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Relation between Language Development, Cognitive Skills and Play Skills

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Abstract

Background: Play is very important as it helps cognitive, language, social, emotional and physical development. The value of play is increasingly recognized by researchers for children as the evidence mounts of its relationship with intellectual achievement, language development and emotional wellbeing.

Aim of Study: To assess play skills in a group of children having cognitive delay (mild and moderate cognitive delay with or without Down's syndrome) and to study the correlation between play level, language skills and cognitive skills in these children.

Subjects and Methods: 75 Egyptian preschool children aged between 2 and 5 years were divided into 3 groups; group of normal children, group of children with Cognitive Delay (CD) and group of Down Syndrome's (DS). They were subjected to the protocol of Arabic language assessment and a play observation checklist designed in this study. The checklist covered the following items; level of play, behavior of the child during play, receptive skills & language use during play, child interaction with peers & with adults as well as problem solving during play.

Results: Normal children under study had higher play skills and language skills than children with CD & DS children. Cognitive level of children with CD and DS was correlated positively with some aspects of their play skills such as language use during play in CD and problem solving, receptive skills and language use during play in DS children. Total Language score was highly correlated with all play aspects in CD and most of play aspects in DS children.

Conclusion: Cognitive level, development of play skills and language abilities were interrelated in groups under study (CD and DS).

Key Words: *Play level – Language abilities – Cognitive skills – Cognitive delay – Down's syndrome.*

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Introduction

PLAY is our window on the world. Through it, the infant learns about objects and how to manipulate them. The young child communicates and cooperates with others to manage risks, to solve problems and expand creative imagination. All the time, play is the key to physical fitness and emotional well being [1].

Play is an area for developing language and communication. Play is demanding for children because they have to pay attention to each other's words and actions. They have to concentrate on their own use of language in order to communicate clearly [2].

Play is also essential to young children's education and should not be abruptly minimized and segregated from learning. Play not only helps children develop pre-literacy skills, problem solving skills and concentration, but it also generates social learning experiences, and helps children to express possible stresses and problems [3].

Peter [3] classified play into the following types according to social participation: Unoccupied play (birth to 3 months) in which children seem to be making random movements with no clear purpose, solitary play (3 months-18 months) in which children are very busy with play and they may not seem to notice other children sitting or playing nearby, Onlooker play (12 months to 24 months) where the child watches other children play. Children are learning how to relate to others and learning language, Parallel play (18 months to 24 months) where children begin to play alongside other children without any interaction, associative play (3-4 years) in which children become more interested in other children than the toys. The child

has started to socialize with other children, Cooperative play (age of 5) where play is organized by group goals. When children move from a self-centered world to an understanding of the importance of social contracts and rules.

Play is classified according to developmental levels into the following stages; Sensorimotor-Exploratory play (emerging 2-4 months). It is the physical manipulation and inspection of objects, such as grasping, holding, mouthing by infants. This is the attempt of an infant to assimilate the objects into his or her existing cognitive structures [4]. Relational-Nonfunctional play (emerging 6-10 months). The child is actively engaging and acting on more than a single object at a time [5]. Functional-Conventional play (emerging 10-12 months). Children begin using objects in play in manners consistent with these objects' social-conventional typical uses. This level of play is one in which the child defines objects by their use through ritualized-conventionalized schemes and through recognition of objects [5].

The previous types are followed by; symbolic play that possess aspects of decontexualization, decentration and symbolization [5]. Socio-dramatic play (3-5 years), children represent their growing understanding of the world through their body language, spontaneous oral language, and vivid imagination. Socio-dramatic play relates strongly to children's cognitive and social abilities [6]. Constructive play, in this type of play, children create things. Constructive play starts with the baby putting things in his/her mouth to see how they feel and taste. As a toddler, children begin building with blocks, playing in sand, and drawing [3]. Pretend play: It is the use of imagination and role play [7]. Games with rules: In which there is accepted predetermined rules to play games such as rummy or jacks [8].

The relationship of play especially social interactive play to cognitive development has been a research of interest among educations and psychologists [9]. The associations between play and advanced language skills or larger vocabularies are largely co relational [10]. Also play was hypothesized to be strongly related to mental representation ability "theory of the mind", which is the way in which an individual envisions the mental activity of another [11].

Children with cognitive delay also engage in play, their engagement is slower than the normal children due to the language and communication difficulties they face [12]. In Down's syndrome children, play is considered one of the most significant cognitive developments in early childhood and is the precursor of representational thought and language [13].

A child with cognitive delay could have a short attention span, lacks imagination and initiative skills. He may prefer to play with children with his mental age in order to feel secure, understood and accepted [14]. In this study, the concern was raised in investigating play-cognition relationship and their effects on language maturation especially in cognitive delayed children and children with Down's syndrome.

Due to the fact that play gives children an opportunity to engage their emerging cognitive and language abilities, it can be used as a context to deliver interventions to children who are struggling with these areas [15].

Objectives:

The aim of this study was to assess play skills in a group of children having cognitive delay (mild and moderate cognitive delay with or without Down's syndrome) and to study the correlation between play level, language skills and cognitive skills in these children.

Subjects and Methods

Subjects:

This study was conducted in the outpatient clinic of Phoniatrics Unit and Unit of Genetics, at Cairo University Hospital in the period from June 2015 to March 2016. Control group was taken from nursery in greater Cairo area after taking approval of the parents. The purpose of the study was explained to parents of all subjects under study before assessment was performed. The sample of this study included 75 Egyptian Arabic speaking children from the same socioeconomic status, aged from 2 to 5 years. This sample was equally divided into 3 groups. Each group included 25 children. Group A: Normal children acting as control (13 females & 12 males). Group B: Children with mild and moderate cognitive delay (10 males & 15 females). Group C: Down's syndrome children with mild and moderate cognitive delay (13 females & 12 males). The three groups were age and sex matched. The exclusion criteria for the study group were: Hearing impairment, neurological disorders, psychiatric disorders, autism spectrum disorders and physical disabilities.

Method:

Parent interview, history taking and examination were done for all children under study. All children were subjected to general examination, vocal tract examination and neurological examination and no abnormal findings have been found. Stanford Binet intelligence scale fourth edition **[16]** applied to both group B & C. The control group (group A) was selected from those reported to be of normal intelligence with no history of language delay and were subjectively evaluated by the assessor.

Language Evaluation: Language skills of children under study were evaluated using the revised Arabic Language Test (A.L.T.) **[17]**. A.L.T includes items that assess semantic age, receptive language age, expressive language age, pragmatic age, prosodic age and then the total Language Age (LA) were calculated from the total calculation of the previous items for every child.

Play observation checklist (Appendix I): The checklist was specifically designed in order to assess play skills in children under study and to be able to study the correlation between play, language skills and cognitive level in both normal children and children with cognitive delay.

Play observation checklist design:

This checklist was filled in by the assessor via informal observation during semi structured settings. The checklist was composed of the following components:

A- Level of play: It included 7 items; sensorimotor, relational non functional, functional conventional, symbolic, constructive, socio dramatic and games with rules.

The play level skill was given score on a scale 1 to 7 graded from score of 1 for sensori-motor level to score of 7 for games with rules level.

B- Receptive skills during play: It included 2 main items; following commands (multi sequential instructions) including one item up to four items and selection from a set of 3 objects by function and by feature.

In following commands, the child was given score on a scale 1 to 4 depending on number of items included in the commands that he/she could follow (regardless the order of presentation) graded from score 1 for following commands including one item to score 4 for following commands including four items.

In selection by function, a set of 3 common objects for children in this age group was used (spoon, cup and pen). (e.g. give me the thing/object we drink with). In selection by feature, a set of 3 common animal toys for children in this age group was used (monkey, elephant and giraffe). It assesses the child's ability to select one or two animal toys out of the three according to their feature. (e.g. give me the animal with long tail).

The child's ability to select by function or by feature was given score on a scale zero to 2 depending on the number of objects he/she could select in a set of 3 objects graded from a score 0 for inability to select to score 2 for his/her ability to select 2 correct toys out of 3 by giving him/her their function or features regardless the order of presentation.

Total score of the child's receptive skills was (8) which is the summation of scores in the previous three components (following commands and selection from a set of 3 objects by function/feature).

C- Language use during play (verbal-non verbal):
It included the following 4 main items:

1- Vocal play: Observing the child's ability to connect sounds (vowels and/ or consonants) in the form of: Jargon (using unintelligible speech), echoing (repeating what the assessor said) or Nursery rhymes.

The child's vocal play was given score on a scale of 1 to 3 depending on type of vocal play the child produced graded from score 1 for jargon to score 3 for his ability to produce nursery rhymes.

2- Vocal imitation: Observing the child's ability to vocally imitate what the assessor said in the form of: Sounds, words and/or sentences.

The child's vocal imitation was given score on a scale of 1 to 3 graded from score 1 for his ability to vocally imitate sounds to score 3 for his ability to vocally imitate sentences.

3- Method of communication: Observing the child's ability to communicate with the assessor during the assessment either in the form of; guiding, pointing & gestures, simple verbal words or extended verbal output.

The child's communication was given score on a scale of 1 to 5 depending on method of communication used during play graded from a score 1 for communication through guiding to score 5 for communication through narration.

4- Verbalization about the play scenario: Observing the child's ability to verbalize about the play scenario either in the form of; using words to describe substitute objects as in (I am washing the

baby) or using words to describe imaginary objects and action as in (I am painting the house).

The child's verbalization was given score on a scale of 0 to 2 depending on the form of verbalization about play scenario he/she used graded from score 0 for not using pretend words during play to score 2 for using words to describe imaginary objects.

Total score of the child's language use during play was (13) which is the summation of scores in the previous four components (vocal play, vocal imitation, method of communication and verbalization about play scenario).

D- *Pragmatics during play:* Observing the following pragmatic parameters produced by the child during play setting.

Greetings (arrive/leave): The child was given score on a scale of 1 to 4 according to the way he/she expresses greetings graded from score 1 for his/her inability to express greetings either by facial expression or actions, score 2 for his/her ability to express greetings by only facial expressions such as smiling and making a sound in greetings, score of 3 for his/her ability to express greetings by an action such as holding up arms in greetings and score 4 for his/her ability to express greetings verbally such as saying greetings words. Total score of child's greetings during play was 4.

The child's ability to maintain eye contact was given score on a scale of 0 to 2 graded from score 0 for inability to maintain eye contact, score 1 for his/her ability to maintain eye contact for short time and score 2 for his/her ability to maintain eye contact for reasonable time.

Joint attention: Observing the child's ability to coordinate attention between a referent of communication and the communication partner. The child was given score of 0 for his/her inability to do joint attention and score 1 for his/her ability to do joint attention. Total score of the child's eye contact during play was (3) which is the summation of scores in the previous two parameters (eye contact and joint attention).

Turn taking: The child was given score of 0 when he couldn't take a turn during play and score of 1 when he could take a turn during play.

Emotions (pleasure/upset): The child was given score of a scale 1 to 4 according to the way he/she could express his/her emotions during play graded from score 1 for his/her inability to express emotions by either facial expression or action, score of 2 for his/her ability to express emotions by only facial expression such as smiling and sad face, score of 3 for his/her ability to express emotions by an action such as clapping hands and nodding of his/her head, score of 4 for his/her ability to express emotions verbally. Total score of child's emotions during play was 4.

Total score of the child's pragmatics during play was (12) which is the summation of scores in the previous four components (eye contact, turn taking, emotions and greetings).

E- *Social interaction & behavior during play:* Observing the child's ability to socially interact with peers, adults and his/her behavior during play setting.

Interaction with peers during play: The child was given score on a scale of 1 to 5 according to way of social interaction with peers during play graded from score 1 for spectator social interaction, score 2 for parallel social interaction, score 3 for associative social interaction and score 4 for cooperative social interaction and score 5 for rule play social interaction. Total score of interaction with peers during play was 5.

Interaction with adults during play: The child was given score on a scale of 0 to 2 according to way of social interaction with adults during play graded from score 0 for his/her avoidance of adults, score 1 for his/her ability to interact with prompts and score 2 for his/her ability to interact with ease and without prompt. Total score of interaction with adults during play was 2.

Behavior during play: Observing the child's behavior during play setting and it included the following 7 items:

- The child was given a score of 1 when he/she was cooperative and compliant by easy accommodation and helping others during play and a score of 0 when he/she was in cooperative and not compliant.
- The child was given a score of 1 when he/she was attentive during play by being alert to everything he/she watched during play and a score of 0 when he/she was not attentive.
- The child was given a score of 1 when his/her activity level was within normal in comparison to peers at his/her age and a score of 0 he/she wasn't within normal activity level in comparison to peers at his/her age.
- The child was given a score of 1 when his/her response latency was within the normal range

during assessment (about 30sec) and a score of 0 when he/she wasn't within the normal range during assessment.

- The child was given a score of 1 when he/she could initiate behavior as starting to build house with blocks and a score of 0 when he/she couldn't initiate behavior.
- The child was given a score of 1 when he/she showed spontaneous imitation without modeling during assessment and a score of 0 when he/she didn't show spontaneous imitation without modeling during assessment.
- The child was given a score of 1 when he/she showed good learning potentials during the assessment and a score of 0 when he/she didn't show good learning potentials during the assessment.

Total score of behavior during play was 7 (1 for each item).

Total score of the child's social interaction and behavior during play was (14) which is the summation of scores in the previous three components (interaction with peers, interaction with adults and behavior during play).

F- *Problem solving during play:* Observing the ability of the child to find solutions to the problem he faced during play. It included the following 3 items:

1- Way of solving: The child was given score on a scale of 1 to 4 according to his/her way of problem solving graded from score 1 for solving problem by force, score 2 for need of assistance to solve problem, score 3 for imitation of action produced previously by the assessor and score 4 for initiation of solving problem either by performing an action or giving solution verbally. Total score of way of solving during play was 4.

2- Performing related sequential actions during play: The child was given score 1 when he/she could perform related sequential actions during assessment (e.g. washing, dressing then feeding the baby) and score 0 when he/she couldn't perform related sequential actions during assessment.

3- Understanding cause and effect: The child was given score 1 when he/she showed understanding of cause and effect during assessment (e.g. putting bigger blocks at the bottom for support) and score 0 when he/she didn't show understanding of cause and effect during assessment.

Total score of the child's problem solving ability during play was 6 which is the summation of scores in the previous three components (way of solving, doing sequence and understanding cause and effect).

Total score of all child's play measures was (60) which is the summation of scores in the previous seven components (level of play, receptive skills during play, language use during play, pragmatics during play, social interaction and behavior during play and problem solving during play).

A pilot study was carried out on 10 children (5 normal and 5 children with cognitive delay). It was carried out prior to the study in order to ensure the applicability of the checklist and to detect the average time needed for its application. A pilot study revealed that the checklist was applicable to all children and few modifications were needed.

The checklist was filled in by the assessor and the observation was done in 2 settings one (the child with the assessor in 1:1 individual setting) and the other setting (the child within a group) in order to have a detailed look on child's behavior within group, social interaction with peers and some aspects of pragmatics.

Results

Statistical analysis:

Data were statistically described in terms of mean ± standard deviation (± SD), median and range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups was done using Student *t*-test for independent samples in comparing 2 groups when normally distributed and Mann Whitney U-test for independent samples when not normally distributed. Comparison of normally distributed numerical variables between more than two groups was done using one way analysis of variance (ANOVA) test with posthoc multiple 2-group comparisons. Non-normal numerical variables between more than two groups were compared using Kruskal Wallis test with posthoc multiple 2-group comparisons. For comparing nominal data, Chi square (χ^2) test was used. Correlation between various variables was done using Pearson moment correlation equation for linear relation in normally distributed variables and Spearman rank correlation equation for non-normal variables/non-linear monotonic relation. p-values less than 0.05 was considered statistically significant. All statistical calculations were done using computer program SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) release 15 for Microsoft Windows (2006).

Comparison between children with group (A) and group (B) (normal and cognitive delay) children showed highly significant difference between both groups regarding scores of total play and total language (Table 1).

Comparison between children with group (A) and group (C) (normal and Down's syndrome) children showed highly significant difference between both groups regarding scores of total play and total language (Table 2).

Comparison between children with CD and Down's syndrome children group regarding IQ, total play scores & language scores showed that there was non-significant difference between the two groups regarding IQ, total play and total language scores (Table 3).

Correlation between IQ and scores of play sub items and total play in children with cognitive delay (group B) showed that there was highly significant positive correlation between IQ and language use during play (r=0.5, p-value=0.01) while there was non-significant correlation between IQ and all other scores of play sub items and total play (Table 4).

Correlation between IQ and scores of play sub items and total play in Down's syndrome (group C) showed that there was highly significant positive correlation between IQ and problem solving and scores of both receptive skills and language use during play. There was significant positive correlation between IQ and total play score while there was non significant correlation between IQ and scores of play level, pragmatics and social interaction (Table 5).

Correlation between scores of total language and scores of play sub items and total play in control group (group A) showed that there was highly significant positive correlation between total language scores, play level, receptive skills and language use and significant positive correlation between total language scores and social interaction during play. There was non significant correlation between total language scores and scores of problem solving, pragmatics and total play scores (Table 6).

Correlation between total language and scores of play sub items and total play in children with cognitive delay (group B) showed that there was highly significant positive correlation between total language and problem solving, pragmatics, receptive skills, language use during play and total play scores and significant positive correlation between total language and social interaction during play (Table 7).

Correlation between total language and scores of play sub items and total play in Down's syndrome (group C) showed that there was highly significant positive correlation between total language and problem solving, social interaction, receptive skills, language use during play and total play scores. There was non-significant correlation between total language and play level and pragmatics during play (Table 8).

Children in group A (control group) showed the following play levels; symbolic, constructive, socio dramatic and games with rules while in group B (CD group) children showed only symbolic play level and children in group C (DS group) showed both functional and symbolic play levels.

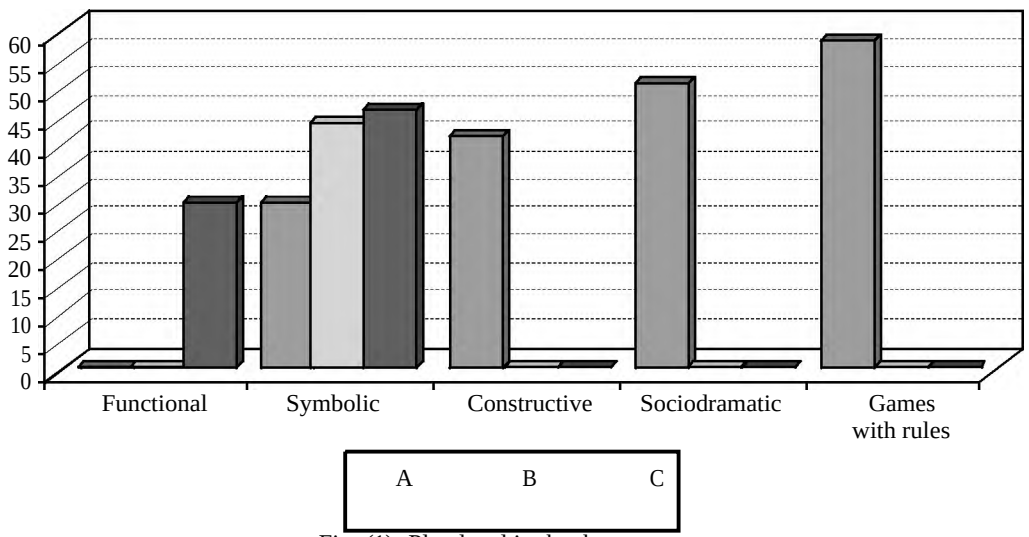

Fig. (1): Play level in the three groups.

Table (1): Comparison between children with group (A) and group (B) (normal and cognitive delay) children regarding total scores of play and language.

	A		B		*p*-value
	Mean	SD	Mean	SD	
Total play	52.4	4.7	30	6.7	0.000HS
Total language	88	20	10	7.6	0.000HS

Group A : Control. S : Significant (*p*-value ≤0.05).
Group B : CD HS : Highly Significant (*p*-value ≤0.01).

Table (2): Comparison between children with group (A) and group (C) (normal and Down's syndrome) children regarding total scores of play and language.

	A		C		*p*-value
	Mean	SD	Mean	SD	
Total play	52.4	4.7	29.5	6.7	0.000HS
Total language	88	20	4.3	4.3	0.000HS

Group A : Control. S : Significant (*p*-value ≤0.05).
Group C : Down's Syndrome. HS : Highly significant (*p*-value≤0.01).

Table (3): Comparison between children with CD and Down's syndrome children group regarding IQ, total play scores & total language scores.

IQ, total play & language scores	B		C		*p*-value
	Mean	SD	Mean	SD	
IQ	44.6	5.6	43	5.9	0.5NS
Total play	27.6	7.5	29.6	6.7	0.4NS
Total language	7.5	9.9	4.3	4.3	0.2NS

Group B : CD.
Group C : Down's syndrome.
NS : Non Significant.
S : Significant (*p*-value ≤0.05).
HS : Highly Significant (*p*-value ≤0.01).

Table (4): Correlation between IQ and scores of play sub items and total play in children with cognitive delay group.

Play sub items	IQ in group B	
	r	*p*-value
Pragmatics	0.3	0.08NS
Problem solving	0.2	0.3NS
Social interaction	0.06	0.7NS
Receptive skills during play	0.1	0.5NS
Language use during play	0.5	0.01HS
Total play	0.2	0.3NS

Group B: CD. S : Significant (*p*-value ≤0.05).
NS: Non Significant. HS : Highly Significant (*p*-value ≤0.01).

Table (5): Correlation between IQ and scores of play sub items and total play in Down's syndrome group.

Play sub items	IQ in group C	
	r	*p*-value
Play level	0.2	0.2NS
Pragmatics	0.1	0.5NS
Problem solving	0.7	0.000HS
Social interaction	0.2	0.3NS
Receptive skills during play	0.5	0.01HS
Language use during play	0.6	0.003HS
Total play	0.4	0.02S

Group C : Down syndrome. S : Significant (*p*-value ≤0.05).
NS : Non Significant. HS : Highly Significant (*p*-value ≤0.01).

Table (6): Correlation between scores of total language and scores of play sub items and total play in control group.

Play sub items	Total language in group A	
	r	*p*-value
Play level	0.5	0.007HS
Pragmatics	0.03	0.8NS
Problem solving	0.03	0.08NS
Social interaction	0.5	0.02S
Receptive skills during play	0.5	0.01HS
Language use during play	0.6	0.002HS
Total play	0.3	0.1NS

Group A : Control. S : Significant (*p*-value ≤0.05).
NS : Non Significant. HS : Highly Significant (*p*-value ≤0.01).

Table (7): Correlation between total language and scores of play sub items and total play in cognitive delay group.

Play sub items	Total language in group B	
	r	*p*-value
Problem solving	0.6	0.001HS
Pragmatics	0.5	0.008HS
Social interaction	0.4	0.03 S
Receptive skills during play	0.7	0.000HS
Language use during play	0.5	0.005HS
Total play	0.6	0.000HS

Group B: CD.
S: Significant (*p*-value ≤0.05).
HS: Highly Significant (*p*-value ≤0.01).

Table (8): Correlation between total language and scores of play sub items and total play in Down's syndrome group.

Play sub items and total play	Total language in group C	
	r	*p*-value
Play level	0.04	0.06NS
Pragmatics	0.3	0.2NS
Problem solving	0.9	0.000HS
Social interaction	0.3	0.000HS
Receptive skills during play	0.6	0.001HS
Language use during play	0.7	0.000HS
Total play	0.6	0.001HS

Group C: Down's syndrome. S : Significant (*p*-value ≤0.05).
NS: Non Significant. HS: Highly Significant (*p*-value ≤0.01).

Discussion

Play, language and cognition are all parts of an integrated reciprocally developing system and children's experiences with play have a causal effect on the development of their cognitive and language competencies.

During the current study, structured and semi-structured settings were used in assessing language abilities and play skills of children under study. During structured setting, Arabic Language test **[17]** was used in which the assessor gave direct stimulus by asking questions and received response from each child. Semi-structured setting included free play session using play materials in which the assessor informally observed the children and filled in a play observation checklist. Sometimes the assessor tended to interfere to stimulate the child in indirect way.

Regarding total play scores the results of this study showed highly significant difference between normal children and cognitive delay children) (Table 1). There was also a highly significant difference between normal children and DS children (Table 2). This can be attributed to the presence of several factors such as difference in the children's cognitive level, language skills that reflected on their ability to imitate and socially interact with others (peers and adults) through play. That was in line with Messier et al., **[18]** who stressed that play skills of cognitive delay children were inter-related with their mental levels. Smith **[19]** also claimed that normal brain development and growth, establishes new neural connections, and in a sense makes the child play more.

In this study regarding total language scores, a highly significant difference between normal children and CD children has been found (Table 1). Also there was highly significant difference between normal children and DS children (Table 2). Those results could be attributed to that children with CD and DS had defective pre-requisites for normal language development such as low cognitive level and intellectual abilities, lack of stimulating environment and atypical parent child interaction. This view was supported by Bloom **[20]** who believed in mixed theory of language development combining innate and environmental factors together. Thus children first build on what they know before language, and then use language as well in constructing additional categories. That is, cognition and language interact in a cyclical fashion as children learn more.

The results of this study showed non-significant difference between group B (cognitive delay children) and group C (DS children) regarding IQ, total play and total language scores (Table 3). In the current study; group (B) and (C) were selected with mild and moderate CD to be IQ matched in order to study other factors such as language and play skills. DS and CD children are thought to share the same factors such as; unhealthy environment, delayed language development, cognitive abnormalities, poor imitation, poor memory and learning difficulties. This goes with a study by Lisa **[15]** who suggested that both cognitive delay children and Down's syndrome children had poor memory, executive functioning defect and lacking experience.

In CD group; the results showed that there was highly significant correlation between IQ and language use during play while there was non significant correlation between IQ and scores of total play and play subitems (Table 4). However In DS group; there was significant correlation between IQ and the following items (problem solving, receptive skills and language use during play) as well as total play scores while there was non significant correlation between IQ and the following items (play level, social interaction and pragmatics during play) in Down's syndrome group (Table 5). This can be attributed to that IQ is one of the factors contributing to development of some aspects of play skills, although it is not the only factor. Small number of children under study might limit the ability to reveal correlation between IQ and other aspects of play skill development. Conveying study on larger scale is warranted.

The inconsistency in correlation findings between IQ and aspects of play could be pointed to that IQ might coincide with some other causal circumstances and seems to be secondary to them in affecting play development. This goes in line with Vygotsky **[21]** who stated that if the correlation between intelligence and pretend play is causal, so unique and important relationship to pretend play should be even and consistent.

The highly significant correlation that was found in this study between total language and play level in normal, cognitive delay and DS children (Tables 6-8) could be attributed to that language and play share the common ability to represent the world mentally to one self. Therefore it is expected that developmental patterns of language and play are parallel and that language impairment is related to deficit in play as stated in study by Pellegrini **[22]**.

In the current study the direction of effect in the correlation studies couldn't be estimated. However it goes in line with study by Sutherland & Friedman **[23]** that showed that children who played more gained better language skills or those children who had better language skills played more.

Play with adults and peers bolsters language development because it encourages greater language use. This was supplied by studies by Mallory et al., **[24]** who related the amount of time children talk to their peers during play in preschool positively to their vocabulary size in kindergarten. Additionally, Dickinson et al., **[25]** examined the relationship between talk during play and language skills and found increased time spent talking during play with peers was associated with better comprehension and production.

The significant correlation between total language and social interaction in the three groups (normal, CD and DS) (Tables 6-8) could be explained by that the more language development, the more the ability of children to socially interact. When language development is delayed, this will lead to poor child interaction with others and stick into solitary or parallel type of play as observed in the current study in the most of children of CD and DS.

The results of present study showed progression of play level in the three groups; normal, CD and DS children Fig. (1). Findings of this study showed that play levels of children in control group were; symbolic at around 24 months, constructive at around 45 months, socio dramatic at around 55 months and games with rules at around 60 months. This was in line with a study by Lifter **[26]** that validated a developmental progression of play. It was shown that infant's play behavior followed a sequence from mouthing and simple manipulation of toys, to recognition of conceptual relationships between objects (functional play), to increasingly decontextualized play (symbolic play). Symbolic play typically develops in children around 18-24 months. Prior to the development of symbolic play, children engage in functional play. Deficits across all levels of play have been identified in children with CD and DS. All cognitive delay children showed symbolic play level and DS children showed functional and symbolic play levels in the age range under study. This goes with a study by Sigman & Ruskin **[27]** that found that children with CD and DS engaged in less varied symbolic play.

This study shows interrelation between the three factors; cognition, play and language. The correlation between play and language is more strong, robust and quite consistent than that between cognition and the other two factors. The consistent correlation goes with the causal view while inconsistent findings in correlation studies contradict the causal view and is more expected with epiphenomenalism which means that the IQ coincides with some other causal circumstances and seems to be secondary to them in affecting play development. These findings should be taken with caution due to small number of children under study. More in depth profile of development of play skills in CD and DS groups as well as relation among their cognitive level, play skills and language abilities are still needed.

Conclusion:

Normal children under study had higher play skills and language skills than children with CD AND DS children. Children with CD and DS children showed nearly the same play skills and total language abilities. Cognitive level of children with CD and DS was correlated positively with some aspects of their play skills such as language use during play in CD and problem solving, receptive skills and language use during play in DS children. Total Language score was highly correlated with all play aspects in CD and most of play aspects in DS children. Informal observation by the assessor using checklist designed in the study showed quite applicability and it could demonstrate functional abilities of children under study. Cognitive level, development of play skills and language abilities were interrelated in groups under study (CD and DS).

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APPENDIX

‡‡‡‡‡

I- Play Checklist

Observer: _____ Date: ___
Child name: _____ Child age:
Child gender: M ——— F

Items	Score	Obtained responses
Play level:		
• Sensori motor-exploratory.	1	
• Relational non functional.	2	
• Functional-conventional.	3	
• Symbolic.	4	
• Constructive.	5	
• Socio dramatic.	6	
• Games with rules.	7	
Total score of play level:	/7	
Receptive skills during play:		
Following commands:		
• Simple command.	1	
• Two order commands.	2	
• Three order commands.	3	
• Four order commands.	4	
Selection by function from 3 objects:		
• Can't select any object.	0	
• Can select one object out of three by function.	1	
• Can select two objects out of three by function.	2	
Selection by feature from 3 objects:		
• Can't select any object.	0	
• Can select one object out of three by feature.	1	
• Can select two objects out of three by feature.	2	
Total score of receptive skills during play:	/8	
Language use during play:		
Vocal play:		
• Jargon.	1	
• Echoing.	2	
• Nursery rhymes.	3	
Vocal imitation:		
• Sounds.	1	
• Words.	2	
• Sentences.	3	
Methods of communication:		
• Guiding.	1	
• Pointing & gestures	2	
• Simple verbal words.	3	
• Simple verbal sentences.	4	
• Narration.	5	
Verbalization about play scenario:		
• Can't use pretend words during play.	0	
• Can using word to describe substitute objects.	1	
• Can using words to describe imaginary objects.	2	
Total score of language use during play	/13	

Items	Score	Obtained responses
Pragmatics during play:		
Eye contact:		
• Short time.	1	
• Reasonable time.	2	
• Joint attention.	1	
Turn taking:		
• Can't take turns during play activity.	0	
• Can take turn during play activity.	1	
Emotions:		
• Can't show any expressions of emotions.	1	
• Can Show emotions by only facial expressions.	2	
• Can express emotions by an action.	3	
• Can express emotions verbally.	4	
Greetings:		
• Can't show any expressions of greetings.	1	
• Can Show only facial expressions.	2	
• Can express by an action.	3	
• Can express verbally.	4	
Total score of pragmatics during play from	/12	
Social interactions and behavior:		
Interaction with peers during play:		
• Spectator.	1	
• Parallel.	2	
• Associative.	3	
• Cooperative.	4	
• Rule play.	5	
Interaction with adults during play:		
• Avoids the adult/assessor.	0	
• Can interact with prompt.	1	
• Can interact with ease/without prompt.	2	
Behavior during play:		
• Compliant and co-operative.	1	
• Attentive.	1	
• Has normal activity level.	1	
• Normal response latency.	1	
• Can initiate behavior.	1	
• Can imitate behavior spontaneously.	1	
• Has good learning potentials.	1	
Total score of social interaction and behavior	/14	
Problem solving during play:		
Way of solving:		
• Solves problem by aggressiveness.	1	
• Needs some assistance to logically solve problem.	2	
• Uses imitation of previously produced actions to solve problem.	3	
• Can independently solve problem by using action or/and verbal.	4	
Can perform related sequential actions during play.	1	
Shows ability to understand cause and effect relationships.	1	
Total score of problem solving	6	
Total score of play parameters:	60	

العلاقة بين النمو اللغوى والمهارات الإدراكية ومهارات اللعب

يعتبر اللعب أكثر نشاط يحتاجه الأطفال فى المراحل العمرية المبكرة، ففى مرحلة الطفولة يرتبط اللعب والتطور الذهنى للطفل السليم بالتفاعل الإجتماعى لدى الطفل وبذلك يساعد فى بناء مهارات الطفل الفكرية والإجتماعية.

وقد كشفت الملاحظات المستمرة للأطفال ذوى التأخر الذهنى فى (سن ما قبل المدرسة) أن لديهم مستويات أقل فى التفاعل الإجتماعى ومستويات أعلى فى اللعب الفردى مقارنة بالأطفال الطبيعين. كما أن أطفال متلازمة داون ذرى الإعاقة الذهنية المتوسطة وجد لديهم إرتباط كبير بين اللعب الرمزى والمراحل المبكرة من التطور اللغوى.

وبعد موافقة اللجنة الأخلاقية وبعد أخذ إقرار بالموافقة من الأهل تم إجراء هذه الدراسة على ٧٥ طفل مصرى يتحدثون اللغة العربية من نفس المستوى الإجتماعى والإقتصادى وتتراوح أعمارهم ما بين سنتين إلى خمس سنوات وقد تضمنت كل مجموعة منها ٢٥ طفل طبيعى، ٢٥ طفل من ذوى الإعاقة الذهنية من الدرجة البسيطة والمتوسطة و٢٥ طفل متلازمة داون ذوى إعاقة ذهنية من الدرجة البسيطة والمتوسطة.

وقد خضع جميع الأطفال تحت الدراسة لبروتوكول تقييم اللغة وإختبار ذكاء وقائمة مرجعية لتقييم مهارات اللعب بين الأطفال ذون سن الدراسة. وقد تم تصميم هذه القائمة خصيصاً فى هذه الدراسة لتقييم مهارات اللعب للأطفال ولدراسة الإرتباط الإحصائى بين مستواهم الإدراكى وقدرتهم فى اللعب واللغة. وقد تمت الإفادة من قبل المقيم عن طريق الملاحظة غير الرسمية وقد شملت القائمة العناصر التالية: مستوى اللعب، البرغماتية، حل المشكلات التفاعل الإجتماعى وأيضاً المهارات الإستقبالية وإستخدام اللغة أثناء اللعب.

وفى تقنية مهارات اللعب عن طريق الملاحظة حصل الأطفال الطبيعين على معدل أعلى من أقرانهم ذوى التأخر الذهنى ومتلازمة داون. كما لا يوجد فروق إحصائية ملحوظة فى مهارات اللعب بين الأطفال ذوى التأخر الذهنى ومتلازمة داون بسبب تأخر قدراتهم اللغوية والذهنية والحرمان البيئى وعدم وجود تفاعل كامل بين الطفل والوالدين.

ولازلنا فى حاجة ماسة إلى المزيد من البحوث فى مجال العلاقة بين اللعب واللغة والقدرات الإدراكية لدى الأطفال.