Journal of Communication Disorders 56 (2015) 103–112

Contents lists available at ScienceDirect

Journal of Communication Disorders

Examining the relationship between speech intensity and self-rated communicative effectiveness in individuals with Parkinson's disease and hypophonia

Allyson D. Dykstra [a,*], Scott G. Adams [b], Mandar Jog [c]

[a] School of Communication Sciences and Disorders, Western University, London, Ontario, Canada
[b] School of Communication Sciences and Disorders, Department of Clinical Neurological Sciences, Western University, London, Ontario, Canada
[c] Department of Clinical Neurological Sciences, Western University, London, Ontario, Canada

ARTICLE INFO

Article history:
Received 21 January 2015
Received in revised form 10 June 2015
Accepted 22 June 2015
Available online 6 July 2015

Keywords:
Parkinson's disease
Communicative effectiveness
Speech intensity
Hypophonia
Speaker-listener dyads

ABSTRACT

Purpose: To examine the relationship between speech intensity and self-ratings of communicative effectiveness in speakers with Parkinson's disease (PD) and hypophonia. An additional purpose was to evaluate if self-ratings of communicative effectiveness made by participants with PD differed from ratings made by primary communication partners.
Methods: Thirty participants with PD and 15 healthy older adults completed the Communication Effectiveness Survey. Thirty primary communication partners rated the communicative effectiveness of his/her partner with PD. Speech intensity was calculated for participants with PD and control participants based on conversational utterances.
Results: Results revealed significant differences between groups in conversational speech intensity ($p = .001$). Participants with PD self-rated communicative effectiveness significantly lower than control participants ($p = .000$). Correlational analyses revealed a small but non-significant relationship between speech intensity and communicative effectiveness for participants with PD ($r = 0.298$, $p = .110$) and control participants ($r = 0.327$, $p = .234$). Self-ratings of communicative effectiveness made participants with PD was not significantly different than ratings made by primary communication partners ($p = .20$).
Conclusions: Obtaining information on communicative effectiveness may help to broaden outcome measurement and may aid in the provision of educational strategies. Findings also suggest that communicative effectiveness may be a separate and a distinct construct that cannot necessarily be predicted from the severity of hypophonia.

1. Introduction

Speech and voice abnormalities are a common and often disabling consequence of Parkinson's disease (PD). It is estimated that over 75% of individuals diagnosed with Parkinson's disease will present with speech and voice abnormalities related directly to PD (Logemann, Fisher, Boshes, & Blonsky, 1978; Sapir et al., 2002). Hypophonia, or reduced speech intensity, can be a consequence of hypokinetic dysarthria associated with PD. Hypophonia often emerges as an initial speech

* Corresponding author at: School of Communication Sciences and Disorders, Elborn College, Western University, London, Ontario, Canada N6G 1H1.
E-mail addresses: adykstr3@uwo.ca (A.D. Dykstra), sadams@uwo.ca (S.G. Adams), Mandar.Jog@lhsc.on.ca (M. Jog).

http://dx.doi.org/10.1016/j.jcomdis.2015.06.012
0021-9924/

symptom in the beginning stages of PD (Logemann et al., 1978). Ludlow and Bassich, and Gamboa and colleagues found that hypophonia was present in 42% and 49% of individuals they studied with hypokinetic dysarthria, respectively (Gamboa et al., 1997; Ludlow & Bassich, 1984). Fox and Ramig (1997) suggest that on average individuals with PD have intensity levels 2–4 dB SPL lower than age-matched control participants. More recently, Dykstra and her colleagues reported habitual conversational intensity values for individuals with PD to be approximately 5 dB SPL less intense than control participants, and approximately 5 dB SPL less intense than control participants in various intensity levels of background noise (Dykstra, Adams, & Jog, 2012).

Given this growing body of evidence that acknowledges many individuals with PD can have significant hypophonia and can have difficulty regulating speech intensity, it is conceivable that individuals with hypophonia may have significant difficulty communicating and participating effectively in a variety of speaking situations. These speaking situations could include speaking while traveling in car, speaking while in a busy restaurant, or at a social gathering. Therefore, it is important to broadly assess hypophonia from a perspective that addresses the impact of the speech disorder on successful communicative interactions. One way of achieving this is to assess an individual's perception of his/her ability to participate and communicate effectively in different speaking situations and to also assess how communicative partners perceive the communicative effectiveness of their partner with PD. This information has the potential to inform treatment planning and to augment the quality of healthcare individuals with PD and hypophonia receive.

There is an emerging body of empirical literature based on the construct of "communicative participation" (see Baylor, Burns, Eadie, Britton, & Yorkston, 2011; Baylor et al., 2013). Communicative participation has its roots within the conceptual framework of the World Health Organization's International Classification of Functioning, Disability and Health (ICF) (WHO, 2001). According to the ICF, the health domain/construct "body functions and body structures" describes aspects of an impairment related to body systems and body structures (WHO, 2001, p. 8). Within the context of the ICF, "participation" is a construct that refers to the nature and the extent of an individual's involvement in life situations (WHO, 2001). Restrictions in participation represent the difficulties individuals can experience in life situations due to the circumstances of their health condition (WHO, 2001). Within the realm of communication, participation refers to the roles and activities that one chooses which involve communication within the context of daily life (WHO, 2001). Eadie and her colleagues suggested a definition of communicative participation as "Taking part in life situations where knowledge, information, ideas or feelings are exchanged. This may take the form of speaking, listening, reading, writing, or nonverbal means of communication" (p. 309) (Eadie et al., 2006). Included within the construct of participation is "communicative effectiveness". Communicative effectiveness was defined by Hustad (1999) as a person's ability to communicate successfully messages in home and community settings to fulfill life roles.

Understanding the participation dimension of functioning allows one to examine how an individual participates in social contexts. Measures of communication effectiveness such as the Communicative Effectiveness Survey (CES) (Donovan, Kendall, Young, & Rosenbek, 2008; Donovan, Velozo, & Rosenbek, 2007; Donovan, Velozo, Rosenbek, Okun, & Sapienza, 2005; Hustad, 1999) can be used to obtain information about the effectiveness of communicative participation in individuals with dysarthria. Other instruments such as the Voice Activity and Participation Profile (VAPP) (Ma & Yiu, 2001), the Voice Handicap Index (VHI) (Jacobson et al., 1997), the Dysarthria Impact Profile (Walshe, Peach, & Miller, 2008), and most recently, the Communicative Participation Item Bank (Baylor et al., 2013) are tools that have been used to examine communicative participation in a variety of communication disorders, including dysarthria (for a thorough review of these instruments, the reader is directed to Eadie et al., 2006). Unfortunately, the relationship between acoustic measures of hypophonia (i.e., speech intensity) and the impact on participation is poorly understood. The majority of research in motor speech disorders has focused on understanding the physiological and perceptual underpinnings of dysarthria. Fewer studies have attempted to delineate the relationship between acoustic measures such as speech intensity (ICF "body functions and structures") and subjective, patient-reported outcome measures such as communicative effectiveness (i.e., ICF "participation"). A review of the extant literature reveals that the relationship between ICF impairment based measures (i.e., speech intensity) and participation has not been explored in individuals with PD. Therefore, obtaining patient reported outcomes on communicative participation in addition to clinically based outcome measures, such as speech intensity is desirable because it can ensure contextually relevant communicative rehabilitation for individuals with dysarthria and it can ensure a breadth of outcome measurement.

In addition to obtaining patient reported outcomes of communicative participation, it is of interest to investigate proxy ratings of communicative participation. Obtaining information on communicative participation from the perspective of the individual with PD and from the perspective of his/her communication partner is important information to gather in order to determine if differences in perceptions exist. This information can be of value clinically in the provision of strategies to overcome communication breakdown between partners. The agreement between patient and proxy reports has been studied among individuals with PD with varying results (Fleming, Cook, Nelson, & Lai, 2005; Martinez-Martin et al., 2004; McRae, Diem, Vo, O'Brien, & Seeberger, 2002). For example, McRae et al. (2002) found a high level of agreement between individuals with PD and their caregivers on responses to the Schwab and England Activities of Daily Living scale, and Hoehn and Yahr staging. Martinez-Martin et al. (2004) evaluated quality of life (QoL) in PD-proxy dyads. The study by Martinez-Martin and colleagues also found concordance in dyad responses, but the responses that pertained to more objective variables had higher concordance than more subjective variables. In their evaluation of QoL and physical activity in PD-proxy dyads, Fleming and her colleagues found that, in general, proxies rated patient disability higher and rated QoL lower than did the individuals with PD (Fleming et al., 2005). In contrast to the study by Martinez-Martin, Fleming's study found there was