Scientific Publishing Unit

Buhūth

Journal of Humanities, Social Sciences & Education

A peer reviewed Academic Journal

Issue 12 – December 2021- Part 3

ISSN 2735-4822 (Online) \ ISSN 2735-4814 (print)

Buhūth is a peer-reviewed academic e-journal published by the Faculty of Women, Ain Shams University. Buhūth encourages submission of original research from a wide range of disciplines such as social sciences, humanities and education

Pragmatic Inference in High-Functioning Autistic Children in Egypt: A Case-Study Report

Sara Mohammed Saber
Master Degree –The English Department
Faculty of Women for Arts, Science & Edu-Ain Shams University - Egypt
Sara.saber83@yahoo.com

Dr. Nagwa Ibrahim Yunis
Professor of Linguistics
The English Department
Faculty of Education
Ain Shams University - Egypt
nagwayounis@yahoo.com

Dr. Azza Abdelfattah Abdeen
Associate professor of Linguistics
The English Department
Faculty of Women for Arts, Science & Edu
Ain Shams University - Egypt
abdeenazza@gmail.com

Abstract

Attempting to lend more focus to the social-communication deficit in high-functioning autistic (HFA) children in Egypt, the current paper aims to examine pragmatic inference skills in a high-functioning autistic female in Egypt regarding her theory of mind ability, as well as providing a valid child/caregiver psycholinguistic-cognitive measure that gives a comprehensive assessment of pragmatic inference abilities via standardized tasks and in real-life situations. Since social-pragmatic difficulty is the core deficit in autistic children, the current study raises some key questions: what are the pragmatic inference difficulties in early, basic, and advanced Theory of Mind (ToM)?; which cognitive dimensions are the most affected?; and which is more effective standardized or real-life situations perspectives?. The study follows a case-study approach design. Five pragmatic tasks of the Theory of Mind Task Battery is applied to a 7-year-old high-functioning autistic female; and a Pragmatic Subscale consisting of 29 items from the Theory of Mind Inventory-II is applied to her caregiver (Hutchins, Prelock & Bonazinga-Bouyea, 2014; Hutchins & Prelock, 2016). Results of both measures are consistent in spotting the pragmatic inference abilities/disabilities of the participant. The findings reveal strength in some of the pragmatic inference skills in the Early Theory of Mind. However, some weaknesses and even lack of the ability are detected in more complex stages (Basic and Advance ToM). The results and findings are supported via raw data scores, and a comprehensive case-study report is provided. The notions of Relevance Theory (RT) and Theory of Mind Hypothesis (ToM) are well-suited accounts to support the findings.

***Keywords*:** pragmatic inference, theory of mind, high-functioning autism, relevance theory, theory of mind inventory and task battery.

1. Introduction

Autism spectrum disorders (ASD) is one of the mental disorders that have largely spread in the last decade, not only locally but worldwide. Numerous scientific researchers were concerned with studying such developmental disorders, as well as inherited language impairments from different perspectives. After reviewing plenty of resources concerned with this matter, the researcher came to the knowledge that pragmatic language impairments are one of the core deficits inherited in the autistic population. Autistic individuals lack proper skills of pragmatic communication and hence it leads to plenty of social communication difficulties. Several pieces of research established that the most salient cognitive theories that we are able to interpret pragmatic disorders in autistic individuals are the relevance theory and the theory of mind (ToM). Both theories are able to introduce a proper interpretation and understanding of this developmental disorder.

Therefore, this study aims to investigate the pragmatic language deficits in high-functioning autistic children in Egypt from the perspective of the theory of mind and relevance theory. Accordingly, this study focuses on studying pragmatic inference skills and the theory of mind faculty in high-functioning children in Egypt via a case-study report.

2. Objectives of the Study

This study aims at:

a) Presenting the pragmatic inference abilities/disabilities as cognitive elements of pragmatics in school HFA children in Egypt via a case-study report.
b) Investigating the most affected cognitive dimensions related to pragmatic inference in Early, Basic and Advanced theory of mind using ToMTB and ToMI-2 in school HFA children in Egypt.
c) Providing a valid child/caregiver psycholinguistic-cognitive measure that effectively and comprehensively evaluates pragmatic inference deficit within the theory of mind faculty in HFA children in Egypt (in both standardized tasks and real-life situation contexts)

d) Utilizing the results of this measure to aid specialists in drafting more developed programs to enhance and improve pragmatic language abilities in HFA children in Egypt.

3. Research Hypotheses

This paper is set to test the validity of the following hypothesis:

1. Pragmatic inference deficits may still exist even in verbal high-functioning autistic children.

4. Research Questions

1. What are the pragmatic inference difficulties that exist in Early, Basic, and Advanced ToM in HFA children in Egypt?
2. Which cognitive dimensions are most affected regarding pragmatic inference skills?
3. Which is more valid: standardized tests or real-life situation perspectives?

5. Significance and the Purpose of the Paper

Pragmatic language impairment is considered the core deficit in autism. It negatively affects social communication abilities. Hence, the importance of this paper lies in investigating pragmatic inference ability in HFA children over a range of psycholinguistic-cognitive tests. It aims to probe into how HFA children will comprehend socially and pragmatically challenging scenarios through a battery that is designed specifically for this matter. Understanding different types of scenarios requires different levels of cognitive effort and it will affect the performance of children with ASD. Moreover, this paper provides a valid authenticated measure consisting of the Pragmatic Subscale from the Theory of Mind Inventory (ToMI-2) and Theory of Mind Task Battery (ToMTB). Both measures serve as a tool for measuring explicit and implicit pragmatic and theory of mind abilities.

6. Literature Review

This section reviews some contemporary works in the same domain of study. Those studies are various as they are based on different theoretical backgrounds.

Certainly, there is a growing body of literature that tackles the issue of pragmatics and theory of mind faculty in autistics. All of the studies are concerned with the issue from different perspectives. However, they all come to the common notion that all autistic populations suffer from weakness or lack of theory of mind which in turn affects their social-pragmatic communication abilities (Cummings, 2014; Leinonen et al., 2000; Norbury & Bishop 2002).

Numerous studies attempt to study pragmatic inference in HFA children with the theory of mind abilities. For instance, Loukusa et.al (2007) analyze the pragmatic response-ability of some HFA children. The study is conducted on a group of HFA children aging from 7 to 12 years old. The study shows that the children performed poorly in contextually demanding questions; even for those who are given correct answers their explanations have led to irrelevant answers, i.e., they drift from the topic. The results clearly show that HFA children have difficulty stopping processing at the relevant point of the topic.

This tendency of initial correct answers followed by irrelevant context processing is also detected in the study by Kaland et al. (2002). The HFA children show specific pragmatic inference deficits that affect their ability to infer implicit meanings of utterances. Failing to make inferences from social scripts, metaphors, and speech acts is also detected in the study by Dennis et al. (2001). It comes in agreement with the study results of Kuusikko (2009) that HFA children lack a certain degree of inference and intentionality while performing tasks relative to context requiring complex processing, such as detecting implicatures (contexts requiring to understand the implicit/intended meaning). Furthermore, the study of Norbury and Bishop (2002) shows that a group of HFA children, featured with pragmatic language impairment, do not pass story comprehension tasks, which require inference and understanding of literal meaning. However, the children give irrelevant responses to the story context. Similarly, Young et al. (2005) investigate pragmatic impairments in autistic children using TOPL tests (a type of test that provides information within six subcomponents of pragmatic language: physical setting, audience, topic, purpose, visual-gestural cues, and abstraction) and resulted in poor pragmatic inference skills manifested in HFA children.

In the study of Jolliffe and Baron-Cohen (2000) the participants have presented questions about global inference, the desire of a character, and questions requiring comprehension. In addition, the children are requested to

recall a story. The results show that control HFA children perform relatively well on memory, comprehension, and desire tasks, whereas the performance in global inference questions is not high. The children are unable to formulate an inference that is context-related to the character's action in the given story. Based on their findings, the researchers suggest that the weak performance in desire and inference questions is due to weak central coherence, which explains their low-level performance in reasoning about desires and socio-cognitive tasks. In the well-known study by Happé (1994), followed by Jolliffe and Baron-Cohen (1999), and Heavey et al. (2000), the Strange Stories Test is used to test HFA children's inference abilities. The children are required to reflect on the mental state of the character and to justify the non-literal speech of the story character. The findings show that the children have difficulty in providing a mental state explanation relevant to the context given. In the study of Jolliffe and Baron-Cohen (1999) two possibilities for the difficulties in the Strange Stories Test are suggested. First, individuals with HFA have difficulties inferring the speaker's intended meaning from the context where it has been implied. Second, they may have difficulties in understanding some of the mental states. Thus, they conclude that such inference difficulties can be caused by a lack of theory of mind or weak central coherence.

In Heavey et al.'s study (2000), they present the Awkward Moment Test along with Happé's Strange Stories Test. The purpose is to measure the superfine subtle difficulties in mental understanding. The children are required to answer questions about mental states that demand an understanding of the film character's beliefs about a social situation and reflect upon the social significance of the character's actions. Also, control questions that are not related to the social content of the film are given. It is evident that HFA children have difficulties in answering a mental-state questions, especially when they are asked to explain or justify the intentions and motives of the film characters.

Another study about pragmatic inference in HFA children is carried out by Pijnacker et al. (2009). The researchers investigate the HFA children's ability to infer scalar implicatures (some and or). Scalar implicatures is a terminology referring to the terms where the listener has to recognize on his/her own what the speaker might have said but did not; to get the implied meaning embedded in an utterance (e.g. when hearing the term some, the listener needs to infer that the speaker means not all). The findings revealed that despite HFA children

being verbally intelligent; they performed poorly while deriving meanings based on scalar terms as their responses were slow.

The current study is designed to examine pragmatic inference skills in a high-functioning autistic female in Egypt regarding her theory of mind ability, as well as providing a valid child/caregiver psycholinguistic-cognitive measure that gives a comprehensive assessment of pragmatic inference abilities via standardized tasks and in real-life situations.

7. Theoretical Framework

This section aims at sketching an overview of the approach that is chosen for the application on the selected data.

One of the main accounts put forward to explain language deficits in HFA is the theory of mind and notions of relevance theory. Both accounts will be utilized to interpret pragmatic inference skills and theory of mind faculty in HFA children.

7.1 High-Functioning Autism (HFA)

High-functioning autism (HFA) belongs to autism spectrum disorders (ASD). According to the criteria mentioned by (World Health Organization, 1993) and (American Psychological Association, 1994), autism is mainly characterized by impairments in the development of communication and social skills and the existence of stereotyped behaviors, and repetitive interests and activities. HFA may generally involve significant delays in language or cognitive development primarily in that it does not involve general delays in language or cognitive development. Landa and other researchers argue that up to date, pragmatic language difficulties are well known as one of the salient diagnostic features that distinguish autistic individuals (Landa, 2000; Ozonoff & Miller, 1996; Ramberg et al., 1996).

The American Psychiatric Association (2000) states that one of the core features, and one of the primary diagnostic symptoms, of autism spectrum disorder (ASD) is a qualitative impairment in communication. Numerous resources currently suggest that the majority of individuals who function within the normal range on IQ testing and use spoken language as their primary means of communication are referred to as high-functioning autistics (American Psychiatric Association, 2000; Dawson et al., 2008; Volkmar et al. 2005). The existing body of research on the development of language in ASD suggests

relative strengths in the areas of phonology, morphosyntax, and vocabulary when compared to pragmatic abilities. The American Speech-Language-Hearing Association (ASHA) (2014) defines pragmatic language ability as having an effective and appropriate use of language to accomplish social goals, manage turns and topics in conversation, and express appropriate degrees of politeness, awareness of social roles, and recognition of others' conversational needs. Plenty of researchers such as Baron-Cohen, Tager-Flusberg, Volkmar, and others, highly argue that even though some high-functioning autistics may enjoy high levels of intellectual ability, deficits in pragmatic skills still highly prevail in such individuals (Baron-Cohen, 1988; Dewey & Everard, 1974; Kim et al., 2014; Tager-Flusberg, 1981; Volkmar, 1987). In support of this, Paul et al. (2014) argue that pragmatic language deficits may exist even in the absence of problems in the areas of syntax, semantics, and phonology.

Recently, a variety of conversational deficits have been reported in the autistic population, which include reduced engagement, in turn, taking, restricted-speech acts, difficulty in making appropriate judgments about how much/little to say in conversational responses, problems in taking another's perspective in conversation, and in structuring narratives, which all contribute to the formation of a proper pragmatic skill.

Definitions of pragmatics may vary in literature. However, regardless of differences in definition, there is a consensus that utilization of context when inferring the meaning of an utterance belongs to the field of pragmatics. It is agreed that the social and cognitive factors affect the pragmatic aspects of language comprehension and expression. The same expression or utterance can have a different meaning in a different communicative situation. It is possible to understand a speaker's intended meaning by exploiting the context of situation itself. For further explanation, an individual can comprehend the linguistic information on any given utterance. Nevertheless, without having the cognitive ability necessary for pragmatic inference, the interpretation of such an utterance remains lacking. Cain et.al (2001) sees inference as a cognitive process that connects information from different sources. It is deemed an important ability that must exist to derive the implied meaning of an utterance and not only the explicit meaning (Cain & Oakhill, 1999; Cain et al., 2001; Oakhill & Yuill, 1986). While interpreting any given utterance, an individual's world knowledge, beliefs, and mind-reading ability all play an important role. All of such are

components of the theory of mind. According to Baron-Cohen (2000), the theory of mind is the ability to infer the beliefs, intentions, and emotions of oneself and others as well. Moreover, Eisbach (2004) argues that the theory of mind also involves the ability to understand mental activities relative to a person's thoughts and those of others.

7.2 Pragmatic Inference in HFA Children and Relevance Theory

The issue of inferences in natural language has a long history in reputable literature. The origin of the concept may go back to the Gricean notions of pragmatics, which assert that the interpretation of an expression is not necessarily identical to its semantic content. However, this semantic content plays a significant role in the derivation of the expression's interpretation. Gricean pragmatic accounts divide the interpretation process of an expression into two parts: its semantic content, which determines its explicit/literal meaning, and cooperative social reasoning, which depends on this explicit interpretation to decide the expression's implicit/inferred meaning. According to this notion, human beings can infer what is meant from what is said; to deduce intended meanings from contexts. Thus, Pragmatics is the study of how contexts are communicated more than how they are said. Listeners make inferences about linguistic expressions to arrive at an interpretation of the speaker's intended meaning.

Linguistically speaking, inference is connecting prior knowledge to text-based information to create meaning beyond what is directly stated. Thus, it is the process of creating personal meaning from text. Inference involves a mental process of combining what is said or read with relevant prior knowledge (background knowledge). After making such a combination, a person can produce/infer a unique interpretation. The inference is not a creation of a meaning that is stated explicitly; on the contrary, it is the active search for implicit meaning (Cain, K. & Oakhill, J., 1999).

Another account of the concept of inference comes from Relevance Theory (Sperber & Wilson, 1995). The main notion assumes that the interpretation of an utterance can be inferentially enriched to capture the speaker's intention in the best way. It has been proposed that verbal communication involves two processes: coding and inferential processes.

Pragmatic inference is one of the underpinning notions in the cognitively oriented pragmatic theory, known as, relevance theory. Relevance theory (RT)

is best known for its account of verbal communication and comprehension. It sets a general picture of the principles that drive the human cognitive system as a whole (Sperber & Wilson, 1995). In the notions of Relevance theory pragmatics, Sperber and Wilson are concerned with the simultaneous processes of utterance interpretation and the nature of the mental systems responsible for them (Sperber & Wilson, 1986, 1995, 2004). Therefore, the principles of RT are relative to human cognition, and children's communicative development. Moreover, it investigates the relation between pragmatic competence and theory of mind and can interpret impaired communicative capacities.

Gibbs and Colston (2012) argue that to have successful communication, there is a need to go beyond the linguistic given information. Leinonen et al. (2000) stress that several simultaneous contextual and social factors impact our interpretations and expressions of language in a continuous manner. Sperber and Wilson (1995, 2012) establish that in many situations, utterances have many possible interpretations that are compatible with linguistic information. However, to reach any interpretations or any kind of comprehension, the listener's mind shall search for relevance. In other words, this means that the listener automatically utilizes only relevant information to reach an utterance interpretation. In this sense, Sperber and Wilson (1995, 2012) describe pragmatics as the study of language use that specifically focuses on how people use context in comprehension and expression. It also clarifies how linguistic meaning, as well as contextual factors, interacts together. To understand what a speaker is communicating in real-life social communication, complex cognitive processes are required to exist. According to Gibbs and Colston (2012), the pragmatic inference is not just interpreting a meaning or intention but is a continuously changing process of the person adapting to the world around. It is established that pragmatic abilities affect how a person communicates and behaves in certain social situations, which in turn affects how others respond to the person, which then subsequently affects his or her actions. Thus, social perception plays an important role in pragmatic inference, since to communicate successfully, a person needs to take other people's emotions, wishes, and intentions into consideration, and be aware of shared knowledge. Therefore, the term pragmatic inference is used with understanding utterances, intentions, feelings, and beliefs based on contextual information. There is an increasing number of studies concerning aspects of social-pragmatic language in HFA.

They all ascertain how pragmatic inference ability is one of the prevalent difficulties in HFA. Many studies focus on difficulties in understanding pragmatic language features, such as understanding irony, humor, metaphors, idioms, recognition of emotions, etc. Pragmatic inference is a complex process that resembles a difficulty in HFA children.

7.3 Pragmatic Inference and Theory of Mind

The theory of mind can account for one of the cognitive theories that interpret pragmatic inference deficits. Theory of Mind (ToM) is a label originally introduced by Premack and Woodruff in 1978. They label the term as the ability to attribute mental states to oneself and others and to be able to use such attribution to predict and explain behaviors. High-functioning autistic children suffer from developmental disabilities, as well as social and behavioral dysfunction. Such disabilities and dysfunctions lead to peer rejection, social isolation, and psychological maladjustment (Hutchins & Prelock, 2013). Children with high-functioning autism may suffer from problems in attention and over-activity, irritability, and anxiety. In addition, they may have higher rates of executive dysfunction and language delays. It has been documented in many studies that HFA autistics lack to some extent the faculty of "theory of mind".

Theory of Mind (ToM) has been defined in literature as “a body of conceptual knowledge that underlies access to both one's own and others' mental states”. Theory of mind faculty has been used in the sense to describe performance on the false belief task. ToM has come to be construed as a broad, complex, and multifaceted construct. To illustrate it furthermore, ToM includes but is not limited to, the ability to engage in joint attention and pretense, the understanding of play pragmatics, empathy, intentionality, and the capacity to differentiate appearance from reality and the mental from the physical world. It involves affect recognition, first- and second-order thinking, visual perspective-taking, and the understanding that seeing leads to knowing. Any individual with a mature ToM also comprehends the mind as an active interpreter and can make inferences and reasoning about the causes and consequences of one's own and others' thoughts and feelings. In other words, any person with an intact theory of mental faculty can do proper mental interpretation processes to understand his/her thoughts and feeling as well as others, i.e., understanding the

implicit/intended meaning from explicit/literal utterances. Some researchers, such as Astington and Baird (2005), used the term "theory of mind" interchangeably with other terms like "social cognition", "mind-reading", "metallization", and "perspective-taking". All the aforementioned terms have significance to the original term "theory of mind". The growing scope of the term ToM is mainly attributable to the breadth and pervasiveness of the social-cognitive impairments that have been documented in high-functioning autism, in particular, and autism spectrum disorders in general.

Baron-Cohen (1995) has been the first to establish the "Theory of Mind Hypothesis" in autism. However, all his empirical evidence is based on two landmark studies that are carried out by Baren-Cohen, Leslie, and Frith (1985), and the work of Wimmer and Perner (1983). The study's focus is to demonstrate that children with ASD have significant difficulties in understanding that others could have a belief that may be opposite to reality (i.e., a false belief). The "theory of mind hypothesis" shows that individuals with ASD performed poorly on a variety of ToM tasks but succeed on carefully designed control tasks.

8. Data Collection and Methodology

This section gives a detailed discussion of how data is collected and what methodology is used in analyzing the collected data.

8.1 Design

This study follows the descriptive method as it is a case-study approach. It aims at investigating the pragmatic inference skills underlying theory of mind ability of a 7-year-old female diagnosed with high-functioning autism. For this end, pragmatic tasks in "Theory of Mind Battery" along with a Pragmatic Subscale in the "Theory of Mind Inventory-II", are applied. The source of the battery and inventory has been created by Hutchins et al. (2014), Hutchins and Prelock (2015), Hutchins et al. (2016). After obtaining consent of the original author via email, the measures are translated into Arabic to be applied to high-functioning autistics in Egypt. Some changes to the wording and picture designs are made to meet the Egyptian culture society and to be more familiar when applied. After being translated by the researcher, three psychology professors approved and validated the measure for application to high-functioning autism samples.

8.2 Participants

A 7-year-old girl, diagnosed with high-functioning autism is the case study whereas her pragmatic skills and theory of mind faculty have been tested over a range of theory of mind tasks, "Theory of Mind Task Battery" as being the child's direct measure. The girl's caregiver is also part of the study, whereas the caregivers' responses are collected via the Theory of Mind Inventory-II, as the caregiver-informant measure. The participant is referred to with her initials. The participant is highly verbal and receives development therapy sessions in a private daycare clinic specialized for special needs children. She does not receive any prescribed medications. She is integrated and enrolled in an elementary school. She is very responsive and interactive with her teachers and colleagues.

8.3 Materials

Since pragmatic competence and theory of mind are broad and multifaceted, and due to the complexity of the human mind, two measures are particularly well-suited for this purpose. The Theory of Mind Task Battery (Hutchins, et al., 2008; Hutchins et al., 2012; Hutchins & Prelock, 2015) is utilized as a child direct measure, and the Pragmatic Subscale in the Theory of Mind Inventory-II (ToMI II) (Hutchins et al., 2012, Hutchins & Prelock, 2015) is introduced as a caregiver informant measure. Both measures are intended to capture pragmatic and theory of mind abilities in three stages of theory of mind faculty, Early, Basic, and Advanced theory of mind. The ToMTB is a child-direct measure that intends to measure the explicit theory of mind and pragmatic abilities in more controlled environment tasks; while ToMI-2 is a caregiver-informant measure that targets the applied (implicit) theory of mind abilities and pragmatics in real-life situations as seen from the perspectives of caregiver/parent. Both ToMTB and ToMI-2 are translated into Arabic, arbitrated, and approved by three psychology professors, to meet the cultural criteria of Egyptian society.

8.3.1 Theory of Mind Task Battery

For this paper, five tasks from the ToM Battery are applied. They are arranged in order of ascending difficulty. Tasks are presented as short vignettes that appear on colored cards. Each card has color illustrations and accompanying text at the back for the administrator's use only. For some tasks, children are presented with one correct response option and three plausible

distracters. The child is requested to point to the answer. Memory control questions are included which must be passed for credit to be given on the test questions. The control questions vary in linguistic complexity and are designed to isolate ToM knowledge from working memory and receptive language. In case the child fails to respond, all test questions have two levels of prompting. Sample items of the battery tasks are provided in Appendix I.

8.3.2 Pragmatic Subscale of Theory of Mind Inventory II

Each item of the Pragmatic Subscale on the ToMI-2 is developed to serve as a face valid indicator of a particular dimension of ToM competencies. The Pragmatic Subscale in ToMI-2 is embedded under the three main factors, Early, Basic, and Advanced Scales. The Pragmatic subscale comprises 29 items; each item is intended to tap a certain dimension of the theory of mind faculty concerning pragmatic inference ability. Each item takes the form of a statement, and each statement is given a rating from 1 to 4 by the caregiver, according to the degree of occurrence. Sample items of the Pragmatic Subscale are provided in Appendix II.

8.4 Procedures

Both tasks are translated into colloquial Arabic language. Slight changes have been made to some of the wordings to suit the Egyptian culture society. The content of the measures has been arbitrated and approved to be valid for application by three psychology professors. The ToM Task Battery is administered by the researcher. It is administrated in a comfortable and quiet environment. The administrator is seated with the child at the same table. The caregiver and therapist of the child are at the back of the room for observation only without any interference, and to make the child more comfortable and less fearful with a familiar face in the room. The administrator attempts to establish a friendly relationship with the child as an icebreaker; by introducing the test as a kind of activity. The cards are held up by the administrator while reading the text at the back of the card in a smooth voice and reasonable pace, with the pictures facing the child. The Responses are scored in a score form, where each correct answer takes a point. Later on, the responses of the child are analyzed. As for the caregiver form, it is clearly explained to the caregiver and the administrator has responded to any further illustrations required by the

caregiver. After the caregiver completes the Inventory, he/she hands it over to the administrator.

Each task/test question in the ToMTB is given a point if answered correctly. The ToMI-2 adopts the following labels to characterize raw scores according to caregiver confidence:

1= never
2= very little
3= sometimes
4= always/usually

All results depended on raw data scores.

N.B: it is made clear that the battery and inventory are for research use only and all the information mentioned in the related scoring forms is deemed confidential. That is why the participant will be referred to with her initials

9. Data Analysis

This section is developed on practical grounds of theoretical application.

9.1 ToM Pragmatic Tasks and Pragmatic Subscale in ToMI-2: Results and Data Analysis

Case Study Report of F.A's Performance

F.A is a seven-year-old girl who is diagnosed with high functioning autism. She has been receiving treatment sessions for nearly three years, with an average of four sessions a week, an hour for each session. The treatment sessions include skills development, speech therapy, and academics. F.A is not taking any medications. She lives with her parents and her brother who is 11 years old. Her parents are highly educated, as the father works as an administrative manager and the mother is a housewife. There have not been any problems during birth problems or pregnancy. F.A is a highly verbal communicator. She demonstrates age-appropriate expressive vocabulary, syntax, and narrative development. Although F.A's receptive vocabulary is impressive, it is noted that she demonstrates difficulty with the flexible use of vocabulary (e.g., understanding the multiple 'senses' of a word). F.A is highly social and interested in developing and maintaining successful relationships with her teachers and peers, as well as her family at home. However, she has some pragmatic challenges, such as difficulty in conversational turn-taking as she can dominate the conversation if interested. F.A is very interactive and has

excellent verbal skills. She can express herself in a very good way without stumbling or pausing while speaking. She can use completely understood utterances. She interacts with her brother and likes to play with younger children. She has a good degree of social interaction, is not shy, has good eye contact, and has a sarcastic voice in some situations (knows how to play with her tone of voice). F.A is tested by the researcher to measure her theory of mind faculty via ToM Task Battery, as a child-direct measure seeking to probe into the theory of mind and pragmatic abilities.

Five Pragmatic Theory of Mind tasks and test questions are administrated to measure F.A's theory of mind abilities relative to pragmatic inference skills. The tasks target the pragmatic inference skills in the Early, Basic and Advanced theory of mind stages. The task battery is designed to act as a direct-child measure; therefore, it is in a more controlled environment. Hence, the ToMI-2 is utilized as a caregiver-informant measure to get a more comprehensive analysis of the case of study in real-life situations. The ToMI-2 yields scores for the Pragmatics subscale (e.g., understanding sarcasm, play on words, audience adaptation, etc.). Each item in the subscale taps on a certain dimension resembling a pragmatic ability in Early, Basic and Advanced ToM (Appendix II: Sample Items and Dimensions Tapped of Pragmatic Subscale is attached). F.A's caregiver has completed the Theory of Mind Inventory-2 (ToMI-2; Hutchins et al., 2016) as part of a comprehensive assessment. The raw data of the pragmatic subscale is obtained from the caregiver's rating of the 29 items included. The caregiver's rating depends on his/her observations of the child in real-life situations. The raw data results of the ToMI-2, completed by F.A's caregiver reveal a total score of (76= real score; max. score = 116). This obtained score places F.A within a moderate level of HFA.

Table1

Pragmatic Subscale Results (ToMI-2, Pragmatic Subscale)

Theory	Real Score	Maximum Score
Early Theory of Mind	8	12
Basic Theory of Mind	37	48
Advanced Theory of Mind	31	56
Total Score	76	116

F.A demonstrates skills consistent with pragmatic abilities in Early ToM. She is able to pass the desire-based emotion task (Task B) which measures her pragmatic ability to infer the mental states of others by recognizing the desire-based emotions. Control questions are answered correctly without using any of the prompt phrases provided. Moreover, she is able to give correct justification to the test question and expresses the answer verbally in her own words. This comes consistent with the ToMI-2 scores obtained. According to her ToMI-2 scores, F.A has relatively high pragmatic skills competent with Early ToM (real score = 8, max. score =12). She demonstrates an ability of pragmatic inference ability, as she can infer intentionality (e.g. infer whether someone is hurt on purpose or by accident), as well as social referencing skills (e.g. able to recognize when a situation is dangerous and sometimes able to ask for illustration in ambiguous situations). Despite her inference and social referencing skills, she lacks the gaze following pragmatic ability (e.g. not interested to follow where others are looking. Therefore, she demonstrates a good early theory of mind ability for her age.

In the "seeing-leads-to-knowing" task (Task C), F.A manages to correctly answer the test question as well as provide a correct logical justification. This is an indication of her pragmatic ability to understand that what a person sees affects what he knows. Unfortunately, F.A fails in the inference of the perception-based action task (Task E) which aims to measure the child's ability to infer that seeing leads to action (that is to say, action is taken upon inference); and the standard false-belief task (Task F) which measures the child's ability to infer in case of unexpected change of location or the ability to assume. Though she fails the test questions, she could answer the control questions without any prompts. F.A's ToMI-2 raw scores also indicate some pragmatic competence in Basic ToM (real score = 37, max. score = 48). Her scores are specifically matching to her performance in battery tasks. Despite F.A's failure in Task E and F, her caregiver indicates an opposite opinion that she understands false beliefs in real-life situations (e.g. situations of unexpected change of location of an object). This contradiction may be referred to the child's short-term working memory and distraction as she could answer the control question without any prompts. The ToMI-2 also indicates that she can understand physiologically-based behaviors (e.g. our physiological state guides our behavior, such as

wearing a jacket when feeling cold), comprehend emotion-based behavior (e.g. referring that a person will not go into a dark room out of fear from darkness), the concept that seeing leads to knowing (e.g. understanding that people will know about things via visual observation), engaging in pretense and understanding pretense in others (e.g. pretending that one object is a different object, or understanding when someone imitates a bird with his/her hand it is not a real bird), counterfactual reasoning (e.g. understanding hypothetical phrases using "if") seem to be pragmatically developed skills in her Basic ToM ability. Finally, Pragmatic Basic ToM skills appear to be reliably weak in F.A in the dimensions relative to false beliefs in the context of unexpected content (e.g. not understanding that a content of a box may differ from its appearance, appearance-reality distinction), understanding promises, and secrets, and attribute-based behaviors (e.g. inferring that certain behavior is the result of a certain characteristic in a person).

In the Advanced ToM, F.A masters passing the message-desire discrepant task (Task H). Passing this task is evidence of her pragmatic ability to infer other people's thoughts or perceptions when interpreting desires. Her pragmatic inference skill enables her to understand the discrepancy between real desires with the expressed message. Nevertheless, she answers the justification question incorrectly as she could refer to the physiological state but not the mental state. Advanced ToM scores of ToMI-2, show the limited ability of pragmatic splintered skills (real score = 31, max. score = 56). At the advanced level, F.A demonstrates weak pragmatic skills in the aspects of understanding sarcasm, display rules (e.g. people can show a feeling that is not necessarily their true feeling), complex social judgment (e.g. differentiating humor from bullying), white lies, common sense (e.g. understanding that an unfamiliar person can make true guesses about me), and situation-based disambiguation of emotion (e.g. differentiating between crying because of losing or winning). The scores also show moderate pragmatic skills as she could sometimes understand metaphoric language (idiomatic language), deception (purposeful deceit by others), jokes, and humor (play on words). These abilities may be latent yet not developed. Despite her low and mild scores in Advance ToM, F.A has shown some relative strength in three pragmatic dimensions, which are, complex social judgment (e.g. recognizing when a listener is not interested), true empathy (e.g. being able to be in other people's shoes and infer how they might feel), and

audience adaptation (e.g. speaking with peers or younger children differently from adults or older people). Her strength in the advanced theory of mind pragmatic areas is revealed to the researcher while administrating the ToMTB on the child.

Table 2

Criterion Table for Pragmatic Subscale

Main Factors	Pragmatic Subscale			
Sub-Factors	Min Score	Max Score	Length of Category = Range/3	Categories
Early Theory of Mind	3	12	3	(3-5) low (6-9) medium (10-12) high
Basic Theory of Mind	12	48	12	(12-23) low (24-36) medium (37-48) high
Advanced Theory of Mind	14	56	14	(14-27) low (28-42) medium (43-56) high
Total Score	29	116	29	(29-57) low (58-87) medium (88-116) high

According to the criterion table mentioned above, F.A has a high level of pragmatic inference skills consistent with the Early theory of mind stage, which is appropriate for her age. Her scores fall within the category of the medium stage. As for her pragmatic inference skills in the Basic theory of mind stage, it is relatively high (it falls between the medium and high); while her pragmatic inference skills in the Advanced theory of mind stage are considered to be in the medium range. This indicates that F.A's overall pragmatic ability within the Early, Basic and Advanced theory of mind falls within the medium range.

Given that, it is established that F.A is a very engaged active child. She is very responsive. She shows skills consistent with the Early theory of mind that is suitable for her age. Her pragmatic inference skills detected could be due to several factors, among which is her interaction with her parents and brother. She interacts greatly with her peers. Her pragmatic skills are evident, as they could be a result of the continuous therapy academic sessions, she has been receiving in a daycare specialized for special needs children. Her therapeutic program does not only involve language development and is not only restricted to the daycare. On the contrary, part of her sessions involves learning social interaction and improving communication skills with the real world. Her poor pragmatic skills in both Basic ToM and Advance ToM could be due to limitations in working memory, cognitive complexity, distraction, fear of incorrect responses, and/or fear of judgment. Hence, her pragmatic inference skills are not fully developed, yet they could be latent and require some improvement. To this end, both the ToMTB and ToMI-2 are used to provide a sufficient assessment of the child's actual ability, to aid in drafting the most appropriate intervention that taps on these defected dimensions. The abovementioned data analysis is consistent with a portrait commonly seen in high functioning autistic children. The pattern of results indicates significant pragmatic challenges in the domains of Early, Basic and Advanced theory of mind.

10. Conclusion and Findings

The findings of the study came consistent with numerous previous studies that cited deficits in the ability to infer a wide range of pragmatic context information and mental states (Happé, 1993, Leinonen & Kerbel, 1999; Ryder & Leinonen, 2003; Loukusa et al., 2007). The results are also consistent with the Theory of Mind Hypothesis of autism (Baron-Cohen, 1995) and suggest the existence of a core conceptual deficit in explicit abilities that affect the applied ToM. The raw scores show weakness in cognitive areas relative to the eye-gaze following, metal-state comprehension, understanding levels of deception, false beliefs, secrets, understanding irony and metaphors, white lies, humor, play on words, complex social judgment, and ambiguity; all of which are the theory of mind dimensions that contribute to providing a sound pragmatic inference ability. All the pragmatic deficits detected are supported by the illustration of Relevance Theory, which states that to have a pragmatic

inference ability, the hearer must apply a cognitive principle and communicative principle in which the hearer must go under pragmatic comprehension processes including coding and decoding of message, that finally enables to reach a proper understanding of the implicit meaning from an explicit utterance. To give a fuller portrait of cognitive pragmatic development in high-functioning autistics, more research will be required.

Based on this study, it is recommended to conduct more pragmatic and cognitive tests that target more complex areas of language communication in HFA. It can be suggested that in developing a proper communication therapy for children with HFA it would be beneficial to focus on how to utilize and connect various types of contextual information and to give more attention to improving pragmatic abilities and social communication within real-life training.

References

Astington, J., Baird, J. (Eds.). (2005). *Why language matters for theory of mind*. Oxford University Press.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.).

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.).

Baron-Cohen, S., Leslie, A., & Frith, U. (1985). Does the autism child have a 'theory of mind'? *Cognition*, *21*(1), 37–46.

Baron-Cohen, S. (1988). Social and pragmatic deficits in autism: Cognitive or affective? *Journal of Autism and Developmental Disorders*, *18*, 379–402.

Baron-Cohen, S. (1995). *Mind blindness*. MIT Press.

Baron-Cohen, S. (2000). Theory of mind and autism: A fifteen-year review. In S. Baron-Cohen, H. Tager-Flusberg, & D. J. Cohen (Eds.), *Understanding other minds: Perspectives from developmental cognitive neuroscience* (pp. 3–20). Oxford University Press.

Cain, K., & Oakhill, J. (1999). Inference making ability and its relation to comprehension failure in young children. *Reading and Writing*, *11*, 489–503.

Cain, K., Oakhill, J., Barnes, M., & Bryant, P. (2001). Comprehension skill, inference-making ability, and their relation to knowledge. *Memory & Cognition*, *29*, 850–859.

Cummings, L. (2014). *Pragmatic disorders*. Springer.

Dawson, M., Mottron, L., & Gernsbacher, M. (2008). Learning in autism. In J. Byrne & H. Roediger (Eds.), *Learning and memory: A comprehensive reference* (pp. 759–772). Elsevier.

Dennis, M., Lazenby, A., & Lockyer, L. (2001). Inferential language in high-function children with autism. *Journal of Autism and Developmental Disorders*, *31*, 47–54. http://dx.doi.org/10.1023/A:1005661613288

Dewey, M., & Everard, M. (1974). The near normal autistic adolescent. *Journal of Autism and Childhood Schizophrenia*, *4*, 348–356.

Eales, M. (1993). Pragmatic impairments in adults with childhood diagnoses of autism or developmental receptive language disorder. *Journal of autism and developmental disorders*, *23*(4), 593–617.

Eisbach, A. (2004). Children's developing awareness of diversity in people's trains of thought. *Child Development, 75*, 1694–1707.

Gibbs, R., & Colston, H. (2012). *Interpreting figurative meaning*. Cambridge University Press.

Happé, F. (1993). Communicative competence and theory of mind in autism. A test of relevance theory. *Cognition, 48*, 101–109. http://dx.doi.org/10.1016/0010-0277(93)90026-R.

Happé, F. (1994). An advanced test of theory of mind: Understanding of story characters' thoughts and feelings by able autistic, mentally handicapped and normal children and adults. *Journal of Autism and Developmental Disorders, 24*, 129–154. http://dx.doi.org/10.1007/BF02172093

Heavey, L., Phillips, W., Baron-Cohen, S., & Rutter, M. (2000). The Awkward Moments Test: A naturalistic measure of social understanding in autism. *Journal of Autism and Developmental Disorders, 3*, 225–236. http://dx.doi.org/10.1023/A:1005544518785.

Hutchins, T., Prelock, P., & Chace, W. (2008). Test–retestreliability of theory-of- mind tasks with children with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities, 23*(4), 195–206.

Hutchins, T., Prelock, P., & Bonazinga, L. (2012). Psychometric evaluation of the Theory of Mind Inventory (ToMI): A study of typically developing children and children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 42*, 327–341.

Hutchins, T., & Prelock, P. (2013). Using communication to reduce challenging behaviors in individuals with autism spectrum disorders and intellectual disability. *Child and Adolescent Psychiatric Clinics of North America, 23*, 41–55.

Hutchins, T., Prelock, P., & Bonazinga-Bouyea, L. (2014). *Technical Manual for the Theory of Mind Inventory and Theory of Mind Task Battery*. https://www.theoryofmindinventory.com

Hutchins, T., & Prelock, P. (2015). Beyond the theory of mind hypothesis: Using a causal model to understand the nature and treatment of multiple deficits in autism spectrum disorder. In R. Bahr, & E. Silliman (Eds.), *Routledge handbook of communication disorders* (pp. 247–257). Routledge. https://doi.org/10.4324/9780203569245

Hutchins, T., Prelock, P., Morris, H., Benner, J., LaVigne, T., & Hoza, B. (2016). Explicit vs. applied theory of mind competence: A comparison of typically developing males, males with ASD, and males with ADHD. *Research in Autism Spectrum Disorders, 21*, 94–108.

Jolliffe, T., & Baron-Cohen, S. (2000). Linguistic processing in high-functioning adults with autism or Asperger's syndrome: Is global coherence impaired? *Psychological Medicine, 30*, 1169–1187. http://dx.doi.org/10.1017/S003329179900241X.

Kaland, N., Møller-Nielsen, A., Callesen, K., Mortensen, E., Gottlieb, D., & Smith, L. (2002). A new 'advanced' test of theory of mind: Evidence from children and adolescents with Asperger syndrome. *Journal of Child Psychology and Psychiatry, 43*, 517–528. http://dx.doi.org/10.1111/1469-7610.00042

Kim, S., Paul, R., Tager-Flusberg, H., & Lord, C. (2014). Communication in ASD. In F. Volkmar, R. Paul, S. Rogers, & K. Pelphrey (Eds.), *Handbook of autism spectrum disorders* (4th ed., pp. 230–262). Wiley.

Kuusikko, S., Haapsamo, H., Jansson-Verkasalo, E., Hurtig, T., Mattila, M.-L., Ebeling, H., jussila, K., Bölte, S., & Moilanen, I. (2009). Emotion recognition in children and adolescents with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39*, 938–945. http://dx.doi.org/10.1007/s10803-009-0700-0.

Landa, R. (2000). Social language use in Asperger syndrome and high-functioning autism. In A. Klin, F. Volkmar, & S. Sparrow (Eds.), *Asperger syndrome* (pp. 125–155). The Guilford Press.

Leinonen, E., & Kerbel, D. (1999). Relevance theory and pragmatic impairment. *International Journal of Language & Communication Disorders, 34*(4), 367-390.

Leinonen, E., Letts, C., & Smith, B. (2000). *Children's pragmatic communication disorders*. Whurr Publishers.

Loukusa, S., Leinonen, E., Jussila, K., Mattila, M.-L., Ryder, N., Ebeling, H., & Moilanen, I. (2007). Answering contextually demanding questions: Pragmatic errors produced by children with Asperger syndrome or high-functioning autism. *Journal of Communication Disorders, 40*(5), 357–381.

Norbury, C., & Bishop, D. (2002). Inferential processing and story recall in children with communication problems: A comparison of specific language impairment, pragmatic language impairment and high-functioning autism. *International Journal of Language and Communication Disorders, 37*, 227–251. http://dx.doi.org/10.1080/13682820210136269

Oakhill, J., & Yuill, N. (1986). Pronoun resolution in skilled and less-skilled comprehenders: Effects of memory load and inferential complexity. *Language and Speech, 29*, 25–37.

Ozonoff, S., & Miller, J. (1996). An exploration of right-hemisphere contributions to the pragmatic impairments of autism. *Brain and Language, 52*, 411–434.

Paul, R., Landa, R., & Simmons, E. (2014). Assessing and treating communication. In J. McPartland, A. Klin, & F. Volkmar (Eds.), Asperger syndrome: Assessing and treating high functioning autism spectrum disorder (2nd ed., pp. 103–142). Guilford Press.

Pijnacker, J., Hagoort, P., Buitelaar, J., Teunisse, J.-P., & Geurts, B. (2009). Pragmatic inferences in high-functioning adults with autism and Asperger syndrome. *Journal of Autism and Developmental Disorders, 39*, 607–618.

Ramberg, C., Ehlers, S., Nyde´ n, A., Johansson, M., & Gillberg, C. (1996). Language and pragmatic functions in school-age children on the autism spectrum. *European Journal of Disorders of Communication, 31*, 387–414.

Ryder, N., & Leinonen, E. (2003). Use of context in question answering by 3-, 4- and 5-year-old children. *Journal of Psycholinguistic Research, 32*, 397–415.

Shields, J., Varley, R., Broks, P., & Simpson, A. (1996). Social cognition in developmental language disorders and high-level autism. *Developmental Medicine & Child Neurology*, *38*(6), 487-495.

Sperber, D., & Wilson, D. (1995). *Relevance: Communication and cognition* (2nd ed.). Blackwell.

Sperber, D., & Wilson, D. (Eds.). (2012). *Meaning and relevance*. Cambridge University Press.

Tager-Flusberg, H. (1981). On the nature of linguistic functioning in early infantile autism. *Journal of Autism and Developmental Disorders, 11*, 45–56.

Volkmar, F. (1987). Social development. In D. Cohen, A. Donnellan, & R. Paul (Eds.), *Handbook of autism and pervasive developmental disorders* (pp. 41–60). Wiley.

Volkmar, F., Klin, A., & Rutter, M. (2005). Issues in classification of autism and related conditions. In F. Volkmar, A. Klin, R. Paul, & D. Cohen (Eds.), *Handbook of autism and pervasive developmental disorders* (3rd ed., pp. 5–41). Wiley.

Wilson, D. (2000). Metarepresentation in linguistic communication. In D. Sperber (Ed.), *Metarepresentations: A multidisciplinary perspective*. (pp. 411–460). OUP.

Wilson, D., & Sperber, D. (2002). Relevance Theory. In G. Ward, L. Horn (Eds.), *Handbook of Pragmatics* (pp.3 – 14). Blackwell.

Deirdre Wilson, Dan Sperber. Relevance Theory. G. Ward, L. Horn. Handbook of Pragmatics,Blackwell, 2002

Wimmer, H., & Perner, J. (1983). Beliefs and beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13*, 103–128.

World Health Organization. (1993). *International classification of mental and behavioural disorders* (ICD-10). Diagnostic Criteria for Research. WHO.

Young, E., Diehl, J., Morris, D., Hyman, S., & Bennetto, L. (2005). The use of two language tests to identify pragmatic language problems in children with autism spectrum disorders. *Language, Speech, and Hearing Services in Schools, 36*, 62–72.

Appendix A

Sample items of Theory of Mind Task Battery

TASK B: The Desire-Based Emotion Task is intended to assess children's understanding of desires. More specifically, this task is designed to tap the understanding that people are happy when desires are satisfied (to infer other people's emotions in specific situations)

- المهمة رقم "B": اختبار العاطفة أو المشاعر القائمة على الرغبة يقوم بتقييم فهم الطفل أن الرغبات هي سبب العاطفة أو المشاعر

البنوتة دي اسمها مريم. مريم عايزة تاكل بسكوت (يشاور المختبر على البنت والبسكوت في الصورة أثناء الكلام)

- سؤال الضبط للاختبار رقم "ب" : مريم عايزة إيه؟

عبارة التحفيز: مريم عايزة إيه، كيك، ولا بسكوت، ولا مصاصة، ولا شوكلاته (يشاور المختبر على كل صورة). شاور الطفل على:

كيك	مصاصة	بسكوت	شوكلاته

TASK F: A Standard False Belief Task is intended to assess children's ability to infer belief in the context of an unexpected location change. Like the Perception-Based Action Task, this task also includes an understanding of the knowing-looking connection; however, the Standard False Belief Task adds yet another layer of complexity because it must also include the understanding that people can have a belief that contradicts reality.

الاختبار رقم "و": اختبار المعتقد الخاطئ :يقيم قدرة الطفل على استنتاج المعتقد (أو الفكرة أو الافتراض) في حالة التغيير غير المتوقع للشيء

ده أحمد، أحمد قاعد بيقرا كتاب. لما أحمد خلص قراية، راح يحط الكتاب على الترابيزة. وبعد كده أحمد خرج من الأودة وراح يشوف حاجة يأكلها في المطبخ. بعد كده، بص، ريم دخلت وخدت الكتاب من على الترابيزة وراحت حطيته في الدرج. بعد كده، ريم مشيت وخرجت من الأودة، بعد شوية، أحمد رجع تاني عشان عايز يقرا شوية كمان في الكتاب أو عايزة يكمل قراية في الكتاب بتاعه

Appendix B

Sample items of Pragmatic Subscale of Theory of Mind Inventory II

Item no.	Factor 1: Early Theory of Mind	Dimension tapped
1	my child understands whether someone hurts another on purpose or by accident **الفعل المتعمد أو عن قصد.** مثال: يفهم الطفل إذا كان الشخص يؤذي شخص آخر عن قصد أو دون قصد. يقدر يميز الفرق بين التعمد إنه لو ضرب حد عن قصد هيأذيه أو يوجعه وإن لو داس على رجله أو خبطه من غير قصد.	the ability to infer intentionality
2	My child understands that, when I show fear, the situation is unsafe or dangerous **المرجعية الاجتماعية، تمييز الخوف.** مثال: يفهم الطفل إن لو بينت الخوف أو مشاعر الخوف، فهذا يعني إن الموقف غير آمن أو خطير.	social referencing: reading or recognizing fear
3	If I looked up and stared in the sky, my child would also look up to see what I was looking at **متابعة/ملاحقة اتجاه نظرة العين.** مثال: يستطيع الطفل ملاحقة نظرة العين. لو نظرت لأعلى وثبت نظري على السماء مثلا أو شيء معين يستطيع الطفل أن ينظر لنفس الشيء الذي أحدق فيه أو أنظر إليه.	gaze following

Item no.	Factor 2: Basic Theory of Mind	Dimension tapped
4	My child understands that when someone puts on a jacket, it is probably because he/she is cold **السلوك القائم على الشعور النفسي.** مثال: يفهم الطفل التصرف أو الفعل المبنى على الشعور النفسي بشيء.عندما يرتدي شخص معطف/جاكت لأنه ممكن يكون سقعان.	Physiologically-based behavior
5	my child understands that to know what is in an unmarked box, you have to see or	Seeing-leads-to knowing

	hear about what is in that box **الرؤية تؤدي للمعرفة.** مثال: يفهم الطفل أن رؤية الشيء تؤدي للمعرفة، أي يفهم الطفل أنه عشان أعرف ما بداخل صندوق أو علبة عادية ليس عليه علامات يجب أن أرى أو أسمع ما بداخله.	
6	My child can pretend that one object is a different object (e.g. pretending a banana is a telephone) **التظاهر: التمثيل أو التظاهر بشيء آخر.** مثال: يستطيع الطفل التظاهر أن الشيء هو شيء أخر مختلف. يتظاهر أن الموزة هي تليفون أو التظاهر بركوب الكرسي على أنه سيارة أثناء اللعب مثلا.	Pretense: engaging in pretense

Item no.	Factor 3: Advance Theory of Mind	Dimension tapped
7	It were raining and I said in a sarcastic voice “gee, looks like a really nice day outside”, my child would understand that I didn’t actually think it is a nice day **فهم السخرية (الهزار/التريقة)** مثال: لو الجو بيمطر وأنا اتريقت وقلت "الله الجو جميل فعلا" بصوت ساخر، يفهم إني بتريق وإن الجو مش حلو في الحقيقة.	Sarcasm
8	If I said “let’s hit the road”, my child would understand that I really meant “let’s go” **الرغبة الخاطئة من الدرجة الثانية.** مثال: يفهم الطفل أن الأشخاص قد يخطئوا فيما يتعلق برغبة الآخرين، مثلا: لو طفل عايز عربية، وباباه فاكره عايز طياره وهيفرح بيها، يفهم الطفل أن الأب غلطان أو فاهم غلط والولد مش هيفرح.	Idiomatic language
9	My child speaks differently to young children versus adults	Pragmatics: audience adaptation

	اللغة التداولية: التكييف مع الآخرين في الحوار. مثال: يتحدث الطفل بشكل مختلف مع الأطفال الصغيرين عكس الكبار. مثلا: يستخدم لغة بسيطة أو نبرة صوت أعلى مع الصغيرين (يفرق في طريقة الكلام مع الكبار والصغيرين) (حضرتك مع الكبار ويحترمهم).	

الاستنباط في اللغة التداولية في الأطفال ذوي التوحد من الفئة المرتفعة في مصر: تقرير دراسة حالة

ساره محمد صابر محمد
باحثة ماجيستير-قسم اللغة الإنجليزية
كلية البنات للأداب والعلوم والتربية- جامعة عين شمس - مصر
Sara.saber83@yahoo.com

أ.د نجوى إبراهيم يونس
أستاذ اللغويات
كلية التربية- جامعة عين شمس - مصر
nagwayounis@yahoo.com

أ.م.د/ عزة عبدالفتاح عابدين
أستاذ مساعد اللغويات
كلية البنات- جامعة عين شمس- مصر
abdeenazza@gmail.com

المستخلص:
في محاولة لإعطاء مزيد من التركيز على عجز التواصل الاجتماعي لدى الأطفال المصابين بالتوحد عالي الأداء في مصر ، تهدف الورقة الحالية إلى فحص مهارات الاستدلال البراغماتي لدى أنثى متوحدة عالية الأداء في مصر فيما يتعلق بنظريتها عن قدرة العقل ، بالإضافة إلى توفير مقياس معرفي نفسي لغوي - معرفي صالح للطفل / مقدم الرعاية يعطي تقييمًا شاملاً لقدرات الاستدلال البراغماتي من خلال المهام الموحدة وفي مواقف الحياة الواقعية. نظرًا لأن الصعوبة الاجتماعية البراغماتية هي العجز الأساسي في الأطفال المصابين بالتوحد ، فإن الدراسة الحالية تثير بعض الأسئلة الرئيسية: ما هي صعوبات الاستدلال البراغماتي في نظرية العقل المبكرة والأساسية والمتقدمة ؛ ما هي الأبعاد المعرفية الأكثر تأثراً ؛ والتي هي أكثر فعالية من منظور مواقف معيارية أو واقعية. تتبع الدراسة تصميم نهج دراسة الحالة. يتم تطبيق خمس مهام براغماتية من نظرية بطارية مهام العقل على أنثى ذات 7 سنوات من التوحد عالية الأداء ؛ ومقياس فرعي عملي يتكون من 29 عنصرًا من Theory of Mind Inventory-II يتم تطبيقه على مقدم الرعاية لها (Hutchins، Prelock & Bonazinga-Bouyea، 2014؛ Hutchins & Prelock، 2015). نتائج كلا المقياسين متسقة في اكتشاف قدرات الاستدلال البراغماتي / الإعاقات للمشارك. تكشف النتائج عن قوة بعض مهارات الاستدلال البراغماتي في نظرية العقل المبكرة. ومع ذلك ، يتم الكشف عن بعض نقاط الضعف وحتى الافتقار إلى القدرة في مراحل أكثر تعقيدًا (Basic and Advance ToM). يتم دعم النتائج والنتائج من خلال درجات البيانات الأولية ، ويتم تقديم تقرير دراسة حالة شامل. تعتبر مفاهيم نظرية الصلة (RT) وفرضية نظرية العقل (ToM) حسابات مناسبة تمامًا لدعم النتائج.

الكلمات المفتاحية: استنباط اللغة التداولية، نظرية العقل، التوحد من الفئة عالية الأداء، نظرية الصلة، مقياس وبطارية نظرية العقل