Accuracy of Clinical Implementation of Main Concept Analysis

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Introduction

o Numerous studies have identified barriers preventing clinicians from utilizing discourse in clinical practice.[1-3]
o Lack of time and training and difficulty identifying appropriate tools are frequently reported.
o Few studies have investigated methods to reduce these barriers and have not enrolled practicing SLPS.[4,5]
o Currently, there is limited information available regarding clinicians' accuracy in implementing discourse measures.
o Main concept analysis (MCA) checklists show promise as a non-transcription-based tool to measure discourse.[6]
o Clinicians' ability to accurately implement MCA is unknown, limiting its clinical implementation.

Specific Aims

In this study we aimed to determine the accuracy of main concept analysis (MCA) coding by practicing speech-language pathologists (SLPs).

Methods – Participants and Procedures

o Transcripts of the Broken Window picture sequence (**Figure 1**) were retrieved from the AphasiaBank database;[7] transcripts included individuals with mild (WAB-AQ <75), moderate (WAB-AQ <75 and >50) and severe-profound (WAB-AQ <50) aphasia (balanced for gender) as well as healthy controls.
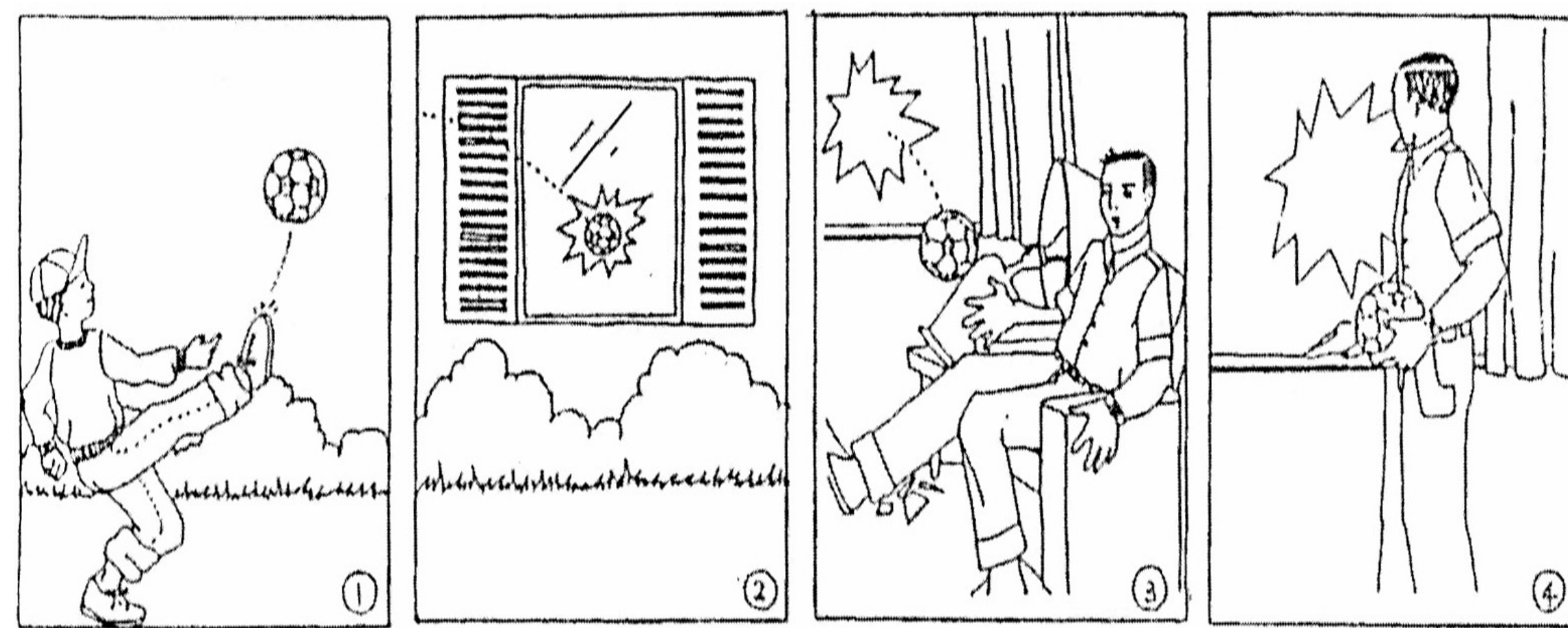o Transcripts included variability across race and ethnicity.

Figure 1. "Broken Window" picture sequence stimulus.

o Participants (SLPs) were asked to score 10 discourse samples (3 controls; 7 individuals with aphasia).
  • Assignment of transcripts was balanced for aphasia severity.
  • Transcripts were assigned on a participant-by-participant basis by stratified random sampling.
o To date, 14 SLP participants (all female) have completed the study (see **Table 1** for demographic data).

Methods – Participants and Procedures

Table 1. Demographic data for SLP participants.

Years experience with neurogenic clients	Work setting	Percent caseload neurogenic clients	Currently using discourse
M = 11.4 years +/- 10.9 Range: 6 months - 38 years	1 Home Health 3 Inpatient 3 Multiple 1 Nursing Home 2 Outpatient 1 Other 1 Private Practice 2 University Clinic	81.6% +/- 20.8% Range: 50% - 100%	8 Yes 6 No

o Participants were provided an MCA training manual, transcripts, and a standardized excel scoresheet.
o All data were collected virtually.
o MCA uses five codes to identify the presence, accuracy and completeness of main concepts in each sample.

  • **AC** - <u>accurate and complete</u>: contains all elements of the main concept on the checklist with no incorrect information

  • **AI** - <u>accurate and incomplete</u>: contains no incorrect information, but leaves out at least one essential element of the main concept on the checklist

  • **IC** - <u>inaccurate and complete</u>: contains at least one incorrect piece of essential information (e.g., "basketball" for "soccer ball") but includes all essential elements of the main concept on the checklist

  • **II** - <u>inaccurate and incomplete</u>: clearly corresponds with a main concept on the checklist but includes at least one incorrect essential element and fails to include at least one essential element

  • **AB** - <u>absent</u>: did not produce the main concept

Methods – Data Analysis

o We compared the MC codes identified by participants to a lab-generated "gold standard" code for each main concept to determine overall scoring accuracy.
o Percent agreement was calculated for control transcripts and each aphasia severity separately.
o ANOVA was conducted to examine differences in scoring accuracy across severity levels (healthy control, mild, moderate, and severe/profound).

Results

o Descriptive statistics (**Figure 2**) for coding accuracy for each group were:
  • Control: M = 76.5%; SD = 10.8; Range = 62.5 – 91.7
  • Mild: M = 68.6%; SD = 12.3; Range = 50 – 93.8
  • Moderate: M = 57.6%; SD = 12.6; Range = 45.8 – 70.8
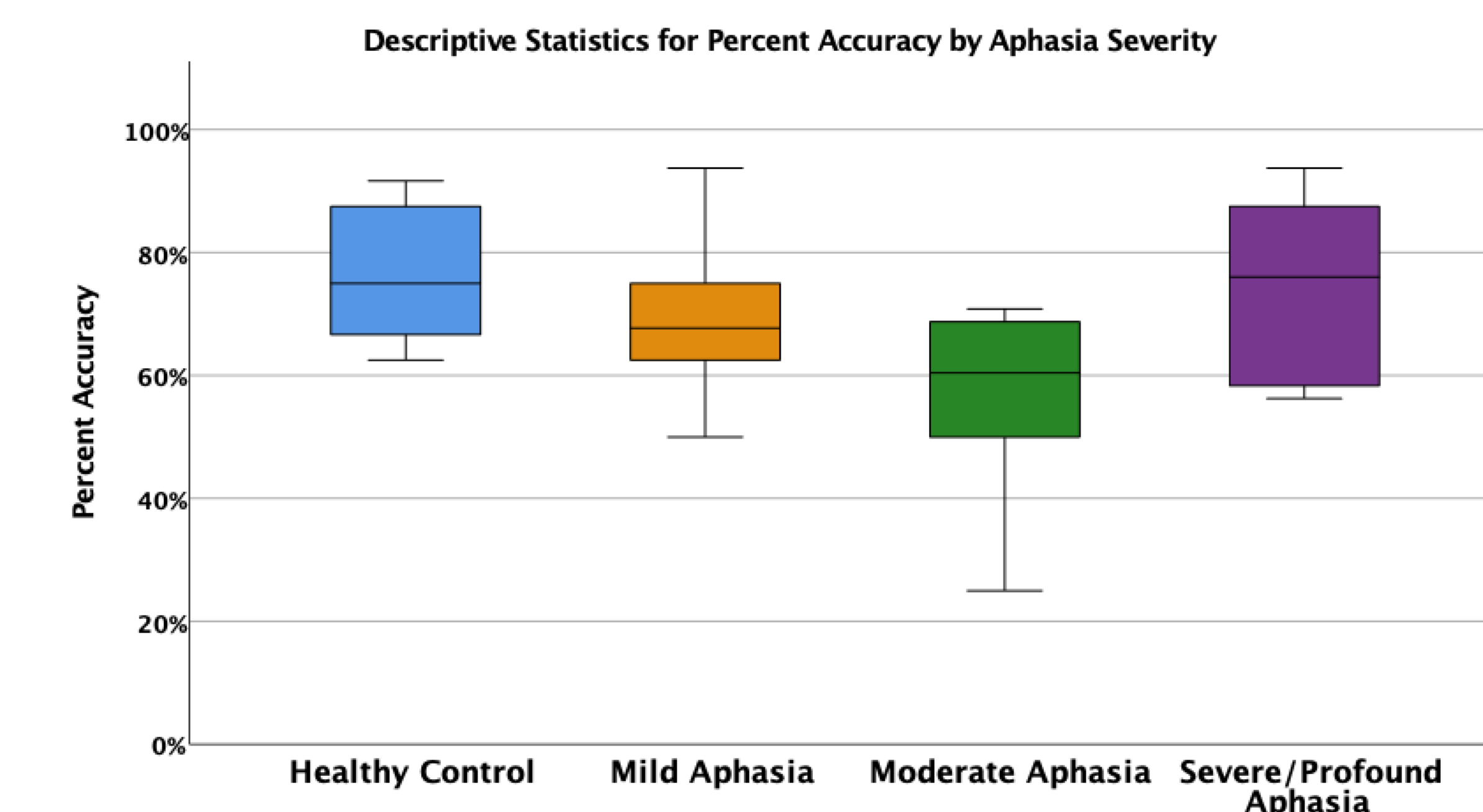 • Severe/Profound: M = 74.9%; SD = 14.3; Range = 56.3 – 93.8

Figure 2. Boxplots displaying median, interquartile range, minimum, and maximum.

o Accuracy of participants' scoring varied significantly by severity rating of PWA and healthy controls (F(3,52) = 6.518; p = .001; eta^2 = .273) (**Figure 3**).
o Post-hoc pairwise comparisons revealed statistically significant differences between scoring accuracy of individuals with moderate aphasia compared to individuals with severe-profound aphasia (p = .003) and healthy controls (p = .001).
o Participants demonstrated greatest accuracy coding healthy controls and individuals with severe-profound aphasia; lowest accuracy coding individuals with moderate aphasia.
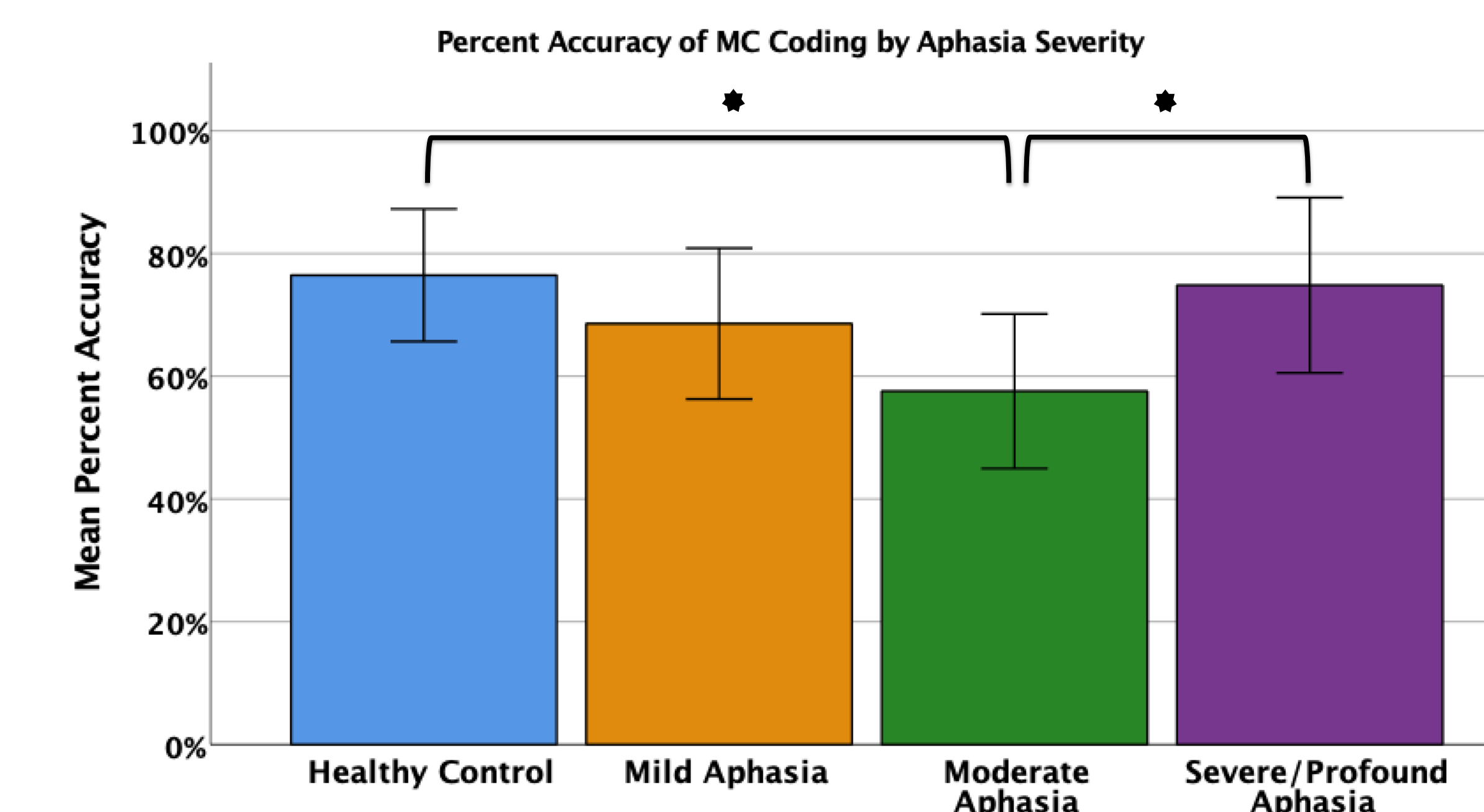

Figure 3. Mean percent accuracy of coding for each group. Statistically significant differences denoted by asterisks.

Discussion

o MCA coding accuracy was highest for control transcripts and transcripts of individuals with severe-profound aphasia.
o Reasons for this may include:
  • Transcripts from healthy controls and mild aphasia may use more conventional syntax and vocabulary, making it easier to match utterances to scoring examples.
  • Transcripts from individuals with severe-profound aphasia may contain limited utterances, making it easier to determine that a main concept was *not* expressed.
  • Transcripts from individuals with moderate aphasia likely contain greater ambiguity with unique expressions and more errors.
o Future research should examine:
  • Whether specific linguistic features contribute to accuracy with current guidelines.
  • Whether years of experience affects accuracy.
  • Whether a live component to virtual training (including Q&A) improves accuracy.
  • Whether individuals with previous experience analyzing discourse are more accurate.
  • Reliability of MCA coding for progress monitoring and/or treatment outcome measurement.
    ▪ Analysis of specific codes/concepts
    ▪ Analysis of coding rules/guidelines

Conclusions

o To our knowledge, this is the first study to examine the accuracy of discourse analysis completed by practicing clinicians.
o MCA coding accuracy was variable and depended in part upon aphasia severity.
o While training materials were provided, they were not sufficient to engender an overall high level of accuracy.
o Moving forward, researchers should proactively consider clinical implementation, including developing training materials, when developing discourse analysis measures.

References
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