Functional Workplace Communication Elicitation for Persons with Traumatic Brain Injury

Abstract

Background: People with traumatic brain injury have characteristic pragmatic language deficits linked to unstable employment outcomes.
Aims: A functional workplace communication elicitation procedure designed to assess expressive pragmatics is described.
Methods & Procedures: Twenty participants with TBI,10 stably employed and 10 with unstable employment, recorded voicemail messages. Transcripts were analyzed using exchange structure analysis, codes for politeness and linguistic mazes.
Outcomes & Results: Participants with unstable employment histories after TBI produced fewer politeness markers and provided information less efficiently than a stably employed cohort.
Conclusions: The voicemail elicitation task differentiates high-level communication skills related to workplace outcomes in TBI.

Proposal

Introduction

A major negative outcome from traumatic brain injury (TBI) is loss of employment, which diminishes quality of life and is an economic stressor for TBI survivors, caregivers, and society (1-5). Two-fifths of people with moderate-severe TBI return to work in 1-2 years (6), but job stability is a problem. Employment instability following TBI highlights the difficulties experienced by vocational rehabilitation

n specialists placing individuals with TBI into competitive workplaces.

People with TBI typically return to lower skilled jobs which pay less compared to before their injury (7). However, even low-skill jobs require complex social communication skills when dealing with clientele or fellow employees. The ability to carry on and understand a conversation is highly predictive of workplace success (8). Job stability problems in TBI are also strongly linked to impaired interpersonal skills (9, 10). These may involve pragmatic communication processes. Sale et al. (1991) focused on employers' reasons for work termination following TBI, finding that "interpersonal relationship issues are at once the most common and the most difficult catalyst to predict in [workplace] separation." (p. 7)

Despite a strong association between employment and communication skills, there remains a paucity of research examining communication and employment instability following TBI. This study has two aims:

1. Introduce a standardized functional workplace language elicitation procedure for people with TBI, and
2. Examine voicemail performance of two groups of participants with TBI: stably employed (SE) and those with unstable employment histories (UE). Language measures included rates of:
    a. Information giving

b. Linguistic maze production
c. Politeness marker production

Methods

Two groups of participants with TBI were matched for age, sex, education and job type (Tables 1, 2). All participants were premorbidly employed for at least 12 months in jobs requiring two years of training (11). One group of 10 participants maintained employment at this job category for greater than 12 months after TBI (SE group) while another group attempted to return to this job category but did not maintain employment for 12 consecutive months (UE group).

Participants were given 4 elicitation scenarios on a laptop computer using Paradigm Software (see appendix 1). Scenarios were designed to, 1. instruct participants to convey new information and 2. request some form of action be taken by the voicemail recipient. These scenarios described four different workplace status relationships: superior, subordinate, friend and colleague. Participants were allowed to take notes before recording messages. Audio recordings were collected using the POP Phone Handset by Native Union, LTD. which enhanced surface validity by resembling an office landline phone.

Audio recordings were orthographically transcribed verbatim, including filled pauses (e.g. uh, um) and content mazes (repetitions, reformulations, false starts and abandonments). Mazes have been used to draw inferences about linguistic factors affecting language performance. Theoretical accounts suggest mazes result from high linguistic processing demands (12).

Transcriptions were separated into moves. Like T-units, moves are comprised of an independent clause and any attached or embedded subordinate clause (13). Transcription analysis used exchange structure analysis (ESA) (14). In ESA where a person acts as a primary source of knowledge, conveying information unknown to a listener, a move is denoted as (K1). Moves where a person requests action are denoted as (A2). Because voicemail messages are monologic, and elicitation scenarios target information conveyance and request for action, K1 and A2 moves were selected for analysis.

Finally, transcriptions were analyzed for modalisers reflecting "politeness"(15). A modaliser is a word or phrase providing information on a speaker's stance. Politeness markers include finite modal verbs (e.g. will, would, could, must, etc.) and comment adjuncts (I think, unfortunately, etc.) among other modalisers. An example of a coded transcription with politeness markers, mazes and ESA conventions is presented in Appendix 2.

Results

Data was collected in two sets: 1. moves per minute of speaking time and 2. percentage measures of total interactions. Statistics presented below are two-tailed T-tests assuming unequal variances with $\alpha=<0.05$. Inter-rater reliability and more refined statistical analysis are pending.

Descriptive statistics are reported for the measures described above per minute of speaking time in Table 3. For measures as a percentage of total moves please refer to Table 5. T-tests for measures of interest are found in Tables 4 and 6.

Information giving

There was a significant difference in the percentage of information giving (K1 moves) between the UE group ($\bar{x}$=2.55, SD=1.28) and the SE group ($\bar{x}$=3.15, SD=1.39); t(77)=1.66, p=0.048. The UE group produced less information on average when compared to persons in the SE group.

The rate of K1 moves in the SE group was also a significantly greater amount than the UE group; UE group ($\bar{x}$=5.26, SD=2.55); SE group ($\bar{x}$=6.72, SD=2.00); t(74)=1.67, p=0.006. This more robust finding is partially related to the shorter voicemail messages the SE group produced. This finding is interpreted to mean the SE group was more efficient in conveying information under voicemail conditions.

Action requests

There was no significant difference in the percentage of action requests (A2 moves) between the UE group ($\bar{x}$=1.88, SD=1.04) and the SE group ($\bar{x}$=1.68, SD=0.07); t(68)=1.01, p=0.158. Both groups requested a similar percentage of actions in their voicemails. Findings were not significant for rate of action requests between the UE group ($\bar{x}$=3.80, SD=1.67) and the SE group ($\bar{x}$=3.74, SD=1.55); t(78)=0.19, p=0.852.

Linguistic maze production

No significant difference was found in the percentage of maze production between the UE group ($\bar{x}$=4.03, SD=3.00) and the SE group ($\bar{x}$=3.18, SD=2.76); t(77)=1.32, p=0.191; nor for the rate of maze production between the UE group ($\bar{x}$=7.57, SD=4.75) and the SE group ($\bar{x}$=6.90, SD=6.05); t(77)=1.32, p=0.191. Descriptive statistics were similar for filled pauses and content mazes between groups. This suggests that there was no difference in percentage or rate of verbal dysfluencies theoretically associated with linguistic processing load.

Politeness marker production

There was a significant difference in the percentage of politeness markers between the UE group ($\bar{x}$=4.25, SD=2.27) and the SE group ($\bar{x}$=6.18, SD=3.20); t(70)=-3.10, p=0.003. The UE group produced fewer sociable linguistic markers on average. Significance was strengthened by examining politeness marker rate; UE group ($\bar{x}$=8.49, SD=) and SE group ($\bar{x}$=13.19, SD=); t(77)=-4.40, p=0.00003).

Discussion

This standardized workplace voicemail elicitation task identified employment outcomes in two small groups of carefully matched participants with TBI. Workplace communication has been linked to employment stability following TBI, but vocational communication disorders remain understudied. Findings indicated that measures of politeness markers and information rate may be clinically useful, but further analysis using a larger group study is needed to establish this finding. Measures of dysfluencies related to linguistic processing demands were not significant.

Although the SE group produced increased rates of information giving, it should be noted ESA does not measure relevance of information content. Qualitative coding completed but not reported here indicated both groups provided necessary voicemail content. However, further analysis is will show whether the UE group had more empty speech, as their voicemail messages were longer and contained less information. In addition, the relevancy of additional information

provided by the SE group should be analyzed to ensure that the additional content was not a product of irrelevancies. Finally, further task validation using control participants stably employed in similar occupations is required .

There is a paucity of meaningful communication assessment and treatment tasks for vocational rehabilitation following TBI. This paper offers preliminary support for a standardized voicemail task which may assist in determining a person with TBI's readiness for return to work. It also provides treatment directions in preparing people with TBI for return to work including training the use of politeness markers and providing sufficient information in a workplace context.

References

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Materials specified: Contributor biographical information http://catdir.loc.gov/catdir/enhancements/fy0609/83005900-b.html.

Appendix 1. Language elicitation cues used for the four voicemail conditions.

Subordinate Condition

William reports to you for a project at work you are in charge of. You notice that he has not been following the dress code recently. The weather outside has warmed up and he started wearing shorts every other day.

Call your assistant William on his office phone. Remind him of the rule that shorts are not allowed in the workplace and ask him to follow the dress code rules.

Supervisor Condition

Your sister is getting married in Mexico in three months. Your job has a strict rule about requesting time off three months advance. You are close to the three month deadline.

Call your supervisor, Hector, on his office phone to let him know that you will need to be in Mexico in three months. Tell him about the wedding and ask for time off to attend the wedding.

Colleague Condition

Your car just broke down and will be in the shop for the rest of the week. Now you need a ride to work. You recently got to know a coworker named Stanley because you are working on a project together. Stanley mentioned he drives by your house his way to work.

Call your coworker Stanley on his office phone. Tell him about your car and ask him for some help with getting to and from work for the next week.

Friend Condition

Brandon has a birthday on Friday and you want to throw him a party. You will be busy setting up the party on Friday night and you need someone to pick up a sandwich platter from a local restaurant.

Call your friend Randy on his office phone. He doesn't know about the party yet. Tell him about the party you are planning and ask him to help by picking up the sandwich platter.

Appendix 2. Example of information exchange structure analysis from transcript of TBI participant

Voicemail Message of SE07 to Subordinate (William)

Move	Pol	M		Codes	
1				GR	Hi William. This is (First Name).
2		2		K1	*Um, it's* – we need to talk about the dress code here and what's allowed and what's not allowed.
3	1	2	Key	K1	*Um,* I'm sure you know already that you can't wear, *uh,* shorts into work even if it's warm outside.
4	3	2	Request	A2	So if you could, *uh,* just remember to dress in the, *uh,* dress code.
5	1			A2	If you have any questions feel free to stop by and to see me or give me a call.
6	1			Close	Thank you.

Move = move number; Pol= number of politeness markers (underlined in text); M=number of mazes (italicized in text); K1 = primary knower (giving information); A2 = action requesting (requesting an action to be performed)

Table 1. Demographics of Stably Employed Participants with TBI (SE)

ID Code	Sex	Age (years)	Years of Education	Time post onset (months)	Severity	Job Zone 3 Category Listing
SE01	Male	51	16	58	Moderate	Sales Representative
SE02	Male	49	12.5	282	Severe	Machinist
SE03	Female	33	14.5	22	Severe	Desktop Publisher
SE04	Male	61	18	319	Severe	Operations Manager
SE05	Female	55	14	15	Moderate	Registered Nurse
SE06	Male	51	14	72	Severe	Police Patrol Officer
SE07	Male	45	16	18	Severe	Police Sergeant
SE08	Female	56	14	300	Severe	Bookkeeper
SE09	Female	29	16	72	Severe	Loan Officer
SE10	Female	64	14	160	Severe	Registered Nurse

Severity is based on length of lost consciousness; Moderate = 30 min – 24 hours; Severe = 24 hours+

Table 2. Demographics of Unstably Employed Participants with TBI (UE)

ID Code	Sex	Age (years)	Years of Education	Month post onset	Severity	Job Zone 3 Category Listing
UE01	Male	24	12.5	18	Severe	Computer Support Specialist
UE02	Female	56	20	82	Severe	Operations Manager
UE03	Male	50	14	230	Severe	Steamfitter
UE04	Female	55	18	362	Severe	Building Manager
UE05	Male	54	14	340	Severe	Vocational Education Teacher
UE06	Male	43	16	357	Severe	Office Machine Repairers
UE07	Female	45	18	77	Severe	Registered Nurse
UE08	Male	60	12	124	Moderate	Food Service Manager
UE09	Male	56	13	338	Severe	Restoration Technician*
UE10	Female	54	15	196	Moderate	Machinist

Severity is based on length of lost consciousness; Moderate = 30 min – 24 hours; Severe = 24 hours+

* Restoration Technician is not listed in O*Net database, but training requires one year certificate training and an on-the-job probationary period making the training requirements commiserate with other Job Zone 3 occupations.

Table 3. Descriptive statistics for per minute of speaking time measures

Move Type	Measure	UE	SE
K1	Mean	5.26	6.72
	SD	2.55	2.00
	Min	1.13	2.73
	Max	11.25	11.25
A2	Mean	3.80	3.74
	SD	1.67	1.55
	Min	1.33	0.94
	Max	7.74	8.18
Pol	Mean	8.49	13.19
	SD	4.45	5.03
	Min	0	0
	Max	18.62	23.57
Maze	Mean	7.57	6.90
	SD	4.75	6.05
	Min	0	0
	Max	18.42	25.71

K1 = Information giving move; K2 = Action requesting move; Pol – Politeness Marker; SD = Standard Deviation; Min = Minimum score; Max = Maximum score.

Table 4. T-test for percentage of politeness markers measure

T-Test: Two-Sample Assuming Unequal Variances

Politeness Markers

	Unstably Employed TBI Group	*Stably Employed TBI Group*
Mean	4.25	6.175
Variance	5.166667	10.25064
Observations	40	40
df	70	
t Stat	-3.10068	
P(T<=t) one-tail	0.001391	
t Critical one-tail	1.666914	

Table 5. Descriptive statistics for percentage of total moves measure

Move Type	Measure	UE	SE
K1	Mean	2.55	3.15
	SD	1.28	1.39
	Min	1	1
	Max	6	9
A2	Mean	1.88	1.68
	SD	1.04	0.69
	Min	1	1
	Max	6	3
Pol	Mean	4.25	6.175
	SD	2.27	3.20
	Min	0	0
	Max	10	18
Maze	Mean	4.03	3.18
	SD	3.00	2.76
	Min	0	0
	Max	12	10

K1 = Information giving move; K2 = Action requesting move; Pol – Politeness Marker; SD = Standard Deviation; Min = Minimum score; Max = Maximum score.

Table 6. T-test for percentage of politeness markers measure

T-Test: Two-Sample Assuming Unequal Variances

Polite Markers/Min

	Unstably Employed TBI Group	*Stably Employed TBI Group*
Mean	8.488	13.18925
Variance	20.29147	25.29121
Observations	40	40
df	77	
t Stat	-4.40396	
P(T<=t) one-tail	1.69E-05	
t Critical one-tail	1.664885	