Summary

Problem and Rationale. Family or partner ratings of communication abilities and social interactions represent an important source of information about people with aphasia. While ratings of communication are correlated with aphasia severity[1], there is little information about which elements of language are predominant. There is even less information about the extent to which family ratings reflect non-language factors such as mood state of the person with aphasia, cognitive deficits, and factors like the patient's marital status, gender, or mental health history. Because of the reliance on family/partner ratings as an outcome measure in many aphasia treatment studies and in the clinic, there is a great need for 1) the validation of commonly used family/partner rating measures, and 2) a better understanding of predictors of family ratings of communication.

Participants and Procedures. One-hundred-thirty individuals with aphasia due to neurologic illness completed a Communication Effectiveness Index (CETI)[2] as part of a comprehensive evaluation at our university-affiliated rehabilitation institute. The CETI is a simple, valid, and reliable way for partners to rate the communication effectiveness of the person with aphasia[2]. Figure 1 shows a sample CETI item. We utilized a CETI based on Lomas et al. (1978), with 16 individual communication behaviors. Raters were instructed to consider both verbal and nonverbal communication like drawing, writing and gestures. Partners marked a line on a 100mm horizontal bar to express how well the patient was able to communicate relative to the time before onset of the aphasia (from "not at all able" to "as able to before"). Raw scores (in mm from 0 to 100) were calculated. The average score across any of the 16 behaviors rated is the total CETI score, and higher scores reflect better communication. Family members or partners of inpatients and outpatients with a mean age of 57.5±15.8 who were 2 to 1248 weeks post-illness (mean=47.6±130) completed the CETI. People with fluent (56%) and non-fluent (44%) aphasias of varying diagnostic subtypes were evaluated. In addition to the CETI, participants with aphasia completed an aphasia severity measure (Boston Diagnostic Aphasia Examination; BDAE)[4], a standardized measure of functional communication (Communication Activities of Daily Living-2nd Edition; CADL-2)[5], a self-report measure of quality of communication life (ASHA Quality of Communication Life Scale; QCL)[6], a nonverbal analog of mood scale (Visual Analog Mood Scale; VAMS)[3] and measures of nonverbal cognitive ability.

Results. Descriptive statistics were used to summarize demographic data. There were no significant differences in CETI scores between married/cohabitating and unmarried people with aphasia, or between those with and without a pre-illness mental health history. There were no differences in CETIs completed by different family relations (spouse, parent, sibling, friend, etc.). People with fluent aphasia had higher CETI scores than nonfluents. Total CETI score was not correlated with weeks post-illness, education, or age (n=130). There were large correlations between CETI and aphasia severity (BDAE Language Competency Index/LCI) and functional communication (CADL-2) (all r_s=.50-.53), and medium correlations with nonverbal cognitive functioning, patient-reported quality of communication life (QCL), and patient-reported fear and anger (VAMS) (all r_s=.20-.32). In order to explore the latent structure of the CETI, a principal component analysis with varimax rotation was performed. Factors with eigenvalues >1 were retained, and a Scree plot was used to confirm the factor solution. The factor analysis revealed two factors with eigenvalues of 8.99 and 1.70, which together accounted for 67 percent of the total CETI variance. CETI items constituting the two factors are presented in Table 1. The first

factor accounted for 56% of the total variance with 8 CETI items loading >0.60 on the factor. This factor included communication behaviors almost entirely involving the initiation of or participation in conversations with others. The second factor accounted for 11% of the variance and was composed of 7 items associated with basic elements of communication, including nonverbal ones, which loaded >.55 on the factor. One CETI item (#6; coffee time visits with friends and neighbors) loaded on both factors >.50.

In order to understand the relationship between CETI factors and the person with aphasia, Spearman correlations between the two CETI factors and demographics, aphasia severity, functional communication, quality of communication life, and nonverbal cognition were calculated. Again, there were no significant correlations between either CETI factor and any demographic variable, weeks post illness, or nonverbal cognitive functioning. Factor scores did not differ in those with and without a pre-illness mental illness. People with nonfluent aphasia had lower factor 1 scores than nonfluents, but factor 2 scores did not differ by fluency. Correlations between factor 1 and aphasia severity (both BDAE expressive and receptive LCIs), CADL-2, and QCL were highly significant. Factor 2 scores were correlated with receptive LCI, CADL-2, and self-reported anger (VAMS), but not expressive LCI or QCL.

Linear regression analyses with each of the two latent CETI factors as dependent variables was completed in participants (n=94) who completed all measures, in order to determine the amount of variance accounted for by variables that were significantly correlated in univariate analyses. Aphasia severity (expressive and receptive LCI, separately) and functional communication (CADL-2) were first entered into the stepwise regression. Next, QCL and VAMS anger were entered. No significant variance in factor 2 ("communication basics") was accounted for by aphasia severity, QCL, anger (VAMS), or CADL-2. However, significant predictors of "conversation" (factor 1) in the regression were expressive aphasia severity (LCI) and QCL, but not receptive aphasia severity, CADL-2, or anger (Adjusted R^2=.39, $F(5,66)=9.29$, $p<.001$) (see Table 2).

Conclusions. While collateral source ratings are commonly used in both clinics and aphasia studies as outcome measures, the underlying components of ratings are not well understood. The results of this study revealed that a two factor model of family/partner-rated communication effectiveness best represents the relationships among the sixteen CETI items, consisting of a "conversation" factor and a "communication basics" factor. In regression analyses, these latent factors were *not* predicted by illness acuity, history of mental illness, nonverbal cognitive functioning, mood state of the person with aphasia, or functional communication as measured by the CADL-2. The "conversation" factor was predicted largely by expressive language impairment (LCI-expression), which on the BDAE is comprised of a grammatical form rating and a naming test. To a lesser extent, this factor was predicted by the person with aphasia's self-reported quality of communication life (QCL). Receptive language impairment was not predictive of this CETI factor. Conversely, the "communication basics" factor was not predicted by any demographic, aphasia severity (LCI), mood state or QCL variables. We conclude that the CETI primarily reflects conversational aptitude, and that family ratings of communication are heavily influenced by the expressive (but not receptive) language impairment of the person with aphasia. Actual functional communication ability (CADL-2), the mood state of the patient, and demographic factors are far less important. Additional variance in family/partner ratings on the CETI are likely to reflect personal qualities of the patient (e.g., pre-illness adjustment,

resilience), or characteristics of the rater (e.g., mood state). The results underscore the fact that family/partners typically rate the communication of a person with aphasia based on expressive language, even though other aspects such as listening comprehension are as important for everyday functional communication[7]. As an outcome measure, the CETI may be less sensitive to change in in areas other than conversation-level expression.

References

1. Bakheit, A.M.O., Carrington, S., Grffiths, S., & Searle, K. (2005). High scores on the Western Aphasia Battery correlate with good functional communication skills (as measured by the Communicative Effectiveness Index) in aphasic stroke patients. Disability and Rehabilitation, 27(6), 287-291.

2. Lomas, J., Pickard, L., Bester, S., Elbard, H., Finlayson, A., & Zoghaib, C. (1989). The Communicative Effectiveness Index: Development and psychometric evaluation of a functional communication measure for adult aphasia. Journal of Speech and Hearing Disorders, 54, 113-124.

3. Stern, R.A. (1997). Visual Analog Mood Scales: Professional Manual. Odessa, FL: Psychological Assessment Resources.

4. Goodglass, H., Kaplan, E., & Barressi, B. (2001). Boston Diagnostic Aphasia Examination-3rd Edition. Philadelphia: Lippincott, Williams & Wilkins.

5. Holland, A., Frattali, C., & Fromm, D. (1998). Communication Activities of Daily Living (CADL-2). Austin, TX: Pro-Ed.

6. Paul, D.R., Frattali, C.M., Holland, A.L., Thompson, C.K., Caperton, C.J., & Slater, S.C. (2004). ASHA Quality of Communication Life Scale: Manual. Rockville, MD: American Speech-Language-Hearing Association.

7. Fucetola, R, Connor, L. T., Perry, J., Leo, P., Tucker, F. M. and Corbetta, M. (2006). Aphasia severity, semantics and depression predict functional communication in acquired aphasia. Aphasiology, 20(5), 449-461.