

# Clinical Linguistics: Theory and Applications

Contributors: Hila Green, Yishai Tobin, et al.



## About the Book

Clinical Linguistics is a sub-discipline of linguistics that involves the application of linguistic theory to the field of Speech-Language Pathology. Clinical linguistics, a branch of applied linguistics, is the use of linguistics to describe, analyze, and treat language disabilities. The study of linguistic aspect of communication disorders is of relevance to a broader understanding of language and linguistic theory. Linguistics being a science, which studies the structure of languages, has its full potentiality over each and every human being's life. It is like; life without language for a human is life less. In recent years, some remarkable growth has taken place in our knowledge and management of language and speech disorders in children and adults. Medical disciplines have been working a lot for past two decades to identify, assess and to remediate these problems. Also theoretical developments in linguistics and its applications have been utilized for the study of speech and language disorders, by clinicians during past decade. This applied study of linguistics with medical discipline is useful for the diagnosis and treatment of language and speech disorders. Clinical Linguistics deals with all types of speech and language disorders found in the development or use of the knowledge of language. It shows the breakdown in the development of language abilities on the usual developmental schedule. On the subject of the descriptions of disorders, there is a great need for descriptive case studies of the language of disordered people. Also normative models of language development are must to describe the delay found in child language acquisition, which can be provided only by a linguist. Regarding intervention, the linguist's role is to help the clinician in planning the linguistic interventions if needed and to monitor the outcome of intervention over a period of time. It is the role a linguist to investigate the language behavior of the intervention provider, teaching materials used, and the environment of intervention provided, as it also can modify the outcome. So speech-language pathologist has to coordinately work with a psychologist and linguist for the assessment and to provide Remedial measures.

Clinical Linguistics- Theory and Applications covers different aspects of speech and language pathology and it provides a fairly comprehensive overview of the complexity and the emerging importance of the field, by identifying and re-examining, from different perspectives, a number of standard assumptions in clinical linguistics and in cognitive sciences. The studies encompass different issues in phonetics, phonology, syntax, semantics, and pragmatics, discussed with respect to deafness, stuttering, child acquisition and impairments.



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**Green,  
Tobin**

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Contributors

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# Preface

Clinical Linguistics is a sub-discipline of linguistics that involves the application of linguistic theory to the field of Speech-Language Pathology. Clinical linguistics, a branch of applied linguistics, is the use of linguistics to describe, analyze, and treat language disabilities. The study of linguistic aspect of communication disorders is of relevance to a broader understanding of language and linguistic theory. Linguistics being a science, which studies the structure of languages, has its full potentiality over each and every human being's life. It is like; life without language for a human is life less. In recent years, some remarkable growth has taken place in our knowledge and management of language and speech disorders in children and adults. Medical disciplines have been working a lot for past two decades to identify, assess and to remediate these problems. Also theoretical developments in linguistics and its applications have been utilized for the study of speech and language disorders, by clinicians during past decade. This applied study of linguistics with medical discipline is useful for the diagnosis and treatment of language and speech disorders. Clinical Linguistics deals with all types of speech and language disorders found in the development or use of the knowledge of language. It shows the breakdown in the development of language abilities on the usual developmental schedule. On the subject of the descriptions of disorders, there is a great need for descriptive case studies of the language of disordered people. Also normative models of language development are must to describe the delay found in child language acquisition, which can be provided only by a linguist. Regarding intervention, the linguist's role is to help the clinician in planning the linguistic interventions if needed and to monitor the outcome of intervention over a period of time. It is the role a linguist to investigate the language behavior of the intervention provider, teaching materials used, and the environment of intervention provided, as it also can modify the outcome. So speech-language pathologist has to coordinately work with a psychologist and linguist for the assessment and to provide Remedial measures.

*Clinical Linguistics- Theory and Applications* covers different aspects of speech and language pathology and it provides a fairly comprehensive overview of the complexity and the emerging importance of the field, by identifying and re-examining, from different perspectives, a number of standard assumptions in clinical linguistics and in cognitive sciences. The studies encompass different issues in phonetics, phonology, syntax, semantics, and pragmatics, discussed with respect to deafness, stuttering, child acquisition and impairments.



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# 1

## REPETITIVE EXTRALINGUISTIC, PROSODIC AND LINGUISTIC BEHAVIOR IN AUTISM SPECTRUM DISORDERS-HIGH FUNCTIONING (ASD-HF)

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### INTRODUCTION

Restricted repetitive behavior has been a defining feature of the Autism Spectrum Disorders (ASD) since the original description of autism (Kanner, 1943), and by diagnostic convention, all individuals with ASD display some form of these “restricted repetitive and stereotyped patterns of behavior, interests, and activities” (Diagnostic and Statistical Manual for Mental Disorders-Forth Edition [DSM-IV], American Psychiatric, [APA], 1994:71). Although ASD is associated with a wide range of specific forms of atypical repetition, this issue received far less research attention than social and communication deficits. Indeed, it was not our original attention to examine the prosody of ASD high functioning (ASD-HF) children from the perspective of the presence or the absence of repetitive behavior, we were concentrating on “prosody” within the context of linguistic behavior - whether or not the manifestation of the “different” prosody by ASD-HF individuals may reflect “delays and deficits in language and communication”, which is another core feature of ASD. However, the data we collected in our research brought this issue into focus and raised new questions regarding the centrality of the restricted repetitive behaviors in ASD.

This chapter is based on results and insights from linguistic research. This research (Green, 2010) comparing and contrasting the prosodic features of 20 peer-matched 9-13 year old male Israeli Hebrew-speaking participants (10 ASD-HF subjects and 10 controls without developmental disorders (WDD) strongly indicated that the prosodic features that were examined exhibited a limited and repetitive repertoire in the ASD-HF population compared with the prosodic features of the WDD control population (Green, 2005; Green & Tobin 2008a, b, 2009 a, b, c; Green, 2010). Furthermore, this significant limited repetitive repertoire of behavior patterns was also exhibited in the extra-linguistic and the linguistic (lexical) domains of the ASD-HF participants.

## THE EXPERIMENTAL RESEARCH

As already noted, this chapter is based on experimental research and deals with the “restricted repetitive behavior” phenomenon. In the original linguistic-oriented research there were four major goals:

- To describe, compare and contrast the phonetic realization of the fundamental frequency and the prosodic features of intonation in the language of children with ASD-HF and WDD children,
- To establish a methodology which allows the analysis of more than one feature of prosody simultaneously,
- To make use of instrumental measurements, (using recently developed speech technology tools) as well as perceptual analysis, and
- To explain the results within the context of the theory of Phonology as Human Behavior (PHB) (e.g. Diver, 1979, 1995; Tobin, 1997, 2009), a linguistic theory which declares that: (a) Language is a symbolic tool, whose structure is shaped both by its communicative function and the characteristics of its users (Tobin, 1990, 1993, 1994, 2009), and (b) Language represents a compromise in the struggle to achieve maximum communication using minimal effort as presented in the theory of Phonology as Human Behavior (PHB) (Diver, 1979, 1995; Tobin, 1997, 2009).

Our empirical data were drawn from the speech samples of 20 children between the ages 9-13 years, in two main groups:

- Research group: subjects diagnosed clinically with ASD-HF (N=10)
- Control group: participants without developmental disorders (WDD, N=10)

The research group includes ten children with ASD aged 9-13 years. They were recruited from mainstream schools that have special education classes for children with ASD. The ASD diagnosis was made by a child psychiatrist who determined that the child met the DSM-IV, APA (1994) criteria for autism. Each child’s special needs were discussed and defined by an “Evaluation Committee”, entrusted with the placement of special needs pupils in appropriate class settings. For all of the children in this group the committee determined that a special class for children within the ASD spectrum is required. IQ scores were re-assessed by the school psychologist within the current year using the Wechsler Intelligence Scale for Children - a Revised Edition [WISC-R]. For the purposes of this research, High Functioning is defined by an IQ 85 and above. All ASD subjects have typical, within the average, school performance in the mainstream class in language and reading, as reported by their teachers.

The control group was composed of children without developmental disorders (WDD) and was drawn from the same schools as the research group. Similar to the research group subjects, in their teachers’ judgment, all the children are average students and do not exhibit any particular academic difficulties or exceptional abilities. The group members have not been tested to determine their IQ scores, but from the information received in interviews with the teachers and parents it can be assumed that they have intelligence in normal range. Their parents report that they have not been referred to a specialist for any developmental reasons. In our study, two language measures were used for peer matching. In addition to similar chronological ages (within two month), the peers were matched on the basis of (a) language fluency in spontaneous-speech sample as measured in MLU-W (within the minimal linguistic unit of one word) and (b) the standardized score of the verbal part in the IQ test within the norm or above. Match between subjects and controls are presented in Table 1.

The analysis of the speech samples of this group provides the basis for the characterization of the prosodic features of Israeli Hebrew (Green, 2009a; Green & Tobin 2009b, c; Green, 2010). All participants were male and at least second generation Israeli-born, and were monolingual speakers of Israeli Hebrew (IH). All participants were from comparable socioeconomic backgrounds and attend mainstream schools. Their mothers all have at least 12 years of education, an indication of socioeconomic status, since maternal education level is the most significant predictor of language functioning in children (Dollaghan et al., 1999). None of the members of the participants’ immediate families has learning or other known disabilities.

**Table 1.** Matched peers and subject’s characteristics

ASD-HF subjects					WDD control group				
Research Group ASD-HF	Mo	VIQ	PIQ	Age	MLU -W	Control Group WDD	Mo	Age	MLU-W

1-ADR	13	109	94	9:0	5.62	11-AVY	13	9:0	5.28
2-ITE	17	121	91	9:2	5.34	12-NIS	15	9:3	4.04
3-UDX	15	108	94	10:8	7.86	13-IDR	17	10:7	6.94
4-YOL	17	111	101	11:1	5.77	14-YVO	16	10:11	5.16
5-RAE	12	86	97	11:6	5.68	15-ITS	17	11:6	4.04
6-BAB	17	109	97	11:11	7.42	16-AVS	16	11:9	7.18
7-ETR	16	100	102	12:5	5.14	17-LIS	13	12:3	5.22
8-TOB	15	108	99	12:8	6.42	18-IDW	16	12:6	6.20
9-NOR	14	90	99	13:0	6.5	19-OMX	14	12:11	5.86
10-OMG(*)	14	89	85	13:0	4.8	20-IDS	17	12:11	6.1

Mo=Mother's years of Education, VIQ/PIQ= verbal/performance Intelligence score (WISC-R) (\*) Participants 10 and 20 do not meet the requirements of the definitions used for peer matching, and are consequently excluded from comparison between the groups. Their results are, however, included when the discussion is about differences within the group.

The speech samples were collected at the participant's house, in his own room. There were three types of elicitation tasks: (a) Repetition: this task comprised four sentence pairs, a WH-Question and its answer, (b) Reading Aloud: participants were asked to read a short story, and (c) Spontaneous speech: these were elicited spontaneous speech sequences in response to open questions, relevant to the child's daily life.

In order to conduct acoustic analyses the speech files were digitized at a rate of 44.1KHz with 16-bit resolution, directly into a laptop computer (Hp Compaq 6710b), using the speech-recording software Audacity (a software package for recording and editing sound files) and a small microphone. The data were subsequently analyzed using the speech analysis program Pratt, version 5.0.30 (Computer program, from <http://www.praat.org/>). Scripts were written to extract data from the transcriptions. Script is a short program that is used to automate Pratt activities and enables the analysis of large data sets, quick processing of information and results, preparation for the use of simple statistics tools, and generation of summary information for control purposes, i.e. to identify errors in the manual transcription process.

## RESTRICTED REPETITIVE BEHAVIOR

Restricted repetitive behaviors are a heterogeneous group of behaviors and a wide range of specific forms of atypical repetition that have been identified and described with relation to ASD (e.g. APA, 1994; Bodfish et al., 2000; Esbensen et al., 2009; Kanner 1943; Lewis & Bodfish, 1998; Militerni et al., 2002; Richler et al., 2007; Rutter, 1996; Szatmari et al., 2006; Turner, 1999). This restricted repetitive behavior can be observed across individuals with ASD, and multiple categories of abnormal repetition can occur within the individual with autism (e.g. Lewis & Bodfish, 1998; Wing & Gould, 1979). These behaviors can be socially inappropriate, increase the plausibility of living in a more restricted environment, and stigmatizing (Bonadonna, 1981; Durand & Carr 1987, Varni et al., 1979).

Several researchers who examined age related aspects of repetitive behavior patterns in ASD suggested that age and level of functioning are associated with variation in the manifestation of restricted repetitive behaviors in individuals with ASD (e.g. Esbensen et al., 2009; Militerni et al., 2002; Lam & Aman, 2007). The overall severity of the ASD has been shown to be significantly positively correlated with the overall severity of repetitive behaviors (e.g. Campbell et al., 1990; Prior & MacMillan, 1973). Esbensen et al. (2009) examined the restricted repetitive behaviors among a large group of children and adults with ASD in order to describe age related patterns of symptom expression and examine if age related patterns are different for the various types of restricted repetitive behaviors. In this research, they combined data from several previous studies to have a large sample size ( $n = 712$ ), spanning a broad age range (age 2–62), and they measured restricted repetitive behaviors using a single instrument, the Repetitive Behavior Scale-Revised (RBS-R: Bodfish et al., 2000) with the modification of the subscales (Lam & Aman, 2007). The empirically derived subscales include: Stereotyped Behavior (movements with no obvious purpose that are repeated in a similar manner), Self-injurious Behavior (actions that cause or have the potential to cause redness, bruising, or other injury to the body), Compulsive Behavior (behavior that is repeated and performed according to a rule or involves things being done "just so"), Ritualistic/sameness Behavior (performing activities of daily living in a similar manner; resistance to change, insisting that things stay the same), and Restricted Interests (limited range of focus, interest, or activity). Their analyses suggest that repetitive behaviors are less frequent and less severe among older individuals than among younger individuals regardless of whether examining total display of restricted

repetitive behaviors, or whether examining each of the various subtypes. One may ask whether restricted repetitive behaviors decrease with age or whether they merely take a different form. A thought previously arise by Piven et al. (1996). Piven's idea was that manifestation of ASD changes as the individual develops.

Other research has suggested that the expression of restricted repetitive behaviors may be influenced by level of functioning (e.g. Bartak & Rutter, 1976; Campbell et al., 1990; Gabriels et al., 2005; Le Couteur et al., 2003; Turner, 1999). Low IQ or presence of mental retardation has been shown to be associated with increased occurrence of repetitive behaviors in autism including stereotypy and self-injury (Bartak & Rutter 1976; Campbell et al., 1990).

Turner (1997) proposed a taxonomy of repetitive behavior; consisting of eleven categories and in a later review (Turner, 1999) suggested that human repetitive behaviors can be divided into (a) lower-level and (b) higher-level categories. Lower-level repetitive behaviors include dyskinesia (involuntary, repetitive movements), tics, repetitive manipulation of objects, repetitive forms of self-injurious behavior and stereotyped movements. Turner's review indicates that although some stereotyped movements and repetitive manipulation of objects might be differentiating features of autism, there are some lower-level repetitive behaviors that may rather be related to ability level or the presence of organic pathology (e.g. Bishop et al., 2006; Bodfish et al., 2000; Cuccaro et al., 2003; Esbensen et al., 2009; Fecteau et al., 2003; Militerni et al., 2002; Lam & Aman, 2007; Szatmari et al., 2006). Irrespective of whether these low-level repetitive behavioral characteristics are unique to ASD or exist in a wider range of organic pathological conditions, they are all repetitive extra-linguistic behaviors.

The high-level repetitive behaviors include circumscribed interests, attachments to objects, insistence on maintenance of sameness and repetitive language. Turner (1999) suggested that certain types of higher-level behavior may be characteristic of and restricted to individuals with ASD once a certain level of development has been achieved.

## Repetitive Language Behavior

During the data analysis phase we could not ignore the proliferation of word repetition and repetition of contents. Repetitive language behavior has been reported in the literature (e.g. Perkins et al., 2006), but as far as we can determine there has not been a comprehensive study of questions raised by this phenomenon.

The following is an example of the lexical repetition found in the spontaneous speech of BAB-ASD (age 11:11) regarding his "interest" (*hitanyenut*) in the "sciences" (*mada'im*). The data are taken from sequential utterances in the same short conversation:

- U3: [ ani mi# *halit'anyenut sheli be'ika(r) mada'im* ]  
I from my INTEREST ESPECIALLY LIKE SCIENCE
- U4: [ *hit'anyenti bemada'im kvar begil ca'r* ]  
I was INTERESTED in SCIENCE since I was young
- U5: [ *meod ahavti mada'im* ]  
I LIKED very much SCIENCE
- U6: [ *mada'im # shama'ati shemada'im # ze ha'olam shemisvivenu* ]  
SCIENCE—I heard that SCIENCE is the world around us
- U13: [ ani ohev et kol hamikco'ot aval be'iqar *mada'im* ]  
I LIKE all the subjects BUT ESPECIALLY SCIENCE
- U14: [ *be'iqar mada'im* ]  
ESPECIALLY SCIENCE
- U15: [ ani yoter beqeTa shel *mada'im* ]  
I am more into SCIENCE

## Repetitive Prosodic Behavior

The term 'prosody' is derived from the Greek '*prosodia*', which is a musical term. Metaphorically, in linguistic contexts, it is implied that prosody is the musical accompaniment to the words themselves. The term "prosody" describes the way one says a particular utterance and covers a wide range of phenomena including: intonation patterns, stress and accent, and pauses and junctions, etc. in speech.

Atypical prosody have been reported in a wide range of developmental conditions including dysarthria (e.g. Brewster, 1989; Crystal, 1979; Vance, 1994), aphasia (e.g. Bryan, 1989; Cooper & Klouda, 1987; Moen 2009), in hearing impairment (e.g. Parkhurst & levitt, 1978; Monsen, 1983; Most & Peled, 2007), in developmental speech and language disorders and/or learning disabilities (e.g. Garken & McGregor, 1989; Hargrove, 1997; Hargrove & McGarr, 1994; Wells & Peppé, 2003), in Williams Syndrome e.g. Setter et al., 2007; Stjanovik et al., 2007), and in ASD.