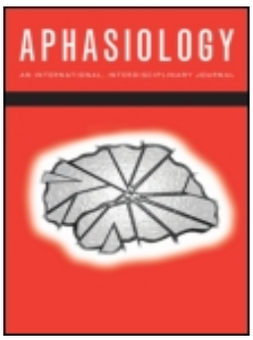

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Functionally relevant items in the treatment of aphasia (part II): Further perspectives and specific tools

Kati Renvall[1,2], Lyndsey Nickels[1,2], and Bronwyn Davidson[1,3]

[1]NHMRC Centre for Clinical Research Excellence (CCRE) in Aphasia Rehabilitation
[2]ARC Centre of Excellence in Cognition and Its Disorders, Department of Cognitive Science, Macquarie University, Sydney, Australia
[3]Department of Audiology and Speech Pathology, The University of Melbourne, Parkville, Australia

Background: This paper is the second in a two part series. In part I, we reviewed the concept of "functionally relevant" and the strategies underlying identification of such vocabulary items for aphasia treatment. Based on the review, we concluded that there is a lack of definitions, strategies and specific tools to assist with identification of functionally relevant items for aphasia therapy. We suggested that frequency-based vocabulary lists could and should be used to increase the number of potentially relevant items in aphasia therapy and that therapy should be directed to words other than the most concrete nouns and verbs.
Aims: This article reviews the existing strategies and materials from adjacent fields relating to functionally relevant stimuli with the aim of establishing resources for identifying potentially relevant therapy items at the level of both vocabulary items and topics of conversation.
Main contribution: By reviewing the core concepts and research from other fields, this article brings together knowledge and materials that can improve current practice regarding identification of functionally relevant items in aphasia therapy. The focus of the review is on studies that have been published in the field of augmentative and alternative communication (AAC) and research that has provided information on unimpaired and impaired adult speakers' everyday conversations. By reanalysing data sets from these studies and using a large psycholinguistic database, we present four resources. Two of the data sets provide evidence regarding the most frequent topics of conversation; one is based on unimpaired speakers conversations and the other extends this by including information from both unimpaired and aphasic speakers' topics of conversation. In addition, to provide evidence of the most frequent vocabulary in adult conversations, we present a list of words compiled from three separate data sets. Finally, a vocabulary list of the 1000 most frequent words retrieved from an objective frequency count (SUBTLEX-US) is presented. Together these resources provide a means for clinicians to select objectively frequent topics and vocabulary as stimuli for functionally relevant therapy.

Address correspondence to: Kati Renvall, NHMRC Centre for Clinical Research Excellence (CCRE) in Aphasia Rehabilitation, ARC Centre of Excellence in Cognition and its Disorders, and Department of Cognitive Science, Macquarie University, NSW 2109, AUSTRALIA. E-mail: kati.renvall@mq.edu.au

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Conclusions: The agenda for future research is to identify specific vocabulary within the most common topics of conversation. The resources provided as part of this article serve as a first step towards the ultimate goal of enabling clinicians to select stimuli for therapy in a more systematic, transparent and objective way.

Keywords: Anomia; Aphasia therapy; Functional vocabulary; Functionally relevant items; Personally chosen items.

The aim of this article is to address the identification of relevant items for use in aphasia therapy. This article continues the discussion commenced in our closely linked paper: Renvall, Nickels, and Davidson, part I (2013). The previous paper (Renvall et al., part I, 2013) focused on describing current practices for identifying and selecting functionally relevant vocabulary items for aphasia therapy. The current article (part II) addresses the creation of specific resources for aphasia therapy by focusing on studies that have been published in adjacent clinical and research fields. The aim is to develop what we hope will be potentially useful resources. In contrast to Renvall et al., part I (2013), which focused on single vocabulary items, this article discusses two levels of functionally relevant resources: single vocabulary items and topics of conversations. The outcome is the compilation of four resources: two lists of frequent topics of conversations and two vocabulary lists.

In Renvall et al., part I (2013), we first defined two main categories of functional vocabulary, namely, personally chosen and generally frequent items. These two categories can also be considered different strategies or approaches to the selection of functionally relevant stimuli: the methods used to identify the items, and the emphasis given to each person as an individual, differ between the categories. When aiming to select personally relevant items, the emphasis is on the identification of individualised vocabularies by obtaining as much personal information as possible about the person with aphasia and his/her communication needs. When selecting generally frequent items, the emphasis is on items that are most frequent across the population, making them potentially relevant for all speakers. Although both of these approaches are useful and widely used in clinical practice, there are several challenges related to them, as discussed in Renvall et al., part I (2013), and briefly summarised next.

As discussed in Renvall et al., part I (2013), personally chosen words can be hard and time-consuming to elicit especially in cases of severe aphasia and/or if there are no relatives or close friends to act as informants regarding the person's daily communication needs. In addition, the current literature does not provide detailed instruction on how to make decisions based on the personal information gathered via different means (e.g., observation, speech samples, interviews, communication diaries and note taking). On the other hand, objective frequency counts have not been used to create tools that would assist clinicians in identifying generally frequent vocabularies. This may be related to several weaknesses of the current language databases, as we described in Renvall et al., part I (2013). However, language corpora have the potential to make the selection of therapy items easier and also more systematic and transparent. Lists extracted by using objective frequency counts could also serve as a starting point when aiming to build more individualised vocabularies: People with aphasia, their communicative partners and clinicians can select those items that are relevant to their communicative needs from the larger list. In addition, we demonstrated in

Renvall et al., part I (2013) that the most frequent items represent many word classes—not just nouns and verbs. It is of note that the current aphasia treatment literature and typical clinical practice have a focus on items from these two classes (nouns and verbs). We concluded the previous paper by recommending that researchers provide tools for the identification of frequent items and also more guidance on what stimuli might be appropriate as personally chosen.

The challenge of finding evidence for functional stimuli for aphasia therapy is similar to the challenge of choosing vocabularies for users of augmentative and alternative communication (AAC). However, it seems that there has been a lack of dialogue between the AAC and aphasia fields with regards to this topic. This is surprising given that clinicians work in both areas and make clinical choices between AAC and more direct language therapy for some people with aphasia. In an attempt to narrow the gap, we next review the literature concerning the basic concepts in the AAC field with regard to vocabulary selection. Following this, we review specific studies that have investigated the topics and vocabularies of unimpaired speakers through analyses of spontaneous conversations and present data that are available to make comparisons between unimpaired and aphasic speakers' topics of conversations. In the final part of the article, we present vocabulary lists in order to provide resources that can be used for both clinical and research purposes.

INSIGHTS ON VOCABULARY SELECTION FROM THE AAC LITERATURE

Yorkston, Dowden, Honsinger, Marriner, and Smith (1988, p. 189) stated that "The selection of appropriate vocabulary items is a critical but poorly investigated aspect of the development of augmentative and alternative communication (AAC) approaches for nonspeaking adolescents and adults".This statement remains true more than two decades later, with studies addressing this issue dating back to the 1990s (e.g., Balandin & Iacono, 1998; Beukelman, McGinnis, & Morrow, 1991; Dark & Balandin, 2007; Stuart, Beukelman, King, 1997; Yorkston, Honsinger, Dowden, & Marriner, 1989). Moreover, these studies take up issues identified much earlier (e.g., Burroughs, 1957; Mein & O'Connor, 1960). Based on these earlier studies, two different types of vocabulary have been distinguished in the AAC literature. First, the "core" vocabulary, which is considered small (approximately 200–250 words), consists of high-frequency words and represents various parts of speech (i.e., pronouns, conjunctions, prepositions, auxiliary verbs, modals and adverbs). The second, so-called "fringe", vocabulary is considered large and highly individual, consisting almost exclusively of content words, including nouns, verbs and adjectives. These content words are taken to reflect individuals' activities, interests, environment and personal style (Stuart et al., 1997). The distinction between core and fringe vocabularies seems to mirror the distinction we used in Renvall et al., part I (2013), namely, "generally frequent items"equate to "core" vocabulary and "personally chosen items" equate to "fringe" vocabulary.

It is also noteworthy that while the distinction between "core" and "fringe" vocabularies has been widely accepted within the AAC literature, it is not totally clear what the "coreness" of the vocabulary relates to. As stated by Balandin and Iacono (1999), the definition of core vocabulary varies between authors: It can refer to the number

of words used by 50% or more of the subjects in a sample or, alternatively, it can refer to the most frequently occurring words in a sample.[1] It seems that much of the AAC literature has concentrated on the issue of frequency, while other possible dimensions of coreness have remained less studied. However, as pointed out by Carter (1987), linguistic tests could be used to study the syntactic, phonological, graphological and morphological characteristics of core vocabulary. Carter suggests, for example, that core words can substitute for other, less core, words, like "eat" for "dine" or "go" for "walk", "drive" or "fly". In addition, it may be easier to find antonyms for core words (e.g., "fat"–"thin", and core words may have generic rather than specific properties (like superordinates). In addition, Carter suggests that coreness could also be taken to mean the easiness, perceptual salience or learnability potential of words. However, Carter's message for language therapy remains unclear, with no published sets of core items that consider properties other than frequency.

Keeping in mind the limitations of the vocabulary studies within the AAC literature, there is one particularly interesting study for our purposes. Yorkston et al. (1988) collated and contrasted two different types of vocabulary lists, namely, so-called "standard" and "user" word lists. In the first phase of the study, the authors analysed 11 existing word lists (so-called standard lists), including the lists of Mein and O'Connor (1960), Berger (1967) and Richards (1974) and ranging in size from 215 to 920 words. One of the main findings of the study was that the different standard lists contained largely different vocabulary items: Only 14% of the words in the total sample occurred in six or more standard lists, and almost half of the words (45%) were contained in only one list. In addition, comparisons between the standard and so-called user lists (i.e., vocabularies stored in the AAC devices of nine non-speaking adults) revealed that almost one-third of the words in users' own devices were not found in even the largest standard vocabulary lists. Based on these findings, Yorkston et al. concluded that the clinical usefulness of any single standard vocabulary list was limited when selecting vocabulary items for AAC devices. Subsequently, Yorkston and colleagues created combinations of the lists by varying the number of unique items within the standard and user lists. For example, the smallest list that was created by using different standard lists contained 123 words, all of which occurred in at least eight (out of 11) standard lists. The largest list in turn contained 2327 words including those occurring in any of the 11 standard lists. Of relevance to our discussion is the authors' conclusion that these combined (or composite) lists can alleviate "guessing" the needs of the client and thus have more potential than any of the standard lists alone when searching potentially useful items for AAC devices.

Although Yorkston et al. (1988) have provided a list of potentially useful vocabulary, there are no reports, as far as we know, of any attempts to apply these items in the treatment of aphasia, probably because the lists were created for a different target group (i.e., non-speaking adults with cerebral palsy). Nevertheless, Yorkston et al. (1988) concluded that there is a great need to collect word usage patterns of large and well-matched groups of subjects which would allow one to develop different vocabulary lists, of varying sizes, for different populations. Yorkston et al. (1988) also note

[1]A similar frequency-based definition of core vocabulary has also been in use in the field of developmental language disorders. Readers who are interested in the paediatric literature are advised to read, for example, the papers of Crosbie, Holm, and Dodd (2005) and Dodd, Holm, Crosbie, and McIntosh (2006). These papers describe so-called "core vocabulary therapy" approach which has been efficacious for children with inconsistent word production.

that basic vocabularies include more abstract words than might be obvious at a first glance, mirroring our comments in Renvall et al., part I (2013). Francis (1990), in his commentary on the Yorkston et al. (1988) paper, noted that a lack of abstract words could limit expression of one's feelings and emotions. Similarly, Graves (2000) investigated vocabulary needs of people with learning difficulties in residential and day-care centres and found evidence suggesting that conversations on physical needs (e.g., references to food and drink) and functions (e.g., references to day and leisure activities) override conversations on social (e.g., meetings with friends and relatives) and emotional topics (e.g., anxiety) between the staff and the people with learning difficulties. Graves (2000) argued that the lack of social and emotional topics in conversations could be a result of the paucity of abstract vocabulary in the AAC systems. The situation is probably similar for people with aphasia who try to communicate verbally but may not be able to retrieve abstract words as part of their everyday conversations. Thus, these studies remind us of the need to include social and emotional topics and vocabulary as part of aphasia therapy.

INSIGHTS ON TOPICS AND VOCABULARY OF UNIMPAIRED SPEAKERS

We now turn to specific studies that have focused on topics and vocabulary as part of everyday conversations within adult populations. In this section, we will refresh and partly reanalyse data that are available from unimpaired adults' conversations. We will first focus on the topics of conversations and then review studies that provide evidence of the vocabulary items of unimpaired adult speakers. A study by Davidson (2004) that includes data from both impaired and unimpaired speakers will, however, be discussed in a later section in order to focus on the similarities and differences between the two groups. Interestingly, these studies have also been mainly published within the AAC field or forums other than those oriented towards treatment of language impairments. An exception is the paper of Stuart, Vanderhoof-Bilyeu, and Beukelman (1994), which was published in the *Journal of Medical Speech-Language Pathology*. In this paper, Stuart et al. (1994) clearly state that the speech pathologists would benefit from knowledge about topic use in elderly communication. More specifically, Stuart et al. (1994, p. 90) wrote that "First, knowledge of frequently referenced topics [of the healthy elderly] would provide direction in selecting appropriate and meaningful vocabulary items for topic use in intervention programs. Second, knowledge of topic use would provide a 'real word' basis for understanding and/or breaking stereotypic ideas of interest areas in this age group".

In another study, Stuart, Vanderhoof, and Beukelman (1993) focused on topics and patterns of vocabulary use of five healthy (non-language-impaired) women aged between 63 and 79 years. The study included a sample of 3000 words from routine conversation. The three most frequently referenced activities across the participants' conversations were *household routines, social networks* and *family life.* While Stuart et al.'s (1993) sample included five women, Stuart et al. (1994) reported a larger study in which they explored the topics of everyday conversations of 10 healthy men and 10 healthy women from 60 to 85 years of age dividing the participants in four separate cohorts (i.e., younger men, older men, younger women and older women). They provided information on references made by the participants (in the four age/gender cohorts separately) to three main topic categories. We have collated

TABLE 1
The topic categories and percentage of references made to three main topic category groups based on the data reported by Stuart et al. (1994)

Topic category	*Percentage of references to each main topic category*
Time frame	
Present	48
Past	39
Future	13
Persons/things	
Events/things	29
Self	26
Friends	20
Family	18
Strangers	5
Public figures	2
Happening	
Facts/network	21
Household routines	9
Games/sports/exercise	6
Food/eating	5
Environmental observations	5
Social relations	5
Work	5
Family life	4
Health/illness	4
Rituals (prayers, etc.)	4
Church: residential organisation/management	3
Church: worship	3
Community affairs	3
Education/training/guidance	3
Emotional status	3
Finances	3
Hobbies (reading/gardening)	2
News event	2
Shopping	2
Travel	2
Miscellaneous	1
Music	1
Philosophy—personal	1
Weather	1
Church: residential social	<1
Clothing	<1
Ethics	<1
Movies/plays	<1
Recreation/drinking	<1
Television	<1

Percentages presented in this table have been averaged across from those presented in Stuart et al. (1994, p. 94).

these data in Table 1 in order to show the most frequent topic references across this elderly population. Interestingly, in one of three main categories, the most topic references were made to the *facts/network* category (21%). This was a category defined as

"those topic segments that do not fit into one of the other general categories and relate specific facts about persons, their things, and places" (p. 97). While being a loosely defined category, the authors' own conclusion on the high percentage of topic references to this particular category was based on their observation that the participants tended to use storytelling narratives when giving specific facts about persons, things and places. As can be seen in Table 1, the next most frequent topics were *household routines, games, food/eating, environmental observations, social relations* and *work.* Thus, some topics that intuitively sound relatively common, such as *weather, clothing* and *television,* were actually among the least frequently occurring topics in this study. Definitions of the categories are presented in Appendix A.

In addition to the studies examining free discourse as part of routine everyday conversations of healthy older adults, there are two studies conducted by Balandin and Iacono (1998, 1999) which targeted conversations in a more specific context: meal-break conversations at workplaces. Both studies used the data from 34 healthy participants (age range 17−57 years, mean 34.9 years, 25 female and 9 male) collected across four worksites (in Australia) over a three-week period. In the first study (Balandin & Iacono, 1998), 73 different topic categories were found. Of these, the five most frequent topics included *fact finding, food, family life, work* and *judgements*, similar to those of earlier studies.

Studies that are informative of the specific vocabulary items used within the topics of everyday conversations are largely the same studies as referenced earlier. For example, Stuart et al. (1993) also analysed the vocabulary patterns in the conversations of the five elderly women. The results showed that a relatively small number of words accounted for a relatively large proportion of the communication sample: 100 words representing 63% and 200 words representing 78% of the total communication sample. Moreover, the authors stated that there was a great overlap of the most frequently used words between the participants regardless of their age and differences in conversation topics. Thus, this study seems to suggest that a relatively small common vocabulary can serve as a starting point for selecting vocabulary items for people with aphasia.

In another study of Stuart et al. (1997), the authors further analysed the data first reported in Stuart et al. (1994) by dividing the same participants into two age groups: younger (60–74 year old, 5 men and 5 women) and older (75–85 year old, 5 men and 5 women) adults. The new data analyses showed that there was a considerable overlap between vocabularies in the two age groups. For example, sublists of vocabulary containing 25–225 words were common to at least 8 of 10 participants (in both cohorts). They also found that the most frequently occurring words were used by the participants irrespective of the conversation topics. Thus, the most basic vocabulary was not sensitive to the age of a speaker or to a particular topic of conversation. It is of note, however, that the age range of the participants in this study was restricted to older adults aged 60–85 years old. Thus, whether vocabulary or topics are different when speakers represent larger differences in age remains unknown. It is also noteworthy that the paper includes a list of the 180 most common items across speakers in the two age groups. The authors conclude that this database could be a useful resource in clinical intervention programmes. However, we have not found reports on intervention studies which have acknowledged use of this list of words.

Balandin and Iacono (1999) further analysed the vocabulary of the most frequently referenced topics (i.e., work, fact finding, food, family life and judgements) from their earlier study (Balandin & Iacono, 1998). As a result, the authors provide a composite list of 347 words that accounted for 78% of the conversational sample. The authors

claim (p. 104) that this list is "strikingly similar to that obtained by Berger (1967) and Stuart et al. (1993)" consisting predominantly of function words with only 35 nouns. Moreover, a list of 909 words contained all of the vocabulary common to two or more of the five most frequently referenced topics. This led the authors to state that the list provides ecologically valid vocabulary resources. Unfortunately, the raw data from this research and from which the list was deduced are no longer available for further analyses (S. Balandin, personal communication, 22 December 2010).

In summary, there are a few studies that have provided information on topics and vocabulary common to everyday adult conversations. Despite the potential usefulness of the vocabulary data sets presented in these papers, the individual vocabulary lists have remained unused and undiscussed within language treatment literature. Moreover, no studies can be found which include data sets of the vocabulary items used within the most frequent topics of conversations. Next we will refresh and reanalyse data that can be used to inform the specific needs of the people with aphasia with regards to topic and vocabulary selection.

INSIGHTS ON TOPICS AND VOCABULARY OF PEOPLE WITH APHASIA

The topic of conversation and vocabulary items of people with aphasia is a little studied area despite the fact that clinicians and researchers possess thousands of hours of conversational data that might shed light on this issue. An exception is Davidson (2004), who used mixed methods to investigate the everyday communication of 15 older people with aphasia (between 63 and 80 years) and a matched group of 15 healthy older people (between 63 and 78 years) through 240 hours of naturalistic observation of participants as they engaged in their usual daily activities. As reported by Davidson, Worrall, and Hickson (2003), observational data recorded the topics of conversations that took place between the participants and their regular communication partners. The topics were categorised under headings that represented the main recurring topic areas.

Table 2 records a list of the 44 most common topics of conversation and compares the number of participants with aphasia and the number of healthy older people who conversed on these topic areas during the observation period. Topics that were common to all participants related to *food and drinks* and also *friends and neighbours*. Other topics covered by the majority of participants related to *family, health issues, the person's weekly activities, hobbies and interests, past events* and *plans for the day*. *The weather, garden, holidays, television programmes, sporting events* as well as *hospitals and nursing homes* were common topics for both groups.

It is of note that *weather* and *television* were actually among the least referenced topics among the unimpaired speakers of the Stuart et al. (1994) study, as we noted in the previous section (see Table 1). This could be due to small sample sizes and differences in research methods. Categorisation of topics in Davidson's research (2004) resulted from the analysis of field notes taken during eight hours of observation of each participant as they went about their usual daily activities. The researcher, as participant observer of the participants with aphasia and healthy older people, documented topics of conversation in the research field notes. Table 2 records the occurrence of topics but not the percentage of reference to these topics. In the Stuart et al. (1994) study, topic categories were developed by three judges on the basis of participants' 3000-word samples. Subsequently, each participant's segmented sample was assigned to

TABLE 2
List of frequent topics and number of participants who engaged in conversations on the topics in Davidson (2004)

Topic	*People with aphasia (n = 15)*	*Healthy older people (n = 15)*
Food and drinks	15	15
Friends and neighbours	15	15
Family	14	15
Health issues	13	15
Past events	13	14
Stroke	13	10
Weekly activities	12	15
Hobbies/interests	12	15
Sig. other's activities	12	14
Weather	12	14
Garden	12	10
Plans for the day	11	15
Car and driving	11	15
Television	11	13
Holidays	11	12
Hospitals/nursing homes	11	11
Overseas countries	10	13
Sport	10	11
Home furnishings	9	14
Plans for meals	9	13
Grandchildren	9	12
Birds/insects	9	11
Music	9	10
Celebratory occasions	9	10
Household maintenance	8	11
Work/occupation	8	10
Parts of Australia	7	12
Household chores	7	12
Church/religious days	7	10
University/research	6	14
Transport/traffic	6	13
Social events	6	13
Photographs	6	10
Gold Lotto/raffles	6	10
Local suburbs	5	14
Books/magazines	5	12
News/current affairs	5	12
Travel	3	14
Government/politics	3	10
Shares/finances	3	9
Death	3	8
Computers	2	10
Humorous events	2	9
Opinions on life	1	15

these topic categories. Despite careful sampling, it is possible that the conversation samples in Stuart et al. (1993, 1994) did not include brief conversations in which typical exchanges about the weather occur. Similarly, it is unclear whether they sampled conversations that took place while the participants were watching television.

It is also possible, however, that the differences reflect cultural differences between English-speaking speakers, as Davidson (2004) studied Australian and Stuart et al. (1994) North American speakers (for cultural differences, see, e.g., Oakes & Farrow, 2007). What these differences do suggest is the need for future research to collect similar data, and carry out similar analyses, from a larger sample and also the need to conduct studies including people of varying ages and preferably from different cultural backgrounds as well.

Meanwhile, Davidson's research (2004) highlights the value of comparing the everyday topics of conversation of healthy older people and those with a communication disability (namely, aphasia): the results illuminated topics that were not engaged in as much by people with aphasia. The following topics were common for the healthy older people but were not frequent conversation topics for the people with aphasia and their partners in the study of Davidson (2004): *books, news and current affairs, local politics, travel, computers, expressing opinions on social issues* and *conversing about other cultures/languages*. It was apparent that for those with aphasia conversation topics tended to focus on the "here and now" and related to people in their inner social networks.

The topics reported by Davidson (2004) and listed in Table 2 are those that could profitably be addressed in anomia therapy, enabling people with aphasia to access vocabulary that may extend their conversational abilities. As discussed by Davidson et al. (2003), it is important to note that while people with aphasia engaged in similar communication activities as their peers without aphasia, they were limited in the number of communication activities: It was apparent that people with aphasia are restricted in certain types of conversations, for example in those involving reflection, storytelling and discussion of opinions and ideas. These findings suggest the need to pay more attention to different genres of conversations. For example, as also discussed by Stuart (2000), storytelling may be an important area to be addressed in therapy for older people. This also implies that it would be beneficial to target vocabulary, for example conjunctions and interjections, which provide structure for telling stories.

While Tables 1 and 2 can be used as resources for identifying and addressing the objectively most frequent topics of conversations in aphasia therapy, we will next describe two frequency-based lists that we compiled in order to assist in identifying specific vocabulary items for aphasia therapy.

SPECIFIC RESOURCES FOR VOCABULARY SELECTION

As demonstrated in Renvall et al., part I (2013), the most frequent words represent many word classes and include many items that are more abstract and lower in imageability than the pictureable nouns and verbs typically targeted in therapy. As also discussed in Renvall et al., part I (2013), there is a lack of published vocabulary lists based on objective frequency counts. Next we aim to narrow this gap and present two frequency-based lists that we created by using objective frequency information from different sources. The items in both lists are organised in alphabetical order within their dominant word classes, as we think this provides the best opportunity to detect possible similarities and differences between one's intuitive feelings and objective information on the frequency of words and word classes. These two lists as well as the list of the 100 most frequent words discussed in Renvall et al., part I (2013), are also available online at http://www.ccd.edu.au/research/language/aphasia/functionallyrelevantitems/.

Vocabulary list 1: Collation of the most frequent words retrieved from adult conversations

Appendix B provides a list of 357 unique words that we created by collating three separate data sets published as part of three separate studies and described previously in this article. The collated list includes 347 words from Balandin and Iacono (1999), 266 words from Stuart et al. (1993) and 180 words from Stuart et al. (1997). The three data sets were selected for further analyses because they were all collected from adult speakers' everyday conversations and also for the practical reason that they were freely available for us as part of the original publications. In order to create a single list, we first combined the words from these three lists and excluded duplicates and four proper names from one list as the other two lists did not include proper names. Of the 357 words, 119 (33%) appeared in all of the original three lists, 77 (22%) in two of the lists and 161 (45%) in a single list only. As the original studies did not provide information on the word classes that items had originally represented, we made the division based on the parts-of-speech tagging available for the same words in CELEX (Baayen, Piepenbrock, & Gulikers, 1995) (for further details, see Appendix B).

Table 3 reports the percentage of words falling into different word classes in the collated word list. It can be seen that the four most frequent word classes are verbs, nouns, adverbs and pronouns. Complex contractions appeared as the fifth most frequent category and thus formed a special category of items including combinations of modal verbs with negation (e.g., doesn't, didn't and couldn't) and pronouns with verbs (e.g., I'm and she's). The sixth most frequent word class in the dataset was adjectives. Based on the distribution of different word classes, the pattern is similar to, and falling between, those presented in Renvall et al., part I (2013), on the 100 and 1000 most frequent words in the SUBTLEX-US and CELEX databases. This is despite the fact the large databases, and SUBTLEX-US in particular, have used different sources of spoken information (TV and film subtitles) to the three studies involved in our analyses (spontaneous conversations).

TABLE 3
Distribution of word classes of data collated from three data sets: Balandin and Iacono (1999), Stuart et al. (1993) and Stuart et al. (1997)

Word class	*Percentage of items*
Verb	27
Noun	19
Adverb	11
Pronoun	11
Complex contraction (e.g., gonna, don't)	8
Adjective	8
Preposition	4
Conjunction	3
Numeral	3
Interjection	2
Items for which category was not found (e.g., uh, um)	2
Abbreviation	1
Article	1
Other	<1

Vocabulary list 2: The most frequent words retrieved from the SUBTLEX-US database

In order to provide an additional and a larger vocabulary list, we present the 1000 most frequent words that we originally extracted from the SUBTLEX-US database (n.d.; Brysbaert & New, 2009; http://expsy.ugent.be/subtlexus/) for the analyses presented in Renvall et al., part I (2013). The full list of items is presented in Appendix C. We chose to use SUBTLEX-US because it can be considered as one of the largest and most reliable spoken language databases currently available. To extract items, we organised them in a descending order based on their dominant parts-of-speech frequency and identified the first 1000 items from the data set. By using the parts-of-speech information, we then divided the items into 11 categories. As demonstrated in Renvall et al., part I (2013), the four most prevalent word classes within this data set are nouns, verbs, adjectives and adverbs (for more details, see Renvall et al., part I, 2013; Table 1).

DISCUSSION

In this article, we have addressed the identification of relevant stimuli for aphasia therapy. Our review demonstrates that the fields of aphasiology and AAC face similar challenges when aiming to identify the most relevant items for communication. In the AAC literature, two concepts—core and fringe vocabulary—are frequently encountered. As we noted, this distinction mirrors that which we make between generally frequent vocabulary (equating to core vocabulary) and personally chosen vocabulary (equating to fringe vocabulary). It is of note that several researchers (e.g., Francis, 1990; Graves, 2000) have discussed the need for more abstract vocabulary than the vocabulary typically included on AAC devices. This parallels our concern in Renvall et al., part I (2013), with regard to the items most typically selected for aphasia therapy. However, as we demonstrated in our previous paper, the most frequent words in language databases include a high proportion of abstract items (e.g., adjectives and adverbs) many of which also have descriptive roles in communication. Thus, there is the means to create some relatively standard vocabulary lists which hold relevance for many people.

By re-analysing the data from Stuart et al. (1994), we provided information on the frequency of specific topics used by older people. Although Stuart et al. (1994) included only a limited number of participants, we argue that this source may nevertheless be useful when trying to identify potentially functional topics for language therapy. It can also serve as a reminder that some topics may not be as common as they seem based on one's intuition. It is of note, however, that all of Stuart et al.'s 20 participants were living at home with their spouses and thus it remains unknown how well the data reflect the topics of conversations of people with different life circumstances.

In an attempt to illuminate the differences between unimpaired and aphasic speakers' topics of conversations, we examined the data from Davidson's (2004) unpublished doctoral thesis. While some of the results of this research were reported in Davidson et al. (2003), we have provided extended analyses including evidence regarding the topics of conversation used by both healthy older people and older people with aphasia. The main difference between the groups was that people with aphasia were restricted in conversations involving reflection, storytelling and discussion of opinions and ideas. It is of note that Armstrong (2005) and Armstrong and Ulatowska

(2007) showed that people with aphasia are restricted in using evaluative language and expressing their opinions and feelings. In addition, Stuart (2000) and Stuart et al. (1994) discussed the finding that the elderly often use storytelling narratives as a means of conveying their life history, life values, philosophy and the continuity between the past and the present. Abstract words relating to opinions, feelings and moral judgements may thus be particularly important for fulfilling communication. Function words, such as conjunctions and interjections, may in turn be particularly important for the purpose of storytelling. Overall these findings suggest the need to pay more attention to different genres of conversations and also specific vocabularies enabling discussions on these topics. We argue that the data we presented on the data collected by Davidson (2004) (see Table 2) can be used as a reminder of the specific needs of aphasic speakers. The findings not only provide information on common topics relevant to the lives of older people but also those topics that may not be explored so frequently because of the impact of aphasia.

It is of particular note that the results of two studies by Stuart and colleagues (1993, 1997) suggest that the most frequent vocabulary is actually not dependent on a particular topic. Because these studies only analysed the most frequent vocabulary, it seems reasonable to assume that if more words were included in the analyses then greater differences would be observed across topics. Finally, although some information is available regarding the vocabulary used within the frequently referenced topics, none of the studies include specific vocabulary items used by the participants within the topics. From an understanding that conversations on specific topics require somewhat different vocabularies, the obvious next step is to identify vocabulary items and therapy materials within particular topics.

In the final part of the article, we provided two frequency-based word lists: one created by combining data sets from three previous studies investigating adult conversations (Balandin & Iacono, 1999; Stuart et al., 1993, 1997) and the other from the most frequent words retrieved from the SUBTLEX-US database (n.d.; Brysbaert & New, 2009). We propose that these lists (together with the list of 100 most frequent words presented in Renvall et al., part I (2013)) can be used to identify whether people can indeed retrieve and produce items from different categories and whether they need these items in their communication. Because these items are frequent in English, they can be considered relevant units of speech and may in principle all be targeted in treatment irrespective of individual variation and interests. Both vocabulary lists provided in this article (and the list of 1000 items in particular) provide a starting point for trying to identify more individualised vocabularies by asking people with aphasia or their significant others to choose those items they feel are most important for them. We have not found studies addressing the question of how to best identify items from a vocabulary or topic list. For example, although the most obvious way is to simply ask informants to identify items from a list, multipoint rating scales may be useful for identifying items from larger lists. This is one of the issues that should be addressed in future studies. However, by dividing the words into different word classes, we aim to provide a potential user—a researcher, a clinician, a person with aphasia or his/her significant other—with a better awareness of the variety of words needed for speech production and meaningful conversations.

It is acknowledged that supplementing items over and above those provided as part of this article may be important for some people. In this regard, we suggest readers review existing, though older, materials, including, for example, the list of 2507 words provided by Berger (1967) and the list of 2268 words provided by Hipskind

& Nerbonne (1970). While it would be a relatively quick and easy task to provide more lists of varying sizes by using the SUBTLEX-US database, future studies will hopefully shed more light on the needs of individual users and help determine the most practical sizes for vocabulary lists.

We suggested earlier in this article that the next step in research should involve collection of authentic data to identify the specific vocabularies within frequent topics of conversation. It is obvious that this demands a substantial amount of resources and expertise. It is unclear whether large ongoing corpus projects, such as the Longman Corpus Network, could provide assistance in studying this issue. A potential source of data may be AphasiaBank (n.d.), which is currently the largest systematic multimedia archive of aphasia. While AphasiaBank and the larger TalkBank contain limited free conversations, as they expand, they could become a resource in terms of topic and vocabulary selection. Research on connected speech is also facilitated by more systematic and extensive use of software that will make databases more manageable and analyses easier to perform. The resources provided as part of this article serve as a first step towards the ultimate goal of enabling clinicians to select stimuli for therapy in a more systematic, transparent and objective way.

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APPENDIX A

Definitions for topics used by Stuart et al. (1994)

Note. The order of the topic subcategories has been arranged alphabetically. We have included the definition for the fact/network subcategory from the text as it was not defined as part of the appendix in the original article.

Category of time frame

Present: Relating to anything that is occurring now.

Past: Relating to anything that occurred in the past.

Future: Relating to anything that will occur.

Category of persons/things

Refers to referent of the topic not the listener unless the listener is also the referent (e.g., You were late again), including the following: acquaintances, immediate family, relatives, the speaker himself or herself, close friends, public figures, service providers, strangers, inanimate objects, places and events.

Category of happening

Church—organisation/management

Reference to committees, procedures, duties and so on involved in the organisation and management of the church (e.g., *Do you still have some of those attendance sheets we put in the pews to register new people?*).

Church—social

Reference to social functions that occur with and through the church (e.g., *We got an Oscar last night from the church, we were honoured for being host family for foreign people*).

Church—worship

Reference to some aspect of the worship service of the church (e.g., *Westminister's new pastor is going to preach his first sermon Sunday at nine and eleven*).

Clothing

Major reference is to the article of clothing, not a function related to it (e.g., *You don't have your new socks on*).

Community affairs

Reference to activities occurring on a community level (e.g., *I noticed in the last night's paper the notice for another retirement centre*).

Education/training/guidance

Reference to formalised classes, counselling, therapy and so on (e.g., *We had an instructor in nursing when I was training and I swear especially if I ever did anything that wasn't quite right she was on my heels*).

Emotional status

Reference to the way an individual is feeling emotionally (e.g., *You know he's an intelligent person and it just crushes him not to be able to express himself at all*).

Environmental observation

Commentary about things observed within environment (e.g., *The thing that really amused me was that the lights on that one tree right there by the bathroom door, when she played a tape why the lights on that three kept time with the music*.).

Facts/network

Those topic segments that do not fit into one of the other general categories and relate specific fact about persons, their things and places. *But in order to get, we didn't have ice scrapers or anything like that, and we didn't know ho to get so we could see to get out of there, you know. And so, we'd finally take our hands and hold them on the windshield, until the heat of our hands would uh, make a spot about that big, just the size of our hand, you know, and you could just see out, just that little bit. That's how we finally got home. And later on. . .* (p. 97)

Family life

Reference to activities and actions of the family (e.g., *Oh, I thought we were going tomorrow when we went to see your Mom*).

Finances

Reference to money and matters primarily related to budgets, making money and so on (e.g., *I forgot to do your Mom's thing this morning on this book. Saw you checks laying there and remembered I had forgot about it*).

Food/eating

Reference to food and/or eating (e.g., *Are you hungry? Wanna eat a bite?).*

Games/sports/exercise

Reference to anything related to these three activities (e.g., *I thought I'd go up to the school and walk this afternoon, but they were using that part of the gym so*).

Health/Illness

Reference to state of health and/or disorders is same (e.g*., He came over and took his mother to the doctor, see to it that she went, and then brought her into hospital and so she's a pretty sick woman*).

Hobbies

Reference to unique activities such as sewing, stamp collecting, aquariums and so on (e.g., *Didn't you make a quilt for one of your kids that had a house on it?*)

Household routines

Reference to things related to the functioning of the household (e.g., *You have this there that you can put things on. This is better here for you than there, isn't it? Well having it in this position it's better here*).

Movies

Reference to anything related to a movie, such as the story involved in a movie or seeing a movie (e.g., *That I can get a movie and watch it while I iron this afternoon*).

Music

Reference to anything directly related to music, playing or listening (e.g., *O.K. find some records and we'll start. Oh you scratched something*).

News events (media)

References to information including the source or the process (e.g., *Never could figure out what she was running for but I liked him. In the news or something. It said on T.V. she wanted to be remembered for more than clothes*).

Philosophy—personal

Commentary that reflects individual's philosophical basis (e.g., *She just thought she had to do this and she had to do that. They're never ready for it I don't care what their age is. I wouldn't think, you know, you get just so much of that stuff around and enough is enough. So you know, I don't question him particularly*).

Recreation/drinking

(definition missing in the original paper).

Rituals (prayers, etc.)

Those phrases or acts of speaking that are done repetitiously to carry out a function related to interaction such as grace at mealtime, greetings on birthdays-holidays, creating social closeness (e.g., *Okay, well take it easy. You're welcome, always glad to oblige you if I can*).

Shopping/buying/selling

References to the process of looking for something, buying or selling something (e.g., *Armstrong's is having a furniture sale, maybe I should go down there and see what they've got*).

Social network

Relating to or seeking facts about another person; predominantly does not include projections or judgments about the facts (e.g., *Is Norma taking care of kids yet? Did Norma and Al move? I guess they just opened up a house, the Fortages, in Florida*).

Social relations

Commentary on people's actions, often with projected ideas about them (e.g., *He can't expect everybody to always agree with him; they won't always think like him*).

T.V.

Reference to the act or concepts obtained through the act of watching (e.g., *Oh, it's time for my soap*).

Travel

Reference to anything related the act or process of travelling (destination, distance, routes, comfort, etc.) (e.g., *He said they were going to Kansas City for the weekend and I just thought. . .so!*).

Weather

Commentary or information related to weather (e.g., *Aren't you glad we didn't get all that snow? They got it just a little bit south of us*).

Work

Reference to occupations, details involved in a job and so on (e.g., *Oh, can you do that with your vacation, can you split your week up and use it as days?*)

Miscellaneous

Those items that could not be reliably categorised (e.g., *Who else is there to remember your wedding but you? It's not in bad condition but it's been two or three months since I had a permanent. That could be, I don't know. And, my Mother, Oh!).*

APPENDIX B

Vocabulary list 1: collation of the most frequent words retrieved from adult conversations based on three data sets (Balandin & Iacono, 1999; Stuart et al., 1993, 1997)

The list includes 357 unique words collated from three data sets (Balandin & Iacono, 1999; Stuart et al., 1993, 1997). As the original word lists did not include information on the parts of speech in which the items had originally occurred, we chose to divide items into different word classes based on their dominant frequency counts as presented in the CELEX database. Thus, each item appears as a representative of one word class only, although many English words can represent different word classes and we do not know which word classes the words represent in the original data. This also explains, for example, why "a" is not included in the list of articles but only appears as a noun. The only exceptions in this are the four words that shared the same frequency between two different word classes (i.e., "shit", "hum", "who" and "more"), and these items appear in both word classes. The list of words is also available online at http://www.ccd.edu.au/research/language/aphasia/functionallyrelevantitems/.

Verbs

are	doing	help	pick	thank
ask	done	hum	play	told
be	eat	is	put	took
been	feel	keep	remember	try
being	find	know	said	trying
break	fix	leave	saw	used
bring	get	left	say	want
brought	gets	let	saying	wanted
buy	getting	live	see	wants
call	give	look	seen	was
called	go	looking	should	wear
came	going	looks	sit	went
can	gone	lost	start	were
care	got	made	started	will
come	guess	make	suppose	won
coming	had	married	take	working
could	happened	mean	takes	would
did	has	might	talk	
do	have	must	talking	
does	having	need	tell	

Nouns

a (letter)	days	lights	ones	stuff
afternoon	dollars	lot	part	Sunday
babe	end	love	past	tea
boy	Friday	lunch	pay	way
cake	guys	meeting	people	week
car	home	mind	person	weekend
cause	hospital	minutes	phone	weeks
Christmas	hour	Monday	place	work
church	hours	money	road	year
class	house	months	Saturday	years
committee	hum	morning	school	
couple	job	mum	shit	
crew	kids	name	shoes	
day	kind	one	sort	

Adverbs

actually	either	much	so	what
again	else	never	still	why
ago	enough	once	straight	yeah
alright	even	only	today	(yep)
always	ever	out	tomorrow	yes
anyway	here	pretty	too	yesterday
away	just	probably	up	
back	maybe	quite	very	
down	more	really	well	

Adjectives

bad	Catholic	fair	lovely	sick
beautiful	close	fucking	new	sorry
better	cold	good	next	sure
big	dear	hard	nice	wrong
bit	different	little	ready	
bloody	extra	long	right	

(*Continued*)

APPENDIX
(Continued)

Pronouns				
all	half	its	our	we
another	he	last	own	where
any	her	many	same	which
anything	him	me	she	who
each	his	mine	some	you
every	how	more	somebody	your
everyone	I	my	someone	
everything	it	other	something	
Complex contractions				
can't	gonna	I'm	that's	what's
couldn't	gotta	isn't	wasn't	won't
didn't	haven't	it's	we'd	wouldn't
doesn't	he'll	I've	we'll	you're
don't	he's	she'd	we're	you've
(dunno)	I'd	she'll	we've	
Prepositions				
after	by	in	on	than
around	for	into	over	with
at	from	like	round	
Conjunctions				
and	before	or	that	while
as	but	since	when	yet
because	if			
Numerals				
eight	five	seven	ten	twenty
eleven	four	six	twelve	two
first	hundred			
Interjections				
ah	(ey)	thanks	shit	(um)
bye	hey	(sakes)	(uh)	
er	huh			
Abbreviations				
am	mm	US	WHO	
Articles				
an	the			
Other				
infinitival "to"				

APPENDIX C

Vocabulary List 2: The 1000 most frequent words retrieved from the SUBTLEX-US database

Notes: The items were retrieved by using the SUBTLEX-US database (n.d.; Brysbaert & New, 2009; http://expsy.ugent.be/subtlexus/). We have manually removed 20 items from the list. Fourteen of these items ("ln", "gon", "ca", "im", "ls", "wo", "to", "not", "there", "em", "na", "ta", "ai" and "nt") were not clearly categorised and/or were subject to error in the original parsing. In addition, two letters ("s" and "t") and four articles ("a", "an", "the" and "every") are not presented in the list.

Nouns (n = 323)

accident	cat	end	honor	miles	pleasure	state
afternoon	cause	evening	horse	million	point	station
age	chance	evidence	hospital	mind	police	store
agent	child	eye	hotel	minute	position	story
air	children	eyes	hour	minutes	power	street
angel	choice	face	hours	miss	president	stuff
apartment	Christmas	fact	house	mistake	prison	summer
area	church	family	hundred	mom	problem	sun
arm	city	father	husband	moment	problems	surprise
army	class	fault	ice	mommy	professor	sweetheart
art	clothes	feet	idea	money	question	system
ass	club	field	idiot	month	questions	table
attention	coffee	film	information	months	radio	team
baby	college	fire	job	morning	reason	test
bag	colonel	fish	joke	mother	record	thanks
ball	company	floor	key	mouth	relationship	thing
bank	congratulations	folks	kid	movie	report	things
bar	control	food	kids	Mr	rest	thousand
bastard	cop	foot	kind	murder	ride	time
bed	cops	friend	king	music	ring	times
beer	country	friends	ladies	name	road	top
birthday	couple	fun	lady	news	rock	town
bit	court	future	land	night	room	train
bitch	crime	game	law	nose	rules	tree
blood	dad	gas	lawyer	number	sake	trip
boat	daddy	general	letter	office	scene	trouble
body	darling	gentlemen	lieutenant	officer	school	truck
book	date	gift	life	ones	seat	truth
books	daughter	girl	light	order	second	TV
boss	day	girlfriend	line	others	seconds	uncle
box	days	girls	list	pain	security	voice
boy	deal	gold	lives	paper	sense	wall
boyfriend	death	government	lord	parents	service	war
boys	difference	ground	lot	part	sex	water
brain	dinner	group	luck	partner	ship	way
brother	doc	gun	lunch	party	shit	wedding
buddy	doctor	guy	machine	peace	shoes	week
building	dog	guys	mama	people	shot	weeks
bullshit	dollars	hair	man	person	side	wife
bus	door	hand	marriage	phone	sir	window
business	dream	hands	master	picture	sister	woman
captain	dreams	head	matter	pictures	situation	women
car	dress	heart	meeting	piece	son	word
card	drink	hell	men	place	song	words
case	dude	history	message	plan	soul	world
cash	earth	honey	middle	plane	star	year
						years

(*Continued*)

APPENDIX
(Continued)

Verbs (n = 297)

agree	decided	go	leaving	owe	show	tried
am	did	goes	left	paid	shut	trust
answer	die	going	let	pass	sign	try
appreciate	died	gone	lie	pay	sing	trying
are	do	got	liked	pick	sit	turn
ask	does	grab	likes	picked	sitting	turned
asked	doing	guess	listen	play	sleep	understand
asking	done	had	live	playing	sound	use
be	drive	handle	lived	promise	sounds	used
beat	drop	hang	living	protect	speak	using
become	eat	happen	look	prove	spend	wait
been	enjoy	happened	looked	pull	spent	waiting
being	excuse	happening	looking	push	stand	wake
believe	expect	happens	looks	put	standing	walk
bet	explain	has	lose	putting	start	wan
blow	fall	hate	lost	quit	started	want
born	feel	have	love	ran	starting	wanted
bother	feeling	having	loved	read	stay	wants
bought	feels	hear	loves	realize	step	was
break	fell	heard	lying	relax	stick	watch
bring	felt	help	made	remember	stop	watching
broke	fight	hide	make	return	stopped	wear
brought	figure	hit	makes	run	suppose	wearing
buy	figured	hold	making	running	swear	welcome
call	find	holding	marry	said	take	went
called	finish	hope	may	save	taken	were
calling	finished	hurry	mean	saved	takes	will
calm	fix	hurt	means	saw	taking	win
came	fly	imagine	meant	say	talk	wish
can	follow	is	meet	saying	talked	won
care	forget	join	met	says	talking	wonder
carry	forgive	keep	might	see	teach	work
catch	forgot	kept	missed	seeing	tell	worked
caught	found	kidding	move	seem	telling	working
change	fuck	kill	moved	seems	thank	works
changed	gave	killed	moving	seen	think	worry
check	get	kiss	must	sell	thinking	would
come	gets	knew	named	send	thinks	write
comes	getting	know	need	sent	thought	wrote
coming	give	known	needed	set	throw	
could	given	knows	needs	shall	told	
cut	gives	learn	open	shoot	took	
dance	giving	leave	ought	should	touch	

(*Continued*)

APPENDIX
(Continued)

Adjectives (n = 102)

able	clean	fine	human	old	scared	sweet
afraid	clear	free	hungry	other	serious	terrible
alive	close	fucking	important	perfect	short	tired
alone	cold	full	interested	personal	sick	tough
amazing	cool	funny	interesting	poor	simple	true
American	crazy	glad	late	possible	single	weird
bad	cute	goddamn	little	private	small	white
beautiful	damn	good	lovely	proud	smart	whole
best	dangerous	great	lucky	quick	sorry	wonderful
big	dead	happy	mad	quiet	special	worse
black	different	hard	married	ready	strange	wrong
blue	drunk	high	nervous	real	strong	young
busy	easy	holy	new	red	stupid	
careful	entire	honest	nice	rich	supposed	
certain	fair	hot	normal	safe	sure	

Adverbs (n = 87)

absolutely	around	especially	just	only	so	totally
actually	away	even	later	out	sometimes	up
again	back	ever	least	outside	somewhere	upstairs
ago	besides	exactly	long	over	soon	very
ahead	better	far	longer	perhaps	sort	well
almost	certainly	fast	maybe	please	still	where
along	completely	finally	most	pretty	straight	why
already	course	forever	never	probably	then	yesterday
also	definitely	forward	now	quite	today	yet
always	down	here	off	rather	together	
anymore	either	home	ok	really	tomorrow	
anyway	else	how	okay	right	tonight	
anywhere	enough	inside	once	seriously	too	

Pronouns (n = 38)

anybody	everything	I	myself	somebody	us	yours
anyone	he	it	nobody	someone	we	yourself
anything	her	its	none	something	who	
each	him	me	nothing	their	ya	
everybody	himself	mine	our	them	you	
everyone	his	my	she	they	your	

Names (n = 40)

Al	Bobby	Frank	James	John	Paris	Steve
America	Charlie	George	Jesus	Johnny	Paul	Tom
Ben	Christ	God	Jim	Mary	Peter	Tony
Bill	Danny	Harry	Jimmy	Max	Ray	York
Billy	David	Henry	Joe	Michael	Richard	
Bob	Ed	Jack	Joey	Mike	Sam	

(*Continued*)

APPENDIX
(Continued)

Prepositions (n = 22)						
about	against	between	for	in	of	under
across	at	by	from	into	on	with
after	behind	during	front	like	through	without
						worth
Interjections (n = 20)						
ah	goodbye	hello	hmm	oh	um	yeah
bye	goodbye	hey	huh	ooh	whoa	yes
dear	ha	hi	no	uh	wow	yo
Determiners (n = 20)						
all	both	many	own	such	this	whatever
another	few	more	same	that	those	which
any	half	much	some	these	what	
Conjunctions (n = 17)						
and	before	if	than	till	until	whether
as	but	or	though	unless	when	while
because	except	since				
Numbers (n = 17)						
one	three	five	seven	nine	first	next
two	four	six	eight	ten	last	third