**Title**: Communicative Informativeness in Aphasia

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**Background:** Informativeness is a measure of communicative success, referring to how successfully the person with aphasia is able to convey their intended message. Informativeness has been measured using objective linguistic measures, for example, correct information units (CIU, Nicholas & Brookshire, 1993) and via perceptual listener ratings (e.g. Jacobs, 2001). Ratings have often used direct magnitude estimation (DME) (e.g. Doyle, Tsironas, Goda & Kalinyak, 1996 & Jacobs, 2001). Within DME, listeners assign a numerical value to an initial sample and then rate subsequent samples in relation to that. There has been limited investigation of the relationship between subjective and objective measures of informativeness. Doyle et al. (1996) found a positive correlation between CIU measures and DME ratings but the relationship with a range of other measures has not been considered. It is, therefore, not clear whether there are certain linguistic measures which have stronger ecological validity in terms of what listeners view as important.

**Aims:** This study explored the relationship between objective linguistic measures and subjective perceptual ratings of informativeness, examining how DME listener ratings of informativeness relate to:

- Number of CIU (NCIU) and Percentage CIU (%CIU) (as defined by Nicholas & Brookshire, 1993)
- Number of propositions (NP) and propositional idea density (PID) (as calculated by Computerized Propositional Idea Density Rater, CPIDR 5.1, Covington, 2012)
- Mean length of utterance in words (MLU-w)

**Method and Procedures**: Complex picture description samples from 20 people with aphasia were analysed across two different picture contexts:- the complex picture from the Comprehensive Aphasia Test (CAT, Swinburn, Porter, & Howard, 2004) and the Tree picture from stimuli included in Nicholas and Brookshire (1993). Objective measures included NCIU, %CIU, NP, PID and MLU-w. Eleven naïve listeners produced DME ratings of informativeness, using the instructions and method described by Doyle et al. (1996).  A correlational design investigated the relationship between mean DME ratings of informativeness and the objective linguistic measures.

**Outcomes and Results:** Positive significant correlations were identified between mean DME rating and NCIU, %CIU, NP and MLU-w; the strength of correlation differed across variables. No significant correlation was found between mean DME informativeness and PID. A summary of the correlations for each picture description sample can be found in table 1.

<div align="center">Insert table 1 about here</div>

**Conclusions**: It is important to consider what factors contribute to someone with aphasia getting their message across successfully. This study investigated the relationship between a range of linguistic measures and listener ratings, using DME. Significant positive relationships were found between the subjective ratings and the linguistic measures, with the exception of PID. This would suggest that NCIU, %CIU, NP and MLU-w all capture features which are related to listeners' perceptions of informativeness. Within this picture description context, the strongest relationship was between NCIU and rated informativeness, emphasising the importance of complete and accurate production of lexical information, particularly nouns. This replicates the findings of Doyle et al. (1996). Listeners rated 'how accurately and completely' the person described the picture and seemed to focus on whether all the people and objects (represented by nouns) had been included. A less strong but still significant relationship was seen with %CIU, suggesting that in this context, there was a reduced focus on the efficiency of production. There was also a less strong relationship with NP and MLU-w; this could reflect the inclusion of both accurate and incorrect information in these measures. Alternatively, it may reflect a reduced emphasis on verb and sentence production, with listeners focusing on the information conveyed by the nouns whether or not they were in a sentence context. Within aphasia, there is an ongoing challenge to ensure linguistic assessment is valid, reliable and efficient. Whilst NCIU was the strongest predictor of perceived informativeness in picture description, other variables may be more important in narrative or conversation. Investigating the relationship between objective and subjective measures in other contexts will develop this understanding.

**References**

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**Table 1: Correlations between Mean DME ratings and Linguistic Measures for the CAT and Tree Pictures**

|  | CAT Picture | | Tree Picture | |
|---|---|---|---|---|
|  | r value (strength) | p value (significance) | r value (strength) | p value (significance) |
| **NCIU** | .879 (very strong) | <.000* | .902 (very strong) | <.000* |
| **%CIU** | .695 (strong) | .001* | .652 (strong) | .002* |
| **NP** | .632 (strong) | .003* | .634 (strong) | .003* |
| **PID** | .217 (weak) | .357 | -.068 (weak) | .777 |
| **MLU-w** | .765 (strong) | <.000* | .651 (strong) | .002* |

* Significant at Bonferroni corrected levels for multiple comparisons for each picture: p<.01.