Communication Deficiency in Adult MR

Betsy Yen
Bryn Mawr College, in accord w/ the Dept. of Linguistics at Swarthmore College

It is virtually impossible to imagine a life with the perpetual inability to express one's thoughts, feelings, and needs. For the Mentally Retarded, this plight has become entwined with their daily lives, and for Mentally Retarded Adults, this frustration has persisted for an especially extensive amount of time. When considering the logistics of language acquisition and communication in people with Mental Retardation (MR), researchers often attribute language deficits in people with MR purely within the boundaries of cognitive science and psycholinguistics, without giving much credence to sociological or individual, circumstantial factors—and the therapeutic methods that have derived from this existing research reflect this discrepancy. However, it is crucial to be cognizant of the fact that MR Adults are an extremely unique group, and it is for this reason that prescribed methods of therapy that prove effective in other language groups are ineffective on adults with MR.

This thesis examines the communication deficits that MR Adults encounter based on the observations of 24 adults, ages 27-65, who are all similar in the fact that they are Mentally Retarded, but diverse in the severity of their condition, their personal and medical histories, and their social situations. We become conscious of the obvious but often overlooked fact that adults undergo developmental milestones contingent on external factors that often modify their cognitions. By observing the characteristic communicative plights—both in a theoretical and applied framework-- among MR Adults, we establish the functions of cognition, ability, and environment with respect to MR and linguistic expression. We assess the relative importance of the nature/nurture dichotomy in language acquisition, and then we examine the speculative success of adopting a directly interventional approach that is less dogmatic and more individualized.

Introduction

There are many nuances of language that are important to its function that people often

overlook or take for granted. From the atomic properties of speech to the implicit

mannerisms that dictate how people interact with each other, it is the many facets of language

and communication that allow a society to function. However, there exists a large society of

people with Mental Retardation whose cognitive deficits prevent them from mastering these

nuances of language, and this phenomenon in itself is also often overlooked. Most people

have only had fleeting interactions with individuals with MR, so they do not fully realize the

extent of this problem. They may have gained the impression that communication is awkward

and that attaining mutual comprehension can be an arduous task, but that is the extent of it.

Before my experience at the habilitation center, I had also but fleeting interactions with MR

Individuals—but after the prolonged interactions with the MR Adults at the center, I began to grasp how these problems contributed to the overall difficulties of their lives. I came to the realization that MR affects not only the inflicted, but also the people in their lives who struggle to communicate with them. Linguistics examines the nuances of communication, and the communication deficiencies of the MR Adults at the center characterize these very effectively. This thesis will use formal linguistics and cognitive science to elucidate a very real problem that affects very real people, and then bring them into a more applicable, relevant light. Hopefully, the true extent of this frustrating problem will be realized, and perhaps this will inspire further research to amend this problem for the entire society of MR Adults.

1. Overview

1.1 Mental Retardation (MR)

MR is a syndrome of delayed or disordered brain development that results in difficulty acquiring information and skills needed to adapt to environmental changes. Estimates of the prevalence of MR fall at about 1.5% of the general population (Rondal & Edwards, 1997), and in the United States, it represents over 3 million people. The severity of MR is quantified on a four-level, 70-point psychometric scale: Mild (IQ range=50-70; the least pervasive), Moderate (IQ=35-49), Severe (IQ= 20-34), and Profound (IQ= below 20; the most pervasive). The most common causes include brain injury, chromosomal abnormalities, exposure to noxious conditions during fetal development, and perinatal factors, among other causes (Ainsworth & Baker, 2004). However, for 75% of diagnosed children with mild symptoms and 30-40% of those with severe symptoms, there is no identifiable cause.

1.2 Cognition in MR

In the context of Mental Retardation, cognition primarily refers to learning and memory. A complete measure of cognitive behavior in terms of information processing should consist of a determination of three characteristics (Das, 1984): 1) Competence, 2) Processes, and 3) Prescription.

Competence (Barron, 2006) is understood as the ability to act on the basis of understanding. It refers to the norms for the age culture, or how well individuals function and adapt relative to everybody else. It is a way of sorting people in terms of efficiency—so the psychometric IQ test measures competence because it metes people based on their test scores, which are relatively based. Otherwise there would be no way to distinguish different levels of intelligence, such as the gifted, the average, and the sub-average, among which there is the Mild to Profoundly Retarded persons. This thesis utilizes the Stanford-Binet Intelligence

Scale, Fifth Edition (SB5), as its basis for the measure of competence. It is formally accepted as a wide-ranging, individually administered test battery that measures five cognitive factors—Fluid Reasoning, Knowledge, Quantitative Reasoning, Visual-Spatial Processing, and Working Memory—in both the verbal and nonverbal domains (Roid & Barram, 2004). The composite intelligence quotient (IQ) scores for the SB5 have a mean of 100 and a standard deviation of 15. Thus, an average individual would have an IQ of 100 and an individual with MR would have an IQ of 70 or below[2].

Processes (Das, 1984) refer to the coding and planning functions of the brain. The brain can be broken down into three blocks: arousal functions, located in the upper brain stem and hippocampus; coding and integration, located in the occipito-parietal area and in the fronto-temporal area; and the planning and decision-making aspects of behavior, located in the frontal lobes. Within the framework of MR, certain tasks act as marker tests for any abnormalities can be tested on brain-damaged patients in order to verify the nature of the processes underlying the tests. This can be accomplished by administering the tests to groups of neurologically impaired individuals—such as MR Individuals—with focal damages in the frontal versus non-frontal areas (planning factor), occipito–parietal as opposed to fronto-temporal areas (simultaneous and successive coding), and damages to the lower area brain stem (disorders of arousal). Prescription is not as subjective with its assessment of a patient's cognitive functions. Instead, it is a measure of how effective and efficient training and remediation would be to the individual, based on his/her competence and processes.

Also along the lines of cognition, MR Individuals are more pronounced in their cognitive inertia than Non-MR Individuals. Cognitive inertia is similar to the notion of cognitive rigidity, wherein there is a lag in a mental process after that process apparently is no longer needed. Cognitive inertia is caused by the automatization of a certain behavior and a deficit in effortful processing that results in a failure to control that automatized behavior (MacLean, 1997). But this is what accounts for the 'slow' disposition of MR Individuals, and this has direct effects on functions such as attention span and response rate.

1.3 Retrieval
In terms of memory, or retrieval, MR Individuals have weaknesses in short-term memory (STM) that greatly affect language development (Rondal, & Edwards, 1997). Alan Baddeley (1997), who also refers to STM as working memory (WM), described a cognitive system supervised by the WM called the phonological loop, which controls the manipulation of speech-based information and is able to retain limited amounts of information at a time. The

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[2] Refer to Section 1.1 of the thesis

phonological loop also entails a phonological store that holds speech-based information and an articulatory control process based on inner speech, which is essentially mentally articulated speech that remains unvocalized. Because the phonological loop passively loses information over time, rehearsal is necessary to refresh the data held in the loop. The articulatory control process thereby refreshes the rehearsed items maintained in the WM, and after an extended period of time, the information could possibly be processed into long-term memory (LTM).

Baddeley (1997) suggested that the phonological store plays an important role in retaining strings of incoming words for a certain period of time while pending the construction of more durable representations of the sentences' syntax and semantics. But because MR Individuals have profound and lasting limitations in WM, they have difficulty acquiring new words, and they also suffer from attention control disorders, slow articulatory rates, and underdevelopment of rehearsal strategies and inner speech. It is clear that language remediation for MR Individuals ought to address the WM, including enlarging WM spans, accelerating speech rates, and installing adequate rehearsal strategies.

1.4 Acquisition

The object of any language acquisition model is to illustrate and predict the processes through which language is acquired. To properly acquire a language is to properly acquire its grammar, and at least three components are necessary for any theory of grammar to be considered adequate: semantics, syntax, and phonology. While this is a rather broad view of grammar and language, it is the basis of the psycholinguistic acquisition model (Ruder, 1972).

The aforementioned model is based primarily on a generative-transformational theory of language as developed by Noam Chomsky. Chomsky distinguishes a person's linguistic competence from his performance. Competence is "the speaker-hearer's knowledge of his language" whereas performance is "the actual use of language in concrete situations" (Chomsky, 1965). It is important to note that linguistic competence itself cannot be measured directly but rather, can only be inferred from performance data based on imitation, comprehension, and/or production. Therefore, performance is what is observed while competence, in this context, is the inferred rule governing that performance (Ruder, 1972).

2. Theoretical Linguistics: The Data

While instances of psycholinguistic function in relation to language acquisition and language processing are generally universal, observing the linguistic habits of MR Individuals can be especially valuable in helping linguists further understand the field of psycholinguistics and the implications of cognitive dysfunction on speech and language.

The following data portrays communication deficiency in Adult MR under a theoretical framework (as opposed to a more generalized or practical framework, which is elucidated in Section 3.1). The data is based on the conversational performance of 24 Adults, ages 27-65, with Mild to Profound MR. They are patrons of a small habilitation center in Eastern New York. The individuals for whom the data is based are divided into the Verbal Group and the Nonverbal Group.

Table 1. The basic information of 24 MR adults, collected by Betsy Yen (subsequently "B.Y." in the data).

The Verbal Goup

Name*	Gender	Age (years)	Tested IQ** (MR Range)
M.S.	F	33	69 (Mild)
D.R.	F	36	58 (Mild)
R.W.	M	52	58 (Mild)
J.H.	M	37	57 (Mild)
M.R.	M	46	54 (Moderate)
M.B.	M	63	52 (Moderate)
B.A.	F	66	44 (Moderate)
S.F.	F	31	42 (Moderate)
A.D.	F	44	40 (Moderate)
J.K.	F	53	40 (Moderate)
M.M.	F	43	40 (Moderate)
A.I.	M	36	40 (Moderate-Severe)
P.G.	M	53	36 (Moderate-Severe)
M.E.	F	50	40 (Moderate-Severe)
S.C.	M	44	35 (Severe)
A.G.	M	64	35 (Severe)
H.P.	M	65	35 (Severe)

The Nonverbal Group

Name*	Gender	Age (years)	Tested IQ** (MR Range)
J.V.	M	27	40 (Moderate)
A.R.	M	50	<20 (Profound)
N.P.	F	35	<20 (Profound)
S.W.	M	40	<20 (Profound)
C.R.	F	56	<20 (Profound)

*All names have been changed
**Based on the SB5 (refer to section 1.2), tests performed within
   the 5-year range of 2002-2007

2.1 The Verbal Group

The Verbal Group, of which the members utilize speech and vocal utterances to communicate, displayed irregularities and/or deficits in Phonology and Phonetics, Pragmatics and Semantics, as well as Syntax and Morphology. Most of the data analyzed were taken down in phonetic transcription. In most cases, the data were spontaneous utterances from the MR

subject, although on some occasions, the subjects were asked to name things or asked questions to elicit responses revealing a particular phenomenon.

I. Phonology and Phonetics

Phonological and phonetic development in MR Individuals is influenced by various internal and external factors (Stoel-Gammon, 1997). Obvious factors include hearing loss and oro-facial anomalies, which often cause difficulties in perceiving and producing speech, and the implications of such impediments can include compromised input and verbal memory. The precise impact of these factors varies with every individual, but many MR Individuals suffer from middle ear infections and abnormalities that result in some degree of hearing loss. In addition to difficulties in acoustic phonetics, MR Individuals also possess a variety of anatomical and physiological features that may affect articulatory phonetics, or simple speech production (Stoel-Gammon, 1997; Rondal & Edwards, 1997; Roach, Barratt, Miller, & Levitt, 1998). These include differences in 1) the vocal folds, influencing voice quality; 2) structure of the oral cavity and the relative tongue size, influencing articulation and mobility; and 3) having weak or hypotonic facial muscles, which can limit lip movement.

While the members of the Verbal Group come from a diversity of backgrounds that utilize different languages and dialects, which can have very different inventories of sounds, the staff at the habilitation center promotes and communicates in Standard American English (SAE). Therefore, the patrons are taught to exercise SAE articulation. The following phonemically, recorded observations represent consistent phonological deviations from the SAE system.

(1) Lack of contrast in voice/less, un/aspirated plosives; Cluster reduction

(MR Subject):	(SAE surface form)	→	([MR output])
M.R.	Pepsi [pʰɛpsi]	→	[pʰɛgi]
H.P.	truck [tʰɹʌk]	→	[gʌk]
	cook [kʰʊk]	→	[gʊk]
M.M.	bump [bʌmp]	→	[bʌb]
A.G.	clock [kʰlɑk]	→	[kʰlɑg]
A.I.	pig [pʰɪg]	→	[bɪd]
	cake [kʰeɪk]	→	[geɪk]

(2) Final consonant deletion; Vocalization

S.C.	open [oʊpʰɪn]	→	[oʊpʰɪ]
	camp [kʰæmp]	→	[kʰam]

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S.F.	house [haʊs]	→	[haʊ]
	pool [pʰul]	→	[pʰuː]
A.I.	hair [hæɪɹ]	→	[hɛ]
	juice [dʒus]	→	[dʒu]
	stop [stɑp]	→	[stɑ]
M.S.	hurt [hɚt]	→	[hɚ]

(3) Fronting of velar and alveolar consonants

M.S.	myself [maɪsɛlf]	→	[maɪθɛlf]
	going [goʊiŋ]	→	[goʊn]
S.F.	tea [tʰi]	→	[fi]
	Saturday [sæɾəɹdeɪ]	→	[θæɾəɹdeɪ]
R.W.	cousin [kʰʌzɪn]	→	[kʰʌðɪn]
	San Francisco [sæn fɹænsɪskʰoʊ]	→	[θæn fɹænθɪðkʰoʊ]

(4) Gliding of liquids

M.B.	rock [ɹɑk]	→	[wɑg]
A.G.	real [ɹiəl]	→	[wij]
	brown [bɹaʊn]	→	[bwaʊ]

(5) Deletion of /l/ and /r/; Glottalisation

S.C.	barbeque [bɑɹbəkju]	→	[bɑhkju]
	yes [jɛs]	→	[jɛh]
A.I.	white [waɪt]	→	[waɪʔt]
	cat [kʰæt]	→	[tʰɪʔæ]
A.G.	cookie [kʰʊkʰi]	→	[kʰʊʔkʰi]
	color [kʰʌləɹ]	→	[kʰɑ]
S.F.	see [si]	→	[hij]

(6) Deletion of pre-consonant /s/ with (some) compensatory lengthening; Lenition of plosives

S.F.	spoon [spu̯un]	→	[buːn]
	swing [swɪŋ]	→	[wɪːŋ]
M.M.	stop [stɑp]	→	[dɑp]

	yesterday [jɛstəˑɹdeɪ]	→	[jəðəˑɹdeɪ]
H.P.	sticker [stɪkəɹ]	→	[dikə]
A.I.	ask [æsk]	→	[æŋ]

(7) Deletion of post-consonantal sonorants

D.R.	angry [æŋgɹi]	→	[ɛŋi]
	new [nju]	→	[nu]
A.I.	play [pʰle̥ɪ]	→	[be]
A.G.	crunch [kɹʌntʃ]	→	[kʰʌŋk]
H.P.	cream [kʰɹim]	→	[ŋim]
M.R.	tree [tʃɹi]	→	[tʃi]

(8) Metathesis of /r/ and /s/

D.E.	bird [bəˑɹd]	→	[bɹəˑd]
	ask [æsk]	→	[æks]
H.P.	mask [mæsk]	→	[mæks]

In acquiring words, people must learn the number of phonemes in the word, what those phonemes are, and the order in which they occur (Smith, 1973). This is accomplished not by memorizing the sounds in each individual word but by acquiring rules that apply to all words. However, despite having extended exposure to certain words, the MR Adults generally seem to not have fully internalized the phonological rules of SAE.

Whether the implications of this are significant is subject to debate. For instance, the most striking fact of language acquisition is its regularity, and if an individual's phonological acquisition is regular, then one should be able to correctly predict the individual's output for any arbitrary word of the target language (Smith, 1973). Thus, if S.F. regularly weakened her /p/'s, then one could correctly predict her form for *pig* as [bIg] or *pass* for [bæs]. This tendency, although not consistent with SAE phonology, is expected of S.F. Additionally, all people possess a list of phonological rules internal to their own idiolects, and it would be presumptuous to denounce an individual's unique language form. However, the phonological outputs of the MR Adults were rarely regular, and idiolects cannot be made sense of without appeal to a prior communal language (George, 1990). Hence, presumptuous or not, the phonological deviations from SAE cause communication problems for MR Adults because their words and statements are therefore unintelligible, even to the people who are already

familiar with the mannerisms and speech the MR Adults. Their thoughts and needs are recurrently misunderstood or unfulfilled.

Of course, certain phonological deviations are more inauspicious than others. For instance, M.S.'s habit of fronting the velar [ŋ] to the alveolar [n] is negligible, despite it producing an unusual quality to her pitch. However, A.I.'s articulation of SAE *play* as [be] or S.F.'s articulation of SAE *pool* as [pu:] can be problematic. In this context, one could easily misconstrue *play* for *bay*, *may*, or *pay*, while *pool* could easily be misinterpreted as *pew* or *boo*. The inability to properly convey needs and thoughts because of phonological irregularities is a perpetual source of frustration for MR Adults. They must constantly repeat themselves, and even then, there is no guarantee that their addressees will eventually comprehend their expressions.

In addition to muddled phonology, the MR Adults from the Verbal Group displayed difficulties in production—namely, problems with articulation and prosody. The MR Adults, at times, appeared physically unable to produce certain words, wherein they evinced great struggle in enunciation. They also did not adjust their volume, pitch, rhythm, or speed of speech in accordance with their environment.

All in all, MR phonology, as a whole, is full of deficits because it leads to—simply put—unintelligibility. Given the strong implications of unintelligible speech, special attention should be put on the phonological acquisition of MR Children and the phonological intervention of MR Adults.

II. Pragmatics and Semantics

Semantics describes the systematic way in which a language structures meaning whereas pragmatics is the intentional use of language in a given context to achieve interpersonal goals-- and both pragmatic and semantic problems play a prominent role in the definition and diagnosis of MR (Abbeduto & Hasketh, 1997). The linguistic, cognitive, and social-emotional limitations of MR Individuals can greatly influence their pragmatic competence. The interpersonal situations that are most manifest of the MR Individuals' pragmatic problems include informal encounters with friends and family as well as more formal encounters in environments such as school or a job; and most intelligence tests used to diagnose MR require an assessment of one's pragmatic skills because they involve problems that are associated with the adaptive behavior deficits that define MR[3].

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[3] Refer to Section 3.1

Pragmatics is more than a mere transmission of information to others through language—it is the intentional use of language to achieve interpersonal, and this in itself requires proficiency in a number of domains of psychological and behavioral functioning (Abbeduto & Hasketh, 1997). It requires a knowledge of the rules for turn-taking, knowledge of the linguistic markers of politeness, and a number of supporting competencies, such as the mastery of the linguistic system, an intact information processing system that can access a sufficient knowledge base, and an ability to understand and reason about other people's cognitions and actions (Abbeduto, Davies, & Furman, 1988). Despite occasional misunderstandings, people generally are able to understand utterances in most situations essentially as they were intended. Interlocutors normally trust that they and their conversational partners are abiding by the same interpretive conventions. Hearers assume that speakers have honored the conventions of interpretation when they construct their utterances, while the speakers must not only assume that the hearers are guided by the same conventions but also that the hearers trust them to have honored those conventions (Abbeduto & Hasketh, 1997). A pragmatically competent communicator follows pragmatic rules so as to make choices about the use of language in a contextually appropriate manner.

Within the observed MR Adults, their level of conversational turn-taking remained generally decent. They do usually adhere to rules in familiar contexts with minimal cognitive, linguistic, and social demands, such as when determining when speaker change is possible, who can assume the rule of the speaker, or how to claim a turn—all of which demonstrate sufficient knowledge of the social world and of linguistic performance (Sacks, Schegloff, & Jefferson, 1974). However, the pragmatic problems observed among the MR Adults outnumber the pragmatic strengths.

Establishing Referents

Successful communication requires that the participants establish the people, places, objects, and events to which they are referring—the speaker must select words that clarify their intended referents to the hearer (Abbeduto & Hasketch, 1997), but the MR Adults demonstrated difficulty in producing messages that make their intended referents clear to their hearers. Their problems in producing adequate referential descriptions mostly emerged in narrative tasks, such as the retelling of stories or of specific incidents. Consider the following:

(9)   M.B.: My nephew likes to eat chocolate, and we watched TV, there was gospel music. It's good, she sings nice.

(10)   J.K.: *(when asked if she had ever been on a vacation)* We went to Florida. She sat on a boat.

(11)   B.A.: I have <u>two sisters</u>, they are so beautiful. <u>My mother</u> came to school once but I
        got sick and <u>they</u> took me to the hospital. <u>The men</u> are so handsome, I told my sisters
        who looked at <u>them</u> and <u>she</u> fell so <u>he</u> could help <u>her</u> with the surgery.

The MR Adults' difficulties in establishing referents do not seem to be a product of limitations in vocabulary: they appear to have the requisite arsenal of referential pronouns in their lexicon. Instead, their utterances result from a failure to attend to the aspects that distinguish the referents from the non-referents. Although examples (9)-(11) are memory-based events that rely on the speakers' STM and LTM—which may not be fair given the retrieval difficulties associated with MR (as discussed in section 1.3)—the MR Adults also displayed difficulty in establishing referents when placed in the role of the hearer:

(12)   B.Y.: <u>Bobby</u> showed you a <u>movie</u> yesterday. Did you like <u>it</u>?
        M.M.: I don't like <u>Bobby</u>.

(13)   R.W.: I bought a <u>cell phone</u> so I can call my <u>girlfriend</u>.
        B.Y.: Where is <u>she</u> from?
        R.W.: I bought <u>it</u> from the store.

The disambiguation of referential descriptions is contingent on the hearer's ability to analyze contextual information. However, Abbeduto suggests that the pattern of use of various types of contextual information is similar in individuals with MR and in Non-MR Children, which suggests that the development of referential listening skills in the former is because of delay, not deviance (Abbeduto et al., 1996, 1997).

The inability or weakness in establishing referents simply hinders an MR Adult's capability to adapt to society and to be socialized. The hearer of B.A.'s story cannot figure out, at any given point of the conversation, whether she is talking about her sisters, her mother, herself, the male hospital workers, and as a result, the premise of her story is unclear and her point does not get across. Additionally, R.W.'s and M.M.'s inabilities to discern (or complete disregard of) B.Y.'s referential pronouns are equally detrimental in that B.Y. does not acquire the information she seeks. Fortunately, the information that B.Y. attempted to extract is relatively trivial—however, when the information becomes crucial or life altering, extraction is extremely important.

Expression and Comprehension of Speech Acts

The goal of language comprehension in conversation is to identify the speech acts (the social function a speaker intends his or her expression to serve in the interaction) an utterance conveys (Kasher, 1998). Speakers must ensure that their speech acts are recognizable in

context and that their form complies with the various social dimensions of the context. Additionally, recognizing speech acts requires that the hearer not only use clues from the speaker's utterance but also contextual clues. Also, hearers must be cognizant of the "rules of conversation" that account for the criteria a statement must meet if its speaker is the make an appropriate contribution to the conversation. The most influential and well known are the conversational implicatures and maxims as stated by H. Paul Grice, which include the Maxims of Quality (which expresses truth), Quantity (which contributes information), Relation (which stipulates relevance), and Manner (which supports clarity).[4]

The observed MR Adults displayed many difficulties in expressing and comprehending various speech acts. Some MR Adults had fewer difficulties than others: M.S., R.W., B.A., and J.V. (only comprehending because he is Non-Verbal) displayed the greatest understanding of speech acts among all of the MR Adults. However, everybody else evinced significant delays in using or receiving the linguistic forms necessary for the expression or comprehension of particular speech acts. In terms of expressing speech acts, simple assertions and questions were relatively trouble-free for the MR Adults, but expressives and commissives, as well as verbal politeness are areas that needed improvement.

(14)   D.R. (*expressives*): When she is bored, angry, or distressed and wants to be taken home, she will wail, "It hurts!" repeatedly. When asked, "What hurts?" D.R. automatically responds with, "It's bleeding!" When prompted for further elucidation of or when told to give evidence of this ailment, D.R. reverts back to wailing, "It hurts" without providing further explanation. D.R.'s intention is to express her general dissatisfaction of being at the center and for a lack of attention towards her. However, she instead complains of a possibly phantom pain because it has caused her mother to take her home in the past. However, her intended hearers, or the center's staff, unless accustomed to D.R.'s pragmatics, will mistake this for actual, physical pain.

Many of the MR Adults periodically have spastic and excessively emotional outbursts, and this is mostly attributed to a sense of general frustration exacerbated by their inadequate abilities to fully express their feelings. In one incident, J.H. spent an hour attempting to explain that he was disappointed in the fact that D.R. did not want to attend his birthday party and that he wanted me to help him convince her. The disadvantages of having no grasp of expressive speech is exemplary here, because an utterance that should have taken less than five minutes to convey took 60 minutes instead. A Non-MR Individual might have simply stated, "I am sad that D.R. is angry at me and doesn't want to come to my party, but I want her to come. Will you help me?" Instead, he launched into five-minute intervals of rocking back and forth with a despondent expression on his face, and then occasional outbursts such

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[4]For a more thorough explanation, please refer to Grice, 1997.

as "D.R. is mad at me, we got in a fight" and "It's my birthday today, we're having a party." I had to ask him a series of questions to ascertain what the problem was, and it was only after I pieced together his disjointed statements that I understood what was bothering him. Clearly, the MR Adults' overall weaknesses in expressive speech can be extremely detrimental, especially in emergencies where they must be prompt in revealing the problem.

(15)   A.D. (*verbal politeness*): Clearly, A.D. acknowledges that certain customs or routines exist in everyday conversation, such as expressing politeness. Otherwise she would have evinced some degree of confusion or perplexity when I prompted her:

   B.Y.: How are you doing?
   A.D.: Good.
   B.Y.: Aren't you going to ask how I'm doing?
   A.D.: How are you today?
   B.Y.: I'm good. Are you going to ask for my name?
   A.D.: What's your name?
   B.Y.: Betsy. What do you think of the weather?
   A.D.: Hot.
   B.Y.: Would you like some water?
   A.D.: Yes.
   B.Y.: Can you say 'yes, please?'
   A.D.: Yes, please.

A.D. has strong reception for questions and assertives, but she is unable to independently verbalize politeness—which is an important social function-- despite her willingness to adjust her expressions so they are more polite, such as reciprocating questions and adding "please" when making a request.

Actually, many of the MR Adults had this problem, even the Adults with Mild MR. Even M.S., who was the most verbally adroit MR Adult, rarely reciprocated conversation.

(16)   B.Y.: How are you doing today?
   M.S.: *(Continues to focus on her drawing)* I'm good.
   B.Y.: Are you going to ask how I'm doing today?
   M.S.: *(Does not look at B.Y.)* How are you doing today?
   B.Y.: I'm good, too.
   M.S.: Can you give me the pens, please?
   B.Y.: Of course.
   M.S.: Thank you.

Reciprocation is an important aspect of conversation: it unites unacquainted parties, and if one party makes no attempt to or evinces no desire to acquire the other party as an acquaintance, he/she is being impolite (Svennevig, 1999). M.S.'s failure to reciprocate also demonstrates

her deficiency in this type of speech act—although, to be fair, MR Individuals often lack the ability to continue a conversation because of a lack of language skills and/or relevant knowledge to advance the topic (Rondal & Edwards, 1997). But she could have made an attempt to continue the discourse, and at the very least, she understands the proper use of 'please' and 'thank you,' which was virtually nonexistent in almost everybody else.

(17)   M.M. (*commissives*): The staff at the habilitation center frequently takes the MR Adults on field trips to better assimilate them into society, which means that the MR Adults are constantly leaving the premises. M.M., despite having knowledge of what the field trips entail-- because she has been on many-- is either unable or unwilling to pledge her future actions in regard to the field trips, even when it is insinuated that she should.

> B.Y.: Where are you going?
> M.M.: Shopping.
> B.Y.: Have you gone before?
> M.M.: Yes, many times. Bobby gave me two dollars.
> B.Y.: What are you buying?
> M.M.: Don't know.
> B.Y.: When are you coming back?
> M.M.: Don't know.

A Non-MR Individual might, at the very least, give the hearer at least some indication of his/her plans, such as, "I'm not sure what I'm buying, but I might buy some ice cream" or "I'm not sure what time we're coming back, but we came back at around 5 last time, so this time should be no different." Either way, the Verbal MR Adults are rarely heard making promises or impending goals of any kind, and this could be harmful in that it undermines their reliability or competence. This may seem slightly paradoxical, because it was established in Section 1.2 that MR Individuals are inherently not as competent as Non-MR Individuals. However, B.A., for instance, is given the daily task of scrubbing the mirrors in the restroom, and she completes this daily task without any prompting or reminding. Just because she does not commissively state that she will perform the task, that does not mean that she is unable to perform it or that she will not perform it. The MR Adults' absence of commissive speech acts can cause people to underestimate their abilities and motivations, and as a result, they may not be given extra responsibilities that could otherwise help assimilate them into society and promote independence.

MR Adults are more proficient in their comprehension of speech acts than in their expression of them. While the MR Adults displayed a lack of understanding with certain types of questions (they often interpret 'would you' questions, 'could you' questions, and 'do you think' questions as assertives or directives, rather than interrogative statements regarding their

ability, willingness, or opinion of something), this is negligible because they are at least proficient enough to recognize that if a sentence has a rising intonation, the speaker is asking a question. Also, it is clear that the MR Adults struggle the most with the comprehension of indirect speech acts, wherein the MR Adults must use the Gricean maxims to sort out the discrepancy between the literal meaning of the utterance and an appropriate interpretation for the context in which it is uttered (Kasher, 1998).

(18) B.A. (*indirect speech acts*): A common observation amongst the MR Adults is their inability to recognize when a conversation must be discontinued. I never encountered any difficulty instigating a substantial conversation with B.A.—she speaks in complete sentences with no difficulties in articulation, is extremely capable in expression speech acts, and reciprocates conversation. The problem was actually in ceasing the conversation.

> *(B.Y. enters the restroom, where B.A. is polishing the mirror)*
> *(After greeting B.Y., B.A. launches into a 5-minute long story about her sister. The following discourse ensues.)*
> B.A.: Do you have any sisters?
> B.Y.: No, I have two brothers.
> B.A.: Well I'll bet they are so handsome! My sister is beautiful!
> B.Y.: I'm sure she is. *(Directs attention to the restroom stall in an attempt to inform B.A. that the conversation must cease so she can enter the stall)* <u>Do you know if anyone is in that stall?</u>
> B.A.: *(Ignores B.Y.'s question—continues talking despite the fact that B.Y. has begun to enter the stall)* Tell you what, I'll invite you to my birthday party in November. My sister is making me a dress. We go to the store and I pick out my favorite color, and we look at the magazines for dresses. And then she makes it. My favorite color is purple. I have 4 purple dresses, 3 pink dresses, a blue one. The one I'm wearing now, my sister helped me make it!
> B.Y.: *(Enters stall)* Oh? That's great. Can you give me a second? I'll be right out.

While the question "Do you know if anybody is in that stall?" acts as a question aimed towards extracting information in most contexts, it acts as an indirect speech act in my conversation with B.A., who was not at all receptive to it. Ideally, she would have sensed my urgency to utilize the stall and at least paused the conversation until I was finished, but she did not. So I asked her a question in hopes that she would answer "no," which would then enable me to say something like, "alright, good, I'll be right back." However, B.A. is garrulous in nature and tends to talk excessively—violating the maxim of quantity of the cooperative principle—and therefore, one cannot use indirect speech acts to direct a conversation with B.A. But MR Individuals inevitably encounter problems with comprehending indirect speech acts. One prerequisite for a successful indirect speech act is that interactors share sufficient background about the context of the interaction, about each other and their society, and about the world in general (Grice, 1997). If MR Individuals are

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unable to adapt to society—that is, internalize its norms and expectations—then perhaps it would be unreasonable to expect them to always recognize an indirect speech act when they encounter it.

<u>Comprehension of Deixis</u>

One of the purposes of semantics is to determine which parameters are essential to characterize deixis—which is defined by the position of entities and events with respect to specific points of reference (Marmaridou, 2000). Usually, people are able to convey what is at least a fundamental comprehension of this, but the observed MR Adults appeared to have very little or no concept of deixis. Deixis consists of three semantic notions: personal deixis, which is commonly conveyed through personal pronouns; spatial deixis, which refers to orientation in space; and temporal deixis, which refers to orientation in time. The MR Adults sometimes improperly communicate the position of entities and occurrences, as they exist in the world.

(19)   M.E. (*personal deixis)*: M.E. *(referring to herself)* no like juice.

(20)   A.I. (*personal deixis*) : A.I. *(referencing himself)* hurt.

Both M.E. and A.I. refer to themselves in the third-person, instead of using the standard pronoun 'I.' Most likely, they do not fully understand the idea of first and second person pronouns as deictic markers, and they do not realize that in SAE, a third-person reference usually applies to any entity other than the speaker and the hearer. Oddly enough, the MR Adults who do not implement 'I' as a marker of personal deixis usually have no trouble integrating the pronoun 'me' into their utterances. While this could be coincidental, it could have something to do with the idea that 'I' is often compounded into lengthier, more proper sentences whereas 'me' is often used alone (such as when answering questions where the answer is yourself, or in the often-used phrase 'me too'). The MR Adults also have a habit of using spatial referents such as 'this,' 'that,' 'here,' and 'there' in a seemingly interchangeable way to refer to distinctive entities in different locations.

(21)   S.F. (*spatial deixis*): Look! Look here *(referring to the window across the room)*!
        B.Y.   : Where? You mean the window over there?
        S.F.   : Yeah, window!

(22)   A.G. (*spatial deixis*): *(When asked what he wants for lunch)* That!
        B.Y.   : What? This *(pointing to a fruit salad)*or this *(pointing to a bowl of stew)*?
        A.G.   : This *(not referring to anything in particular)*!
        B.Y.   : *(Pointing to the fruit salad)* That?
        A.G.   : No!

B.Y.	: You want the stew?
A.G.	: *(No response)*
B.Y.	: *(Pointing to the stew)* This?
A.G.	: Yeah, this!

It is apparent that S.F. does not know the difference between 'here' and 'there.' She is unaware that 'here' refers to entities positioned within closer proximity whereas 'there' refers to something more distant. The same applies to A.G.: he does not comprehend the functions of 'this' and 'that.' From example (22), it can even be inferred that he thinks that 'this' and 'that' are the names of the food items. After all, after B.Y. asked him whether he wanted "this" or "this"—after establishing where they were positioned in physical space—A.G. simply responded with "this" without referencing anything in particular. We finally figure out that A.G. had wanted the stew, but because B.Y. referenced the stew as 'this,' A.G. must have thought that 'this' was the name for 'stew.' Equally problematic is how the MR Adults do not seem to know how to position the referents of actions (whether it be themselves or other people) and events in time. Thus, they often talk about past events as if they were presents events, and vice versa.

(23)   J.K. (*temporal deixis*): I've been to Florida.

B.Y.	: You have? When was this?
J.K.	: <u>Yesterday</u>.
B.Y.	: But you were here yesterday.
J.K.	: Last year.

(24)   M.M. (*temporal deixis*): I go home <u>soon</u>.

B.Y.	: But it's only 11 o'clock. Don't you usually go home at 3?
M.M.	: I go home at 3.
B.Y.	: Are you going home early today?
M.M.	: No.

The discrepancies in temporal deixis cause much confusion. J.K. has been known to lie chronically and to simply say the first thing that comes to her mind when somebody asks her a question, but in this context, it seems like she used the word 'yesterday' to refer to the general past. Of course, J.K.'s deictic problems go beyond the temporal kind because most of her statements have no reference to real-world entities or events, whatsoever; but that is just her inability to be truthful with her statements. M.M.'s use of 'soon' was also misleading because it led B.Y. to think that she was going home early. While 'soon' is extremely general and does not reflect a specific point in time (such as 'yesterday' or '1 p.m.'), 3:00 p.m. is not relatively soon to 11:00 a.m. if M.M. arrived at the center at 9 a.m.

Altogether, the MR Adults' improper use of deictic markers creates confusion and simply makes it more difficult for them to get their points across. The misleading nature of their

statements violates the conversational Maxim of Quality. J.K. has no articulatory problems whatsoever, and her computational language functions are fine: her basic grammar and word order are impeccable. However, because she has an extreme form of Autism (refer to Section 4.2), she is unable to properly interact with others, and as a result, she does not realize that when people seek information from her, they do not merely want a response but that the information they seek must correspond to something in real life—that the information must be true. Unlike M.M., who may not actually comprehend the notion of the word 'soon,' J.K. does know the difference between 'yesterday' and 'last year.' Thus, while most MR Adults, such as M.M., inadvertently violate the conversational maxim of truth, others--such as J.K.-- flout the maxims with little regard, and much of this manifests through improper deictic markers. Of course, this is all extremely detrimental: if the MR Adults cannot sync their utterances with the world, with space, and with time, then they will be perceived as even more unreliable.

III. Syntax and Morphology

Based on the utterances of the MR Adults at the center, it is likely that MR Individuals in general have delayed computational language capacities. Morpho-syntactic development, in particular, is largely incomplete and invariably problematic, especially with the MR Adults who are closer to the Severely Retarded side of the psychometric spectrum. M.S., D.R., R.W., B.A., and J.K. displayed the least problems, in terms morphology and syntax, but they are also the most articulate amongst all of the MR Adults, and none of them are Severely Retarded. They are also the most fluid with their speech: that is, the MR Adults who have irregular word-order and reduced incidence of grammatical markers have a 'telegraphic' quality to their speech, and this is more prevalent amongst the more Severely Retarded MR Adults. But the language errors typified by the MR Adults include the inaccurate use of morphological and syntactic features such as the proper marking of number, gender, tense, and aspect, and the frequent omission of articles and conjunctions.

Non-Conventional Word Order

While word order is by no means any simpler to master than other grammatical devices, most people living under normal circumstances are able to internalize the computational aspects of language before the onset of puberty[5]. It is unclear how children are led to recognize their patterns of speaking and listening in the course of growing up, but one known method amongst speech therapists is that of 'verbal bombardment,' wherein caretakers talk to their children as much as possible so as to maximize the number of syntactic patterns exposed to the children (Haas & Haas, 1972). How much exposure the MR Adults received in the past is

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[5] Refer to Section 4.1

variable, but the MR Adults currently do not lack exposure to samples of SAE, especially now that televisions and radios are so widespread. Yet, the way in which some of them organize their sentences is sporadic and not consistent with SAE word order.

(25)　　M.R.: (*compounded with gesticulations*) Bobby coffee he make
　　　　　　　　　　　　　　　　　　　　　'Bobby made coffee.'

(26)　　B.Y.: What did you eat for breakfast?
　　　　H.P.: (*elongated phonology and prosody*) Cereal eat and milk
　　　　　　　　　　　　　　　　　　　　　'I ate cereal (and/with) milk'

(27)　　A.I.: (*in exclamatory outbursts*) Home A.I. *(referring to himself)* go!
　　　　　　　　　　　　　　　　　　　'I am going home.'

A majority of the MR Adults did not display any particular problems with word order in simple utterances, but a few individuals—particularly the ones mentioned in examples (25)-(27)—cannot conform to SAE word order even on a basic level. The three statements are normally SVO-compounds, but M.R.'s utterance was in the form of SOV, H.P.'s in O(S)V with the subject omitted altogether, while A.I. had somehow produced an OSV compound. Other MR Adults who also encountered problems with SVO-structures include P.G., M.E., S.C., and A.G., but for the most part, the rest of the MR Adults were unproblematic in this aspect. Incidentally, the aforementioned MR Adults are of the more Severely Retarded individuals of the group, with the exception of M.R.[6], but it is also important to note that none of the 24 MR Adults in the center ever deviate from simple sentence structures when they communicate. Most of the MR Adults have no difficulty forming or comprehending declarative, active sentences, and they have no difficulty comprehending active simple, active WH-questions; but the incidence of passive sentence constructions and subordinate clauses in their speech are extremely low, and it is debatable whether they can even comprehend statements in the passive voice.

 In any case, it is this irregular syntax that creates a disjointed, 'telegraphic' quality in some of the MR Adults' utterances. It is unclear whether these MR Adults are consistent with their irregular syntactic structures; they do not follow SAE syntax, but perhaps they implement their own idiolectic structures that can be predicted with prolonged interaction. However, even the MR Adults must learn to communicate with people they are not accustomed to— and while the deviant syntax are not so malformed that the utterances are completely indecipherable, they are exacerbated by the MR Adults' abnormal phonology, which are also inconsistent with SAE (refer to Section 2.1-I). Most of the people with whom the MR Adults

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[6] This will be explained in Section 4.2

must communicate utilize SAE, and thus, the MR Adults should be encouraged to master all aspects of SAE, including its syntax.

Reduced and Unstable Grammatical Morphology and Syntax

The MR Adults were highly variable in their production of both free and bound morphemes, even in obligatory contexts. They had the tendency to omit or incorrectly use various grammatical elements, such as articles, prepositions, pronouns, modals, copula, auxiliaries, and conjunction, and they had difficulty inflecting words for tense and number.

(28)   A.D.: We <u>watch</u> <u>movie</u> today
                'We <u>watched</u> <u>a movie</u> today.'

(29)   M.R.: *(with gesticulations)* He <u>push</u> M.R. *(referring to himself)* on <u>sidewalk</u> I <u>fall</u>
                                'He <u>pushed</u> me on <u>the sidewalk</u> <u>and</u> I <u>fell</u>.'

(30)   M.E.: Where <u>you get</u> your watch?
                'Where <u>did you get</u> your watch?'

(31)   S.F.: No more <u>pencil</u> here (*referring to a small box*)!
                '(<u>There are</u>) no more <u>pencils</u> <u>in here</u>!

All of the previous statements display some degree of ungrammaticality due to improper morphology or to the syntactic omission of certain functional elements. (28) and (29) are lacking in verb and tense agreement, and (30) and (31) are lacking in other aspects. A.D. and M.R. are both missing articles before their nouns, M.R. did not insert a conjunction when making a transition of statements, and S.F.'s utterance is missing a preposition. The MR Adults' sporadic use of morphemes gives their speech a child-like quality, which is evident in every single MR Adult at the center-- with the exception of B.A. and J.K.-- and the more Severely Retarded patrons manifest this to a greater degree than the more Mildly Retarded patrons. This is arguably detrimental: the MR Adults are all 27-65 years old, but the manner in which they speak do not correspond to their physical ages. On the other hand, most MR Adults have the mental ages of Non-MR Children, but the goal of language intervention is to help assimilate MR Individuals into society. Ideally, their linguistic capabilities should be a reflection of their technical adulthood and progressive maturation, but because MR Individuals have a developmental handicap, society will never accept these MR Adults as consenting adults--both socially and legally—and their child-like speech caused by stunted morphological development only promotes this unfortunate circumstance.

Morphophonemic Condensation and Verbal Non-Fluency

Also known as 'slurring,' some of the MR Adults tend to condense their morphemes and phonemes, leading to indistinct speech. Their utterances run together because they speak in a

hurriedly and carelessly, or they mumble. Conversely, other MR Adults do not have enough fluidity in their speech, and their utterances are replete with seemingly involuntary repetitions of certain phonemes and morphemes. Deficits in motor coordination and timing may be partly responsible for this prevalence of stuttering or stuttering-like phenomena observed in MR Individuals (Rondal, & Edwards, 1997). The MR Adults who most prominently display morphophonemic condensation include M.B., S.F., A.I., M.E., A.G., and H.P., while the patrons with the most severe verbal non-fluency include R.W. and M.E. However, these morphological (and phonological) deficiencies are not always a result of the cognitive limitations associated with MR—many Non-MR Individuals 'slur' and 'stutter' in their everyday speech. Instead, these could be due to the various anatomical or organic articulatory defects that affect many MR Individuals or to other co-morbid disorders[7]. While it is unfortunate that these MR Adults must overcome productive morphological deficiencies in addition to grammatical ones, they should be encouraged as early as possible to enunciate and to speak slowly.

Overall, the MR Adults are generally sufficient with the construction and comprehension of morpho-syntactic phrases, as long as they are not overly complex, but researchers believe that the major part of the individual variance in morpho-syntactic development must be attributed to brain differences between MR Individuals (Rondal & Edwards, 1997). This is consistent with the data: with the exception of M.R., the MR Adults with the most markedly irregular morpho-syntax are the more Severely Retarded individuals of the group. One of the main causes of the language deficits and irregularities must lie in the underlying grammatical system of each individual and must have an inherited component. As mentioned before, the more exposure to different morpho-syntactic SAE constructions one experiences, the more he/she internalizes, but there is no guarantee that these constructions did not 'go in one ear and out the other' for the MR Adults, so to speak. This is not unlikely: the MR Adults all appeared to have some form of Attention Deficit Disorder, probably caused by the cognitive inertia discussed in Section 1.2. Perhaps the degree of cognitive inertia is proportional to the severity of MR, and it is the degree of cognitive inertia that dictates how much morpho-syntactic information MR Individuals are able to pay attention to and thus internalize—but this is speculative and should be explored in further research.

2.2 The Nonverbal Group

The Nonverbal Group refers to the group of MR Adults who do not utilize articulated speech to communicate. This group comprises of five individuals, four of whom are Profoundly Retarded. With the exception of J.V., these individuals are the most difficult to communicate

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[7] Discussed briefly in Section 2.1-I and in Section 4.2-I

with, and S.W. and C.R. are especially challenging because they also have co-morbid Autism[8]. It is possible that these MR Adults have anatomical abnormalities that render them unable to articulate speech; J.V. and C.R., for example, both have Epilepsy, and S.W. has Cerebral Palsy. However, it is more likely that Profound Retardation makes the successful acquisition of computational language processes nearly impossible and that the implications of this are manifest throughout their lifetimes. The tremendous level of difficulty involved in communicating with the members of the Nonverbal Group can be attributed to a number of shortcomings, not just related to the mere lack of verbal performance.

I. Lack of a Comprehensive Sign System

People with MR typically exhibit deficits in expressive language skills that are disproportionately more severe than their cognitive limitations (Mundy, Sigma, Kasari, & Yirmiya, 1988). Nonverbal MR Individuals often rely on nonverbal acts such as eye contact, direction of gaze, gestures such as pointing, vocalizations, and combinations of these acts to refer to objects and events—but the MR Adults have obviously undergone intransitory periods where they routinely and consistently see the same people and perform the same tasks on a daily basis, at least for that period of time. As a natural consequence, they must have developed a consistent method of referring to the people, things, and tasks they regularly encounter. The members of the Verbal Group simply assimilate new words into their lexicon and articulate them when needed. But members of the Nonverbal Group must develop some sort of idiolect comprised of various gesticulations to make references.

However, despite their formidable attempts at sign interaction, the Nonverbal Group were still unintelligible. Firstly, none of them had any proficiency in any formal sign language. Some of their gesticulations may have been borrowed from American Sign Language (ASL), which is what the center's staff members were trained to instruct the patrons. But apart from sporadically utilizing gesticulations that resemble ASL signs, they fail to incorporate ASL syntax and proper ASL articulations, so they really do not have a comprehensive, systematic means of communication. Secondly, their gesticulations were arbitrary. Usually, they would accompany their gestures with inarticulate noises, and based on the volume and pitch, I was able to better determine what they wanted to convey.

For example, A.R. would wave his balled up fist from side to side and grunt loudly when he needed to use the restroom. The ASL sign for 'bathroom' is made by forming the right hand into the letter 't' with the palm facing away from the expresser and shaking the hand from side to side (Sternberg, 1994). Although A.R.'s conventional gesture for 'bathroom' is

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[8] Refer to Section 4.2-I

relatively similar to the ASL sign for 'bathroom,' I would not have been able to guess that A.R. needed to use the restroom had he not compounded the gesture with a loud, urgent grunt. His gesticulations are lethargic, and I had initially thought that he wanted to direct my attention to a certain direction. But his motion resembled ASL's 'bathroom' just enough so that I was able to realize he was attempting to express 'bathroom' when he vocalized a needy grunt.

Also, C.R. attempted to express the ASL sign for 'coffee,' but her hand movements were so exaggerated and her gesticulations were so rushed and careless that I was unable to discern her reference. It was only after one of the staff members who was accustomed to her gesture idiolect and who was familiar with her affinity for coffee offered me an explanation that I understood C.R. was signaling 'coffee.' While she did provide cues by vocalizing a loud grunt that could only be associated with hunger or thirst and by shifting her eyes towards the kitchen door, I was still perplexed, nonetheless.

Both C.R. and A.R. demonstrate that Nonverbal communication is not effective without a mutually comprehensible system. One of the members of the Verbal Group, M.R., often attempts to incorporate ASL signs when communicating; and despite the fact that his gesticulations are not always precise or consistent with ASL, they are helpful nonetheless because his phonology is only slightly muddled and his gesticulations are consistent enough that they effectively supplement his articulations. The members of the Nonverbal Group cannot articulate phonemes at all so they must rely solely on gesticulations to communicate. Thus, it is imperative that members of this group and for the people in their inner circles to establish a mutual and consistent sign system. Otherwise, interactions will always remain one-sided, as hearers struggle to decipher the MR Adults' gestures while remaining unable to contribute to the conversation.

II. Spatial Awareness and Cognition

Certain neurocognitive factors exacerbate the already adverse communication deficiencies of the Nonverbal MR Adults. Studies have suggested that MR Individuals are less motivated to explore and exploit objects, which could be attributed to neuromotor hypotonia (muscle weakness), affective responsivity, and temperament. As a result, MR Individuals may possess chronically low levels of arousal, thereby perpetually exhibiting a passive style of interaction with their surrounding people and environment (Mundy, 1988). This is especially apparent in the patrons A.R., N.P., and S.W. They can often be seen gazing aimlessly into space, and they do not appear to acknowledge the presence of their speakers. Normally, when people enter the room or when people sit down next to you, you would typically acknowledge their

presence by at least giving a cursory glance in their direction. A.R., N.P., and S.W. continue to aimlessly gaze into space until somebody taps them while saying their names.

Not only are many of the Nonverbal MR Adults unaware of developments in spatial situations, but they also appear to have difficulty with actual spatial cognition. Objects in space order themselves among the dimensions of space: we inherently understand space in terms of topological relations, and we are able to coordinate and seriate objects in accordance with the projective properties of space (Cohen, 1985). The inability to properly process spatial information is detrimental to communication because this renders facial recognition nearly impossible. S.W., for example, once referred to me as 'Jenny.' Of course, he did not verbalize this reference—another staff member mentioned her name, and he pointed at me. Incidentally, 'Jenny' is the name of his former speech therapist. It appears that S.W. does not learn to recognize people by their physical features. It is likely that he identifies people based on how they function in his daily life.

Actually, many of the MR Adults at the center displayed problems with spatial cognition. I was often confused for 'Anna,' a female staff member who is the same ethnicity as I am and has similar facial features. Most Non-MR Individuals would have no difficulty making the distinction between me and Anna. However, the MR Adults often referred to me as 'Anna,' and it is most likely because of an impaired cognitive function that would otherwise enable them to coordinate entities such as facial features in relation to each other. Because most of the members of the Nonverbal Group are Profoundly Retarded, it is fair to assume that their spatial cognitions are worse than everybody in the Verbal Group's, which is comprised of Mildly-Severely Retarded adults. Specific deficits of spatial cognition often are encountered with specific localized lesions (Krasnegor, 1991), and although MR is generally considered a nonspecific pervasive disorder resulting in across-the-board deficits, it should follow that because Profound Retardation is the most debilitating on the psychometric spectrum, all deficits are exacerbated. That is, both R.W. (who is a Mildly Retarded member of the Verbal Group) and N.P. probably suffer from deficits in spatial cognition—however, because N.P. is Profoundly Retarded, her deficits are correspondingly more severe. Unlike N.P., R.W. consistently recognized me and identified me by name, and he acknowledged my presence whenever I entered the room.

III. Inattentiveness

With the exception of J.V., all of the members of the Nonverbal Group (and many members of the Verbal Group, for that matter) lacked joint attention and did not reciprocate in social interactions. This creates a substantial efficiency issue: having to repeatedly remind somebody to "pay attention" is extremely inefficient. Communicating with A.R., N.P., S.W.,

and C.R. was tremendously frustrating because as soon as I garnered their attention (or as soon as I called their name), they immediately looked away during the subsequent utterance. It must be the tragic combination of cognitive inertia and of low arousal levels that accounts for these deficits in attention. Perception of speech signals is often problematic in Severely and Profoundly Retarded Individuals because of the high incidence of auditory deficiencies (anatomical or otherwise), and the greater the cognitive inertia, the less rapid the auditory processing (Rondal & Edwards, 1997). Human speech generally occurs at a very rapid rate, and if an MR Adult is not in a position to process the speech signal correctly, they will not overextend themselves to clarify it.

For example, a Non-MR Individual would ask me to repeat myself or to speak at a slower rate if he/she did not comprehend my utterance. A.R., N.P., S.W., or C.R., however, would stop listening altogether because my utterances—which they perceive as nonsense—do not arouse them. At the very least, they can recognize their own names, and they are aware of the fact that when people call their names (especially if projected in a commanding or urgent tone), they must direct their attention to the speaker. However, it is up to the speaker to maintain the attention of the MR Adult after they have acquired it, and the only way to achieve this is to make the subsequent expressions as stimulating as possible. Otherwise, communicative therapy and social interactions will perpetually remain inefficient, and the quality of life for the MR Adults will be further hindered.

3. Applied Linguistics: The Therapy
3.1 Comparative Assessment
A major goal of any hospital or (re)habilitation center should be to stabilize the individuals to the point where they may continue their lives and successfully live in society. The actualization of this goal is contingent on the individual's treatment team members (Singh, 1999). Usually, treatment teams work in an interdisciplinary manner to develop a treatment plan that involves all aspects of the individual that requires attention, including psychiatric, psychological, nursing, psychosocial, and general medical care, among others. If the individual has behavioral issues--such as aggression, self-injury, property destruction—then, the treatment teams often rely on a psychologist or behavior specialist to provide a behavior treatment plan that addresses the issues. Of course, my role at the habilitation center was that of the speech pathology treatment team.

But before any real method can be applied, somebody must perform a functional analysis of specific target problems of the individual (such as stuttering or problematic phonology) in specific settings (during treatment groups, mealtimes, recreation), develop a hypothesis

regarding the function(s) of each target problem, informally test the hypothesis, develop a treatment, informally test the treatment in the setting that the behavior occurs, and, if proven correct, establish a behavior treatment plan that may or may not encompass the entire treatment staff (Singh, 1999). As the treatment team member responsible for communication, I had to assess the patrons' target problems, as well as their capabilities, in communication.

While the data from the previous section was dedicated almost entirely to the observations and analyses of the MR Adults' target problems in communication, it was examined within the context of theoretical linguistics and did not provide any standardized means of comparison. In this context, the three most useful tools for assessing communication efficiency on a relative or quantifiable scale were the *Vineland Adaptive Behavior Scales: Second Edition* (*Vineland-II*), the *Adaptive Behavior Scale-Residential and Community, Second Edition* (*ABS-RC:2*), and the *Developmental Disabilities Profile* (*DDP-2*).

I. Vineland-II

The Vineland Adaptive Behavior Scales (Sparrow, Cicchetti, & Balla, 2005) have been established as a reliable and standard means of assessing intellectual functioning and adaptive behavior. It was revised and re-standardized in 1984 and is endorsed by the World Health Organization as a measure of adaptive behavior; additionally, it has proven valuable in legal, clinical, and research contexts (Beail, 2003). According to the latest definition by the American Association on Intellectual and Developmental Disabilities (AAIDD--formerly the American Association on Mental Deficiency, or AAMD; then the American Association on Mental Retardation, or AAMR), a person with mental retardation has significant limitations in adaptive behavior as expressed in conceptual, social, and practical adaptive skills; and the Vineland Scales encompass the five measures of adaptive behavior as defined by the AAIDD in 2002. It identifies four domains: (a) Motor or Physical Competence; (b) Independent or Daily Living Skills, or Practical Intelligence; (c) Cognitive Competence, Communication, or Conceptual Intelligence; and (d) Social Competence or Intelligence (Beail, 2003).

While the *Vineland-II* is structured as a survey-interview form and as a parent/caregiver rating form that can be quantified into standard composite scores, I did not consider the *Vineland-II* as such because none of the MR Adults had any recorded scores. Instead, I perused the criteria given in each domain and sub-domain that had to do with communication and took them into consideration when evaluating the patrons. The most frequently observed communication deficiencies, in accordance with the *Vineland-II*, among the 24 MR Adults are characterized in the following domains and sub-domains:

Table 2. A list of select domains and sub-domains from the *Vineland-II*, collected from pages 16-26 (Sparrow, et al., 2005), applicable to communication deficiency in MR Adults

a) *Socialization Domain (SD)- 'Social Communication' Sub-domain* (i.e., attempts to make social contact; keeps comfortable distance between self and others when conversing; talks with others about shared interests; wary/careful of personal matters; chooses not to say embarrassing/mean things in public)
b) *SD- Thoughtfulness* (i.e., acts when another person needs a helping hand)
c) *SD- Friendship* (i.e., demonstrates friendship-seeking behavior; has close friends)
d) *SD- Sharing and Cooperating* (i.e., asks permission before using objects belonging to or being used by another)
e) *SD- Manners* (i.e., says 'thank you;' chews with mouth closed; apologizes appropriately; changes voice level depending on location or situation)
f) *SD- Responsibility* (i.e., expresses/tells the parent or caregiver his/her plans such as what time he/she is leaving and returning, or where he/she is going)
g) *SD- Transitions* (i.e., changes behavior depending on how well he/she knows another person; refrains from complaining to reasonable changes)
h) *SD- Controlling Impulses* (i.e., accepts helpful suggestions from others; controls anger appropriately)
i) *SD- Speech Skills* (i.e., can hold ten-minute long conversations)
j) *Communication Domain (CD)- Beginning to Talk* (i.e., repeats or tries to repeat common words upon learning them; answers or tries to answer when asked a question; forms complete sentences)
k) *CD- Speech Skills* (i.e., uses prepositions correctly; uses possessives in phrases or sentences; can correctly use pronouns; pronounces words clearly without sound substitutions, such as '*rabbit*' not '*wabbit*'; modulates tone of voice, volume, and rhythm appropriately)

All of the MR Adults, with the exception of a few, needed improvement in sub-domains (a) through (f) and (i). Predictably, the MR Adults with the least number of deficits were the more Mildly Retarded individuals. Sub-domains (g) and (h) proved more problematic with the MR Adults with behavior or anger-management problems, and the more Profoundly Retarded MR Adults had the most difficulties with sub-domains (j) and (k).

II. ABS-RC:2

The *Adaptive Behavior Scale-Residential and Community, Second Edition* (Nihira, Leland, & Lambert, 1993) is a revised version of the 1969 and 1974 AAMD Adaptive Behavior Scales. The ABS-2 assesses the abilities, as well as adaptive assets and liabilities, of individuals who have MR, are emotionally maladjusted, or are developmentally disabled to cope with the natural and social demands of their environment. It is available in two versions, one for residential and community settings and the other for schools. The items of the *ABS-RC:2,* or the set of norms based on a sample of 4,000 adults with developmental disabilities, have undergone numerous modifications since the 1969 edition, with the revisions focusing more on how to improve the reliability of the interrogator/interviewer and their effectiveness in discriminating among institutionalized persons with MR and those in community settings who

previously had been classified at different adaptive behavior levels according to the AAIDD's Classification in Mental Retardation (AAIDD, 2007; Nihira et al., 1993).

Part I of the *ABS-RC:2* focuses on personal independence, namely important coping skills for daily living, while Part II focuses on social behavior and manifestations of personality and behavioral disorders (Aiken, 1996; Nihira et al., 1993). The part that was useful to me, as the communication treatment team member, is in Part I, which entails the behavior domain of Language Development. This domain is broken down into three sub-domains: a) Expression; b) Comprehension; and c) Social Language Development. As a means of quantifying adaptive behavior, the *ABS-RC:2* allows the interrogator or the administrator of the test to acquire a raw score for each domain, which can then be converted to standard scores. Most of the patrons at the habilitation center had already been assessed with the *ABS-RC:2*, and their scores were readily available. Thus, I examined the results of each patrons' communicative abilities and deficiencies according to the raw scores of the Language Development domain in their completed *ABS-RC:2* test forms. Note that not all of the 24 MR Adults from the center had any record of a completed *ABS-RC:2* form and that I was not able to acquire every individual's scores-- only the MR Adults whose scores I was able to acquire are taken into account for this section.

Table 3. The raw Language Development scores of the MR Adults who had previously completed the *Adaptive Behavior Scale-Residential and Community, Second Edition* (Nihira et al, 1993).

ABS-RC:2 Language Development Domain Scores
The Verbal Goup

Name	Age/Gender	IQ	ABS-RC:2**
M.S.	33/F	69	38
J.H.	37/M	57	21
M.R.	46/M	54	26
A.D.	44/F	40	18
J.K.	53/F	40	26
M.M.	43/F	40	14
A.I.	36/M	40	12
P.G.	53/M	36	20

The Nonverbal Group

Name	Age/Gender	IQ	ABS-RC:2**
A.R.	50/M	<20	9
N.P.	35/F	<20	8
S.W.	40/M	<20	10

*Extension of Table 1
**Out of a maximum score of 39

III. DDP-2

The *Developmental Disabilities Profile* (OMRDD, 2007) is mandated and employed by New York State's Office of Mental Retardation and Developmental Disabilities (NYS-OMRDD). It essentially verifies an individual's disability status and qualifications for state funding— namely, it is used to describe consumer registrations, changes in disability program enrollments, and the characteristics of people with developmental disabilities participating in said services. The two primary DDP forms are the *DDP-1*, which is used to record registrations and moves, and the *DDP-2*, which records the skills and challenges of developmentally disabled person. It is usually administered and completed by a reliable individual who is familiar with the informant, or individual being assessed. Unlike the *ABS-RC:2* and *Vineland-II,* the results for the *DDP-2* are not quantified: it is not meant to be an all-encompassing picture of the individual. Instead, it serves as a "snapshot" of what the individual is capable of at the time of assessment—which is why NYS-OMRDD requires that the *DDP-2* be updated at least every two years (OMRDD, 2007; Indiana Bureau of Developmental Disabilities Services, 2001).

The *DDP-2* is divided into eight sections: two standard sections that ask for basic identification and for disability identification, and then six additional sections that survey the informant's medical conditions and history, sensory/motor skills, cognitive/communication abilities, behavior problems, self-care and daily living skills, and received clinical services. The section that I examined for my assessment of the consumers' communication deficiencies and abilities is the fifth section of the *DDP-2*, or the Cognitive/Communication section.

Table 4. Part (E) of OMRDD's *DDP-2* (OMRDD, 2007)

E. COGNITIVE / COMMUNICATION

23. Indicate whether or not individual can perform each of the following:

		YES	NO
a.	Sort objects by size...	1	2
b.	Correctly spell first and last name..........................	1	2
c.	Tell time to nearest five minutes (digital or analog)...	1	2
d.	Distinguish between right and left..........................	1	2
e.	Count ten or more objects......................................	1	2
f.	Understand simple functional signs (e.g., EXIT, restrooms)...	1	2
g.	Do simple addition and subtraction of figures...........	1	2
h.	Read and comprehend simple sentences......................	1	2
i.	Read and comprehend newspaper or magazine articles...	1	2

24. Indicate whether or not individual **typically** displays each of the following receptive and expressive communications skills. Method of communication can be **written, verbal, sign, or symbolic.**

		YES	NO
a.	Understands the meaning of 'No'	1	2
b.	Understands one-step directions (e.g., "Put on your coat.")	1	2
c.	Understands two-step directions (e.g., "Put on your coat, then go outside.")	1	2
d.	Understands a joke or story	1	2
e.	Indicates a 'Yes' or 'No' response to a simple question	1	2
f.	Asks a simple question	1	2
g.	Relates experiences when asked	1	2
h.	Tells a story, joke, or the plot of a television show	1	2
i.	Describes realistic plans in detail	1	2

As with the *ABS-RC:2,* I was not able to acquire the *DDP-2* results of all 24 MR Adults from the center, and only the MR Adults whose results I was able to acquire are taken into account for this section. Additionally, some of the MR Adults who have *ABS-RC:2* data will also have *DDP-2* data and some will not.

Table 5. Based on the information from Table 4: the lowercase letters correspond to the skills that the MR Individual are unable to perform.

DDP-2 Cognitive/Communication Domain Deficits
The Verbal Goup

Name	Age/Gender	IQ	Subdomain 23	Subdomain 24	Total Deficits*
M.S.	33/F	69	c,g,i	(NONE)	3
B.A.	66/F	44	c,d,e,f,g,h,i	i	8
A.D.	44/F	40	b,c,d,f,g,h,i	h,i	9
J.K.	53/F	40	b,c,d,e,f,g,h,i	h,i	10
M.M.	43/F	40	a-i (ALL)	g,h,i	12
P.G.	53/M	36	a,b,c,d,f,g,h,i	d,g,h,i	12
S.C.	44/M	35	a-i (ALL)	d,g,h,i	13

The Nonverbal Group

Name	Age/Gender	IQ	Subdomain 23	Subdomain 24	
J.V.	27/M	40	c,g,i	h,i	5
A.R.	50/M	<20	b,c,d,e,f,g,h,i	c,d,f,g,h,i	13
N.P.	35/F	<20	a-i (ALL)	c,d,e,f,g,h,i	16
S.W.	40/M	<20	a-i (ALL)	d,e,f,g,h,i	15
C.R.	56/F	<20	a-i (ALL)	d,e,f,g,h,i	15

*The letters to which the informant answered "No," out of 18 letters

3.2 The Therapy

It is evident, from the examination of the three standardized assessment tools and from the data in Section 2, that the MR Adults displayed an assortment of communication problems. The data from Section 2 portrays the communication problems under a theoretical and analytical framework, while the results of the assessment tools present the problems on a more comparative and quantifiable level. Thus, after understanding how the various types of communication deficits manifest, as well as the severity of the deficits—at least in relation to each MR Adult in the center—I tried to ameliorate the problems to the best of my ability.

Because I received no formal guidance in this matter, I utilized my intuitions to establish a method of speech therapy that I thought would be most beneficial. The method was extremely simple: identify the areas that needed the most improvement, figure out who needs more help (using the standardized assessment tools), and then use repetitive drills to facilitate improvement. For example: M.R. had problematic phonology and syntax and he received a score of 26 on the *ABS-RC:2*. Therefore, I had him repeat words and sentences after me until I deemed that he could sufficiently pronounce the words and compound the sentences, however, I did not allocate more time to M.R. for this procedure than I did for somebody in a more mediocre state-- such as A.I., who only received a score of 12 on the *ABS-RC:2*.

Nevertheless, my method may have been deceivingly simple—at the end of my tenure at the center, none of the 24 MR Adults showed any signs of marked improvement. In my defense, my method would probably have yielded different results within a different group of people, whether they be MR Children or Non-MR Individuals. Actually, most methods in existence today designed for Non-MR Individuals (as well as for MR Children) with communication deficits revolve around systematic imitation reinforcement (Ruder, 1972) and self-motivation, which is what my method was contingent upon. But it is still clear from a retrospective analysis that overall, such methods prove ineffective on the MR Adults. Why?

4. Important Distinctions

In figuring out why the methods were ineffective, it is crucial to make certain distinctions

4.1 Issues of Nature: Non-MR Individuals, MR Children, and MR Adults

Firstly, successful language remediation is contingent upon an individual's motivations and abilities to provide feedback. A commonly encountered problem among the MR Adults at the habilitation center was their obvious lack of acknowledgment that they had communicative deficiencies. They meet frequent frustrations in their everyday lives because the people around them find their utterances unintelligible, and as a result, the MR Adults cannot express their needs, which often go unfulfilled. A common form of interventive speech therapy

amongst Non-MR Individuals is talk therapy, which entails cognitive therapy or psychodynamic psychotherapy (Messer & Warren, 1998). Such therapies rely on a patient's cognitive abilities and verbal insights in order to promote change, but they prove little or no benefit in regard to MR Individuals. As discovered in Section 2-II, MR Adults have trouble communicating expressive speech acts, which means that they are unable to use language to effectively sort through their emotions. Most adults who have speech problems are aware of the fact that they have speech problems. Otherwise they would not even put themselves in a position where they are receiving speech therapy. But part of the MR diagnosis is the marked disability to cope with the natural and social demands within one's environment, and this can be characterized by the failure to recognize communicative deficiencies. After all, a facet of adaptive behavior is conforming to the mannerisms and standards of surrounding people—at least to an acceptable degree—and if the people around you consistently cannot comprehend your expressions, then you are not sufficiently conforming yourself to your society's communicative norms. The MR Adults appeared unable to attribute their communicative difficulties to the fact that their language skills do not conform to those of the people around them. In fact, it would be fair to say that the observed MR Adults did not even know that they had speech problems, so they cannot motivate themselves to promote change.

Furthermore, the same methods of therapy cannot even be applied to both MR Children and MR Adults. To understand why, it is crucial to be aware of the inherent differences that encompass the various groups.

The first main difference is applicable to both Non-MR and MR Individuals. Eric Lenneberg has had profound influence on the advancement of developmental psycholinguistics—and one of his most significant contributions has been his suggestion of the existence of a critical period for language development (Lenneberg, 1964). According to Lenneberg, there exists a critical period for language acquisition that generally extends from when an individual is 2 years old until puberty. It is based on the gradual establishment of the left cerebral hemisphere as the dominant determiner of language functions. Lenneberg claimed that at birth, the two cerebral hemispheres are functionally equivalent for the language to develop: this is known as the equipotentiality hypothesis. At puberty, laterality becomes definitively established, and as a result, the plasticity of the neural organization underlying language decreases substantially, and basic language development becomes increasingly difficult (Rondal & Edwards, 1997).

The most compelling evidence of the critical period hypothesis derives from examining the outcomes of unfortunate, inadvertent experiments of cases involving language deprivation up

to and beyond the end of puberty—and necessarily inadvert, because it is inhumane to deliberately expose human beings to such long-term, devastating experiments.

One of the most renowned cases is that of Genie, whose tragic upbringing was studied and analyzed by Susan Curtiss and James Kent (Curtiss, Fromkin, Krashen, Rigler, & Rigler, 2004; Archibald, 1993). In the 1970's, California social workers discovered Genie, who was isolated from social contact for most of the first 13 years of her life. When she was discovered, she was hardly ambulatory, understood only a few words, and was completely nonverbal. Since her discovery, her lexical development was relatively rapid, despite having virtually no previous overt language training; additionally, Genie's mother reported that Genie had began to speak words before her confinement at approximately 20 months. It is known that a delay of language onset is one of the most prevalent characteristics of MR, and therefore, researchers ruled out an MR diagnosis for Genie. On the other hand, despite her linguistic progress in semantics and expansion of a referential lexicon, Genie could not sufficiently acquire grammatical rules and their use in more complex utterances, and although she could discriminate and recognize the sounds of English, her productive phonology remained abnormal.

Another case, also documented by Susan Curtiss (Ioup, 2005) is from the 1980's, wherein a hearing-impaired adult of normal intelligence named Chelsea attempted to acquire spoken language in her thirties. Unlike Genie, Chelsea was not abused by her parents; however, her parents had been misguided into believing that she had MR and that she was emotionally troubled when, in fact, she was actually born deaf. As a result, her deafness was not discovered until she was 31 years old—which was then immediately rectified with a hearing aid that successfully amplified her hearing—but she also received no sign language input until the discovery. Afterwards, her lexical knowledge progressed normally and became substantial, but her ability to combine vocabulary items into grammatical utterances remained extremely limited, resulting in frequent and unacceptable phrasal and clausal ungrammaticalities. Furthermore, her phonology, like Genie's, remained at a low level. Both Genie and Chelsea's failures to develop appropriate phonology and morpho-syntax is commonly attributed to them having passed the estimated boundary of the critical period for language acquisition.

Curtiss also observed that Genie appeared to be right-hemisphere dominant for language and thinking functions, which suggests that 'after the critical period, the left hemisphere may no longer be able to function in language acquisition, leaving the right hemisphere to assume control' (Curtiss, et al., 2004). However, some researchers claim that if the left cerebral hemisphere incurs lesions early on in life or that if early unilateral brain injuries occur, then

further language development can proceed normally under the control of the right hemisphere. They claim that only lesions that arise in the left hemisphere later in life cause irreversible damage to the language functions. On the other hand, some authors also doubt that the right hemisphere can mediate language functions as effectively as the left, even in the event of the onset of early lesions, because it is their belief that the ultimate level of linguistic competence that the right hemisphere is able to achieve is inherently less than that of the left (Rondal & Edwards, 1997). This facet of psycholinguistics has been under dispute for a long time and needs further research-- but either way, the left hemisphere plays a crucial role in computational language functions.

Although the left cerebral hemisphere is species-specifically predisposed towards dominance for the computational aspects of language, it still needs both time and speech stimulation to firmly establish its dominance, whereas the right hemisphere, which controls non-segmental phonological features, tends to mature more rapidly, regardless of time-frame (Singleton & Ryan, 2004). However, the two hemispheres are most likely co-involved in the development of semantics and pragmatics (Rondal & Edwards, 1997). Early damage that cannot be compensated within the left hemisphere may determine the transfer of the computational language functions to the right hemisphere at no functional cost, but the progressive establishment of the left hemisphere's dominance can have costly detriments on computational efficiency if a transfer were to be made (Gazzaniga, 1984). In Genie's case, it is possible that the lack of speech stimulation during the maturational period of cognitive language development rendered her brain structurally unable to properly develop. After a certain point, no restoration of the capacity linked to the left hemisphere would have been possible, so her right hemisphere established dominance for language function but at a great cost: her phonological and morpho-syntactic functioning remained permanently impaired (Curtiss, et al., 2004; Rondal & Edwards, 1997).

Despite the various technical arguments and theories of the critical period for language acquisition, both Genie and Chelsea at least give some credence to the notion that there exists specialized neuropsychological mechanisms for the computational aspects of language, and that these mechanisms—whether or not they are tied to the left hemisphere—appear to develop under strong maturational constraints. The next issue that comes into question would be the actual time frames of the critical periods: generally, phonological flexibility begins to decline after 6-7 years, while the ending period for morpho-syntax is approximately10-12 years. This is all based on the fact that synaptic density increases sharply between the ages 2-8 in many cortical areas, at which ages it culminates before significantly declining (Singleton & Ryan, 2004). James Hurford (1991) suggests that the main determinant for the time parameters of the critical periods are based on a combination of evolutive, genetic factors and

of external, human influences in relation to language acquisition. Essentially, he argues that individuals with a greater propensity towards language, as dictated by natural selection, will arise early in life, and that the longer the period of one's life that one possesses the whole of one's native language, the greater the benefit. However, he still firmly asserts that there does exist a critical period for language acquisition that coincides roughly with puberty.

It is critical to keep in mind that both Genie and Chelsea did not have MR. Most, if not all, of the MR Adults were never isolated from linguistic interaction for prolonged periods in their lifetimes, but they display many of the same communicative difficulties that Genie and Chelsea did in their quest to assimilate themselves to their respective language communities. Additionally, Genie and Chelsea both progressed greatly in the non-computational aspects of language. The MR Adults have been displaying the same deficiencies for years, with very protracted progress. Thus, if Hurford's evolutionary constraints correspondingly apply to MR Individuals, one could fairly speculate that no spontaneous basic computational language development will be observed in them beyond puberty. Yet, because of the intrinsic cognitive deficiencies that are associated with MR, their grammatical capabilities will be hindered from the start, and the closing of the critical period will inevitably catch them in a state of grammatical immaturity, even if they are constantly stimulated by language in their environment before the onset of the critical period. The cognitive deficiencies are akin to the aforementioned hemispheric lesions; and although most of the observed MR Adults were mentally disabled since the early onset of life, even if a transfer of computational language function from the left hemisphere to the right at no functional cost were to transpire, it is most likely that the right hemisphere would be similarly impaired and thereby unable to compensate. So even though Non-MR Individuals will always be at an advantage to acquire language over MR Individuals, MR Children will still possess an advantage over MR Adults, who have already transpired the critical period of language acquisition.

4.2 The Significance of Nurture: MR Adults and other MR Adults
So if language acquisition is predetermined by genetic and anatomical factors, are present MR Adults necessarily doomed to a life of continued linguistic disappointment, unless they undergo drastic internal, medical procedures? This is when a scrutiny of the nature/nurture dichotomy is useful: changes due to 'nature' come from within an organism while changes due to 'nurture' come from outside it, but both lead to changes in the brain and thereby in behavior (Richardson, 2000).

The idea behind taking into account the situational or nurture-related differences amongst all of the MR Adults is to better establish a level 'playing field.' Reasonably, the only way that therapy methods applied to Non-MR Individuals and MR children can be just as effective on

MR Adults is if the strict cognitive aspects are comparable. However, they are not, and the methods of language remediation must accommodate this. After all, a widely accepted principle in human political theory is that true equality is attained by treating equals equally and unequals unequally. It has been established that Non-MR Individuals, MR Children, and MR Adults are unequal and should therefore be given unequal treatments. But by that virtue, MR Adults should also be given unequal treatments in relation to each other, despite being 'equal,' at least on a more relative scale. Therefore, a determination of where each MR Adult is unequal—particularly in aspects regarding nurture-- can greatly assist his/her treatment team in giving him/her an equal chance to adjust to society

I. Medical and Psychiatric Differences

The most equal aspect amongst all MR Adults is that they are all adults diagnosed with the developmental disorder that is Mental Retardation. It may appear that in terms of 'nature,' all MR Adults are equal. However, before an appropriate nurture-based method of therapy can be established, a more specific and thorough examination of the MR Adults' biological and cognitive natures must be executed. That way, the proper medications can be administered that will normalize any chemical imbalances or maladies; and if the conjunctive disorder(s) cannot be treated with medications, that the treatment teams acknowledge its presence so they can act accordingly. Most, if not all of the 24 observed MR Adults regularly receive or have received treatment for other afflictions and disorders. Of the co-morbid disorders, the ones that could affect or do affect language development and communication are mostly psychological and neurological disorders, or disorders that affect cognition and motor movement.

Autism

First described in 1943 by Leo Kanner, a psychiatrist from Johns Hopkins, it is applied to people who are socially withdrawn and preoccupied with routine. It is often observed in children who struggle to acquire spoken language, but possess intellectual abilities that rule out MR. In 1944, Hans Asperger applied the term to children who were socially maladroit, displayed bizarre obsessions but at the same time, were highly verbal and seemingly quite bright. It was not until 1981 that British psychiatrist Dr. Lorna Wing asserted that Asperger's analysis of the disorder appeared in many ways to be a variant of Kanner's Autism, so that the commonalities seemed as important as the differences. As a result, researchers now believe that Asperger and Kanner were essentially describing variations of the same genetically-based disorder. Severe Autism is not always accompanied by compensatory intellectual gifts and is far likelier to be characterized by tragic deficits and Mental Retardation (Nash, Goehner, Park, Greenfield, & Grandin, 2002). The disorder causes the MR Adults to not respond to or acknowledge unfamiliar people, and it causes the inability to adjust to changes in environment

and situations. This is problematic because much of language acquisition is contingent upon exposure to social interactions, and even the people who are there to help them—such as myself-- get shunned.

Affected Patrons: J.K., M.E., S.W., and C.R.

How They Are Treated: The MR Adults with co-morbid Autism are all placed into a separate group called the TEACCH Group, which refers to a learning program founded by psychologist Eric Schopler (Siegel, 2003). It stands for 'Treatment and Education of Autistic and Related Communication-Handicapped Children,' and it employs certain treatment strategies to target problems associated with Autism. In terms of language and communication, the MR Adults in the TEACCH Group are generally given very direct instructions in language use to accommodate their lack of language skills. But other problems, such as the failure to use language socially, the lack of conversational reciprocity, or an inclination towards social isolation are remediated by differential reinforcement, directing one's focus on communication rather than speech, coaching in reciprocal conversation, and planned periods of interaction.

Cerebral Palsy

 The term encompasses a multitude of neurological disorders that appear early in life, and it permanently affects body movement and muscle coordination (Crothers & Paine, 1959). This is due to abnormalities in parts of the brain that control muscle movements. This is a detriment to their speech and communication, particularly in R.W., whose speech is extremely labored.   When he speaks, it appears that he must "push" the words out, which leaves many of his word-final phonemes extremely aspirated and many of his vowels excessively rounded—and a majority of his utterances are stuttered. Even more distressing is the apparent dysfunction of his larynx, which causes him to perpetually speak in a soft, raspy tone. Observing how R.W.'s Cerebral Palsy has affected his speech is extremely saddening because his speech is excellent, otherwise, and the sense of how undeserving the circumstances are is overwhelming because he is quite possibly one of the friendliest people in existence. However, he gladly complies when reminded to speak more slowly and clearly—which would be frustrating for most people, given how often he is reminded—but it appears that he has accepted his disabilities, and his tenaciously positive attitude towards self-improvement (including in speech therapy) and towards his peers is inspiring.

Affected Patrons: R.W., S.W.

How They Are Treated: There is no cure for Cerebral Palsy, but physical and occupational therapy are the best available treatment options. However, the affected consumers are given

drugs to control seizures, to relax muscle spasms, and to alleviate any associated pain. To treat the dysarthria, or problems with articulating words due to emotional stress or muscle discord, techniques to strengthen the muscles required for speech can be implemented. However, many people with severe communication problems due to Cerebral Palsy utilize manual tools that augment communication. While these can include electronic speech synthesizers, less expensive and less complex alternatives are equally effective: S.W., who is part of the Non-Verbal Group, utilizes a binder with pictures and words that correspond to the important people and tasks in S.W.'s everyday life. Instead of speaking, he simply points to a picture in the binder to express his needs.

Epilepsy

Epilepsy is very prevalent amongst MR Individuals—7-18% of children with Mild MR and 35-44% of children with Severe MR have some degree of Epilepsy (Shorvon, 2004). It is a chronic progressive disease of the brain characterized by the periodic occurrence of seizures instigated by erratic neurological activity and causes loss of consciousness. The seizures can be described as attacks of loss, or impairment, of consciousness, and sometimes convulsions accompany the seizures (Turner, 1907). Epilepsy has no direct effect on an individual's overall communicative abilities, but the onset of the seizures often cause speech arrest and unusual vocalizations (Shorvon, 2005).

Affected Patrons: P.G., J.V. (non-convulsive), B.A., C.R., J.K.

How They Are Treated: Epilepsy cannot be cured, but it can be treated and controlled with medications. The MR Adults at the center are given regular doses of pharmacologic drugs to prevent or reduce their seizures, and the MR Adults who have convulsive Epilepsy are given 'anticonvulsants' to supplement their treatments. However, given the intermittent and infrequent Epileptic seizures in the affected consumers (the drugs undoubtedly play a significant role in suppressing them), there is no reason to take the disorder into account when prescribing speech remediation.

Other Psychiatric/Psychological Disorders

Psychosis (J.H.); Fetishism (J.H.); Bipolar Disorder (S.C., C.R.); Dysthymia (S.W.); Obsessive Compulsive Disorder, or OCD (C.R.); Impulse Control Disorder (C.R.). These can directly affect the process of direct language learning the same way that Autism can, in that the consumers will refuse speech therapy out of defiance because it makes them uncomfortable, despite the benefits. C.R. and S.C., for example, both became extremely despondent when their communicative skills were criticized and would even cry, at times. But that is what emotional polarity entails: overwhelmingly extreme, internal feelings. Also, C.R.'s OCD was problematic: because she is part of the Non-Verbal Group, she

communicates with sign and with a small magnetic board that allows her to shift around letters of the alphabet to spell out words. However, OCD can cause people to be inclined towards certain numbers, and in C.R.'s case, it was 13. Therefore, every time she is demonstrated a new sign, she imitates it an excessive 13 times, but even then there was no guarantee that she retained it. Most of the time, she did not end up retaining what she learned, despite a time-consuming effort on my part. Also, the magnetic board proved futile most of the time because her OCD dictated that the letters on the board be positioned a certain way. When I removed a few letters to spell out a word, she immediately put them back into their original positions. These psychological disorders create problematic habits and mannerisms that make speech therapy extremely difficult. Equally problematic, is that because these disorders usually manifest themselves as extreme and abnormal behavior, which translates into disagreeable pragmatics and semantics.

How They Are Treated: Not all of these disorders can be treated with medications, but psychotropic drugs are administered when possible. These drugs include anti-psychotics, mood stabilizers, anti-depressants, and barbiturates, among others (Boyd, 2005). While the affected MR Adults would be undoubtedly worse off if they were not medicated, their communicative abilities are still greatly damaged by their conditions, and I was not able to address these problems. My role as a language interventionist fell out of the scope of these disorders—the communicative deficiencies directly affected by these psychological problems require life-long treatment.

After these nature-based differences amongst the MR Adults are identified and treated, speech intervention and remediation becomes much easier. But more than that, diagnosing certain disorders is necessary because the MR Adults need to be able to describe their conditions in the event of any medical emergencies, and implementing the proper terms into their lexicon in accordance to their medical histories could save their lives.

II. Domestic and Socioeconomic Circumstances

Psychosocial issues have been implicated in the development of MR. The notion of "psychosocial retardation" has been closely linked with poverty. This is mostly due to the estimate that MR is more prevalent among impoverished individuals and non-Caucasians. However, it may be purely coincidental that minorities are over-represented in the study group of impoverished people; thus, isolating the specific impact of poverty or race on mental development may not be possible and is certainly controversial (Ainsworth & Baker, 2004). It is also crucial to remember that many individuals living in poverty exhibit normal intellectual ability.   Most of the MR Adults at the center are not from privileged circumstances. Actually, the habilitation center is managed by a non-profit organization, and

while the guardians of the MR Adults must pay a nominal fee to the center every month, the organization receives much of its funding from the government, which is why the patrons are required to fill out the *DDP-2*.

One of the common anatomical problems among MR Individuals is having a buccal cavity too small for the tongue, or having a protruding tongue. This greatly impedes articulation and swallowing, and increasing attention has been given recently to the surgical modification of the tip of the tongue (Rondal & Edwards, 1997). Decreasing the tongue length could potentially enable improved intra-oral control and perhaps enhance the intelligibility of articulation in MR Individuals. The effectiveness of this procedure is often contested because many researchers believe that the surgery also removes muscles necessary for the articulation of certain phonemes, but some of the MR Adults with oversized tongues, such as M.R. and S.C. not only had both problematic phonology and swallowing problems. Given their already-inarticulate pronunciations, getting this surgery could be a lateral move.

However, despite the existing medical remedies and the ongoing scientific advances as solutions for MR and its presenting problems, it is crucial to recognize the fact that many afflicted individuals, unfortunately, simply cannot afford such costly procedures. After all, it was previously established that MR is more prevalent among impoverished individuals. M.R. and S.C. both receive aid from government-funded programs--including Medicaid—but given the uncertain effectiveness of procedures such as tongue length modification, M.R. and S.C. would most likely have to pay for the surgery themselves. The truth is, people with developmental disabilities who are on Medicaid do receive health care from different doctors, specialists, hospitals, and approved clinics which provide physical, occupational, and speech therapy and other habilitation services (OMRDD, 2007). The MR Adults could definitely be worse off, and at the very least, they receive adequate health care and are not given inferior treatment to Non-MR Individuals. But perhaps if M.R. and S.C. had wealthier guardians who were willing to pay for certain procedures, then they would not have their current articulation problems.

Also, the extravagant nature of costly speech remediation is not only limited to medical procedures. Some of the communication aides in existence, including the electronic speech synthesizers mentioned in Section 4.2-I, are expensive. Of course, there inexpensive and effective options do exist, such as the binder of pictures that S.W. carries with him. But it is obvious that the electronic options are more preferable. J.V., one of the members of the Non-Verbal Group affected by Epilepsy, carries around a Dynavox[9], which is a small device with a

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[9] All product and pricing information can be found at www.dynavoxtech.com

touch-screen display that enables the user to create messages, and it projects digitized speech based on what the user has programmed into the information drive. The Dynavox is essentially what S.W.'s picture binder would be like if it had thousands of pages of information and if it could talk. Without the Dynavox, J.V. would not be able to communicate effectively whatsoever. His muscle movements and motor skills are impaired, which is why he cannot produce organized gesticulations and articulate speech, but the Dynavox helps him produce full sentences. J.V. simply touches certain, designated icons on the Dynavox screen—such as a picture of himself, a picture of a birthday cake, and then the image of the calendar slot 'August 12'—and then an automated voice from the device will project the sentence *"My birthday is on August 12th."* Needless to say, the Dynavox has helped J.V. immensely: he is a high school graduate, which is astounding, given his inherent limitations.

Despite the proven benefits of having a device such as the Dynavox, many MR Adults do not have guardians who are willing to invest the time and money. Not only does a Dynavox cost upward of $7,500, but also, somebody must spend the time programming words and pictures into the device and teaching the MR Individual how to utilize it—which is an arduous task in itself. J.V. is the only MR Adult at the center who owns a Dynavox and who knows how to operate it, but had the rest of the MR Adults been familiarized with the Dynavox in the past, perhaps they would not have such great difficulty communicating with others.

Additionally, some of the MR Adults receive less support from their guardians than other MR Adults. Certain MR Adults, such as A.I., J.V., S.W., and D.R., among others, are still considerably young (40 years or younger) and thus still under the guardianship of their parents. On the other hand, older MR Adults such as B.A., J.K., A.R., or H.P. are considered senior citizens; their parents are deceased, and some of them, instead of being under the guardianship of siblings or other natural relatives, receive assistance from designated state-approved guardians in their communal residences. Every MR Adult at the center has a guardian since most MR Adults are considered to be non-consenting adults; but the guardians are only required to ensure the rights and safety of the MR Adults. So S.W.'s parents, who take an extremely active interest in their son's lifestyle, routinely ask the center's staff how their son is progressing and even spend extra money on outside, additional speech therapy. Although S.W. is Profoundly Retarded and Autistic and still non-verbal, he would be worse off if his parents were not so involved. Conversely, A.R. has been under the care of a court-approved guardian since the death of his parents a few years ago, and his guardian is nowhere near as involved as S.W.'s parents—which is logical given their apparent sense of parental duty and great emotional attachment. A.R. therefore receives less speech therapy than S.W. and shows less overall improvement, as a result. The MR Adults would never seek speech

remediation themselves, but more speech remediation is better than less—and if an MR Adult's guardian is not involved enough to contribute the maximal amount of resources into the further advancement of their MR Individual, then that is unfortunate (but still their prerogative).

Such is the tragic nature of life: those who are fortunate enough to have more money and to be surrounded by selfless people will inevitably be in a better position than those who are not so fortunate. A speech therapist should definitely take an MR Adult's socioeconomic and domestic status into account when providing language remediation, because he/she should bear in mind that the amount of money somebody has or the people in one's immediate surroundings is not a reflection of his/her cognitive capabilities. In diagnosing an MR Adult's communicative deficits, the speech pathology treatment team member(s) must realize what resources have been persistently unavailable to the MR Adult, and what are the consequences of the lack of resources on the patron's linguistic abilities. This is fair—once the circumstantial discrepancies are clear, only then can a more accurate method of speech remediation that accommodates each person's situations be applied.

III. Different Histories and Educational Backgrounds

Although all of the MR Adults reside in the Long Island area of New York, mildly insinuating that their educational backgrounds and upbringings are greatly similar, the levels at which they communicate still vary greatly despite similarities that should prove otherwise. For instance, J.V. and M.M. both have tested IQ's of 40 (refer to Table 1) and are both considered Moderately Retarded. However, J.V. scored significantly higher than M.M. in the Cognitive/Communication Domain on the DDP-2 (refer to Table 5), displaying only five deficiencies in Sub-domains 23 and 24, while M.M. displays 12 deficiencies.

Mental Retardation, or at least the idea of cognitive dysfunction and disorder, has been in existence since the beginning of human history—however, its history is bleak. Most people in the seventeenth and eighteenth centuries, as well as in the Middle Ages and prior, did not care to make social distinctions or have formal methods of dealing with what they considered deviants, such as delinquents, fools, hysterics, prostitutes, epileptics, and people with what is technically MR, among others, and these people were all rejected with the same degradation. They were confined in asylums, general hospitals, and prisons, or they were exiled by being sent via boat to some other community. This lack of understanding and the callous treatment towards those with disabilities are manifest of the severe ignorance and of the questionable ethical ideas that dominated society at the time. Many people apparently believed that such individuals were morally at fault and were a social detriment to society (Foucault, 1995;

Rondal & Edwards, 1997), and their derisive attitudes were evident in their laws and customs. In ancient Greece and Rome, it was socially acceptable to abandon babies born with disabilities on hillsides; Spartan law actually mandated the killing of children with disabilities; and the practice of using individuals with mental impairments as comic slaves was common in ancient China, ancient Egypt, and pre-Columbian American civilizations (Jaeger & Bowman, 2005).

Actually, few rights were established for individuals with disabilities in any nation or society until well into the twentieth century. Changes in attitudes and methods of working with the mentally retarded began emerging with advances in biological, physical, and social sciences, as well as in educational and vocational rehabilitation. The ever-growing public interest in the matter, as well as the renaissance of civil rights movements in Western societies, have resulted in proactive concern over large-scale social and anthropological degeneration (Wright, 1963; Rondal & Edwards 1997). With that said, one would think that institutional mistreatment and degradation of disabled people, mental or otherwise, have been all but eradicated in the United States, at least in the latter 20th century—but sadly, this is untrue.

A few of the MR Adults (M.R, C.R., and M.M.) at the habilitation center are part of the Willowbrook Class, and members of this group receive additional benefits from the state and are given the highest priority amongst the MR Adults in the center. This special treatment has nothing to do with their abilities relative to everyone else—most of them are no less proficient or no more challenged than other MR Adults. Instead, this is compensation for the atrocious way in which they were treated in the past, for they were subject to the callous and inhumane conditions of the Willowbrook State School (Rothman & Rothman, 1984; Rivera, 1972), which was actually a large state-run hospital in Staten Island, New York, that had been shut down in 1987 after a decade-long war with the justice system. Geraldo Rivera, whose expose on the institution instigated a nation-wide uproar, gave the description: "There were perhaps 60 or 70 severely and profoundly retarded children living… in a room that looked like the unfinished basement of a cheap home in the suburbs…The residents of the ward bore only a passing resemblance to children I have known. Their heads were swollen. Their bodies were bent and twisted. Their eyes were rolled back. Some were lying on the floor or on the benches… The kids were either naked or wearing fragments of clothing. Some wore just strait jackets…The ward was filled with noise, but none of it seemed human…It was the moaning made by all those kids left unattended, uncleaned, and unloved... They try to care for their wards but are simply overwhelmed. The patient to attendant ratio, which should be

about 4 to 1 [had dropped to] 30 or 40 to 1. The institution [was] 912 employees below its authorized staff.[10]"

To further elucidate the appalling conditions of Willowbrook, one of the institution's doctors revealed: "There [were] five thousand three hundred patients at Willowbrook, which is the largest institution for the mentally retarded in the world. The ones that we saw were the most severely and profoundly retarded. There [were] thousands here like that: not going to school, sitting on the ward all day, not being talked to by anyone. Only one or two or three people take care of seventy people on the ward; kids share the same toilet, contract one another's diseases. One hundred percent of the patients at Willowbrook [contracted] hepatitis within six months of being in the institution." He continues to acknowledge that Willowbrook is dangerous for children, that "it breeds battered children… the [unattended children] get bored, frustrated… and assault other unattended children. Given the neglect, deprivation, malnutrition, and trauma, there [was] a mortality rate of three or four a week. And these [were] preventable deaths.[11]"

It is unfathomable how the MR Adults in the Willowbrook Class withstood this. Proper speech therapy was probably the least of their concerns at the time, but all of the MR Adults who are in the Willowbrook Class had resided in the institution during (and beyond, in C.R.'s case) the critical periods of language acquisition. M.R. resided there for eight years, from the time he was 4 years old to the year the institution was defamed in 1972, and M.M. was there at Willowbrook for most of the first 12 years of her life. C.R. was admitted to the institution at 5 ½ years old and also did not leave until 22 years later in 1978.

The implications of this are tremendous: although M.R. is considerably adept with his communication and displays no aberrant behavior (although his phonology is greatly affected by his lack of teeth; the members of the Willowbrook School were not given solid food to chew on, so the gums of most of the young patients weakened and their teeth eventually fell out. Also, oral hygiene was completely neglected at Willowbrook, which exacerbated the problem), C.R. has the most co-morbid psychiatric disorders amongst all of the MR Adults at the center, and her communication skills are severely maladjusted. As for M.M., it was established earlier that M.M. technically has the same potential to be just as advanced in her cognitive and communicative abilities as J.V.—who did, after all, graduate high school and have parents who could afford additional treatment options. However, it can be inferred that M.M.'s upbringing in the Willowbrook Institution has had detrimental effects on her language acquisition, in opposition to J.V.'s considerably privileged upbringing.

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[10] Rivera (1972), especially pages 1-30, for more detailed on-scene accounts by reporter Geraldo Rivera
[11] Refer to Rivera (1972), pages 23-25, for Rivera's interview of Dr. Wilkins

The fact is, many people with mental illness live in communities that are not prepared to receive them—thus, the quality of life for many people with MR is marked by poverty, unemployment, dependency on government-aid programs, inadequate public service access, homelessness, intolerance, and correctional facility placement (Prince, Akincigil, & Bromet, 2007). A majority of the MR Adults at the habilitation center had considerably decent or 'normal' educational backgrounds and upbringings, but for the unfortunate ones who had been mistreated in the past, such as those in the Willowbrook Class, a more affectionate or understanding approach should be taken. After all, they were raised under the impression that authority figures or the people who are supposed to be helping them are actually malicious. Repairing the long-term linguistic damage to these MR Adults is laborious enough as it is, but this need not be exacerbated if the speech therapist can earn their trust.

4. Conclusion

The MR Adults in this study displayed language deficiencies and/or difficulties in all aspects, especially in Phonetics, Phonology, Semantics, Pragmatics, Morphology, and Syntax. The mechanics behind language intervention and remediation programming with MR Individuals are straightforward and not unlike that of Non-MR Individuals: Phonological and morpho-syntactic training should be applied at the greatest possible rate during childhood, before the end of the critical period (adequate potential for continued development in these aspects may no longer be viable beyond 12-14 years), while intensive semantic and pragmatic training should also be given during childhood but continued during adolescence and early adulthood. The cost-efficiency ratio of intervention regarding the computational linguistics of MR Individuals will rapidly decline with age. However, in the scope of this study, that scheme is entirely preventative, and MR Adults who display prominent communicative deficiencies need methods of speech therapy specialized to their needs and not empirical methods applied to Non-MR Individuals or MR Children. However, this means that despite the immense phonological and morpho-syntactic deficiencies and irregularities displayed in the MR Adults, there is little hope of remediation for those aspects. Future caretakers and guardians of MR Children will need to learn from the present MR Adults that the sooner an MR Individual undergoes computational-language intervention, the better. However, that is not to say that other aspects of language more contingent on the 'nurture' side of the nature/nurture dichotomy cannot be mended for MR Adults. Rote procedures are completely ineffective, not only for computational language problems, but also for language problems that affect socialization. The MR Adults need a long-term regiment of interactive drills, both at the habilitation center and at home—that is, be effectively demonstrated an increase in the quality of life with every marked linguistic improvement, preferably within an immediate timeframe

because of their short attention spans. Either way, MR Adults come from an assortment of medical, socioeconomic, domestic, and educational backgrounds, and if the drills properly accommodate their differences, there is a greater chance that they will eventually acquire the sufficient communication skills that will help them assimilate into society.

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