
Language Disfluency and Diagnosis in the Deaf Inpatient Population

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Abstract

This study was designed to investigate the relationship between language dysfluency in the deaf inpatient population and the following variables: psychiatric diagnosis, risk of harm to self and others and psycho-social functioning admission scores on the Clinical Evaluation of Risk and Functioning Scale - Revised (CERF-R), and cognitive ability as measured by the Allen Cognitive Level Scale (ACL).

The research found that 75% of deaf individuals fell into the non-fluent range of communication in ASL, their best language. Participants with severe language dysfluency received DSM-IV diagnoses concentrated in more severe forms of psychopathology, while individuals with fluent language skills received a broader range of diagnoses. Individuals with severe language dysfluency exhibited lower cognitive scores, overall lower functioning scores but not higher risk scores. The data suggest that future research is needed to develop a better understanding of language dysfluency, the distinction between language dysfluency and psychopathology, and of the behavioral patterns of deaf individuals who have faced a life-long history of severe language deprivation.

Introduction

A search of the psychological and medical literature reveals that psychopathology in people born deaf is poorly understood. Historically, assessment and treatment of deaf persons was performed by hearing professionals who lacked cross-cultural training in deafness (Baker-Shenk & Cokely, 1984; Glickman, 1983, 1986, 2003; Glickman & Gulati, 2003; Glickman & Harvey, 1996; Lane, 1999; Pollard, 1994, 1996, 1998; Pollard, Minor, & Cioffi, 2000; Raifman & Vernon, 1996; Steinberg, 1991). A number of researchers hypothesized a "psychology of deafness" in which deaf persons are evaluated on how they deviate from hearing norms and any differences are considered deficient or deviant behavior (Baker-Shenk & Cokely, 1984; Lane, 1999; Paul & Jackson, 1993). The psychology of deafness model minimizes or obscures cultural differences across populations and attributes such differences to psychopathology. Within the context of this model, deaf persons are perceived as having a higher prevalence of psychopathology than hearing individuals (Pollard, et al. 2000).

By contrast, a Deaf cultural model has emerged claiming that the medical model is oppressive to deaf individuals (Baker-Shenk & Cokely, 1980; Glickman & Harvey, 1996; Higgins, 1980; Lane, 1999; Padden & Humphries, 1998; Pollard, 1998; Pollard, et al., 2000; Steinberg, 1991). Researchers from this perspective argue that rates of psychopathology in

the earlier studies were a matter of deaf individuals being misunderstood and misdiagnosed (Glickman, 2003a). Behaviors previously labeled as psychopathological are seen as normative within a culturally Deaf framework. The deaf cultural model is motivated by a political agenda to empower deaf people. Professionals working within this model might tend to interpret deaf/hearing differences as resulting from cultural factors and overlook evidence of genuine psychopathology (Pollard, 2000).

The existence of two different models and the resulting inconsistency in diagnostic formulation prompt questions regarding accuracy of diagnosis and what should be an appropriate model for studying the deaf inpatient population. Current clinical research suggests that unique factors exist that interact with deafness. For example, Glickman and Gulati (2003) point out that simply being deaf within a hearing world may severely complicate the forms and appearances that an individual's psychopathology might take (Glickman & Gulati, 2003). They also note that deaf patients may present with language and cognitive deficits complicated primarily by delayed or inadequate language development.

To date, empirical research has rarely addressed any distinction between degrees of language dysfluency in the deaf persons' best language and psychopathology within the deaf inpatient population. Previous studies concentrated on comparing the deaf population to the hearing population in terms of mental health diagnoses without taking into consideration the effects of language skill. When language dysfluency is considered at all, it is considered a possible indicator of thought disorder rather than as a clinical issue, independent of mental illness, to be evaluated in its own right (Altshuler, Kallman & Demming, 1963; Altshuler & Rainer, 1966; Grinker, et al., 1969; Trybus, 1983). Certainly, severe language dysfluency complicates the clinical presentation of many deaf patients. It is a problem that appears almost without parallel in hearing persons who have normal brain functioning.

Issues related to diagnoses and psychopathology in deaf persons run parallel to studies involving other minorities. Minority studies are often conducted by outsiders who misinterpret culturally normative behaviors as pathological or deviant. The deaf population, like other minority groups, need to be examined from a cultural insider's perspective in order to identify and recognize their needs. A cross-cultural model examining language fluency, thus far lacking in the

literature, allows for a more clearly defined perspective in examining psychopathology in deaf people that is both culturally sensitive and clinically sophisticated.

The proposed model addresses the probable relationship between severe language dysfluency, psychosocial functioning, and risk, cognitive functioning, and psychopathology. Language dysfluency is evaluated in terms of the patient's "best" language, generally ASL. Severity of language dysfluency in the deaf inpatient population is examined along with DSM-IV diagnoses, psychosocial risk and functioning as measured by the Clinical Evaluation of Risk and Function-Revised (CERF-R), and cognitive functioning as measured by the Allen Cognitive Level (ACL). The study addresses and adds clarity to the following questions: Do deaf individuals with greater degrees of language dysfluency exhibit lower functioning skills and higher risk behaviors than deaf individuals with more fluent language? Do deaf individuals with greater degrees of language dysfluency exhibit lower cognitive scores? Finally, do deaf individuals with severe language dysfluency receive DSM diagnoses concentrated in more severe forms of psychopathology than those individuals with less severe language dysfluency?

The opportunity to study the deaf inpatient population in a setting that specializes in identifying and treating the cross-cultural needs of this heterogeneous group increases the probability of obtaining a more accurate diagnostic formulation. Without such accuracy, deaf individuals are left in a perpetual state of what Harlan Lane (1999) refers to as "diagnostic mayhem." As Lane states, "Heaven help the deaf man or woman who is really mentally ill; earthly help is not likely to be forthcoming" (p. 55).

Methods

Participants and Procedures

This study consisted of the use of archival data obtained from discharged adult patients at the Deaf Unit of Westborough State Hospital in Westborough, Massachusetts. Participants consisted of 64 adult deaf male and female Department of Mental Health consumers who were patients on the hospital's specialized Deaf Unit between 1999 and 2004, and were since discharged. Participants placed on this unit were either deaf or severely hard of hearing individuals who communicated using sign language and/or visual-gestural communication, and required a treatment program responsive to their specific needs.

This study focused specifically on an inpatient Deaf Unit designed to meet the cultural and linguistic needs of deaf individuals. The Deaf Unit at Westborough State Hospital is only one of about a dozen deaf inpatient psychiatric treatment programs in existence in the United States. The Deaf Unit provides a culturally affirmative treatment model for deaf individuals that allows for full communication accessibility in all aspects of patient care (Glickman & Gulati, 2003). The treatment model espouses an affirmative view of deafness in which deafness is understood as a positive cultural difference. The treatment team members consist of deaf and hearing professionals from various disciplines, including social work, psychology, psychiatry, nursing, occupational therapy, sign language interpreting, and a communication specialist. Staff skills in ASL vary from beginner to native fluency, and a competent Communication Department composed of two interpreters and a Communication Specialist assists to assure appropriate communication. On average over time, about a third of the program staff tend to be Deaf.

The impact of language dysfluency on diagnosis, cognition, risky behaviors and functional skills was examined in this study. Language dysfluency was determined using a communication assessment tool. This assessment was conducted by the staff's Communication Specialist as part of the general intake process for all patients on the Deaf Unit. The Communication Specialist, a near-native, linguistically sophisticated Deaf ASL user, examined expressive and receptive communication skills, impairment of language and language dysfluency, and family and educational communication history.

Instrumentation: Deaf Unit Sign Communication Assessment

The Communication Assessment conducted by the Communication Specialist, based on a structured interview, breaks down patient communication skills into seven skill levels as follows:

1. Relies mainly on gesture, drawing, or other non-linguistic means of communication.
2. Grossly limited or impaired language abilities. Very limited vocabulary, which is likely to include home signs. Uses isolated signs or short sign phrases. Signs may be used incorrectly. Almost no grammatical structure.
3. Functional communication skills in a language, but non-fluent. Has vocabulary sufficient for everyday conversation, but

misunderstandings are frequent. Consistent grammatical mistakes. Among these signers, some common errors are: lack of topic/comment sentence structure and resulting confusion as to subject and object, poor use of time indicators and poor temporal sequencing, limited vocabulary with signs used incorrectly, unnecessary sign repetition instead of inflection, tendency to use short sign phrases rather than full sentences, and an inability to "code-switch" or modify signing to fit different receivers.

4. Fluent user of other spoken language such as Spanish or French.

5. Fluent user of spoken, written, or signed English. Command of English sufficient so as to effect signing. Generally signs in English word order. Lacks ASL grammatical features such as use of space, directionality, locatives, and sign inflection. May use some initialized signs.

6. Fluent user of ASL. Follows grammatical rules of ASL. Clear use of space, directionality, locatives, modifiers, and sign production.

7. Bilingual in ASL and spoken/written/signed English.

The Clinical Evaluation of Risk and Functioning Scale - Revised (CERF-R)

The CERF-R (Lambert, McCorkle, Fenby, Patel, Rubano, & Vinter, 1999) is an assessment tool designed by the clinician administrators of the Metrosuburban Area of the Massachusetts Department of Mental Health. It has been routinely used in the ongoing assessment of all hospitalized and community-based DMH hearing and deaf patients in east central Massachusetts since October 1999. Statewide release of the CERF-R began in January, 2000.

The CERF-R provides a consistent, clear, and reliable measure for recording assessment of patients' current risk levels, functional abilities, and intensity of services provided. The instrument is administered by a multi-disciplinary team who serves as the patient's care providers. On the Deaf Unit, this team includes direct care staff, nurses, a social worker, an occupational therapist, a communication specialist, a psychologist, a primary care physician, and a psychiatrist. Authors of

the CERF-R (Lambert, et al., 1999) point out that the perspectives of multiple providers are needed in order to address the complexities of a patient's mental health issues and overall abilities.

The CERF-R assesses nine functional abilities and seven risk factors, each of which is rated on a 6-point, anchored Likert scale. The treatment team rates each patient on a periodic review schedule at admission, three months, six months, annually thereafter, and at discharge. A rating of "1" indicates no current problem behaviors in the area, and a rating of "6" indicates a need for total supervision in the identified area by staff in order to prevent harmful behaviors.

Barry (2002) found acceptable levels of reliability and validity on the CERF-R. The functioning and risk scales of the CERF-R are presented in Appendix A.

The Allen Cognitive Level Scale (ACL)

The ACL is an instrument commonly used by occupational therapists in assessing consumers' cognitive and functional abilities (Allen, 1992). The ACL has been in clinical use since 1973. It is a standard tool used with patients upon admission to the Deaf Unit, with its strength being that it is a non-verbal task. Since few non-verbal functioning measures are available, this task helps obtain information regarding a person's ability to relate, learn, recognize, correct errors, and problem solve. The ACL consists of a leather-lacing task in which the person is asked to replicate three stitch patterns of increasing complexity. Individuals' performances are rated on a six-point scale from 0 to 6. The average range for this task falls between 5.4 to 5.8. Statistical properties of the ACL are summarized in Appendix B.

DSM Axis Codes

Initial admission diagnoses using Axis I and Axis II codes from the DSM IV were obtained for all deaf patients.

Data Analysis

The following hypotheses were tested:

1. Patients with greater language dysfluency will show higher levels of risk of harm to self and others and lower levels of psychosocial functioning as measured using the CERF-R.
2. Patients with greater language dysfluency will show lower levels of cognitive functioning as measured by the ACL.

3. Patients with greater language dysfluency will be diagnosed with more severe forms of psychopathology. Deaf patients with fluent language skills will display a wider range of kinds of psychopathology than patients with language dysfluency.

Hypothesis 1 was analyzed by correlating the level of language fluency with the sum of all the CERF-R risk and functioning items. Level of language fluency was then correlated with individual CERF-R items. The independent variable, the communication score, was treated as ordinal data and the dependent variable, the CERF-R scores, were treated as interval variables.

Hypothesis 2 used the Pearson r correlation to assess the strength of the relationship between the level of communication and the ACL (an interval measurement).

Hypothesis 3 compared level of communication with DSM-IV diagnoses, classified into severe and non-severe psychopathology. A t -test was used to analyze the categorical data, and a chi square test was conducted to examine degree of communication scores by severity of diagnosis.

Operational Definitions

Language dysfluency: Patients who meet the criteria for language dysfluency include those deaf individuals classified as fitting categories 1, 2 or 3 on the communication assessment.

Severe psychopathology: For the purposes of this study, "severe psychopathology" was defined to include the diagnoses of Schizophrenia, Schizophreniform Disorder, Schizoaffective Disorder, Delusional Disorder, Brief Psychotic Disorder, Psychotic Disorder, and Pervasive Developmental Disorders. All other diagnoses are classified as non-severe psychopathologies.

Results

A demographic breakdown of the patient population can be found in Black (2005).

Levels of communication scores were examined and are presented in Table 1. Scores ranged from 2 to 7, with a mean score of 3.28 and a standard deviation of 1.27. The scores indicated that 75% of participants fell into the non-fluent range of communication. Twenty-five percent of the participants scored in the fluent range, with the majority of

these falling into the classification of Fluent English. As Table 4 shows, three participants (4.7%) were found to be fluent in ASL, the language of culturally deaf persons.

Table 1

Frequency of Level of Communication Scores (N = 64)

Degree of Communication Score	n	Percent
Visual/Gestural	0	0
Grossly Impaired/Limited Vocabulary	18	28.1
Functional but Nonfluent	30	46.9
Fluent Foreign Language	1	1.6
Fluent English (sign, speech, writing)	12	18.1
ASL Fluent	1	1.6
ASL and English Fluent	2	3.1

ACL scores were obtained on all the patients. Table 2 presents the frequency of Allen Cognitive Level Scores. Scores ranged from 3.2 to 5.8, with a mean of 4.78. Allen (1992) classifies levels 5.4 to 5.8 as within the normal range of functioning. As can be seen, 32.9% of the participants fell within this range, while 67.1% of individuals fell below this range. Some guidelines for evaluating ACL scores are presented in Appendix C.

Table 2

Frequency of Allen Cognitive Level (ACL) Scores (N = 64)

ACL Score	n	Percent
3.2	1	1.6
3.3	1	1.6

ACL Score	n	Percent
3.6	3	4.7
3.7	1	1.6
3.8	2	3.1
4.0	2	3.1
4.1	2	3.1
4.2	5	7.8
4.3	1	1.6
4.4	7	10.9
4.5	1	1.6
4.6	4	6.3
4.7	1	1.6
4.8	1	1.6
5.0	6	9.4
5.2	5	7.8
5.4	12	18.8
5.6	1	1.6
5.8	8	12.5

A breakdown of DSM-IV diagnoses is presented in Table 3. It should be noted that 29.7% (n = 19) of the participants were diagnosed with major depression. If depression NOS (3.1%) and major depression with psychosis (3.1%) were added to this figure, the total percentage of individuals with depression would be 35.9 (n = 23). The next major diagnosis was that of Post-Traumatic Stress Disorder (26.6%, n = 17).

This was followed by Schizoaffective Disorder (17.25, n = 11), and Bipolar Disorder (15.6%, n = 10).

Table 3

DSM-IV Diagnoses (in alphabetical order) (N = 64)

Variable	n	Percent
Adjustment Disorder	1	1.6
Alcohol Dependency	2	3.1
Attention Deficit Disorder	3	4.7
Anxiety Disorder	1	1.6
Asperger's Disorder	1	1.6
Bipolar Disorder	10	15.6
Borderline Personality Disorder	5	7.8
Cocaine Abuse	1	1.6
Communication Dissorder	2	3.1
Delusional Disorder	1	1.6
Dependent Personality Disorder	1	1.6
Depression NOS	2	3.1
Dissociative Disorder	1	1.6
Impulse Control Disorder	3	4.7
Intermittent Explosive Disorder	3	4.7
Learning Disorder	1	1.6
Major Depression	19	29.7

Variable	n	Percent
Major Depression with Psychosis	2	3.1
Mental Retardation	5	7.8
Obsessive-Compulsive Disorder	4	6.3
Pervasive Developmental Disorder	4	6.3
Polysubstance Abuse	3	4.7
Polysubstance Dependence	4	6.3
Post Traumatic Stress Disorder	17	26.6
Psychotic Disorder NOS	7	10.9
Schizoaffective	11	17.2
Schizophrenia	7	10.9

Note: As some subjects have multiple diagnoses, total n is more than 64, and total percent equals more than 100.

Hypothesis 1: Level of communication, psychosocial functioning, and risk

When the CERF-R was divided into separate risk and functioning scales, there was a significant correlation between level of communication scores and functioning scores overall ($r = -.485, p < .01$). However, Hypothesis 2, regarding the overall risk scores, was not confirmed ($r = .081$). (It should be noted that on the CERF-R, the scale was designed so that high scores indicate more risk and lower functioning levels. This scale is different from the level of communication score, in which lower scores equal lower communication levels. The relationship between level of communication and the CERF-R summary scores categories is positive, but was identified statistically as a negative correlation due to the directionality of the scales.

This data is presented in Table 4.

Table 4

Intercorrelations between Level of Communication and CERF-R Functioning Items

Summary on Admission and CERF Risk Items Summary on Admission. (N = 64)

VARIABLE	1	2	3
1. Degree of Communication			.08
2. CERF Functioning Items Summary on Admission		.48**	
3. CERF Risk Items Summary on Admission			.11

Note. ** $p < .01$ (1-tailed)

Table 5 presents the intercorrelations between level of communication and Individual CERF-R Functioning and Risk Items on admission. There was a significant correlation between level of communication and some of the CERF-R Functioning and Risk items.

Table 5

Intercorrelations between Degree of Communication and Individual CERF-R

Functioning and Risk Items (N = 64)

Variable	Degree of Communication
Hygiene	-.403*
Nutrition	-.372*
Personal Finances	-.445*
Variable	Degree of Communication

Holding a job	-.488*
Negotiating a Social Situation	-.316*
Pursuing Appropriate Independence	-.490*
Using Services That Promote Recovery	-.225**
Appropriate use of Psychiatric Medication	-.113
Recognizing and Avoiding Common Hazards	-.251**
Physical Violence Towards Others	-.081
Committing Sexual Offenses	-.191
Deliberate Self-Harm	-.346**
Significant Consequences of Other Unacceptable Behavior	-.021
Substance Use	.146
Leaving Services Prematurely	-.040
Poor Impulse Control	.031

Note. * $p < .05$, ** $p < .01$

Hypothesis 2: Level of communication and cognitive functioning

When the ACL scores were correlated with the level of communication scores, hypothesis 2 was supported. The Pearson r correlation of .547 was statistically significant at the .01 level (1-tailed).

Hypothesis 3: Level of communication and severity of psychiatric diagnosis

To test hypothesis 3, a t-test was conducted with level of communication as the dependent variable and severity of diagnosis as the independent variable (Table 6). Forty participants were in the "Not Severe Psychopathology Diagnosis" category and 24 were in the "Severe Psychopathology Diagnosis" category. Participants in the Not Severe

Psychopathology Diagnosis category did have significantly higher level of communication scores than did those in the severe psychopathology diagnosis category ($M = 3.55$ vs. $M = 2.83$) which confirmed the hypothesis. Because Levene's Test for Equality of Variances was significant, the t-test when equal variances is not assumed was used, $t(60.41) = 2.44, p < .05$.

Table 6

Degree of Communication by Severity of Diagnosis
(N=64)

Variable	Severe	n	Not Severe	n
Degree of Communications	2.83*	24	3.55*	40

Note. * $p < .05$, ** $p < .01$

A chi square test was conducted to examine level of communication scores by severity of diagnosis. A Kendall's tau-b chi square showed a significant difference ($\tau = .2106, p < .05$) between degrees of fluency for patients with severe psychopathology and those with non-severe psychopathology. Table 7 shows that only 4.7% of participants with severe psychopathology fell into any areas of fluency, whereas, 20.6% of participants with non-severe psychopathology fell into all four of the fluency ranges. The highest percentage of participants in both severe and non-severe psychopathology was seen in the functional but nonfluent range (severe = 17.2, non-severe = 29.7).

Table 7.

Chi Square Test of Degree of Communication and Diagnosis
(N = 64)

Degree of Communication Score:	Psychosis: Degree of Psychopathology					
	Not Severe Pathology		Severe Pathology		Total	
	n	%	n	%	n	%
Visual/Gestural	0	0	0	0	0	0
Grossly Impaired	8	12.5	10	15.6	18	28.1
Limited Vocabulary Functional but Nonfluent	19	29.7	11	17.2	30	46.9
Fluent Foreign Language	1	1.6	0	0	1	1.6
Fluent English (Sign, Speech, Writing)	9	14.1	3	4.7	12	18.8
ASL Fluent	1	1.6	0	0	1	1.6
ASL & English Fluent	2	3.1	0	0	2	3.1
TOTAL	40	62.5	24	37.5	64	100.0

$$\chi^2 (.106) = -.262$$

*p < .05

Discussion

This study was designed to investigate the relationship between language dysfluency in the deaf inpatient population and the following variables: risk of harm to self and others and psychosocial functioning as

measured by scores on the CERF-R, and cognitive ability as measured by the ACL, and psychiatric diagnoses.

Functioning and Risk Levels of Deaf Individuals with Severe Language Dysfluency

This research finds that deaf individuals with language dysfluency exhibit overall lower psychosocial functioning skills than those with language fluency. Gulati (2003) proposed that deaf individuals with language dysfluency suffer from a number of emotional and social deficits and academic and vocational stressors that result in reduced quality of life (Gulati, 2003). The findings of this study are broadly supportive of this position. Statistical significance on the CERF-R Functioning Scale (include holding a job, negotiating social situations, pursuing appropriate independence, recognizing and avoiding common hazards) shows that the more severe the dysfluency, the more difficulty the deaf individual has in navigating a social environment.

Without a comprehensive language system, the language dysfluent deaf individual struggles to meet the demands of everyday life. The addition of mental health problems further complicates the situation. Yet, how does the language dysfluent, mentally ill deaf adult seek the help that is needed, or even conceptually understand the need for mental health services? The results show that a high correlation exists between language dysfluency and the CERF-R functioning item: "Using services that promote recovery." A large part of this may be due to the deaf person feeling overwhelmed and not understanding how to seek the help needed. Even if the deaf individual does find a way to search for help, literature shows that only a mere 2% of deaf persons in need of mental health services receive them (DuBow, et al., 1992; Pollard, 1994). Deaf people who are culturally and linguistically isolated are often unable to access the support system needed. In locations where no outpatient services or intermediate levels of care are available, a unit specifically designed to serve deaf individuals at a hospital might be the direct line of care for these individuals.

One would also expect that deaf individuals with poor functioning abilities are more susceptible to increased risk behaviors such as poor impulse control or other behavioral disturbances. However, these findings contradict this hypothesis. Overall, there was no significant correlation between the summary of risk scores on the CERF-R and language dysfluency. When examining individual items on the Risk Scale, there was only one significant correlation. A significant correlation was found between communication skill and risk for

deliberate self-harm. However, this later correlation showed that those with a higher level of communication were at greater risk for deliberate self-harm. This is a striking finding that one would certainly want to see replicated. We might speculate as to the reasons for this correlation. Perhaps higher levels of language skills are required for one to blame oneself and direct aggression inward. People with dysfluent language might be more likely to attribute problems to the behavior of other people than to themselves.

An interesting finding is that severe language dysfluency did not correlate with the CERF-R item "current risk of harm due to poor impulse control." Impulsivity has received considerable attention in the literature. A Psychology of Deafness model regards impulsivity as a negative attribute found in all deaf individuals (Lane, et al., 1996; Lane, 1999). Early inpatient researchers noted behavior and impulse control problems in their patients (Altshuler, Kallman, & Deming, 1963; Rainer & Altshuler, 1966). In other research, poor communication skills and little education were thought to be associated with impulsivity and behavioral problems (Rainer & Altshuler, 1966; Grinker, et al., 1969; Rainer, et al., 1963). In this study, this commonly cited relationship between language skills and impulsivity was not substantiated.

Other risk items that did not demonstrate significant correlations with communication skill include physical violence toward others, consequences from others' unacceptable behavior, leaving services prematurely, and risk of harm due to substance abuse. Thus, generally we see a picture of poor language skills being related to generally poor psychosocial functioning, but not to risky behaviors. The exception was with risk of self-harm, which in this study was correlated with higher levels of language fluency.

Cognitive functioning and language dysfluency

A high correlation was found between severe language dysfluency and low ACL scores. This finding confirms past and current research that lack of early exposure to language influences cognitive functioning (Rainer & Altshuler, 1966; Brauer, et al., 1998; Glickman and Gulati, 2003; Grinker, et al., 1969; Pollard, 1998; Schlesinger & Meadow, 1972). Clinical research shows that deaf individuals exhibit cognitive deficits in terms of verbal IQ scores but may exhibit more normal performance IQ scores (Braden, 1994; Gulati, 2003; Pollard, 1998). The ACL is a non-verbal task but as with performance subtests of the Wechsler scale, language skills may help someone reason through a non-verbal task. Thus, we saw that patients with poor language skills

also scored more poorly on the non-verbal ACL measure of cognitive functioning.

Language dysfluency and severity of psychopathology

This study found that deaf individuals with severe language dysfluency received DSM-IV diagnoses concentrated in the more severe forms of psychopathology than those individuals with more fluent language. No comparisons with this study and previous findings can be made since psychopathology was not correlated with language dysfluency in past research. However, a table displaying frequencies for each diagnosis was constructed (Table 3). These diagnoses can be examined in relation to previous findings.

Previous literature shows a number of over-diagnosed disorders in the deaf population. Of interest is that the three highest over-diagnosed disorders also fall into the category of severe psychopathology as defined by this study. The diagnosis that received the highest frequency was Schizoaffective Disorder. Most past studies grouped this diagnosis together with other psychotic disorders, making it difficult to estimate its prevalence. In this study, 17.6% of participants received this diagnosis. In terms of the general population, the DSM-IV (1999) does not state specific prevalence but notes that this disorder is lower than Schizophrenia (.2 to 2%). It is possible that the diagnosis of Schizoaffective Disorder is a decisive movement away from the diagnostic label of Schizophrenia, considered a "wastebasket classification" for deaf patients with poor language skills (Rainer & Altshuler, 1966, p. 199). It is also possible that a more thorough understanding of the difference between psychosis and affect regulation could be arrived at by trained professionals working with patients with language dysfluency.

There is another possible reason for the apparent high correlation between severe psychopathology and language dysfluency. Even on a specialized Deaf unit, the state of our understanding of the differential diagnosis between language dysfluency and thought disorder is still rudimentary. Clinicians know about the problem and hopefully don't make obvious mistakes such as mistaking written English samples for psychosis. However, many of the Deaf Unit's more severely language dysfluent patients really are quite difficult to communicate with, even with expert communication assistance. Psychosis is sometimes obvious, as when someone is seen hallucinating and reports hallucinations or when someone reports a bizarre delusion, but more often the diagnosis of thought disorder is more complex and subtle. Many patients appear

disorganized cognitively, and parsing out thought disorder from language dysfluency from other kinds of organic brain syndrome requires knowledge that isn't yet established clearly in the field. Thus, it is possible that some language-dysfluent patients were misjudged as thought disordered or visa-versa, in spite of best efforts. The apparent high correlation may reflect continuing difficulty in distinguishing the two groups from each other clearly.

Another disorder that has been over diagnosed is mental retardation. In this study, the frequency of this diagnosis was relatively smaller than in many past studies. However, at 7.8% of the participants, prevalence is still much higher than the general population (1%). The Westborough Deaf Unit receives many referrals of deaf mentally retarded people who may or may not have a psychiatric disorder but who exhibit severe behavioral problems. Some of these patients are admitted partially because of the lack of other resources to serve them. The Deaf Unit could easily increase its number of deaf mentally retarded patients by outreach to the Department of Mental Retardation. Thus, the number of mentally retarded deaf persons served by the unit is a matter of how many such patients are sought out, referred, and admitted, and not likely a matter of misdiagnosis.

Contrary to most of the prior research, depression, bipolar disorder, PTSD, and substance abuse were not under diagnosed in this study. In fact, each of these four diagnoses received a higher prevalence than in the general population. Of these four, depression and PTSD were the most frequently diagnosed of all the disorders, including those in the severe psychopathology category. It is possible that in previous research these disorders were difficult to diagnose due to communication problems. The cultural model may have helped increase awareness of normative behaviors in the deaf population while at the same time shedding light on how symptoms manifest themselves in deaf patients.

Of the four diagnoses mentioned above, PTSD was not identified in any past research, yet its prevalence is noted in this study. Given that the deaf are considered to have high rates of physical and sexual abuse, the result is not surprising. This study found 35.1% of participants had a known history of sexual abuse and 27.1% had a known history of physical abuse. Other clinical findings show that rates are much higher (Gulati, 2003; Sullivan, Vernon & Scanlan, 1987). We believe that these percentages represent a low estimate because many language-dysfluent patients do not give clear histories and because the unit staff's attention to trauma issues has increased since the time this study began.

Throughout the literature, findings on the rates of diagnoses of personality disorders has been conflicting, with rates either significantly lower or significantly higher than the hearing population. This study identified two personality disorders: Borderline Personality Disorder and Dependent Personality Disorder. Rates for both these were relatively low. However, early researchers believed that environmental deficits produced "certain unique personality features" among deaf individuals (Rainer & Altshuler, 1966, p. 141). These features were used to place individuals in various categories of personality disorders. Individuals received diagnoses such as Inadequate Personality, Primitive Personality Disorder and Passive Dependency (Altshuler & Rainer, 1966; Grinker et al., 1969; Rainer, et al., 1963). Although some consideration was given to the communication issues faced by deaf patients, it appears likely that language dysfluency and its coinciding behaviors became identified as symptoms of a diagnosis rather than a diagnosis in and of itself.

The Psychology of Deafness model identified deaf personality traits, such as those mentioned above, as pathological. The cultural model rejects the notion of a psychology of deafness. Looking at past research from today's perspective, it is possible that some characteristics described in the psychology of deafness literature, such as lower psychosocial and cognitive functioning, are characteristic of many deaf psychiatric inpatients who are language dysfluent, but this finding could not be generalized to deaf people, or even deaf inpatients, as a whole. In other words, a psychology of deafness model may fit for many language-dysfluent deaf persons but not for culturally deaf, or people with hearing impairments as a whole.

Areas for Future Research

The communication assessment used for this study was designed by the staff at Westborough State Hospital. It has proven to be a valuable tool in assessing level of communication for the patients on the unit, including the participants of this study. With this tool, significant results were obtained in understanding the role that language dysfluency plays in assessing functioning and risk levels, cognitive abilities, and psychopathology. However, to date, there is no research-validated language assessment tool uniformly available for facilities or practitioners serving deaf individuals (Gulati, 2003). The communication assessment at Westborough could serve as a model in the development of such a tool. If it is true that language dysfluency correlates significantly with psychosocial functioning, and some aspects of risk, as well as cognitive functioning and degree of psychopathology, then a validated

measure of sign language skills would need to be the crucial part of psychiatric assessment of signing deaf people.

In the same way that greater clarity is needed in diagnosing language dysfluency in deaf people, so too is there a need for a clinical tool to assist in the assessment of thought disorder in deaf persons. In 2005, specialized deaf programs can be expected to be aware of the problem of possible confounding of language dysfluency and psychosis. Staff at programs that do not typically serve deaf persons would most likely not be familiar with this problem. But even with the problem known and excellent communication resources, we do not yet have valid and reliable tools to diagnosis either language dysfluency or thought disorder in deaf persons. Consequently, this research must be considered preliminary, and its conclusions tentative.

Previous studies compared the deaf to the hearing population. This study was designed to examine the deaf inpatient population exclusively, using the lens of language dysfluency. Results shed light on the relationship of diagnosed psychopathology and language deficits, an area not previously addressed in the literature. However, sample size of participants with severe language dysfluency and severe psychopathology was small. Further research with a larger sample and the opportunity to follow diagnostic interpretations throughout the course of hospitalization will increase our understanding of how these variables interact. Results of this research may provide opportunities for other specialized treatment facilities to follow suit, recognizing the important role that language dysfluency can have on diagnostic interpretation, functioning levels and perhaps risk behaviors, and how combined psychopathology and language dysfluency displays itself in this unique population.

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Appendix A: Functioning and Risk Scores of the
CERF-R Functional Abilities

- A. Currently able to maintain adequate hygiene (cleanliness of body, clothing, and living space)
- B. Currently able to maintain appropriate nutrition (eating a balanced diet, food shopping, and cooking)
- C. Currently able to manage personal finances
- D. Currently able to hold a job
- E. Currently able to negotiate social situations
- F. Currently able to pursue appropriate independence (including accepting changes)
- G. Currently able to use services that promote recovery (such as housing, employment, substance abuse and mental health services)
- H. Currently able to use psychiatric medications as needed
- I. Currently able to recognize and avoid common hazards and dangerous interpersonal situations (traffic and smoking safety, being victimized, exposure to elements, etc.)

Risk Factors

- J. Current risk for physical violence towards others
- K. Current risk for committing sexual offenses (sexual violence, sexual threats, exposure, stalking, harassment)
- L. Current risk for deliberate self-harm (self-injury, suicide)
- M. Current risk of significant consequences from other unacceptable behavior (illegal or socially disturbing behavior such as victimizing others, property damage, harassment, theft or arson)

N. Current risk of harm due to substance use

O. Current risk of leaving services prematurely (stop attending needed services, wandering from home or program, escape from secure settings, etc.)

P. Current risk of harm due to poor impulse control

Appendix B: Statistical Properties of the ACL

The ACL is found to have inter-rater reliability between .90 and .99 (Allen, Earhart, and Blue, 1992). In terms of validity, the ACL has been correlated with cognitive measures such as the WAIS. The strongest correlations were between the ACL and Block Design and Object Assembly ($r = .729, p < .001$). Performance IQ also showed a high correlation with the ACL ($r = .55, p < .003$). The correlation between the ACL and Performance IQ is beneficial in that most deaf individuals with non-fluent English language, are generally tested using only the Performance Scale of the WAIS. Allen (2002) also reports that the ACL correlates significantly with functional abilities such as activities of daily living (ADL's) including independent self care, ability to live alone, and community functioning including social skills and occupational functioning, similar to the functioning items on the CERF-R.

Appendix C: ACL Cognitive Levels (Allen, 1994)

The severity of an illness, as it affects the individual's ability to function, is measured by six cognitive levels:

Level 0: The individual is alive but in a coma or under general anesthesia. No conscious control of movement is evident.

Level 1: The individual responds to an external stimulus. A general response, like a change in heart rate usually precedes a specific response to noxious stimuli, followed by additional stimuli like bells, voices, pictures, and mobiles.

Level 2: The individual controls gross body movements to sit up, stand up, walk and do push/pull exercises. Adaptive equipment that protects the individual from hazardous postural movements or supports a functional position is indicated.

Level 3: The hands are used to reach for and grasp objects. Repetitive manual actions are common, but the effect produced on the object is not judged. Constant supervision is required to protect the patient from harm.

Level 4: Actions are goal-directed to complete a familiar activity. The routine activities of daily living can be done independently. Assistance is required to solve any problems presented by changes in the environment and to protect from unseen hazards.

Level 5: New actions are learned by doing an activity. The novelty presented by new products is explored. Hazards are not anticipated, and supervision in using dangerous or expensive products is advised. Aesthetic judgments about less striking visual cues are made, but with difficulty.

Level 6: The individual anticipates the consequences of his or her actions. An effective and efficient course of action is planned. The creation of an individual design can be premeditated and accomplished with ease.

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