

### **What this paper adds**

#### *What is already known on this subject?*

The hypokinetic dysarthria associated with Parkinson's Disease (PD) causes speech intelligibility problems and people with PD (PwPD) report negative consequences of this for everyday interactional participation. There is a lack of knowledge regarding the specific nature of these difficulties. Previous conversation analytic (CA) studies, focussing on other types of dysarthria, have revealed valuable information about what happens when everyday conversations are disrupted by the need for repair and have also touched on the phenomenon of multiple repair, where more than one attempt is made by a conversation partner to resolve a trouble source.

#### *What this paper adds*

This CA study examines instances of multiple repair in everyday conversations between PwPD and their conversation partner (CPs), shedding light on the methods used by CPs to initiate repair and the ordering of the repair initiators used. This leads to a proposal for an intervention, which, following further development, could enable SLTs to target the use of participation focussed communication strategies.

## **Abstract**

### *Background*

Features of dysarthria associated with Parkinson's Disease (PD), such as low volume, variable rate of speech and increased pauses, impact speaker intelligibility. Those affected report restricted interactional participation, although this area is under explored.

### *Aims*

The aim of this study was to examine naturally-occurring instances of problems with intelligibility that resulted in multiple attempts at repair in order to consider repair initiation strategies that might restrict or enhance participation.

### *Methods and procedures*

Thirteen people with PD video-recorded over 10 hours of informal conversation data, in the home setting, involving familiar conversation partners (CPs). Using a conversation analytic approach, and drawing on an existing typology of repair initiators (RIs) for everyday talk-in-interaction (Schegloff et al., 1977) and their relative power to locate a turn's repairable element, the design and ordering of RIs used by CPs was addressed, alongside their local consequences.

### *Outcomes and results*

CPs tended to increase the specificity of their RIs in line with the existing typology, progressing from open class forms (e.g. 'mm?') to more specific forms (e.g. questions/partial repeats). Repeated open class RIs (OCRIs) were used where PD speakers' self-repair attempts provided limited information. Sometimes however, specificity was increased too soon, before enough syntactic knowledge was gleaned, which resulted in an extended repair sequence.

Where one OCRI followed another, the second always took a different form; lexically or in terms of prosodic/non-verbal features. RI forms not described in the existing typology were also identified, such as 'prompts to modify speech' (e.g. 'Speak louder') and repeating/rephrasing the original First pair part (FPP, e.g. question), and their effectiveness examined.

### *Conclusions and implications*

First steps are presented towards the design of a communication intervention promoting the efficient resolution of repair to moderate social withdrawal and increase participation for this client group. Future research will need to explore the feasibility and acceptability of such a resource.

## **Background**

### ***Parkinson's Disease and communication***

Around 70% of people with Parkinson's Disease (PD) experience 'hypokinetic' dysarthria (Hartelius and Svensson, 1994) the clinical features of which include reduced vocal volume and intonation, imprecise articulation, speech initiation difficulties and variable rate (Duffy, 2005). This can greatly impact on speech intelligibility.

Around 20% of people diagnosed with PD develop dementia, often of the subcortical type, with memory and executive functioning predominantly affected. A further 60% demonstrate cognitive impairments without dementia, the deficits including impaired free recall, lack of spontaneous task planning, difficulties maintaining attentional set and set shifting, reduced ability to alternate tasks and cognitive slowing (Marinus et al., 2003). These cognitive deficits can affect language comprehension (Grossman et al., 2002) and expression, in particular word fluency (Strauss Hough, 2004).

People with PD (PwPD) report that participation in everyday conversations is restricted (Miller et al., 2006), yet research into everyday 'outside the clinic' communication is limited and speech and language therapists (SLTs) lack resources to help improve participation for this client group (Griffiths et al., 2011). Moreover, the psychological and social impact of dysarthria, irrespective of the underlying neurological condition, has remained under researched despite a growing awareness amongst researchers and practitioners in the field that such issues have a core relevance to theoretical and clinical frameworks, clinical resources and outcome measures (Bloch et al., 2011). Future research on developing and evaluating assessments and interventions therefore needs to address barriers to

social participation (Bloch et al., 2011). This research should focus on what happens for people outside the clinical setting, and should not focus purely on the person with dysarthria; as Walshe and Miller have argued, ‘there is much to be done on listener education’ (2011: 202).

Evidence indicates that training conversation partners (CPs) of those with chronic aphasia can improve communication activities and participation for both the partners and the clients (Simmons-Mackie, 2010). Such evidence is so far lacking in dysarthria, although there has also been some small-scale pilot work on communication skills training for CPs of people with PD, suggesting that this is a model that would be well received with potential to effect positive change on perceptions of everyday communication (Forsgren et al., 2013). Future research on how conversations operate in PD will enable further development of such training protocols.

There has been a recent emergence of a social interaction research approach to dysarthria associated with conditions other than PD. Everyday communication outside the clinical setting has been explored, notably in the conversation analytic work of Bloch and Wilkinson (e.g. 2004, 2011) on Motor Neurone Disease (MND), leading to speculation by some that this approach might provide a step towards extending an understanding of participation (O’Halloran and Larkins, 2008; Hartelius and Miller, 2011).

### ***Repair in conversation and dysarthria***

Studies of everyday interaction in dysarthria to date have revealed important information about what happens when progression in conversation is impeded by the need for ‘repair’. Repair is described as the range of practices available to speakers for resolving troubles with speaking hearing, understanding (Schegloff et al., 1977)

or acceptability (Schegloff, 2007). Researchers often refer to a problematic segment of talk as the 'trouble source' or the 'repairable'. Studies of ordinary conversation have revealed that when a potential trouble source arises, unless passed over, a repair sequence typically unfolds in two stages. First, repair initiation occurs, whereby the need for repair is initiated by the speaker of the trouble source (self-initiation of repair) or another speaker (other-initiation (OI) of repair). Second, the repair outcome - a 'solution or abandonment of the problem' (Schegloff, 2000) - the solution being carried out by 'self' or 'other'.

Repair plays an important role in maintaining 'intersubjectivity', or shared understanding, between co-participants in conversation. Every turn at talk displays understanding of the previous turn (Heritage, 1984). When understanding is potentially at stake, the 'machinery' of repair can operate to restore, as quickly as possible, the intersubjectivity that is the basis of collaborative action (Schegloff, 1992).

Studies examining repair in dysarthria, have so far mainly involved participants with MND (e.g. Bloch, 2005, 2011; Bloch and Wilkinson, 2004, 2009) and Multiple Sclerosis (e.g. Rutter 2009; Bloch and Wilkinson, 2011). These neurological conditions are associated with 'mixed' dysarthria, which is qualitatively different from hypokinetic dysarthria and can have a variety of features depending where in the motor system the depletion of motor neurones (MND) or the demyelination of nerves (MS) has occurred. For example, the speech of a person with advanced MND, where there is damage throughout the motor system, might be effortful and slow, with vocal straining and hypernasality. When speech is affected in MS there can be a combination of features caused by excess muscle tone and incoordination (e.g. excess and equal stress on syllables). In contrast, the distinguishing features of PD

speech include reduced volume and variable (often fast) rate (Duffy, 2005). Therefore, the impact of dysarthria on conversation in PD may differ from other neurological conditions. Frequent pauses, for instance, have the potential to cause interactional trouble when the listener is uncertain whether the PD speaker's turn is finished or still in progress (Griffiths et al., 2011).

Clarke and Wilkinson (2008) have examined repair patterns in conversations involving children with cerebral palsy (CP) and severe dysarthria, who use augmentative and alternative communication (AAC) systems as their primary mode of communication. In this type of research the focus is on how the use of a communication system, rather than the speech impairment, impacts on conversation. Alternatively, some studies have examined interaction for dysarthric speakers with MND who use AAC as an adjunct to speech (e.g. Bloch and Wilkinson, 2004, 2009). Amongst the findings of such studies, conversationalists have been shown to collaborate to resolve a trouble source or avoid trouble. For example, in order to avoid the need for repair, an utterance may be collaboratively produced by two or more speakers, sometimes in idiosyncratic ways Bloch (2005) identified a naturally developed strategy reducing the need for too much repair:

- a. The dysarthric speaker produces an incomplete turn of talk, then pauses
- b. The recipient repeats back the utterance with flat intonation (i.e. the intonation signals that the repetition is intended as a display of understanding rather than a request for verification)
- c. The dysarthric speaker completes the turn

This efficient system is also seen when the dysarthric speaker self-repairs using spelling aloud.

This steadily expanding research into the effects on interaction in different types of dysarthria has made a unique contribution to knowledge by revealing patterns of repair that differ from those found in ordinary conversation and indeed other types of communication disability. Exploring the success or otherwise of repair practices in communication disability can be useful in providing therapy targeted at the problems people encounter on a daily basis.

These benefits have now begun to extend to the study of repair in conversations disrupted by a speaker's hypokinetic dysarthria. Griffiths et al (2012) found that speakers with PD often find their turns at talk being subject to overlap by other parties, which can lead to the need for repair, or alternately, to the PwPD's turns being effectively deleted from the interaction. The authors suggest that characteristic features of PD communication, such as speech initiation difficulty, low vocal volume and cognitive impairment result in a potential vulnerability to being 'talked over'.

More recently, Saldert et al (2014) examined instances of semantic trouble sources leading to OI of repair in PD, describing the strategies used by CPs during collaborative word searches such as rephrasing or providing a suggestion for the target word. Similarities between strategies employed by CPs of those with PD and aphasia have been identified by Carlsson et al (2014). Categorising strategies used across both client groups, these authors found no significant group differences in strategies used, for example asking for clarification or providing a candidate solution (guessing what the intended target might be). The only exception to this was that the CPs of those with PD tended to use a greater frequency of open-class RIs (forms such as 'pardon?' or 'mm?'). This type of repair will be discussed further in relation to other types, in the following section.

### ***Multiple repair***

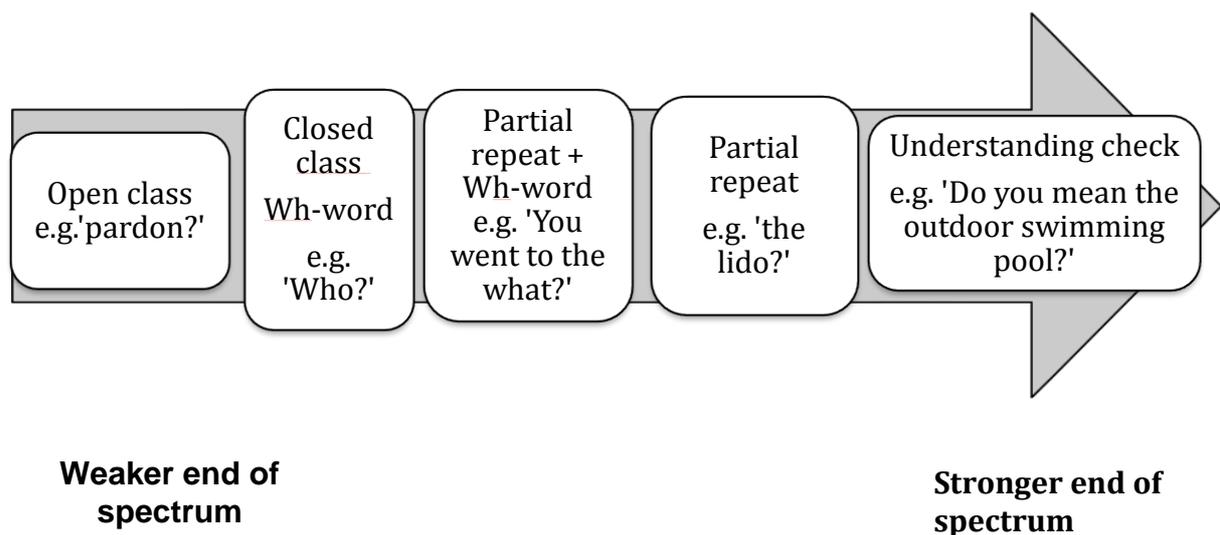
Some of this previous work on repair in dysarthria has touched on the issue of 'multiple repair', whereby more than one repair initiator (RI) is needed to resolve a single trouble source (Schegloff et al., 1977). Bloch and Wilkinson (2004, 2009, 2011), have already described some specific ways in which 'extended repair sequences' can arise and how they get resolved. As multiple repair sequences present an intensified threat to participation in conversation, however, it would be valuable to understand yet further how these unfold in relation to what might be expected in ordinary conversation.

Based on studies of everyday talk between non-communication impaired speakers, (Schegloff et al., 1977) developed a typology showing how OI can be more or less helpful to the speaker of the repairable utterance in locating which element of that utterance is problematic. This is important for ensuring that repair is achieved as quickly as possible. Types of RIs have a 'natural ordering' based on their relative power to enable the 'repairee' in this respect (Schegloff et al., 1977).

The Schegloff et al (1977) typology of OI forms is shown in Figure 1. At the weaker end of the spectrum are open class repair initiators (OCRIs) such as 'pardon?' and 'mm?', which indicate some kind of trouble, but do not locate a specific repairable element of the utterance. More powerful would be a closed class RI using a question word like 'who?' (indicating trouble with a person referent); 'Where?', (indicating trouble with a place referent) and so on. 'What?', can be either an open class or closed class RI depending on whether used to display a general problem with hearing, or to locate a problematic noun phrase ('the what?'). Moving along the continuum, framing a question word with a repeat of an element of the repairable utterance ('You went to the what?') provides more power. Repair can also be

initiated by repeating an element without a question word ('the lido?') and finally by using a direct understanding check: 'Do you mean the outdoor swimming pool?' RIs often perform this type of check by offering a candidate solution to the trouble, either in combination with another RI or alone: 'What? The pool?' (Sidnell, 2010). Along with the initiation form, intonation plays a crucial part in alerting the repairer to the precise nature of the trouble.

**Figure 1: Typology of OI forms (Schegloff et al., 1977)\***



*\*Arrow indicates increasing power of the OI form, from left to right, in its ability to locate the repairable element of an utterance.*

Schegloff et al (1977) acknowledge that the typology is not an exhaustive list of RI types and their use is not simply a matter of choice (Schegloff, 1987), but is based on a range of interactional circumstances. It is often the case that OCRIs indicate a general problem with hearing; a recipient being unable to hear enough of the repairable turn to provide a stronger form. However, they can also indicate problems in interpreting the action a speaker means to accomplish; a serious question versus a joke for instance (Sidnell, 2010). It is important also to recognise that the use of a

specific RI does not necessarily provide an insight into cognitive state, including the user's motivations for selecting specific forms (Drew, 1997).

As well as looking at multiple repair sequences in terms of the specificity of RIs, some authors have described an ordering of RIs based on how they present the type of trouble source to its speaker. For instance, where there is a problem with the acceptability of a turn, recipients tend to start by indicating a problem of hearing or understanding, as this is less socially complicated and gives the speaker the opportunity to address what was unacceptable within the next turn (Pomerantz, 1984; Schegloff, 2007). Whilst this provides some insight, recent research suggests that in conversations involving people with PD, open class is by far the most frequent type of repair initiation used (Griffiths, 2013). This frequency also appears to be greater in conversations involving people with PD than in those involving people with aphasia (Carlsson et al., 2014). This suggests that in conversations involving people with dysarthria, where intelligibility of speech is a problem, recipients are faced with challenges that differ to those encountered in both ordinary conversation and in conversations involving other types of communication disorder. These listeners often have limited options regarding how the type of trouble source is presented because it is often the case that a whole utterance is not heard or understood. There is therefore limited information from which to construct anything other than an OCRI.

Multiple repair sequences have also been addressed in the aphasia literature. For example, Perkins et al (1999) observed that the strength of RIs used initially, determined the length of the resulting repair sequence in conversations between speakers with aphasia and their conversation partners (CPs). Weak, open class RIs resulted in more protracted repair sequences. The authors demonstrated that how and when repair initiation is used is significant in shaping the repair sequence

overall, but after the first RI, did not address the ordering of subsequent forms. Despite this interest in multiple repair and communication disability, to the authors' knowledge, there have been no studies addressing the ordering of RIs by CPs in such sequences, or consideration of whether these operate hierarchically. This kind of information could inform CPs about 'what to try and in what order' to resolve a repair situation most efficiently.

## **Aims**

This study was part of a wider research project aiming to identify threats to participation and strategies used to manage participation in conversations. The focus of the current paper is to examine instances of speech intelligibility problems resulting in multiple attempts at repair and to identify strategies for managing this kind of heightened threat to participation.

## **Methods and procedures**

### *Data Collection*

Following NHS ethical approval, speech and language therapists (SLTs) and PD Nurse Specialists across four NHS Health Trusts, recruited 13 participants with PD. Background information for each of the 13 participants is presented in Table 1. Pseudonyms have been used to protect participant confidentiality.

In order to better describe the sample, during a home visit, the first author (who is a SLT) carried out several clinical assessments. These included a measure of overall disease severity; the Hoehn and Yahr (1967) disability rating scale. This allocates stages from 1 to 5 to indicate the relative level of disability, with stage one representing mild symptoms and stage five indicating that the patient may need constant nursing care. Scales for Outcomes in Parkinson's Disease – Cognition (SCOPA-COG) {Marinus et al., 2003} was used to assess cognitive status. This is a

short, reliable and valid cognitive assessment specifically developed for PD, assessing the 4 domains of memory and learning, attention, executive functioning and visual spatial functioning. There is a possible total score of 43, higher scores reflecting better performance with a cut off below 21 suggesting PD related dementia. The Frenchay Dysarthria Assessment Edition 2 (FDA-2) (Enderby and Palmer, 2008) was also used.

This clinical data is presented in Table 1. Pseudonyms are used throughout. The FDA-2 intelligibility in word and sentence reading aloud totals were combined to form a percentage score for each participant. The FDA-2 'Intelligibility in conversation' ratings range from a: 'No abnormality' to e: 'Totally unintelligible'. A rating of 'b-c' represents intelligibility falling between the descriptors b: 'Speech abnormal but intelligible – occasionally has to repeat' and c: 'Speech severely distorted, can be understood half the time. Very often has to repeat'.

**Table 1: Summary of participant clinical data: age, disease duration and severity, speech intelligibility and cognitive status**

PD Participant	Age	Years since diagnosis	Hoehn and Yahr stage	FDA-2 Intelligibility in reading aloud (%)*	FDA-2 Intelligibility in conversation rating**	SCOPA-COG score***
David	65	7	3	40	b-c	25
Peter	75	9.5	3	80	a-b	28
Sally	72	19	4	80	b	24
Harry	84	7	4	60	b-c	23
Arnie	79	3.5	3	80	a-b	24
Will	64	20	3	80	b-c	26
Tom	86	6	3	80	b	25
Doug	76	5	3	80	a	24
Greg	65	14	4	Not available****	c	Not available****
Graham	77	5	2	80	a-b	22
Jack	72	13	3	60	b-c	22
Clive	70	8	2	60	b-c	26
Lily	82	18	5	Not available****	b-c	Not available****

\*Frenchay Dysarthria Assessment (Edition 2) (Enderby and Palmer, 2008) - intelligibility in word and sentence reading aloud totals combined to form a percentage score

\*\* Range of possible scores is a = 'No abnormality' to e = 'Totally unintelligible'. Some ratings fall between two descriptors (e.g. b-c).

\*\*\* Scales for Outcomes in Parkinson's Disease – Cognition (Marinus et al., 2003). A score of below 21 indicates PD related dementia.

\*\*\*\* Greg and Lily were unable to take part in formal assessment due to fatigue, reduced attention span and severe speech initiation difficulties. During periods of alertness, they demonstrated verbal understanding of project and gave consent.

Of those participants who were formally assessed, reading aloud intelligibility scores ranged from 40% (David) to 80% (Peter, Sally, Arnie, Will, Tom, Doug and Graham). For 'Intelligibility in conversation' Doug was rated the highest and Greg was rated the least intelligible. None of the participants were rated below this and none of them were AAC users.

Information regarding all participants' perspectives on communication at home in general, was gained by asking the following standard questions: 'How is communication at the moment?' 'What are the main problems with communicating?' and 'How does communication vary?' A summary of responses, along with some further background information about the participants is presented in Table 2 to allow readers to contextualise the findings.

**Table 2: PD participants and conversation partners: Background information and perceptions of communication**

<b>PD Participant</b>	<b>Background and perceptions of communication</b>	<b>Main CP</b>	<b>Background and perceptions of communication</b>
<b>David</b>	Retired electrician. Finds talking extremely effortful. Sociable by nature, but has started to avoid social situations. Enjoys going out for afternoon tea with wife and daughter.	<b>Fiona</b> (daughter)	Spends much of her time visiting her parents and taking them out. Feels that David's speech is rapidly deteriorating and that he is most difficult to understand after he's taken his medication due to his involuntary movements.
<b>Peter</b>	Owns industrial design business. Feels his speech varies with his mood and is aware of expressive language difficulties.	<b>Jenny</b> (wife)	Lives with Peter and their dog Maisy. Feels that at times Peter becomes stuck on a topic and it becomes hard to change the subject.
<b>Sally</b>	Retired primary school teacher. Complains that her saliva escape problems interfere with her speech more than anything else.	<b>John</b> (husband)	Often feels frustrated when communicating with Sally. He feels she does not try to make things easier for him.
<b>Harry</b>	A former dockyard worker. Finds it annoying to be asked to repeat himself frequently. Despite a busy social life, he can feel lonely in a group setting due to his communication difficulties.	<b>Joan</b> (wife)	Retired teacher. Has a hearing loss. Says that she can hear other people fine in conversation but struggles to hear Harry.
<b>Arnie</b>	Retired herdsman. Hearing loss in both ears. Feels that his voice has become quieter and that he talks less since having PD.	<b>Betty</b> (wife)	Sees Arnie's main problems with communication as a lack of speech clarity and forgetting what people have said to him.
<b>Will</b>	Retired university lecturer. Has done a lot of travelling with Julie. Aware that his speech has deteriorated and that he lacks facial expression.	<b>Julie</b> (wife)	Feels that Will's vocal volume is reduced and this makes it hard to understand him. It annoys her when other people pretend to have understood him.
<b>Tom</b>	Retired deputy head teacher of a secondary school. Lives alone in a warden-assisted flat. Aware that he speaks very quietly and consequently does not speak to many people.	<b>James</b> (son)	As he sees his dad in the evenings usually, feels that communication is affected by Tom's fatigue.
<b>Doug</b>	Retired blacksmith and builder. Aware that his voice is becoming quieter, that he has started to stammer and that he sometimes has difficulty formulating language. It is obvious to him when others don't understand him even when they try to conceal this.	<b>Lottie</b> (wife)	Feels that Doug's difficulties with finding the right words are more pronounced in the evenings when he is tired.
<b>Greg</b>	Retired university lecturer who travelled during his career. Experiences fatigue, reduced attention span and severe speech initiation difficulties.	<b>Rosie</b> (wife)	Feels that her main concern is getting Greg to talk, mainly through use of a question and answer approach.
<b>Graham</b>	Retired sales manager. Feels that his speech varies with emotion. When he is under stress his ability to communicate deteriorates.	<b>Anne</b> (wife)	Mild hearing loss in one ear. Feels the main problems are Graham's quiet voice and his use of minimal responses. Feels communication is at its worst in the evenings when Graham is tired.
<b>Jack</b>	Now retired but has had various careers. Active committee member of local branch PD UK. Aware that his vocal volume is low and that this makes his role on committees challenging.	<b>Molly</b> (wife)	Feels that she frequently asks Jack to speak up and that she often takes over and speaks for him.

<b>Clive</b>	Retired dockyard worker. Feels that it has become more difficult to retain information and that communicating in a group of people is now much more demanding.	<b>Irene</b> (wife)	Feels that Clive's speech has become very unclear and that listening carefully to understand him can be draining. Aware that at times she talks for him, especially in time pressured situations like visiting the neurologist.
<b>Lily</b>	Lives with Sahir in a warden-controlled flat and has daily home care. Feels that she is bright, but gets mixed up with her words and that it can be annoying when she is asked to repeat herself frequently.	<b>Sahir</b> (husband)	Feels that Lily has a very quiet voice and takes a long time to respond. Often positions himself very close to her so she can repeat what she was trying to say.

Participants were given training in how to video-record everyday conversation with their familiar CPs in the home setting over a period of two weeks.

### *Analytic Process*

The video data was transcribed and analysed according to the principles of Conversation Analysis (CA). The first stage of analysis involved becoming familiar with the video data through repeated viewings and initial verbatim transcription of the entire data set. Next, a full CA transcription of sections of the data took place, using the Jefferson (2004) system of transcription, taking account of prosodic features, simultaneous talk and (where of interest) non-verbal features.

Data transcription and analysis took place using Transana software version 2.30 (Woods and Fassnacht, 2008). This allows a researcher to work with large amounts of video data, use CA transcription conventions, measure pause durations and organize clips into meaningful categories and collections as analysis proceeds.

Transcription acts as a major 'noticing device', making it possible to attend to details of the interaction that would not be apparent to the ordinary listener (Ten Have, 2007). During the data-driven analytic process, which relies on close and minute scrutiny of sequences of dialogue, across-case instances of multiple repair, defined as a sequence in which more than one repair initiator (RI), including both verbal and non-verbal, is used to attempt to resolve that single trouble source were identified. These were examined in the manner of a comprehensive data treatment (Ten Have, 2007), with distinctive and shared features extrapolated. Instances that appeared to differ from the emerging pattern in terms of their design or positioning (deviant cases) were examined for what they could reveal about the integrity of the on-going analysis or the interactional consequences for the participants of deviation from a rule.

It is common practice in CA for researchers to present their findings and insights for others to critically inspect (Ten Have, 2007). 'As a practice and discipline, CA is rooted in local communities of practitioners... *This...provides an audience for trying out observations.*' (Sidnell, 2010:29). This is usually done in the form of data sessions, whereby a researcher presents video or audio data extracts along with their associated transcripts to a group of other researchers. Repeated viewing/listening within the group can lead to the proffering of substantial observations and constructive criticism regarding the on-going analysis and how well it is grounded in the data rather than being impressionistic (Ten Have, 2007). To this end, data sessions were held, whereby data extracts and emerging insights were presented to a local group of independent CA researchers for critical inspection. In order to further enhance the transparency of the analytic process, and in line with CA good practice, this study presents findings along with detailed transcribed extracts. This allows the reader to re-do the observations made by the analyst, thereby providing a form of credibility checking (Pomerantz and Fehr, 2011).

### **Outcomes and results**

In total, the participants collected around 635 minutes (10 and a half hours) of video data. Twenty-nine multiple repair sequences were identified. Eighteen of these were found in Harry's data. Harry's conversation partner Joan has a degree of hearing impairment; therefore, disentangling the role of hearing from that of dysarthria in causing the frequent repair is problematic. One thing we have to go on is Joan's own observation that she can 'hear other people fine in conversation but struggles to hear Harry' (see Table 2), suggesting that her hearing loss exacerbates the difficulties caused by his reduced speech intelligibility. As varying degrees of hearing loss are common in older people, this combined effect on interaction will not be unusual

amongst those presenting with dysarthria. Of Harry's 18 multiple repair sequences, 15 included two RIs and three included three RIs. Most other multiple repair sequences identified contained two or three RIs.

**Table 3: Number of multiple repair sequences**

Participant	Minutes of data collected	Number of multiple repair sequences	Number of RIs in each multiple repair sequence
David	28.40	No multiple repair sequences	
Peter	81.53	1	2
Sally	31.93	1	13
Harry	51.00	18	Of these 18 sequences, 15 include 2 RIs and 3 include 3 RIs
Arnie	103.43	1	2
Will	8.13	No multiple repair sequences	
Tom	31.95	1	2
Doug	51.30	No multiple repair sequences	
Greg	40.17	2	One of these 2 sequences includes 5 RIs and the other includes 10
Graham	81.55	1	2
Jack	33.05	1	2
Clive	51.72	1	2
Lily	40.43	2	3 3
<b>Total</b>	<b>635</b>	<b>29</b>	

There were no multiple repair sequences identified in conversations involving three of the participants. David and Will both collected fewer minutes of data than other participants, which might contribute to this finding. This does not apply to Doug, who collected 51.30 minutes of data. However, he was rated as showing 'no abnormality'

of speech intelligibility in conversation (see Table 1) and although complains of difficulties ‘formulating language’ (see Table 2) this is not apparent in his conversation data. He possibly encounters more difficulty in conversations with less familiar others.

There were three notably longer sequences: two in Greg’s data and one in Sally’s, consisting of 5, 10 and 13 RIs. Of the 29 multiple repair sequences identified, 23 (including two of the longer sequences) started with the initial use of an OCRI. This would be expected because the problem is frequently due to reduced intelligibility. Quite often the listener has little to go on in order to base a more specific RI. Interestingly, of the entire set of multiple repair sequences only one was abandoned without resolution, in favour of progressivity. This is presented later as extract 6. The shorter sequences involving two and three RIs will be examined first to look for patterns. Consideration will then be given to one of three extended multiple repair sequences with analysis of the features that contribute to its increased length.

### ***Sequences involving two or three RIs***

Table 4 shows how the 26 multiple repair sequences involving two or three RIs were structured.

**Table 4: Structure of the multiple repair sequences involving two or three repair initiators (RIs)**

<b>Number of RIs used</b>	<b>Structure</b>	<b>Number of sequences With each structure</b>
<b>Two RIs</b>	OCRI → Repeat + 'wh'- word	9
	OCRI → OCRI	6
	OCRI → Direct prompt to modify speech	2
	OCRI → Understanding check	1
	Closed class → Understanding check	1
	Repeat + 'wh'-word → Closed class ( <b>DEVIANT CASE</b> )	1
	Repeat + 'wh" word → Repeat	1
<b>Three RIs</b>	Understanding check → Understanding check→ Understanding check	1
	OCRI → Repeat + 'wh'-word → Repeat + 'wh'- word	1
	OCRI → Repeat + 'wh-word' → Repeat	1
	OCRI → Understanding check → Understanding check	1
	Repeat → Understanding check → Understanding check	1

Overall, where multiple repair occurred, CPs used RIs in order of increasing specificity and strength, from left to right, as set out in the model proposed by Schegloff et al (1977). In one deviant case, which will be examined shortly, specificity was decreased rather than increased. It was also observed that once CPs have enough information to attempt an understanding check, this form may be repeated until repair is resolved.

The most common type of multiple-stage repair initiation in the data is open class moving to a repetition of part of the repairable with a question word, as shown in

Extract 1. A glossary of CA transcription conventions (based on Jefferson, 2004) is provided in Appendix A, Table 5, and the RI turns in each extract will be highlighted. For ease of reading, the PD speaker's name will be marked with an asterisk in each extract introduction.

**Extract 1**

**Harry: Christmas cake**

**01:16 – 01:36**



Figure 2: Harry\* is on the left

- |    |        |  |
|----|--------|--|
| 1  | Joan:  | I hope ↑it be alright in that o↓ven, becos I've not- I've done not                 |
| 2  |        | done christmas cakes in that o <u>ven</u> . before,                                |
| 3  |        | (0.7)  |
| 4  | Harry: | (usually        )  |
| 5  | Joan:  | mm,  |
| 6  | Harry: | (>usually you don't burn ↑any↓thing<)  |
| 7  |        | (0.6)  |
| 8  | Joan:  | I what,  |
| 9  | Harry: | us↓ually you don't burn em,  |
| 10 | Joan:  | ↑well. yes, f- for o <u>r</u> inary. coo↑king ↓stuff, but I du↑nno ↓about er (0.6) |

Joan has been telling Harry\* about her plans to make a Christmas cake. In lines 1-2 she expresses concern that she hasn't made one before using their current oven. At line 4 Harry's utterance is unclear which leads to Joan using an OCRI 'mm', at line 5. Harry's utterance at line 6 is delivered at a fast rate but Joan now has enough information to increase the strength of her repair initiation. Her 'I what' (line 8) displays to Harry that she understands he is commenting on something to do with her. The 'I' is a repeat of Harry's 'you' and her 'what' requests a repeat of the verb phrase. Harry then produces a phonetically modified repeat (marked pitch change on 'usually') with shortened linguistic structure ('anything' becomes 'em') and the sequence progresses with no further repair initiation.

Results of this study show that sometimes, following open class repair initiation, a self-repair attempt by the PD speaker does not provide the CP with enough information to increase the strength of RI, and further, non-specific repair initiation ensues. In all cases, the second OCRI takes a different form from the first. This may constitute a lexical difference ('mm?' then 'pardon?' for example) or the use of a non-verbal RI the second time. It might also take the form of repeating the lexical item but upgrading its delivery, either by increasing gaze or intensifying intonation. An example encompassing both these types of upgrade is illustrated in Extract 2.

**Extract 2**  
**Tom: Golf**  
**04:16 – 04:2**

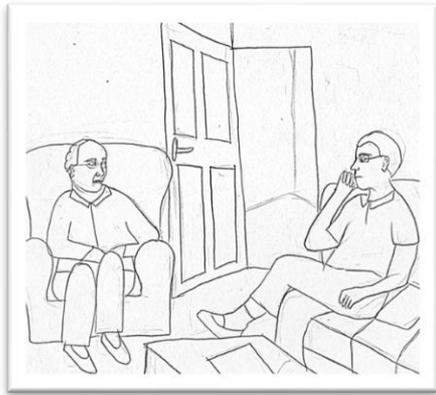


Figure 3: Lines 1-4, Tom\* is on the left



Figure 4: Line 5

- 1 James: watch the golf to↑night
- 2 Tom: (1.3) (I don't know if I shall)
- 3 James: =mm, ((sound of engine starts up))
- 4 Tom: ( watched it last night)
- 5 James: mm? ((juts head forward and raises eyebrows))
- 6 Tom: watched it la:st ↓night,
- 7 James: ((releases gesture)) yeah

James is having trouble hearing/understanding Tom's\* response to his question at line 1. Just after he initiates repair at line 3, some background noise starts up which appears to affect his understanding of Tom's self-repair turn (line 4). It is unusual for repair to involve more than one attempt for this participant pair. When James initiates repair for the second time at line 5, he accompanies this with a gesture, jutting his head forward and raising his eyebrows as well as increasing the pitch rise on this utterance. He maintains this gesture until the end of Tom's successful self-repair turn at line 6. Intensifying gaze may both enable James to pick up nonverbal clues that

may help him to better understand Tom and also contribute to mobilising a response from Tom.

In two multiple repair sequences, CP appear to increase the specificity from OCRIs 'prompts to modify speech'. In the following example, Harry\* is telling Joan about the route he was asked to take in his recent driving test.

**Extract 3**  
**Harry: Driving Test**  
**00:58-01:26**



Figure 5: Harry\* is on the left

- 1 Joan: Did you ↓do anything in the (.) car ↓park out there?
- 2 Harry: ↓No (1.1) >(when we were ↑in the car park 'e said ↑back)
- 3 Joan: you what,
- 4 Harry: >(when we were ↑in the ↓car park 'e said,)<
- 5 Joan: will you talk a bit ↑louder please.
- 6 Harry: went ↑out (in) the ↓car park, (1.3) ↓went down ('e said) ↑turn left. (1.0)
- 7 Keep goin ↑straight as I ↓tell yer, (0.9) (when I got to) ↑top (0.8) ↓there
- 8 (was) ↑two (roundabouts) to go rou:nd (0.8) take ye ↑take ye ↑take ye
- 9 (third exit)
- 10 Joan: now ↑where's all this taking you

Harry's response, at line 2 is unclear and delivered at a fast rate. Elsewhere in the data, as at line 3, Joan often uses 'you what,' as an OCRI, as opposed to a repeat + 'wh' word form. In this case, however, its use does not yield a successful self-repair attempt by Harry. At line 5, Joan issues a request for Harry to modify his speech by raising the volume. This kind of request also acts as a RI and, in SLT terms, might be described as a 'prompt'. At lines 6-9, Harry does not necessarily increase his volume, but he does slow his rate of speech. Both instances of multiple repair involving such prompts came from Harry and Joan's data. In a further use of a prompt by Joan that did not lead to a multiple repair sequence, she orients to the video camera, demonstrating her sensitivity to the issues of implied incompetence wound up in using this type of RI. She whispers her prompt and can only just be heard to say 'speak up will you?'. It is known that Harry has attended a SLT group where increased vocal loudness was a therapeutic target, requests to modify speech production forming part of that intervention, yet Joan's whisper suggests that prompting, being outside the rules of normal conversation, should be avoided.

Despite this, prompting in the context of everyday conversation can be an effective strategy. As part of the larger study (see Griffiths, 2013) these kinds of self-repair turns were examined informally, using Praat software (Boersma and Weenink, 2014) to look at their phonetic properties. It was observed that when asked to speak up or slow down, PD speakers could modify their speech in some way to result in a successful self-repair, although not always in the exact manner suggested by the CP. It might just be the prompting action itself that cues the PD speaker to draw on whatever residual phonetic resources are available to him/her as an individual.

In some cases, prompts to modify speech seem to have an element of 'complaint' about them or be used as a strategy to prevent trouble rather than acting as RIs. In the case of Extract 3, however, Joan's prompt does appear to do the work of a RI, providing the speaker with both a request for re-doing the trouble source turn and a suggestion of what type of modification would be helpful to the recipient. Prompts seems to represent an adaptation to the available resources used for dealing with repair in ordinary conversation. They constitute a form of RI that differs from those on the Schegloff et al (1977) continuum, which all offer to the speaker more information about what *content* the recipient has understood of the speaker's trouble source turn. Prompts highlight to the speaker the *manner* in which the next repair attempt should be done. This difference in function makes it difficult to claim that a prompt is a stronger form of RI than an OCRI as it is not a simple case of comparing like with like. However, in this example, Joan does appear to 'step up' from an OCRI to the use of a prompt. The message is upgraded from 'say it again' to 'say it again and say it differently'.

### ***Repair on separate elements of the repairable turn in stages***

As well as offering RIs in order of increasing specificity CPs are seen on occasion to initiate repair on first one element of the repairable turn then another, partitioning it out for attention. In Extract 3, Peter\* raises the possibility of Karen renting out her house. At line 3, Peter's 'reng' seems to be an approximation of 'reckons' (meaning 'is of the opinion that'). Here he makes a first attempt to convey that Steven believes Karen could make one thousand two hundred pounds a month by renting her property.

**Extract 4**  
**Peter: a one point two**  
**53:15 – 53:38**



Figure 6: Peter\* is on the left

- 1 Peter: .hh >whad about< renting ↑you:r ↑house, >for a period.  
2 Karen: (2.4) u:m (1.1) I think in a house that si:ze =I ↑don't know. (1.4) ptk u:m  
3 Peter: Steven. reng you may get- (1.0) a one point ↑two.  
4 (2.1)  
5 Karen: a wha:t  
6 Peter: one point thousand two hundred. a month.  
7 Karen: Steven.  
8 Peter: yeah  
9 (0.8)  
10 Karen: mmm.

Karen's first repair initiation, a 'repeat + 'wh-word' form (line 5), aims to elicit a repeat of the noun phrase, establishing what it was Steven said she could get. This achieved, at line 7, she then concentrates on repairing the person referent, the 'who' element of the repairable turn using a repeat in order to check her hearing of 'Steven'.

This illustrates how repair initiation can progress in stages, with the CP first initiating repair on one element of the repairable turn then another, in a 'I've got that bit, now I want to understand that bit' fashion.

**Deviant case**

There is one sequence for which this hierarchy of ordering RIs according to increasing strength does not fit. In Extract 5, a later segment of the 'driving test' sequence introduced earlier, Harry\* has just described and had recognised, a road he drove along during his driving test. Now at line 1 he conveys more information to Joan about the road in question: the Griffins live there.

**Extract 5**  
**Harry: Griffins**  
**02:27 – 02:39**



Figure 7: Harry\* is on the on the left

- 1 Harry: that's where the: er- >Gri↑ffins< ↓live up there,
- 2 Joan: where the ↑what
- 3 Harry: >↑Griffins< ↓live up there, >↑Gri↓ffins<
- 4 (0.9)
- 5 Joan: who?
- 6 Harry: Griffins.

7 (1.0)  
8 Joan: the Griffins. o:h the Griffins. ye:s. the Gri↓ffins live up there, yeah.

At line 2 Joan it appears that Joan initiates repair using a 'repeat + wh-word' form, however, the structure does not fit the repairable turn. She has only understood 'that's where the' and, assuming that the missing noun phrase identifies an object, tries to locate the 'what' when the appropriate form in this case would be to locate the 'who'. Harry, responding to Joan's cue that it is not the start of his turn that was problematic, repeats the troublesome part, and as if anticipating further repair initiation, repeats again the collective person referent 'Griffins'. Perhaps this second repeat of the name is also done to emphasise to Joan that it is a name that is in question, not a thing. She still has trouble understanding but her closed class RI at line 5 shows that she is likely to have heard at least the word 'live' as she now knows a person referent needs clarifying. In response to this, Harry delivers the only element of his repairable turn that still needs clarifying and the repair sequence is complete.

Instead of increasing the specificity of repair initiation, in this sequence, Joan does the opposite, progressing from using a 'repeat + wh-word' form to a 'closed class' form. It is suggested that the reason for this deviance from the general pattern is that her first RI did not fit the repairable. Unknown to her, she did not yet have enough information to enable her to use a 'repeat + wh-word' form. If she had tried an OCRI or a partial repeat ('where the..') it's possible that only one RI would have been needed.

### ***Where increasing the specificity goes wrong***

A phenomenon was observed, in the current study, whereby the specificity of the repair initiator is increased too soon, before there is enough understanding of the repairable turn on which to base that increase. Bloch and Wilkinson (2009) described a similar pattern. Although multiple repair is not the focus of their paper, they present a sequence whereby a CP uses the 'wrong kind' of RI. Mary, who has severe dysarthria as a result of MND, is asked by her CP (Stan) what kind of cancer their acquaintance has. Stan suggests different candidate types: 'cancer of the spine was it, no cancer of the hip was it?' Mary's response lacks intelligibility and sounds like 'mine mm'. After a 2 second pause, Stan then initiates repair, using a 'repeat + wh question' form; 'mind the what?' based on his not yet confirmed candidate understanding of Mary's turn. He has misinterpreted both the word (spine) and the action Mary is carrying out (correcting). He uses a more specific RI than an open class one, at a point where he does not yet have the right syntactic knowledge to warrant this. Mary then repeats 'spine' and further repair initiation is needed, in the form of a repeat ('spine?') before Mary confirms this candidate understanding with a head nod and the conversation moves on.

There are 2 multiple repair sequences in the current study, that fit the overall pattern of RIs increasing in specificity and yet this in itself causes a problem. The following extract is presented as an example. Joan asks Harry\* to help her complete her shopping list (Extract 6, lines 1-2). He begins to read aloud from the list (line 3), then after a pause, offers up as a new item, 'fairy liquid, yes'. This is delivered at a fast speech rate and Joan has trouble understanding, as reflected by her open class repair initiation at line 4.

**Extract 6**  
**Harry: Fairy liquid**  
**14.8 – 44.2**



Figure 8: Harry\* is on the on the right

- 1 Joan: now um. I'm doing a list here for.(2.0) ((picks up pen and list)) hh Morrison's.  
2 is there anything else we want, d'you think? ((passes list to Harry))  
3 Harry: (I dunno,) (crunchy oats) flour eggs bread milk ( ) (2.2) >fairy liquid< yes.  
4 Joan: mm,  
5 Harry: >fairy< liquid.  
6 (1.1)  
7 Joan: it's what?  
8 Harry: ↑>fairy< liquid.  
9 (0.5)  
10 Joan: we don't need a lot  
11 Harry: ↓no  
12 (1.9)  
13 Joan: we need fish

Harry repeats the new item at line 5 but with a lack of phonetic upgrading seen elsewhere in his data. In fact if anything his pitch and volume are both reduced and his rate of speech does not change. He does however 're-do' the linguistic structure, deleting the 'yes'. This does not lead to repair resolution and Joan tries a second RI at line 7. This time she increases the specificity. It is hypothesised that she has heard 'fairy' and believes that Harry is making a comment on the list being 'fairly' something. 'It's what?' could be described as a 'repeat + wh-word form', although the repeat element of the turn is an inferred repeat; Joan is possibly repeating what she thinks Harry has said, not what he actually said. Of course this is an interpretation, as we do not have access to Joan's motivations for using this form of RI (Drew, 1997). At line 8, Harry provides a second repeat, upgraded this time with increased pitch.

Joan still has trouble understanding. If she is expecting his next self-repair turn (line 8), to be in the category of adjectives, this is not surprising. She appears to gloss over the trouble at line 10, producing a turn that moves the conversation on and Harry abandons his attempts to get fairy liquid on the list. In this sequence, rather like the deviant case, Joan upgrades the strength of the repair initiation at a point where she does not yet have enough knowledge of the syntactic category the repairable item falls into. This hampers her processing of Harry's subsequent self-repair attempt. Context is important when interpreting disordered speech and if listeners are primed to expect to hear an adjective when in fact the utterance is a noun, this is likely to impact on intelligibility.

In a move designed to restore intersubjectivity and get the conversation 'back on track' as quickly as possible, Joan increases the strength of her repair initiation in this example. Unfortunately she ends up using the wrong type of RI at the wrong

time. She could have done more groundwork by using less specific RIs until repair was achieved or until she was at least sure of the elements the repairable turn contained. Without this groundwork there is a danger that repair will get abandoned and the PD speaker's contribution left unacknowledged, which could be argued to present more of a risk to social solidarity than continuing to resolve the trouble.

### ***An extended Multiple Repair Sequence***

An extended multiple repair sequence is now examined in order to highlight an interesting phenomenon, specific to conversations between Greg and his CP Rosie; that of 'Repeating/rephrasing the first pair part (FPP)'. In Extract 7, Rosie tries to discover what Greg\* would like to drink.

#### ***Extract 7***

#### ***Greg: A whole pint of something***

***03:20 – 04:14***



Figure 9: Greg\* is on the left  
Line 6: Rosie leans in

- 1 Rosie: ((wiping his mouth then putting tissue on table)) would you like a ↓drink
- 2 Greg: °yes°
- 3 (1.3)
- 4 Rosie: what ↓drink would y'like
- 5 Greg: (1.9) (pint )

6 Rosie: pardon? ((*leans in close and puts her ear near his mouth*))

7 Greg: (1.2) (pint)

8 (1.1) ((*Rosie reaches for tissue and wipes his mouth*))

9 Rosie: what would you ↑like to drink?

10 Greg: whole pint of (lemon ade)

11 Rosie: a whole p̄int of something,

12 Greg: ye:s.

13 Rosie: a whole pint ov: >lemon< ↑squash

14 Greg: no um (3.6) ((*wipes his mouth*))

15 Rosie: o↑range

16 Greg: no

17 Rosie: ↓no, wa↑ter

18 Greg: °water, ↓no°

19 Rosie: beer,

20 (1.7)

21 → d'you want a beer?

22 Greg: no

23 Rosie: ↓no coke

24 (4.9) ((*Greg moves his mouth minimally but no voicing occurs*))

25 Rosie: you'd l̄ike a dr̄ink of ↓what

26 Greg: ( ) water

27 Rosie: water. water. o↑kay ↓I cn do ↑that ↓with some ice in, ((*Rosie moves*

28 *away from table*))

This extract identifies 10 RIs overall and the sequence fits the pattern of RIs increasing in specificity. Rosie moves from an OCRI (line 6) to a repeat form (line 11) to a number of understanding checks in the form of candidate solutions (lines 13, 15, 17, 19, 21 and 23). However, amongst this overall sequence, at lines 9 and 25,

Rosie uses a different form of RI, not described in the Schegloff et al (1977) hierarchy, that we have labelled 'Repeating/rephrasing the first pair part (FPP)'. This will be explained in the following analysis.

When Rosie's OCRI (line 6) fails, she issues a rephrasing of the original question (line 9). An important feature of the turn-taking system in ordinary conversation is 'adjacency', whereby 'first pair parts (FPPs)' such as questions or invitations are routinely followed by 'second pair parts (SPPs)' such as answers, acceptances and so on, with nothing intervening (Schegloff, 2007). At line 9, Rosie is rephrasing the original FPP. This action could be said to double up as a RI as well as a question, as it is being used to resolve rather than gloss over the original trouble source. It appears to work, as at line 10 Greg replies that he'd like a whole pint of lemonade. However it is only with the benefit of repeated listening when transcribing, that his response becomes clear. In real time, Rosie's RI did not work for her as she still cannot understand his response. She follows up with what looks like a partial 'repeat + wh word' at line 11, with 'something' taking the place of a 'wh' word and displaying that it is the drink name Greg needs to focus on repairing. Instead of repeating the drink name he simply confirms with an elongated 'ye:s' at line 12 suggesting that this is not a straightforward agreement but that maybe he is still trying to process his next response.

There then follows a series of understanding checks of the 'offering candidates' type, each rejected apart from 'beer' at line 19 which gets no response. Rosie re-offers up this choice for confirmation at line 21 but this time constructs it as if it is being presented for the first time: 'd'you want a beer?' (line 21). This strategy may be used to provide cognitive facilitation, supporting Greg by reminding him of the ongoing

topic. It also has the feel of going back to the beginning and making the conversation sound fresh again.

When a further candidate solution fails (line 23), Rosie tries the strategy of deleting the entire preceding repair sequence by rephrasing the original FPP again at line 25. 'What drink would y'like' (line 4) has become 'you'd like a drink of what' (line 25). This restructuring has made the request for the drink name ('what') more recent and is likely to help with Greg's cognitive difficulties. He now indicates that he would like water (line 26) and Rosie understands and accepts this. The repair sequence is resolved. Greg, however, has moved from a position of requesting lemonade to now requesting water. Antaki et al (2008) offer some insights that might help to explain this in their study on how choices around meals, holiday and leisure planning are presented to adults with intellectual disabilities. Offering a series of choices (in this case candidate repair solutions), each to be accepted or rejected, can be effective in some cases. A danger arises however when one of the choices is accepted, and yet the series of choices continues in an effort to make sure that the 'chooser' has been completely understood. These checks may induce the chooser to switch decision. This may be the result of confusion due to cognitive overload, or may be a result of the chooser reacting to a sense that their first choice was somehow wrong: 'After all, what seems to be the re-issue of a question may indicate that there was something wrong with the answer' (Antaki et al., 2008:1171). By the end of Extract 7 Greg seems to switch decision, although Rosie has made it clear at line 11 that she didn't actually hear 'lemonade', so the switch is less likely to be due to him taking the hint that his answer was somehow inappropriate. Somewhere during the long sequence of questioning, he may well have forgotten what he actually wanted or

become unable to retrieve the lexical item. He also may simply be going along with the easiest option in order to end the sequence and restore normality.

Either way, offering a series of candidates in this example was not effective. What was effective in bringing the sequence to a close was repeating/rephrasing the original question (FPP), which allowed the conversation to progress but at the cost of Greg getting what he really wanted and sequentially deleting what has gone before. However, elsewhere in Greg's data, Rosie uses this strategy with more positive benefits for securing Greg's participation.

Repeating/rephrasing the FPP was not seen in the extended repair sequences involving Sally, who exhibited less cognitive decline than Greg. Perhaps the strategy is best suited to facilitating conversation where there is a greater degree of cognitive impairment. An interesting area for future research could be a comparison of the use of this repair strategy in people with varying cognitive difficulties.

## **Conclusions and implications**

When multiple repair initiation takes place, this study has demonstrated a general tendency for CPs to use RIs of increasing specificity in the order outlined by Schegloff et al (1977). Sometimes, PD speakers' self-repair attempts do not provide enough information to enable CPs to increase the specificity of their RIs and in these cases, repeated non-specific RIs are used (e.g. Extract 1, lines 3 and 5). In all instances where one OCRI follows another, the second takes a different form to the first, either lexically, becoming non-verbal or by upgrading the delivery by increasing gaze or intensifying prosody. Prompts to modify speech can also follow OCRIs.

Although the evidence is restricted to one participant pair in this study, it may be that a series of understanding checks in the form of candidate solutions is not a very effective method of resolving extended repair sequences, especially where the PD

speaker has cognitive difficulties. Extract 7 showed how using serial understanding checks, in the form of candidate solutions (e.g. Beer?...Coke?...Water?) risks PD speakers becoming cognitively overloaded and abandoning what they originally intended to communicate. In order to lessen this risk, when 'offering candidates' as part of the repair sequence, CPs could be advised to add to their armoury of resources, an effective strategy described by Antaki et al (2008). In their study it was noted that one of the 'carers', when offering a choice of 2 items, first asked the question e.g. 'what would you like for lunch?' then held up his fists one after the other in synchrony with the presented choices, as a visual cue/reminder. Variations on this strategy are described in the aphasia literature (Lasker et al., 1997). Choices can be provided in written form to supplement verbal presentation. Alternatively, choices can be presented one at a time, each choice coinciding with the speaker pointing to a place on a page (marked with 1- 2- 3- etc) visually representing that choice. These strategies can enable people with severe aphasia, with varying levels of comprehension deficit, to make choices through pointing. However, despite the known cognitive and language processing deficits associated with PD (Marinus et al., 2003, Grossman et al., 2002, Strauss Hough, 2004), these kinds of adaptations do not feature in the standard advice for communicating with people with PD and there is little guidance for SLTs in managing the cognitive/linguistic aspects. Looking to the literature on other communication disorders, such as aphasia, could inform intervention planning.

Repeating or rephrasing the original FPP is a strategy that has been seen to be effective in moving out of multiple repair or at least splitting up an extended repair sequence into shorter units. This may act to provide cognitive support to the person

who is attempting the repair, in the form of a topic reminder as well as making the conversation feel less of a prolonged struggle to resolve one trouble source.

CPs may successfully initiate repair on separate syntactic elements of a repairable utterance in stages. They may also, in their efforts to promote progressivity, increase the specificity of their repair initiation before they have adequate knowledge regarding the syntactic elements of the repairable turn to inform this.

The instances of multiple repair identified in this study are examples of how these particular CPs 'stuck with it', to pursue repair, despite the negative social implications associated with repair initiation and prolonged repair sequences. Perhaps in these types of conversations, joint intersubjectivity in interaction (and therefore full and meaningful participation) is a 'prized outcome' (Heritage, 2007) that can over-ride concerns over the need for progressivity. However, as the majority of cases came from Harry's data, it could also be argued that Joan's tendency to pursue repair was influenced by her taking on some of the responsibility for the trouble due to her hearing impairment.

There is a need to develop new communication assessments that can reveal the complexity of experience for people with PD outside the clinic and interventions targeting improved participation in talk. An adapted menu and hierarchy of repair initiation based on the original Schegloff et al (1977) model could be developed specifically for use by clinicians working with those who have dysarthria. An option for resolving multiple repair, such as prompting to modify speech, could be incorporated into such a model. The strategy of repeating the FFP might prove helpful in some cases, i.e. 'if all else fails go back to the beginning' and therefore could also appear on an adapted hierarchy.

This kind of resource could be used as a tool by SLTs to inform individualised therapy. It could aid SLTs when examining video recorded episodes of informal conversations showing repair in action and form the basis of discussions with PD clients and their CPs. Various options could be explained, along with their relative benefits to progressivity against risks in terms of the social implications.

This study has contributed to a growing understanding of how delays in progression and repair are managed in communication disability and the implications of these for participation. Findings such as those reported here can allow SLTs work with PwPD at the level of participation, raising awareness of current strategies-in-use and strategies with potential to be trialled. For instance, if PD speakers would prefer more prompts, CPs could be supported in trying them out. They could experiment with wording that is most acceptable to all. 'Speak up please' might not feel acceptable whereas 'sorry - your volume's gone a bit.' might feel better for example. Previous CA and dysarthria studies have tended to recruit participants with measurably moderate to severe intelligibility impairments (e.g. Bloch and Wilkinson, 2004; Bloch and Beeke, 2008; Rutter, 2009; Bloch, 2011). Including a range of participants, some of whom might be described as 'high functioning' in terms of the measurable aspects of speech, this study has allowed an exploration of the impact on communication of these 'milder' difficulties.

For the participants in this study, communication assessment scores do not necessarily allow insights into the person's day-to-day experiences of communication. For instance, Lily and Harry scored equally on the FDA-2 rating of intelligibility in conversation: 'b-c'. Looking at patterns of interaction indicates that they have a very different experience of everyday communication despite this similar rating. Harry encounters a great deal more multiple repair than Lily, with his CP

Joan's hearing loss a likely factor in this. Lily's speech initiation difficulties cause significant pausing, a feature not characteristic of Harry's speech, and consequently she faces more difficulty than him holding the floor in conversation. This study has informally looked for signs that intelligibility measures might predict patterns in interaction and has detected no obvious links. Features specific to hypokinetic dysarthria such as speech initiation difficulties and increased pauses can cause significant interactional difficulties despite only mild to moderate measurable effects on intelligibility and the psychosocial impact of these difficulties are likely to be highly individualised.

The number of participants was modest, and there was no attempt to investigate interaction outside the home setting, with unfamiliar people, therefore the study does not allow for wide ranging generalisation. Stronger claims of generalisation could accumulate over time through a process of aggregation, as further studies reveal similar patterns (Svennevig and Skovholt, 2005).

In terms of the future research agenda, this study forms part of an essential development phase of developing and evaluating complex interventions (Craig et al., 2008), providing the initial groundwork before 'feasibility and piloting' 'evaluation' and 'implementation' can be addressed. There is still a great deal of work to be done if the ideas for intervention are to be further developed and eventually embedded in clinical practice.

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