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Characterizing common workplace communication skills for disorders associated with traumatic brain injury: A qualitative study

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Abstract

BACKGROUND: Interpersonal skill deficits are the primary reason for workplace separation after traumatic brain injury (TBI). Communication is integral to interpersonal skills, but workplace communication demands are inadequately described in the rehabilitation literature.

OBJECTIVE: This study describes inter-stakeholder examples of workplace communication behaviors for a level of employment to which people with TBI commonly attempt to return.

METHODS: *Setting:* Mid-level workplaces.

Design: Semi-structured interviews were audio recorded, transcribed verbatim, then analyzed using thematic content analysis. Findings were linked to common communication deficits in persons with TBI.

Participants: A volunteer sample of twenty healthy individuals employed in the mid-level workplaces, ten employees and ten supervisors.

Main Outcome Measure(s): Taxonomy of communication skill deficits common in persons with TBI and associated with mid-level workplaces.

RESULTS: Interviews revealed seven communication-related skills associated with mid-level employment: 1) spoken language processing; 2) verbal memory; 3) reading and writing; 4) verbal reasoning; 5) expressive pragmatics; 6) multi-tasking; and 7) social cognition.

CONCLUSION: Workers and supervisors from an assortment of mid-level jobs with differing job contents all identified similarly common and important cross-occupational communication-related skills. Findings provide a preliminary guide to assess and treat communication skills for patients who have work re-entry as a goal.

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Keywords

Traumatic brain injury; employment; vocational rehabilitation; social reintegration; communication disorders

1. Introduction

The US economy has shifted to service sector jobs in the past decades (Bailey, 1997; McConnell & Perez-Quiros, 2000), increasing the importance of interpersonal communication skills in the work-place (Downing, 2011; Muchmore & Galvin, 1983; Robles, 2012; Winsor, Curtis, & Stephens, 1997). In addition, the integration of technologies in manufacturing industries has increased the importance of verbal reasoning in blue-collar workplaces (Mikelson, Ratcliffe, & Nightingale, 2003; National Research Council, 1999). Because communication plays an important role in building and maintaining relationships with colleagues and customers, communication skills are vital factors in recruiting, training, and managing employees, even in entry-level jobs (Bryen, Potts, & Carey, 2007; Salzberg, Agran, & Lignugaris, 1986; Schnurr, 2013). Despite evidence that communication is an important aspect of the workplace, there is little empirical data on which communication behaviors are important; moreover, rehabilitation aimed at return to work return after neurologic injury has not been informed by the real-world demands of the workplace.

Approximately 40% of persons with moderate-severe traumatic brain injury (TBI) who return to work maintain stable work histories, the remaining 60% have problems sustaining employment or are unemployed (Hoofien, Gilboa, Vakil, & Donovan, 2001; Kreutzer et al., 2003; Machamer, Temkin, Fraser, Doctor, & Dikmen, 2005). While return to work after TBI has been associated with cognitive ability, the employment stability problems after TBI also have been linked to poor interpersonal skills (Cattalani, Tanzi, Lombardi, & Mazzucchi, 2002; Ezrachi, Ben-Yishay, Kay, & Diller, 1991; Hofgren, Esbjörnsson, & Sunnerhagen, 2010; Johansson & Bernspång, 2001; O'Neill et al., 1998; Temkin, Corrigan, Dikmen, & Machamer, 2009). In the literature, interpersonal deficits associated with work separation include examples such as problems 'screening thoughts and verbalizations' (Sale, West, Sherron, Wehman, 1991, p. 7), and 'carrying on and understanding conversation' (Brooks, McKinlay, Symington, Beattie, & Campsie, 1987, p. 11), and 'changing subjects for no reason' (Schwab, Grafman, Salazar, & Kraft, 1993, p. 97). Despite the association of communication-related issues with work instability after TBI, communication in relation to work outcomes has been understudied (Penn & Jones, 2000). However, a literature examining the relationship between communication and work outcomes after TBI has recently emerged (Isake & Turkstra, 2000; Rietdijk, Simpson, Togher, Power, & Gillett, 2013; Struchen et al., 2008).

Isake and Turkstra (2000) measured language comprehension, verbal fluency, speed of processing and verbal reasoning in 20 adults with TBI, 10 employed and 10 unemployed, balanced for job types. Discriminant function analysis revealed the groups differed in performance on communication measures. Measures of auditory processing and verbal reasoning correctly classified employment status in 85% of the participants. The sample size

in this study was small and important employment outcomes such as level of employment or employment status (i.e., full time vs. part time) were not described. Furthermore, the study was retrospective and the authors did not report employed status before injury, which has been positively associated with work return after TBI (Saltychev, Eskola, Tenovuo, & Laimi, 2013).

Struchen et al. (2008) compared the prognostic value of executive functioning and social communication skills on employment outcomes in 121 persons with TBI. The authors measured social communication using participant self-report on the La Trobe Communication Questionnaire (Douglas, O'Flaherty, & Snow, 2000). The La Trobe Communication Questionnaire, designed to be given to persons with TBI and a significant other or caregiver, measures responses on a four-point scale listing 30 questions such as, *'When talking to others do you find it easy to change your speech style (e.g., tone of voice, choice of words) according to the situation you are in?'* The authors compared LaTrobe scores, scores on the affect recognition test (Bowers, Blonder, & Heilman, 1991), and executive functioning test scores to employment outcomes. Measures of executive functioning and affect recognition were related to occupational outcomes, but social communication variables were related to both occupational outcome measures and social integration using the Craig Handicap Assessment and Reporting Technique (CHART) (Whiteneck, Charlifue, Gerhart, Overholster, & Richardson, 1992). Limitations of this study include use of a convenience sample and a limited communication assessment with reliance on self-report measures of social communication.

Rietdijk et al. (2013) compared work outcomes in 13 previously employed persons with severe TBI. The authors found that verbal reasoning and strategy application differentiated the employed and unemployed groups. Using the Functional Assessment of Verbal Reasoning and Executive Strategies (FAVRES) (Mac-Donald, 2005), the authors related three measures to successful work outcomes: 1) scheduling actions, 2) decision making, and 3) persuasive writing. Participants returned to different levels of occupation after injury, with some returning to part-time work. The variety of work types and inclusion of part- and full-time employment, as well as the small sample size, limit interpretation and generalization of results.

This small body of research supports anecdotal findings that communication skills are related to re-employment and job retention after TBI. Of the three studies, two were small pilot studies (Isake & Turkstra, 2000; Rietdijk et al., 2013), and the larger study lacked a comprehensive communication assessment. This research did not consider job level, job characteristics, or employment status, which limits their findings.

Research that describes communication at work is necessary to develop a framework of communication that would enable both a systematic investigation of workplace communication and measures to be matched with communication characteristics particular to certain jobs. A list of workplace communication characteristics would provide guidance for developing hypotheses about what aspects of communication might be targeted in therapy or research. Selecting measures and hypotheses based on descriptive data, such as job characteristics, is referred to 'testing a descriptive causal hypothesis' (Shadish, Cook, &

Campbell, 2001, p. 9). The rationale for collecting descriptive data is that the better defined an outcome variable (return to work) is, the better researchers can identify predictor variables. The literature on employment for adults with TBI has not used such a systematic approach.

Because the rehabilitation literature lacks a conceptual framework for workplace communication, we looked to the business management literature based upon the field's interest in training workplace communication skills. The business management literature, however, has been criticized for a similar lack of systematic investigation of workplace communication behaviors (De Kay, 2012; Keyton et al., 2013). Although a variety of workplace communication behaviours have been studied in the business management literature (Lee Ashcraft & Allen, 2003; Myers & Sadaghiani, 2010; Turner, Qvarfordt, Biehl, Golovehinsky, & Back, 2010), we were unable to identify studies describing specific communication behaviours necessary for specific job types, due in part to the aforementioned lack of systematic study. Therefore, we developed the current descriptive qualitative study to examine the role of communication in a specific level of work.

All workplaces are not equal in communication demands, so for data to be helpful in TBI rehabilitation the type of workplace must be specified. While there is an infinite variety of jobs, different jobs share training and skill levels, and the Department of Labor used these shared features to create 'Job Zones'. Job Zone I is comprised of jobs with little training required, such as dishwashers, whereas Job Zone 5 includes jobs with the most training required, such as lawyers (National Center for O*NET Development, 2014). Jobs such as those in Zones 4 and 5, require advanced training, and can be sensitive even to mild cognitive deficits. The jobs that persons with TBI *attempt* to return to most frequently are skilled jobs that require training (Brenneman, Redelmeier, Boulanger, McLellan, & Culhane, 1997; Brooks et al., 1987; Fraser, Dikmen, McLean, & Miller, 1988; Ip, Dornan, & Schentag, 1995; Johnson, 1987; Keyser-Marcus, 2002; MacKenzie et al., 1987; Sherer et al., 2002; Walker, Marwitz, Kreutzer, Hart, & Novack, 2006). This job type corresponds to Job Zones 3–5, with most jobs in the category of Job Zone 3. Jobs requiring more advanced training such as those in Zones 4 and 5 can be sensitive to even mild cognitive deficits. Therefore, understanding routine communication activities relevant to occupations in Job Zone 3 is most pertinent for treatment of persons with TBI who are at risk for workplace separation due to communication deficits.

1.1. Summary and purpose

The work outcomes literature examining communication after TBI is growing, but studies of communication share the methodological limitations of the business literature; that is, they lack a conceptual framework and do not provide details about workplace type. The aim of this study is to address these gaps in the literature. This research assumes that workplace stake-holders — supervisors and coworkers — expect persons with TBI to meet common communication standards in the workplace. Accordingly, we interviewed supervisors and coworkers *without* brain injury to obtain this inter-stakeholder perspective on routine and important workplace communication.

1.2. Study design

In order to describe workplace communication skills we recruited workers and supervisors without brain injury who were employed in Job Zone 3. Participants completed in-depth semi-structured interviews (Dicicco-Bloom & Crabtree, 2006) based on a pilot study of communication skills used by workers (Meulenbroek & Turkstra, 2011). Interviews were transcribed and coded using a modified approach to content analysis described by Elo and Kyngäs (2008).

Using a ‘start list’ of codes (Miles & Huberman, 1994, p. 58) obtained from pilot research (Meulenbroek & Turkstra, 2012) with persons employed in Job Zone 3 we created an *a priori* codebook (Neuendorf, 2002; Weber, 1990). Interviews with workers in Job Zone 3 were completed before interviews with supervisors. After each interview, the codebook was updated before the next interview was conducted.

We developed a display matrix to unify concepts and to better illustrate our findings (Miles & Huberman, 1994). The lead author used the display matrix to thematically organize codes according to cognitive-communication and social communication deficits associated with TB1 as described in the literature (Hartley, 1995; Togher, 2011; Ylvisaker, Szekeres, & Feeney, 2001).

1.3. Sampling and recruitment

We recruited candidates via postings and telephone solicitations to local businesses. We selected participants using purposive sampling. Purposive sampling refers to sampling persons best suited to provide the information desired (Maxwell, 1997). Participants for the study were selected through nomination; we asked employees and supervisors to suggest persons in the workplace they considered effective communicators. Table 1 displays the inclusion criteria.

1.4. Data collection

The lead author conducted semi-structured in-depth interviews using a topic guide to structure discussion (see Fig. 1), with follow-up questions emerging naturally during dialogue (Dicicco-Bloom & Crabtree, 2006). The topic guide was designed to begin with broad aspects of work activities, then narrow down to activities more directly related to communication events. Our pilot research indicated that communication examples were well suited for our content analysis coding approach (Meulenbroek & Turkstra, 2012). Therefore, when participants made vague comments such as, ‘We talk about projects before doing them’, the interviewer encouraged the participant to provide an example using prompts like, ‘Describe the last time this happened.’ We used workplace communication examples as the coding source for communication skills. Participants were instructed to continue speaking until they had nothing more to say about the topic. Interview durations ranged from 20–75 minutes.

Twenty interviews were conducted with ten workers and ten supervisors. Table 2 displays participant characteristics. Seven participants were from unique workplaces, and three were

from related workplaces. Participants were provided a choice for their interview location to ensure they were comfortable speaking about the topic.

The first author completed interviews with workers before beginning interviews with supervisors. Interviews were transcribed verbatim into a Word document with coding completed by hand by the lead author and a lab assistant. All procedures were approved by the institutional review board at the University of Wisconsin-Madison.

1.5. Data analysis

We used a two-step content analysis process described by Elo and Kyngäs (2008). The first step was the *preparation phase* and the second step was the *organizing phase*. Figure 2 illustrates the study's methodology.

1.6. Preparation phase

The purpose of the preparation phase was to prepare transcripts for coding. First, the lead author and a lab assistant wrote notes outlining the topics and main ideas related to communication reported by the participant. Reviewers' notes enabled immersion into the data and aligned the reviewers' interpretations to increase reliability (Burnard, 1991). This process is referred to as a 'sense of whole' (Elo & Kyngäs, 2008, p. 109) and directs the reviewers' attention to global aspects of events in a transcript. During this note-taking process transcripts were read twice while listening to an audio recording. Then we extracted *communication examples* from the transcripts to serve as text for coding. Communication examples were used as 'units of analysis', as shown in Fig. 2 (Krippendorff, 2004; Neuendorf, 2002).

The codebook and matrix were organized using the perspective of pragmatics. Pragmatic language refers to the use of language in context beyond understanding the basic meaning of words and grammatical forms (Levinson, 1983). In the matrix, factors that influence the meaning of words and grammar are termed 'dimensions' of communication.

Linguists study pragmatics within 'genres', or social contextual factors, of communication. For instance, the linguistic genre of 'procedural discourse' refers to contexts in which one person is trying to get another person to do something (Koester, 2006, p. 43). According to the matrix, the 'purpose' of the communication example (e.g. getting someone to do something) is considered a dimension of communication. In procedural discourse in the workplace, there is usually an object that is the focus of the action (Koester, 2006, p. 38). In the statement, 'Plant that shrub over there,' The shrub is the object of the action.

Aspects of the 'environment' that influence language use constitute a dimension in our matrix. Five dimensions are used in the codebook and matrix. These include: 1) *what* was communicated (word choice); 2) to *whom* (speaker roles); 3) *how* (approach strategy); 4) for what *purpose* (context); and 5) *where* (setting).

1.7. Organizing phase - content analysis

Coding occurred during the organization phase. Coding is the process of identifying and defining new codes. Definitions were developed from the examples of communication

identified in the preparation phase. These codes were used to develop a codebook and a display matrix. We used our pilot research (Meulenbroek & Turkstra, 2012) to provide an initial template for the codebook and display matrix.

The first transcript was coded using a start list of codes from pilot research, with new codes emerging from each interview. The first author coded all of the transcripts, with a trained research assistant coding random transcripts for reliability purposes. Upon completion of coding the first author and a trained research assistant reviewed the codebook for redundancies or vague definitions. Before consolidation the codebook contained 207 codes. The final codebook consisted of 142 codes. For simplicity, Fig. 3 displays the top fifty codes according to their weighted scores.

1.8. Weighted scores

Review of the ‘sense of whole’ documents revealed that many codes were emphasized as important, although the frequency with which those codes were mentioned did not always reflect their importance. Therefore, the authors analyzed the frequency participants referred to a coded item as important (e.g., ‘It is important that...’ or ‘I can’t forget to...’) to weight codes. For example, Worker 6 said, *‘A cell phone is a very important tool in this job. I do a lot of communicating on a cell phone.’* Therefore, the code associated with cell phone (i.e., voice receiver) was assigned a weight.

At the end of data collection, weighting was determined by multiplying the number of times each code was stated to be important by 0.1 and adding that number to the single count for that code. For example, if a code was noted to be important once, then the final frequency count of that code was multiplied by 1.1. If that code was mentioned twice, then the frequency count was multiplied by 1.2, three times by 1.3, and so on. All codes were included in the matrix, whether or not they were assigned a weight.

1.9. Data saturation

Data saturation is a rationale used for stopping data collection in qualitative research. This study was descriptive so we defined data saturation per Meadows and Morse (2001), who recommend stopping analysis once no new relevant information is extracted from interview transcripts and coding becomes redundant. We based coding redundancy on the number of new codes emerging per transcript in worker interviews. We reached saturation at 10 interviews of employees (see Fig. 4). We completed 10 interviews with supervisors for data equivalency.

1.10. Links to common communication deficits in TBI

The lead author developed themes by examining the overlap of communication codes and common communication deficits reported in adults with TBI (Beukelman & Yorkston, 1991; Hartley, 1995; Lillie et al., 2010; Togher, 2011; Ylvisaker et al., 2001). Disordered communication behaviors after TBI include use of irrelevant comments and an insensitivity to the conversational needs of others and are assumed to reflect underlying impairments in cognitive functions such as executive functions, processing speed, attention, working

memory, and social cognition including recognition and interpretation of social cues (Byom & Turkstra, 2012; Godfrey & Shum, 2000; Struchen et al., 2008).

Codes and weighted scores from the display matrix (see Fig. 3) were reviewed by the lead author with the above aspects of communication-related skills in mind. The display matrix was used to identify relevant aspects of communication in relation to workplace communication skills.

2. Results

2.1. Common communication themes associated with mid-level jobs

Communication themes that emerged from analysis were: 1) auditory processing, 2) verbal memory, 3) reading and writing, 4) verbal reasoning, 5) expressive pragmatics, 6) multi-tasking, and 7) social cognition. Examples of how these workplace communication themes relate to the common deficits in TBI are illustrated by quotes below.

The next section will describe codes and themes using the following convention: codes will be identified by quotes, such as ‘face-to-face’; and themes representing a link to common communication deficits in persons with TBI will be underlined, such as attending to distorted speech signals. Quotations from interview transcripts will be indicated using italicized text.

2.2. Communication skill 1 - spoken language processing

Spoken language processing is directly related to activities described in mid-level workplace communication. Codes for ‘spoken’ and ‘face-to-face’ communication were the most heavily weighted of all codes and were associated with high demands on spoken language processing. For example, spoken language processing was reportedly used by airfield operators to monitor unrelated, overlapping conversations via radio, according to Supervisor 3.

‘Terminal maintenance has their own subset [of radio channels] so they can talk to each other and they don’t hear what we talk about or what airfield maintenance talks about... But [airfield operators], they hear it all, so you can be getting two different conversations going on here.’

Spoken language processing and active monitoring of the environment were emphasized by Worker 1, an administrative assistant. She described the need to monitor office talk in a small business. *‘Probably like 99% of the things I know about the office I’m not told directly, I just overhear.’* She explained the reason for this: *‘I’m not in the relevant circles, I don’t participate in the morning planning of who’s going where, so I’m really considered like sort of peripheral — except that I’m expected to know it all.’*

Many mid-level work environments contained auditory distractions, which is related to the theme of attending to distorted speech signals (see Fig. 3). Participants noted that the use of phones and radios distort speech signals. The code for these devices was ‘voice recorders’, which received a heavy weighted score. Supervisor 10 reported municipal fire-fighters wear equipment that makes hearing difficult:

‘A lot of times when you’re in a building using a radio with an air pack on the communication is muffled. Sometimes it’s not real clear to either the person who’s on the outside or the person who’s on the inside using the radio because it’s hard talk into a radio wearing an air pack.’

2.3. Communication skill 2 - verbal memory

Comments from interviews related to both verbal working memory and verbal learning. For working memory, examples provided in interviews largely related to following or giving directions. The code for ‘procedural’ words (Fig. 3) received the highest weighted score for the content domain. ‘Procedural’ codes are related to the workplace communication themes of following procedures and instructions and working memory for spoken information.

These two working memory-related communication functions are illustrated by comments from Supervisor 6, who stated the following job requirements for PT assistants;

‘To take direction from physical therapists, specific to a patient’s diagnosis, [the patient’s] other medical problems, precautions that need to be considered during a treatment session, and then specifically take direction about what should happen during the treatment - what kind of treatment they should provide to the patient.’

Supervisor 7 provided another relevant example related to verbal working memory for spoken instructions, in this case for administrative assistants:

‘I would say 70% of your day is interruptions. Having to be able to remember what you were just working on and now talk about something totally different and get all the details because most of the time you can’t do it right now because you gotta get back to what you were doing.’

The workplace communication function of managing verbal information was seen in mid-level jobs where verbal information was managed for use at a later time. As a hairstylist, Worker 2 reported using software to manage client details:

‘We do have a system in the computer where we can take notes which is really helpful, because I’m not going to remember a hundred people’s faces and names and who their mother is and what they do; so I’m going to put it in the computer.’

Many workers used scheduling software to help manage verbal information. For example, Worker 5, an electrician, said; ‘*I use my calendar on Outlook, it’s probably my biggest friend I have. Um, and basically, try and do, um, try and estimate my time wisely, I guess.*’

The theme for remembering for new learning also emerged in interviews. Worker 2 reported taking courses for professional development, ‘*I’ve been to, probably, maybe like five classes now so far since we’ve started using Aveda™.*’ Worker 10, a solar photovoltaic installer, said she has to take accreditation coursework and reported, ‘*Every other week I’ve got a full day of class.*’

2.4. Communication skill 3 - reading and writing

In addition to basic language skills, text comprehension relies on cognitive functions such as working memory and inference. Likewise, written expression requires not only language and

graphemic skills but also cognitive functions such as ability to consider the knowledge and perspective of the intended recipient (i.e., theory of mind) (Trabasso & Magliano, 1996). Participants identified reading for new learning as an important aspect of their work, including using written reference materials in order to complete work tasks.

Supervisor 5 reported that occupational therapy aides searched documents for patient information, stating that aides needed to *‘navigate through that software and be able to type within the system. Be able to read lists of things and pick the appropriate choice would be the types of written skills needed within electronic medical records.’*

The themes write short correspondences and document communications emerged from worker interviews and codes. In the matrix of communication codes, the weighted score for ‘writing’ was ranked 10th and ‘keyboard’ was ranked 11th. Workers in mid-level jobs described writing brief messages for cell phone texting and emails. In addition, workers described creating paper trails documenting work-related activities. Worker 7 described the need for paper trails:

‘I told a teacher about a translator not being there for a conference, he forgot, and then I was accused of not telling him because I didn’t email, because I made a choice to tell him in person... I didn’t want him to feel like I was impersonally emailing him, so I told him face-to-face. So I didn’t email him, so there wasn’t a paper trail. So, now I do that.’

Worker 8 needed to document activities in writing not only for accountability in her nursing job, but also as a way to advocate for her patients:

‘That’s why I think the hand-off note, that’s important, because you can write, or verbally tell people — what I think, It’s important to write it, some people don’t, but to leave a record of overall how the shift was, what happened, how the patient did and what is supposed to happen next.’

2.5. Communication skill 4 - verbal reasoning

Verbal reasoning refers to drawing inferences or conclusions from known information (Sohlberg & Mateer, 1989). The code for ‘verbal reasoning’ co-occurred with ‘advocating’ for positions or ‘educating’ others. Codes for ‘verbal reasoning’, ‘persuading’, and ‘teaching’ were other heavily weighted codes associated with verbal reasoning skills.

The workplace communication theme interpreting explanation commonly emerged in descriptions of collaborating with others. Supervisor 1 reported that hairstylists needed to interpret their clients’ descriptions carefully:

‘Everybody describes [hairstyles] completely different; and, so, they’re describing something and you’re understanding it — but it’s not at all what they’re describing. You know? So, like, pictures should be brought out. Sometimes it takes a couple times of cutting someone’s hair and they’re like, talking, [imitates customer’s voice] “Oh, I want my hair feathered.” Well, to me, feathered is like, going back, but, for some reason for them it was, like, fringed around their face. And not until I saw a picture did I have a clue what they were talking about.’

As a computer support specialist, worker 3 described a similar job activity: *‘Most people can’t really describe what it is that their [computer] problem is really happening and even if they can describe it, it’s usually not accurate.’* She described using a series of questions to interpret what the problem was.

The workplace communication theme for scheduling and prioritizing activities emerged as a daily activity in mid-level jobs. This theme is related to verbal reasoning. For instance, worker 7 described making schedules for herself and others at her school: *‘I create lessons for [the teacher] with three students three times a week. And I also create her schedule and my schedule to meet the needs of all of the students on our caseload feasibly throughout the year.’*

Developing plans emerged as a workplace communication theme, with workplace activities commonly being completed under deadlines. This indicated that mid-level work taxed speed of verbal reasoning. Worker 6 described collaborating with others to install a solar panel array:

‘So we sat down in front of a computer and looked at photos of the site. We looked at the site report on a computer, and he talked about the details of how we were going to run the pipe, where we were going to put the storage tanks, how we are going to tie into her heating system.’

Interviewees reported that mid-level work required workers to describe their work activities, which was another theme that emerged. Employees had to describe their work activities to provide a rationale for their actions and advocate for their workplace needs. Providing a rationale and advocating requires verbal reasoning. Worker 5 reported that he provided a rationale for equipment purchases:

‘[I will] comment and say, well, this light fixture that you have in here is not very serviceable because it’s made in China. It’s a one-off, we’re never going to find a balance for it when it goes out because it’s a special LED fixture that’s going to be made for one month, and then after that we’re going to have to replace the whole thing.’

Worker 8, a nurse, reported that she would advocate for her patients:

‘When you hand-off you say there are certain things that take a large amount of time if your patient needs you to do all their cares versus a patient who just needs help up to the sink to brush their own teeth — Or if your patient has that insulin drip that needs someone in there every hour or if they’re hopping out of bed every 30 seconds. So you have to communicate with each other to get the help that you need to safely care for your patients with both the charge nurse and the other nurses.’

2.6. Communication skill 5 - expressive pragmatics

One aspect of pragmatics that emerged as a theme was negotiating power status. The importance of power status is supported by the number of related communication codes in the display matrix, including the need to flexibly adjust communication behaviours across interactions with ‘co-workers’, ‘customers’ and ‘superiors’. For instance, as an English as a

Second Language (ESL) teacher, Worker 7 reported the need to converse with children, parents, and coworkers. Worker 8 reported that seniority status among nurses affected how she resolved problems:

‘One of the nurses was angry about his assignment because of this change that she had made and so I was, I don’t know, it was a very, tense situation. But the woman I had to address the issue with was, you know, a 56-year-old nurse who’d been at the hospital forever, and who I respect very much I, it was hard to kinda lay down the boundary.’

The workplace communication theme accommodating the needs of others, referred to accurately perceiving and appropriately responding to the social and conversational needs of others. In this case, communication differences were based on social cues rather than workplace status. As illustration, Worker 8 described ‘difficult’ families as those to which she needed to give special attention:

‘At the end of that assessment at the beginning of my shift, and almost every time I leave the room, I’ll ask them if they have any questions, concerns, complaints, things like that. Something I could do for them and generally that keeps them pretty happy or just spending a little more time with those difficult families, showing some compassion for how the patient is feeling and. just talking to them generally will help, If you spend a little time with the family and patient that will do it.’

The workplace communication theme of presenting oneself professionally was stated in all interviews. Worker 5, an electrician, reported that tact was important on the job: ‘*You’re speaking with [the chancellor] for instance, you can’t drop an f-bomb every oilier word with her. That’s not the way it works.*’

As an ESL teacher, Worker 7 stated that co-workers and job tasks often changed year to year. These changes made maintaining professional demeanor across all interactions important, especially for certain personality types:

‘I have to make sure that I have good working relationships with everyone, because I don’t know who all I’ll work with from year to year. And honestly, I work with a really challenging special education teacher in sixth grade right now, who will blow up at me sometimes, for me asking her to send documents directly to the translators, and I don’t really understand that, and so I just kind of try to stay out of her way.’

The communication theme of managing impressions emerged in relation to improving or maintaining social standing in the workplace. Worker 4 found that managing impressions affected workplace social standing and how others treated you:

‘You could develop a reputation if you try and help a fitter too much. Particularly over the phone, if they call in and say, “I can’t this thing to work.” Or whatever, you know, I say, “I’m doing this with the software, um is it doing this?” “What do you mean, do you think that I don’t know my job!?”’

Supervisor 8 indicated that poor impressions reflected on co-workers and the company as a whole:

‘...sometimes I see nurses say to patients, ‘I can’t get a hold of this physician he’s so incompetent.’ I’m trying to explain them that’s only going to hurt the patient, because they will become very anxious that patients need to know that the team is well oiled and synchronized and on the same page.’

2.7. Communication skill 6 – multi-tasking

Multi-tasking requires shifting attention, working memory and regulating goal-oriented behavior (König, Bühner, & Mürling, 2005; Lillie et al, 2010; Norman & Shallice, 2000). Mid-level jobs often involved verbal tasks requiring complex attention and rapid processing to mediate multiple tasks, which emerged as a communication theme. Another communication theme that emerged from participants’ descriptions was shifting attention between tasks while resisting distraction.

Supervisor 7 reported that administrative assistants needed multi-tasking skills at least as much as social skills. She referred to dealing with paperwork while also serving others: ‘... *you know, administrative assistant: one of my first thoughts is someone who can multitask and easily shift gears and have good interpersonal skills*’ Worker 3, a computer support specialist, also reported that shifting between projects was important. She had to write computer code, answer the phone, and finish partially completed jobs:

‘But if I have, like, ten things that are, like, [makes swooshing noise four times], then I’m like, okay. Time to whirl, you know, and then it’s like, check that off, and, oh, do this. And, but then I can also easily be distracted and kind of get back into it right away. I mean, sometimes it does take a little while – depending on how long I’m distracted for, or whatever.’

2.8. Communication skill 7 – social cognition

Social cognition is important for effective communication (McDonald, 2013). Mid-level jobs emphasized collaboration; a function for which social cognition is critical (Frith & Frith, 2010). The code ‘collaborating’ often co-occurred with ‘meetings’. ‘Meetings’ were often impromptu events happening in the field, requiring clear and concise communication. The code ‘meeting’ was often associated with ‘assisting’ others by providing ‘advice’ or ‘contributing’ in order to create a group ‘consensus’.

Worker 4, a steamfitter, described an impromptu meeting in the field:

‘When I work with [names another trade] it’s a complete cluster every time because they’re completely disorganized... every time we meet I say, “No, This is the way these jobs need to go. This is the way we’re going to do it.” And every time it’s the same thing.’

Worker 10 found that social cues of her coworkers were important when approaching them:

‘Sometimes we just kind of get overwhelmed, and there’s times when there’s a lot of friendliness and camaraderie and joking around and there’s times when everybody is grumpy and just doesn’t want to deal with each other, or everything seems to be going wrong, which I’m sure that’s pretty standard in different groups.’

So, to ask any question, it kind of depends on the day, and the week and how everybody is feeling about things.'

2.9. Linking communication skills to communication-related deficits in TBI

Table 3 lists the seven common workplace communication activities that emerged from interviews and were related to common communication impairments after TBI. First, spoken language processing is commonly impaired after TBI (Lew, Lee, Pan, & Date, 2004; Madigan, DeLuca, Diamond, Tramontano, & Averill, 2000). Deficits in spoken language processing can precipitate problematic communication behaviours such as prolonged response times and difficulty maintaining topic maintenance (Hartley, 1995). This can adversely affect comprehension of spoken instructions and other face-to-face workplace interactions mentioned by interview participants. Second, verbal memory impairments are common after TBI (Beukelman & Yorkston, 1991; Ylvisaker et al., 2001). Verbal memory deficits can result in confabulation, repetition, and disorganized discourse (Hartley, 1995), affecting workplace behaviours described in interviews such as following instructions and directions, as well as new learning tasks. Third, impairments in reading and writing after TBI may be related to impairments in declarative memory and perspective taking necessary for written comprehension and expression (Beukelman & Yorkston, 1991; Schmitter-Edgecomb & Bales, 2005; Sullivan, Griffiths, & Sohlberg, 2015). Reading and writing deficits can reduce proficiency in using work-place reference materials, reading activities related to new learning, and writing correspondence in the work-place. Fourth, verbal reasoning deficits are common after TBI and can cause difficulty with generation and implementation of problem solving strategies and also can adversely affect judgment after injury (Beukelman & Yorkston, 1991). Use of verbal reasoning skills were commonplace in work activities described by interview participants. Participants described interpreting explanations and developing plans, as well as scheduling and prioritizing daily activities. Fifth, expressive pragmatic language deficits are common after TBI and can include decreased verbal initiation, hyper-verbosity, tangentiality, and egocentric talk (McDonald, Turkstra, & Togher, 2012). Deficits in expressive pragmatics can impair execution of mid-level workplace skills described in interviews, including negotiating and accommodating the needs of others, and managing impressions of others in the workplace. Sixth, multi-tasking is commonly impaired in persons with TBI (König et al., 2005; Lillie et al, 2010; Norman & Shallice, 2000). Participants in mid-level jobs described multi-tasking many verbal tasks with the need to shift between activities being key skills in some job descriptions. Last, impairments in social cognition are commonly found in persons with TBI (Byom & Turkstra, 2012; McDonald, 2013; Stronach & Turkstra, 2008). Impairments in social cognition can impact working relationships and the person's ability to behave with the appropriate social decorum for the workplace, which participants described as important to mid-level jobs.

3. Discussion

Workplace conditions, including the type of communication used in the workplace, directly interact with an individual's disability (Hooson, Coetzer, Stew & Moore, 2013). By managing the social conditions in the workplace through environmental controls

rehabilitation professionals can mitigate the level of disablement experienced by persons with TBI. This research describes the communication context of a level of competitive work that persons with TBI attempt to return to most frequently. In doing so it offers a list of communication domains to be considered by research and clinical assessment. Previous research examining return to work after TBI mostly did not consider job types, job levels, or job characteristics when examining outcomes – partially because there has not been a conceptual framework for characterizing workplace demands put forth to guide research and practice. The present study aimed to address this gap by proposing a workplace communication framework for a specific category of employment that is commonly sought by adults with TBI. By linking communication-related skills to common communication deficits after TBI this research employed qualitative methods to translate descriptions of work activities into measurable domains of communication-related constructs. The authors have used this workplace communication framework to test measures associated with these constructs (Meulenbroek & Turkstra, 2016).

This study demonstrated that a wide variety of job types, in this case mid-level jobs, have common communication skills despite differences in job settings and task demands. Research in the business and the sociolinguistic literature has also found that communication skills can be generalized across job types (Keyton et al., 2013; Koester, 2006; Schnurr, 2013). By understanding the common communication skills used at work by persons without disability as a context that interacts with disability we enable the generation of hypotheses about possible factors influencing work return after communication disability. We thematically linked our findings to common deficits found in persons with TBI to offer a preliminary framework to link workplace communication skills to communication constructs relevant to persons with TBI.

Our findings are consistent with findings in other disciplines. For instance, the sociolinguistic framework of workplace communication developed by Drew and Heritage (1992), emphasizes three aspects of communication: 1) communication is goal or task oriented, 2) communication is constrained by partner and environmental contexts, and 3) workplace communication lays unique importance on social inference. This study found executive functioning, multi-tasking and verbal reasoning were involved with workplace communication, consistent with goal orientation. This study also emphasized the importance of social and physical context on workplace communication, with social cognition needed for social cues and perceiving speakers' needs for adequate spoken language performance. These findings are also consistent with unique social inferences present in the workplace. In addition to supporting the sociolinguistic literature, our findings extended necessary communication skills for rehabilitation specialists to include spoken language processing and executive functioning for reading as important skills related to workplace communication demands. Managing impressions and social skills are reasons cited for workplace separation in persons with TBI as well as with other disabled populations (Greenspan & Shoultz, 1981; Hanley-Maxwell, Rusch, Chadsey-Rusch, & Renzaglia, 1986; Sale et al., 1991).

The majority of the literature examining return to work after TBI focuses on executive functioning (Bayless, Varney, & Roberts, 1989; Guilmette, 2005; Ownsworth & McKenna,

2004). This study demonstrates that a greater emphasis is needed on aspects of social cognition and expressive pragmatics skills, in line with recent findings (Isake & Turkstra, 2000; Rietdijk et al., 2013; Struchen et al., 2008). Our findings are also consistent with an increasing emphasis of communication skills in hiring, and job maintenance in the modern workplace.

There are a number of limitations to this study. Inter-rater reliability was established during initial codebook development, but the later portions of the codebook were constructed by the lead author. Despite this, findings were consistent with sociolinguistic frameworks for workplace communication and research in the business management literature. The workplaces under investigation were in Job Zone 3, which intentionally limited the scope to mid-level jobs. While this segment of the workplace is most relevant to persons with TBI, other types of workplace environments must be studied to see if findings transfer to other work settings. However, Job Zone 3 is the largest and most varied of all the Job Zone levels, providing hope that if common communication skills can be identified at this level, they may be generalized to other levels as well. Job Zone 3 is a category of the workplace defined by the level of training required for the position. This means that Job Zone 3 uses average level of education to segment the workplace, but because the physical environment interacts with disability, jobs with similar work settings (e.g. office jobs, construction, etc.) may be another way to segment the study of work-place communication that might be relevant for persons with TBI. Future studies examining workplace communication might consider focusing on jobs with similar job tasks (e.g. managerial positions versus menial positions, etc.), or social environments (high stress, casual, professional, etc.). Finally, there is wide variability in job demands between workplaces even within the same job title. For example, electricians can specialize in installation or in drafting, each carrying unique work demands. Identifying commonality in communication skills required for either one of these tasks still does not address the need for individualized assessment of each patient. However, a description of the common work-place communication skills within a job category does provide clinicians and researchers a starting point for measure selection and establishing rehabilitation needs.

4. Conclusions

Communication skills are important for competitive employment and should be considered when return to work is a therapeutic goal. Specific skills related to the workplace can be identified for populations with characteristic communication deficits. For mid-level employment social cognition, expressive pragmatics, verbal reasoning and executive functioning are important skills vocational rehabilitation should evaluate before return to competitive work in persons with TBI.

Understanding of the communication needs of the workplace is critical to establishing intervention goals and to planning therapeutic activities. With no systematic description of communication, clinical approaches will continue to have no basis for targeting assessments. Furthermore, as research into the impact of workplace communication in TBI emerges it is important to have a description of communication skills to guide hypothesis generation.

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Walk me through the day-to-day activities of your job.
How do you deal with information at work?

- Describe instances where communication is important.
- How important are different communication technologies?

Describe the content of the things you communicate at work.

- Talk to me about the ideas that you put into words daily.
- Talk to me about the nature of information you encounter daily.

Fig. 1.
Interview topic guide.

Fig. 2.

Overview of data analysis procedures. Data analysis was based on Elo & Kyngäs (2008). Analysis was divided into two phases. During the preparation phase interview transcripts were arranged for analysis. During the organization phase transcripts were coded and codes were assembled for interpretation.

What		Whom		How		Purpose		Where		
Detail		Status		Approach		Educating		Setting		
Procedural	391.5	Co-worker	326.3	Accommodating	173.2	Learning	243.2	Field	146.6	
Technical	351.5	Customer	254.8	Tact	143.0	Provision	133.0	Manual		
Temporal	85.0	Superior	211.2	Authoritative	60.8	Teaching	99.4		Voice Receiver	182.8
Regulatory	58.5	Distinction	174.2	Formatting	57.2	Assessing	68.0		Keyboard	165.6
Financial	50.4	Expert	118.4	Visual	53.7				Reference	58.6
		Trades	84.0	Urgent	48.4	Managing				
Inferential		Number		Manner/Modality		Efficiency	77.7	Virtual		
Mentalizing	49.5			Spoken	671.5	Scheduling	69.3	Software	153.4	
				Face-to-face	396.0	Prioritizing	66.0	E-mail	110.4	
		Small group	93.0	Written	193.6	Monitoring	49.0	Meeting	109.2	
		Individual	91.3	Clarity	115.6	Referral	46.2	Atmosphere	109.0	
						Brainstorming				
						Verbal Reasoning	265.2			
						Mathematical	44.3			
						Collaborating				
						Assisting	176.0			
						Contributing	134.4			
						Consensus	103.7			
						Persuading	102.6			
						Cooperation	68.0			
						Inter-reliant	61.6			

Fig. 3.

Display matrix of the fifty most heavily weighted codes. The data matrix was designed to assist with visualizing the codes to help extract meaning from the interviews. The columns represent dimensions of communication affecting global aspects of interpersonal situations. Under the columns are categories of codes. The numbers in the shaded region are the weighted scores, which reflect each code's relative contribution to workplace communication as described by interview respondents.

Fig. 4.

The number of new codes emerging from worker interviews. The number of new codes from worker interviews provided the basis for data saturation.

Table 1

Inclusion criteria for interview participants

-
- Twenty-two years of age or older
 - Works in or supervises a mid-level job
 - Workers were employed in mid-level job for >12 consecutive months
 - No history of medical or neurological disease affecting the brain
 - No history of learning disability
 - Fluent in the English language established by first author during telephone intake
-

Table 2

Interview participants

Workers	Sex	Occupation
1	F	Administrative Assistant
2	F	Hairstylist
3	F	Computer Support Specialist
4	M	Scamfitter
5	M	Electrician
6	M	Solar Photovoltaic Installers
7	F	Self-Enrichment Education Teacher
8	F	Registered Nurse
9	M	Computer Support Specialist
10	F	Solar Photovoltaic Installer
Supervisors	Sex	Occupation
1	F	Hairstylist
2	M	Business Automation Specialist
3	M	Airfield Operations Specialist
4	F	Computer Support Specialist
5	M	Occupational Therapy Assistant
6	F	Physical Therapy Assistant
7	F	Administrative Assistant
8	F	Registered Nurse
9	F	Preschool Teacher
10	M	Municipal Firefighter

Table 3

Qualitative themes of common workplace communication deficit and their theoretical link to TBI

Qualitative themes of workplace communication activities		Theoretical link to communication deficits in TBI
1	Processing spoken information	Spoken language Processing Working Memory
2	Following procedures and instruction	
3	Working memory for spoken information	
1	Processing spoken information	Spoken language Processing
2	Attending to distorted speech signals	
1	Working memory for spoken information	Verbal Memory
2	Managing verbal information	
3	Remembering for new learning	
1	Reading for new learning or reference	Reading and Writing
2	Monitoring written correspondence and email	
3	Writing short correspondences and documenting communications	
1	Interpreting explanation	Verbal Reasoning
2	Scheduling and prioritizing activities	
3	Developing plans	
4	Describing work activities	
1	Negotiating power status	Expressive Pragmatics
2	Accommodating the needs of others	
3	Presenting self professionally	
4	Managing impressions	
1	Mediate multiple verbal tasks	Multi-tasking
2	Shifting between tasks and activities	
1	Recognizing and responding to office politics appropriately	Social Cognition
2	Maintaining working relationships	

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Theoretical link to communication deficits in TBI	
3	Qualitative themes of workplace communication activities
	Ability to inference the needs of others