93	.48	10.58	3.87	2.24	0.07	0.56
14-14 years and 11 months	99.21	9.47	1.08	19.00	4.41	3.13	0.16	0.28
15-15 years and 11 months	103.78	9.26	.54	25.20	4.21	4.11	0.29	0.07
≥16	99.59	9.22	.35	14.40	3.64	1.97	0.06	0.59
Total	**101.59**	**10.94**	**.39**	**14.34**	**3.29**	**2.24**	**-0.05**	**0.3**

* p<0.05,**p<0.01

This table shows no correlation between time used and IQ scores derived from projective drawing test in every age group. Minimum time used was 16 seconds while maximum time used was 25.2 minutes

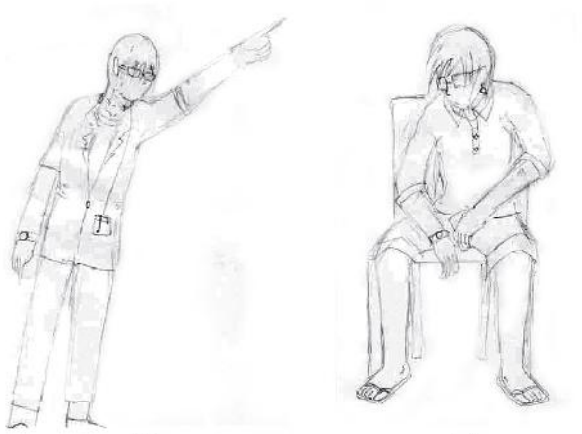

Figure I Sample pictures showed almost equal raw score of 2 projective human figure drawing with different time used drawn by a 15 years old student (a) drawn in 5.03 minutes; raw score = 45 (b) drawn in 10.21 minutes; raw score = 43.

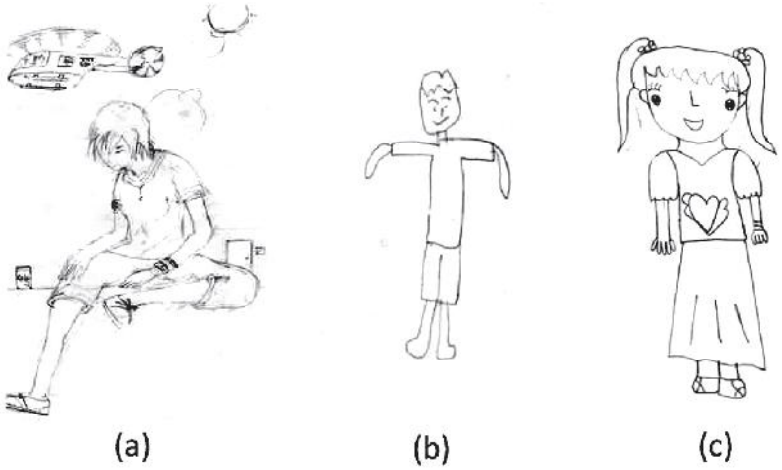

Figure II showed 3 pictures of human figure drawing that were different in details (a) drawn by 15 years old student showing creative thinking (b) drawn by 7 years old student showing easy drawing and (c) drawn by 10 years old student showing human picture with more details.

Discussion

Like previous studies, initially, we tested correlation between IQ scores from projective drawing test interpreted by Nagleiri's criterion and IQ scores from progressive matrices test developed by JC. Raven. It was found that there were correlation in group aged below 12 years (CPM used for this age group). The result of this study showed correlation in group aged 7-7 years and 11 months, 9-9 years and 11 months and 11-11 years and 11 months years that were primary school students. Although there was no correlation among every group of primary school students, it showed consistence with other works that studied correlation between IQ scores from drawing test and intelligence standardized test. For examples, Sangthongluan (2003) found correlation ($p<0.01$) between IQ scores from DAP: QSS developed by Naglieri and IQ scores from the coloured progressive matrices (CPM) in students age 6-11years. Besides, work of Prasertsri (1992) studied correlation in 60 Thai students age 8- 8 years and 6 months found significant correlation between DAP and Wechsler Intelligence Scale for Children (WISC) (Prasertsri, 1992). While recent work that studied correlation between DAP: QSS with short forms of the Wechsler Intelligence Scales in 125 children aged between 5 to 6 years old had also found modest correlation (Emma, 2011). For this study, the result showed IQ scores from drawing would be higher than IQ scores from CPM for group age 7-9 years and 11 months but it would be opposite to the groups aged over 10 years (Table 4). Our finding can be explained by cognitive development theory, that formal operation stage in children aged more 10 years involved their ability to think creatively, understanding abstract and reason from concrete visible events (McLeod, 2000). Children in this stage will extremely increase ability to deal with CPM more. It is opposite to drawing ability when children age 11 years, they will decrease their interest in drawing (Harris, 1963).

For IQ scores derived from the 2 drawing techniques, showed positive moderate correlation and indifference in secondary school student groups, however, this correlation showed decreasing trend in older children group (Table 5). When consider the difference between IQ scores derived from the 2 techniques, there was no different in 7- 9 years old group but the significant difference was found in group aged over 10 years especially 13-16 years, IQ scores derived from projective drawing test showed significantly higher IQ scores than objective drawing test (Table 6). Subjects used average time per picture = 3.29+2.29 minutes. Minimum time was 16 seconds and maximum time was 25.20 minutes. Male, female and self drawing showed positive correlation with time used (Table 7). However, although subjects in older group used more time than younger group, time used was not show impact to IQ scores derived from projective drawing test (Figure I).

These results showed that projective drawing test interpreted by Nagleiri's criteria could be used to assess IQ level in younger children more suitable than older children (more than 10 years). The correlation between IQ scores derived from both techniques from this study was consistent with previous study used Goodenough-Harris Draw A Man test, which unlimited time used and also similar to instruction, compared with drawing measured by DAP: QSS that found high correlation between the 2 techniques from testing 2 times ($r=.75$-$.84$ and $r=0.87$) (Uthairattanakit, 1995). From these studies, although both techniques were different in instruction, the results from drawing by primary school students revealed moderate correlation and indifference in IQ scores. It can be explained that intellectual function of children in this age is still not complicated (Piaget, 1973) and children are still interested in drawing. Although they will begin to have imagination, their drawing are still visual realism which drawing is results from seeing things and not various. They will draw easy

picture having just main structure and less detail (Lowenfeld, 1957: 33-39) (Figure II (b)). Derived IQ scores in primary school students, thus, would not different. Conversely, IQ scores derived from projective drawing drawn by secondary schools students that was significantly higher than IQ scores from objective drawing. (Table 6) It may be because age approximately 12 years old is considered as critical period for drawing in children that begin to reduce interest in drawing, children who are success in drawing would be still interested in drawing continually opposite to children who fail in drawing would decrease in drawing interest (Harris, 1963). Therefore, we will see that IQ scores derived from drawing in secondary school students were lower than IQ scores from primary school students. (Table 5) For IQ scores from projective drawing test that was different higher than IQ scores from objective drawing test in this age may come from developing increasingly of creative thinking in teenagers and projective drawing test, that is free association technique, gives more opportunity to teenagers to express underlying details such as hair, clothes or any accessories that have an effect on increased scores with Nagleiri's criteria (Figure I (a)). For difference of time used in projective drawing test, although projective technique allows drawer to draw in unlimited time , we did not found correlation between increased score and time used (Table 7). From our inspection, it was found that some subjects used less time but they had higher score which may result from habituation and ability in drawing that each subject would have difference to one another (Figure I).

Another interesting point is the study on drawing and cognitive function or brain imaging showing the relation between drawing and changes of various brain area, for examples, at the cognitive level, drawing from memory may implicate a number of processes, including the access to and integrity of semantic memory, visuospatial abilities, the planning and construction of two-dimensional structures, the control of mental images generation, and the link of intention and action (Anna R., 2011). Furthermore, many studies showed that each drawing such as naturalistic and sketched portrait (Schaer, Jahn, & Lotze), or drawing cartoon' face, showed different brain areas activated (Willcock, Imuta, & Hayne, 2011) (Miall, Gowen, & Tchalenko, 2009). With this reason, it is possible that IQ scores which are different between objective and projective technique in older group may result from functioning of different brain areas while children are drawing.

There are some issues that should be discussed because it may have effect on scoring, namely scoring system of Naglieri that is main criteria used in this study. Although many studies showed positive correlation between DAP: QSS with other drawing techniques or standardize intelligence test, however, some studies showed correlation in some age groups and some studies showed just low correlation. It was found from Willcock's study that conducted with an unselected group of children from normal classrooms. It was found that DAP: QSS failed to identify a large number of children with intellectual difficulties and falsely identified children with normal (and superior) intellectual functioning as having difficulties. On the basis of these findings, the author concluded that the DAP: QSS did not provide a valid measure of intellectual functioning and should not be used as a screening measure in clinical or educational contexts (Willcock, Imuta, & Hayne, 2011).

Conclusion

From this study IQ scores derived from projective human figure drawing showed clear positive correlation with IQ scores derived from objective drawing and it was found that time used for drawing has not impact to IQ scores derived from projective drawing. Furthermore, the results

of this study revealed that IQ scores derived from projective drawing would be significantly higher than IQ scores derived from objective drawing in children group aged between 13-16 years. Thus, it is possible to use projective drawing test to assess IQ level in primary school children more than secondary school children. In practice, thus, if examiners want to roughly assess IQ scores derived from projective drawing interpreted by Nagleiri's a criterion should recognize about interpreting IQ level in older children to protect overestimation which may have impact to accuracy of evaluated IQ level.

Suggestions

We recommend for further study on finding correlation between IQ scores derived from projective drawing test with other standard objective drawing tests which would help to confirm the possibilities of using projective drawing test as a screening tool for some groups of children which would facilitate the psychologists's who work in limited conditions. In addition, because IQ scores derived from both techniques are external behaviors, so studying the internal behaviors such as changes that involved brain area are important issues to develop clinical work or disclose the secret of the relation between brain and mechanism of mind such as unconscious mind of psychoanalysis theory which will help increase more understanding and acceptance in scientific viewing. Recent advanced studies in the development of brain imaging techniques like the brain activity in the electroencephalogram (EEG), the measurement of regional cerebral blood flow (rCBF) via positron emission tomography (PET), or functional magnetic resonance imaging (fMRI) techniques allow us to look at the brain functions (Trojano, Grossi, & Flash, 2009). Therefore, it will be benefits more understanding about the internal world and the origin of subjects' intelligence who are drawing under free association or concentration state.

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