# Case study of the results of Applied Behavioral Analysis: Incidental Teaching by parents to speech and language performance of Autistic child age 2:4 year

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## Abstract

Incidental teaching ( IT) is a strategy that uses the principles of Applied Behavior Analysis (ABA) to provide structured learning opportunities in the natural environment using the child's interests and natural motivation. This technique had five steps 1.Watching for the child to initiate (watch) 2.Remove the desire object (remove), 3.Ask for request (ask), 4.Pause for 10-30 second, 5.Give the reword (object in step 2). Report outcomes presented pause parent-child interaction with implement IT technique over  6 month period significantly improved the speech and language skills of children with ASD aged 2:4 years. The child able to produce almost all Thai phonetic sounds except / ph/ and/ th/ and had MLU increasing from unable to calculated into 1.89 at the end of the study. This preliminary study, suggest further investigation, including a standard research study would yield valuable clinical findings.

## Introduction

Autistic Spectrum Disorder (ASD) is a group of the neurodevelopmental  disorders which have abnormal or deviance in two developmental  areas , according to DSM IV "abnormal in interaction with others and communication both gesture and verbal". An evidence based program effective for  the remediation of behavior and development is Applied Behavioral Analysis ( ABA ) ( Lovaas, 1987; Ryan, 2011), in which Incidental teaching  targets the production of spontaneous speech Incidental teaching (IT), first introduced to the literature by Hart & Risley (1974), is one of the most popular naturalistic intervention procedures. Incidental teaching was initially designed to facilitate the generalization and spontaneous use of language in disadvantaged preschoolers (Hart &

Risley, 1974; 1975; 1982; 1995). Although IT was not originally developed for use with children who have ASD , it has been modified to meet the social and educational needs of these students, with the assumption that it can be powerful in promoting the generalization and spontaneous use of communication (Miranda-Linné & Melin, 1992). IT generally begins by arranging a teaching environment which contains materials and activities that are of high interest to the child. Once the teaching stimuli are in place, the child's interest in or initiation toward a stimulus item denotes the beginning of the teaching trial. In its original form, IT occurs only when a child reaches for or requests access to the preferred stimuli or activities. For example, a child might look at a ball and say, "Want ball." or simply reach for the ball. Teaching may also be initiated by

presenting stimuli or activities to the child that have been found to reliably function as reinforcers in the past. For example, an IT episode might begin with either a verbal cue such as, "Push the button on the to." or a nonverbal cue ,such as blocking the door handle until the child asks for the door to be opened (Wilczynski et al., 2003). Because these types of interactions can occur in many different situations and with many different stimuli, depending upon the child's interests, IT involves training diverse behaviors. Once the initiation or cue is present, the student is given the opportunity to respond and the behavior is reinforced with access to the preferred object. The response to the child's behavior is followed by a pause marking the end of one episode. The teacher then waits for the child to initiate another learning trial or begins the next trial by presenting a motivating stimulus. These discrete learning trials can appear similar to analog procedures; the primary difference in this case is that these episodes are guided by the child's interests, rely on natural consequences, and are performed in natural settings, using a diverse set of stimuli. These latter features distinguish IT as a naturalistic procedure.

IT is a procedure in which stimuli and events are arranged within ongoing, typical activities to motivate children to interact with people or practice a skill. During IT, the therapist increases the likelihood of a child's response by contriving motivating operations in the context of specific interactions in which reinforcers are delivered immediately after each correct response. This procedure has been most frequently applied to teach language to children with ASD (McGee, Krantz, Mason, & McClannahan, 1983; Schepis et al., 1982) In 2011. Hsieh, Wilder , & Abellon (2011) implemented

a brief training structure consisting of modeling, rehearsal, and feedback to train caregivers to use IT to teach three children with ASD to request an item or activity. The number of speech and language pathologists who responsible for speech and language intervention in Thailand is very low. Thus, teaching parents or caregivers intervention strategies is necessary to stimulate the development of speech and language of their children. focuses on parent-child interaction while using natural environment-based ABA as IT to improve. The ASD child's speech and language skills This preliminary study examines the IT skills of parents while targeting the speech and language in autistic child age 2:4 years (28 months) at Rajanagarindra Institute of Child Development in Chiang Mai, Thailand.

### *Literature Review*
#### *Incidental Teaching*
Incidental teaching (IT) is a strategy that uses the principles of Applied Behavior Analysis (ABA) to provide structured learning opportunities in the natural environment by using the child's interests and natural motivation. IT is an especially useful approach with young children. In IT, the teacher or parent follows the lead of the child in selecting the activity or situation in which the learning opportunities will occur. Once the teacher identifies a naturally occurring situation that a child is expressing interest in, strategies are then used to encourage the child's responses. IT strategies are designed to promote motivation and facilitate generalization. According to Optimizing Learning Opportunities in the Natural Environment by McGee, Morrier, & Daly (1999), there are 8 components of IT which stage on below table.

**Table 1:** The Table of 8 Components of Incidental Teaching.

| Component | Details |
|---|---|
| Follow the Child's Lead | A parent can enhance engagement by determining the child's current interests. Identify the materials, actions, and objects that are motivating to the child at a given time. The object or activity of interest should be at the child's developmental level. Be aware that children's interests are constantly changing. Rather than introducing a toy the child has previously shown interest in, it is better to go with what the child is already playing with. <br> **Example:** If a child is playing with a toy bus and a parent is interested in working on identifying colors, the parent should not replace the bus with a stack of flashcards. Instead, the parent can make a game using the child's current interest in the toy bus. The child can practice colors by identifying the color of the bus and identifying the colors of figurines before picking each one up in the toy bus. |

| Component | Details |
|---|---|
| Attention | If a child is not attending to an adult's requests, it is unlikely that there will be a successful response. Therefore, it is important to ensure the adult has the child's attention before initiating anything that requires a response. Adults should position themselves to maximize face-to-face interactions. Getting close and at eye-level helps the child focus and understand that something is expected. Doing something unexpected or taking a turn with a desired toy can also increase a child's attention. |
| Environmental Arrangements | Since activities follow the lead of the child, it is important for the adult to have some control over the environment. This enables shared control: if a child wants access to a particular toy or activity, the child must first go through the adult. Placing a desired item out of reach (but still within view) creates an opportunity for the child to request. Similarly, only offering a small amount increases the likelihood that the child will request again, when more is desired. Organizing the environment and adjusting the amount of visual, auditory, or sensory stimuli can enable the child to function without getting overloaded. |
| Time Delay | After making an initiation or request, the adult should wait for the child's response. This pause allows time for processing and gives the child an opportunity to initiate. While waiting, the adult can encourage the child to respond using non-verbal cues such as an expectant look, exaggerated expression, or use of body language. If the non-verbal cues alone do not lead the child to respond independently, the adult can model the correct response or use additional prompts. |
| Model Correct Response | The adult demonstrates words, phrases, and/or gestures about the objects and activities the child is interested in and pauses with an expectant look, allowing the child to imitate.This clearly shows what the child should do or say in order to get what is desired.<br>**Example:** A child is struggling to reach a bag of chips. The adult crouches down to the eye-level of the child and makes an inquisitive face. If the child does not request independently, the adult models the desired response, "Chips." The child then requests "chips." |
| Contingent Reinforcement | Reinforcement should only be offered when the child displays a desired response. In the previous example the adult would offer the chips following the child's request. If the child did not imitate, "chips" and instead began to whine, the adult should not allow access to chips. Any attempts and approximations should also be reinforced. If the child does not say "chips" but instead points and says "ip," the adult should offer the child a chip to reinforce efforts. |
| Repetition | Children require multiple opportunities to practice a skill that is being learned. This repetition may be back to back when initially learning a skill, and later becomes dispersed throughout the day to promote independence. Environmental arrangements also contribute to creating opportunities for repetition. Offering only small amounts ensures that the child will repeat the interaction and request more. Also, interrupting play with turns can allow for repetition. |
| Vary the Difficulty | One last thing to consider when optimizing learning opportunities in the natural environment is maintaining motivation. Following the child's lead ensures the child's interest, but varying the difficulty by offering some tasks that are less difficult maintains motivation. A child who experiences success while also being challenged is more likely to continue. Interspersing difficult tasks with relatively easy components limits frustrations, creates more opportunities to get rein forcers, and promotes successful interactions. (McGee et al., 1999) |

McGee et al. (1999) used IT with 28 toddlers who had ASD. The results of their study demonstrated that within 6-12 months, IT improved the speech of these children( average age of 2:5 years). Specifically, 36 % of the subjects were able to verbalize at the conclusion of the 12 months program, with 82 % of these subjects demonstrating speech at the word level. Literature review of IT from 2000-2011 revealed a study (Fenske, Krant & Mcclenahan, 2001 ) which explained steps of IT:

**Step 1 -** Instructor arranges a variety of toys and activities.

**Step 2 -** Instructor waits for the child to initiate to begin playing with toys or begin an activity.

**Step 3 -** Instructor requests or prompts the child to express more language or an approximate verbalization indicating which activity or toy the child is interested or plays for a moment

**Step 4 -** Wait for a request from the child for 10 seconds before prompting and sending the stimulus to the child when the child responds with the target behavior. Instructor waits for the child to play for a moment before removing the toy or ceasing the activity. The instructor then waits for the child to initiate again before expanding the child's utterance. For example, if the child produces a one syllable word, the instructor will then shape the behavior by expanding the utterance to a two-three syllable word. Ryan (2011) Explained IT occurs when a clinician receives assign of initiation from the child, either verbal or nonverbal without prompting. In this study, IT consists of 5 steps:

1. Watching for the child to initiate (Watch): The instructor sits or approaches the child at 1-1.5 meter

distance.

2. Remove the desire object (Remove): the instructor makes eye contact for 1 second when the child initiate and removes the desired toy out of child reach.

3. Ask for request (ASK): The instructor models the desired utterance/gesture for the child to imitate, expanding the utterance

4. Pause for 10-30 seconds (Pause): The instructor waits 10-30 seconds for the child to respond independently. If the child does not initiate communication, the instructor gives a prompt (Ryan, 2011; Mcgee & Daly, 2007).

5. Give reward (object removed in Step 2)

## Objective

To evaluated the speech and language performance of children with ASD who participate in Incidental Teaching (IT) intervention conducted by their parents

**Hypothesis: A**. A language intervention program in which parents implement Incidental Teaching (IT) improves the speech and language skills of their child with ASD.

**Research Question.** Is a language intervention program in which parents implement an Incidental Teaching (IT) technique able to improve speech and language skills of their child with ASD?

## Method

1. Data was collected in the home environment of participants and divides into 4 zones:

   Desk activities which mother and child have joint attention.

   Floor activities which mother and child have joint attention.

   Stories telling on the bed.

   Floating toys in the bathtub.

2. The speech–language pathologist evaluated the speech and language performance of the child before and after the experimental period by using the Language Test and the Language Levels. The clinician analyzed prerecorded 10-minute videos of parent-child interactions at 5, 10, 15, 20, and 24 weeks (6-month period of the study) which were sent to the researcher via Google drive.

3. Parent child interactions using IT technique were scored at the beginning and the conclusion of the experimental period by a different speech –language pathologist

4. The speech –language pathologist trained each parent in IT techniques using the Ryan (2011) protocol over a three 3 days course , with follow up via telephone every weeks throughout the study.

### Population

Children with ASD who receive IPD ( IN- Patient Department) program at Rajanagarindra Institute of Child Development (RICD) , and parents who volunteered to be a case study subject who was willing to provide video within their home environment (November 2019 to April 2020)

### Subject I

*Inclusion Criteria*

   Child with ASD, age 2 : 4 years who participated IPD program at RICD between November 2019 to April 2020.

   Child with no hearing problem or Global Delayed Development (GDD), Intellectual Disabilities (ID), Attention Deficit Hyperactive Disorders (ADHD).

   Child with current language level 3 (Emergent phase) (E) at the beginning of study.

   Parent with adequate reading and writing skills, no hearing problem; and age less than 45 years old.

   Child with no existing severe behavior problems.

   Case chosen by the researcher and parent willing to join the program.

### Exclusion Criteria

   Child who has a comorbidity with ASD such as Epilepsy, GDD, Cerebral Palsy, ADHD or has a suspected hearing problem.

   Did not meet the deadline for submitting video more than two of the specified deadlines.

### Equipment

   Incidental Teaching skills from Mcgee & Daly (2007) and Ryan (2011) has reliability of Index of Item Objective Congruence (IOC) =0.67.

   Language Test with a reliability 0.87.

   Language Levels Assessment, which consists of 7 levels:

- Level 1- No intention to communicate
- Level 2- Intentional communication

- Level 3- Single words
- Level 4- Word combination
- Level 5- Early syntax
- Level 6- Syntax mastery
- Level 7- Complete generative grammar

Each level has 3 phases: Emergent (E), Prompt (P) and Mastery (M).

Mean length of Utterance was calculated by transcribing speech samples of 50 utterances and dividing the number of morphemes by the number of utterances.

### Data Collection

Speech–language pathologist evaluated speech and language performance of the child before and after the experimental period using the Language Test and the Language Levels by analyzing video recording of 10 minutes of parent child interaction at 5,10,15,20,and24 weeks(6 month period of the study) which was sent to the researcher via Google drive.

Speech –language pathologist evaluated and scores the parent - child interaction using the Likert Scale. ( 0= not doing, 1 = do a little, 2 mean do sometime, 3 =do most of time, 4= do all the time).

## Results

After six months of parent-implemented, IT techniques, 2:4 years old children with ASD, demonstrated :



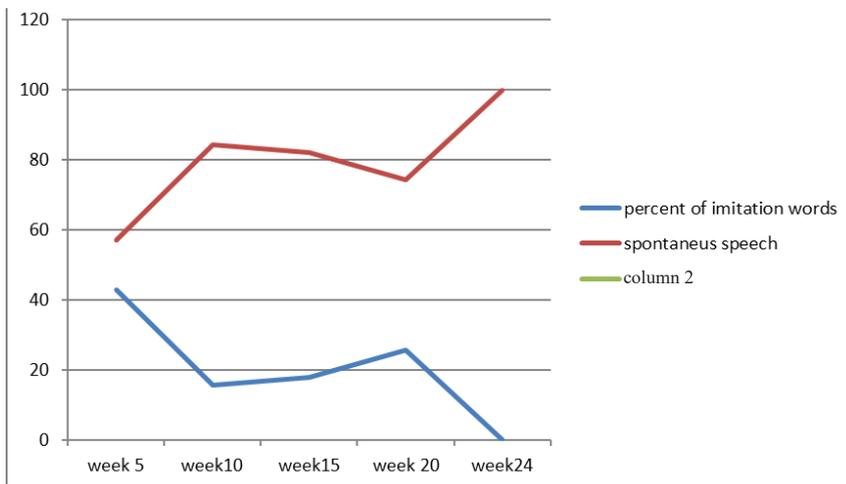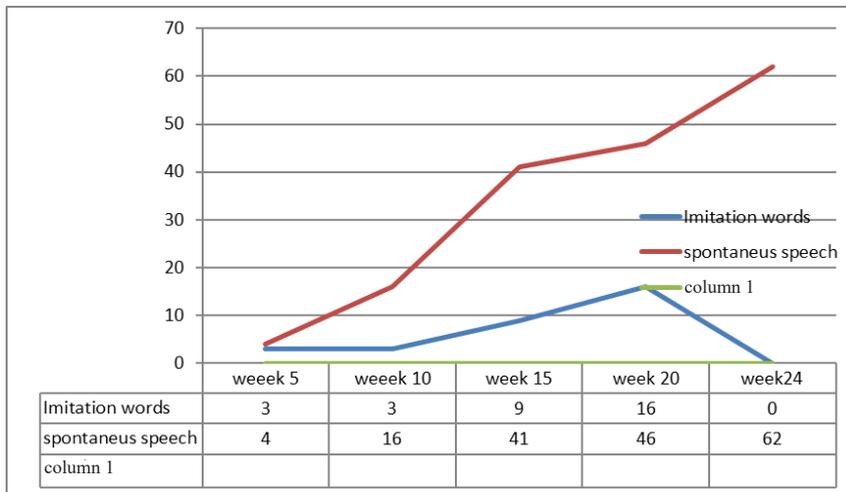| | weeek 5 | weeek 10 | week 15 | week 20 | week24 |
|---|---|---|---|---|---|
| Imitation words | 3 | 3 | 9 | 16 | 0 |
| spontaneus speech | 4 | 16 | 41 | 46 | 62 |
| column 1 | | | | | |



**Figure1:** Six months of parent-implemented.

Initially, the imitation of words and spontaneous word production was equal. However, as the study progressed spontaneous word production compared to word imitation increased significantly at week 10. At the conclusion of the 6 months program, the subjects demonstrated spontaneous speech 100 % of the time with a Mean Length of Utterance =1.89 MLU. Vocalizations and speech production of the subject was transcribed in IPA after the first session. Five Thai phonetic sounds including /ʔ/ ,/b/ , /j/, /t/ , /n / were recorded at the onset of the study. However, at the conclusion of the study, the subject was able to produce almost all Thai phonetic sounds except /pʰ / and/ tʰ/. Parent-child interaction scores pre-and post-intervention were 0.89 and 3.76 respectively, indicating a significant improvement of parent skills.

## Discussion and conclusion

Parent - child interaction with the implement of IT techniques over a 6 month period significantly improved the speech and language skills of children with ASD aged 2:4 years. The subject's Mean length of Utterance increased from unmeasurable to 1.89 MLU. At the end of 6 months, the child had 62 utterances in spontaneous speech. The child was observed: (1) expressing negative sentence forms; (2) wh questions e.g. where, what); and (3) an improvement from language level 3 E (10 % of utterance in word level) to language level 5 E (that had spontaneous speech in the level of sentences 10 % of utterances). These results are commensurate with the studies conducted (McGee et al., 1999; McGee & Daly, 2007; Hsieh et al., 2011). Results of this preliminary study, suggest further investigation, including a standard research would yield valuable clinical findings.

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