



## Introduction

- Dementia is a neurodegenerative disorder affecting both memory and cognitive domains including executive functioning, abstract thinking, and language (ASHA, 2017)
- Individuals with dementia present with difficulties understanding as well as producing linguistic information, significantly affecting day to day communication (ASHA, 2017)
- Currently, the implications of literature examining language deterioration in bilingual speakers with dementia remain unclear
- *The aim of this systematic review is to search the current literature to investigate the language changes in various domains in all languages spoken by bilingual individuals diagnosed with dementia*

## Methods

### Databases searched:

- PubMed, CINAHL, ComDisDome, PsychInfo, SCOPUS, LLBA

### Search terms utilized:

(bilingual\* OR multilingual\*) AND (dementia[mesh] OR dementia\* OR alzheimer\*)

### Inclusion criteria:

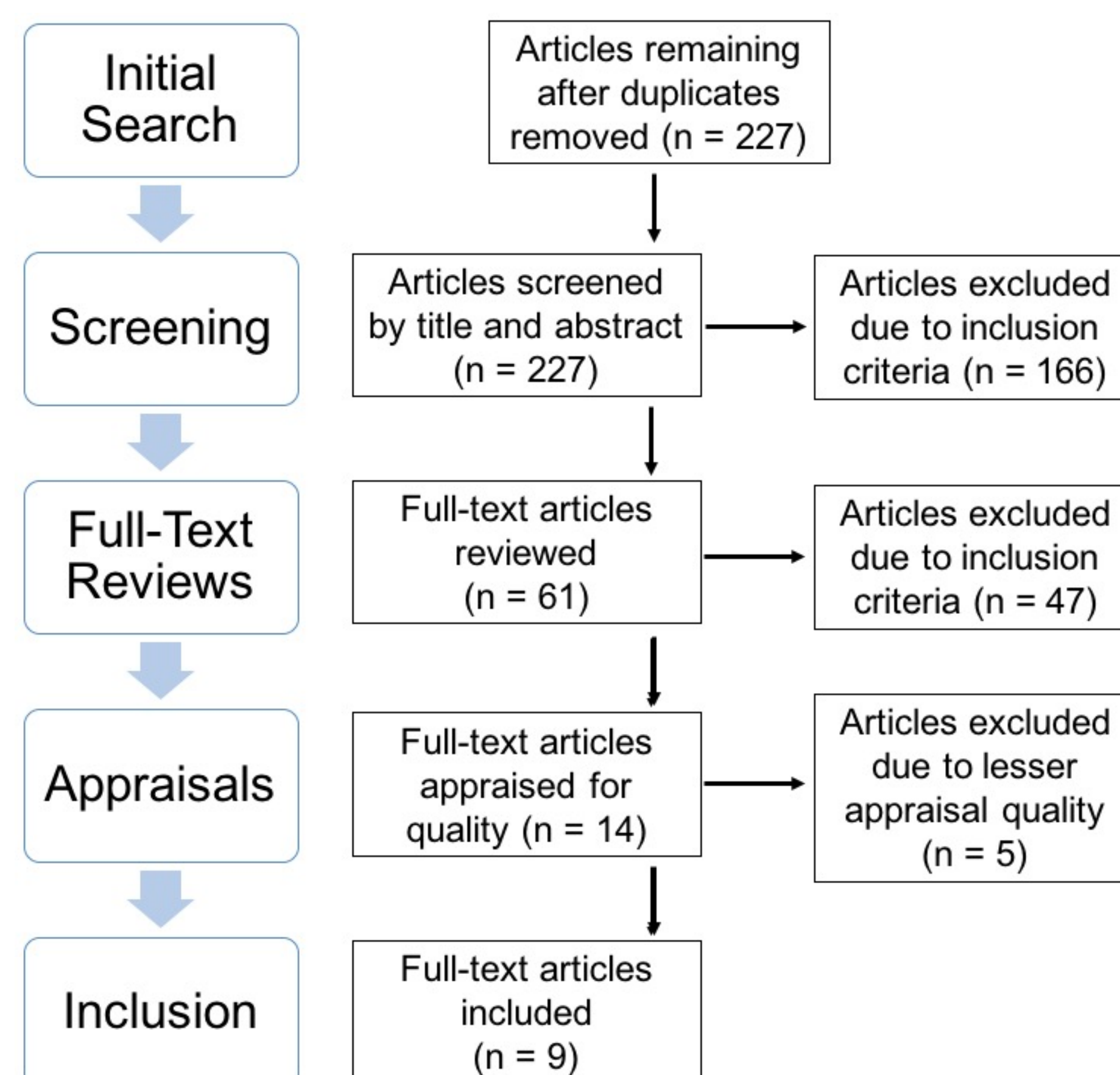
- Bilingual or multilingual adults diagnosed with any form of probable dementia
- Language outcomes in all languages spoken
- Cohort, case control, and case report study designs
- “Good” quality appraisal ranking
- Studies published in English

### Quality appraisals:

- Researchers utilized LEGEND quality appraisal forms
- Each article was appraised independently by two researchers
- Inter-rater reliability was found to be 93%

## Methods

Figure 1: Literature Search Flow Chart



## Results

Figure 2: Key Information of Included Studies

Author	Year	Study Design	Sample Size	Dementia Type
Brice et al.	2014	Case report	1	Alzheimer's
Costa et al.	2012	Case control	71	Alzheimer's
D'Antonio et al.	2016	Case report	1	Alzheimer's
Gollan et al.	2010	Case control	71	Alzheimer's
Ivanova et al.	2014	Case control	26	Not specified
Kowoll et al.	2015	Case control	86	Alzheimer's
Manchon et al.	2015	Case control	25	Not specified
Peiter de Vreese et al.	1988	Case report	1	Alzheimer's
Salvatierra et al.	2007	Case control	22	Not specified

Figure 3: Language Tasks Reported

Author	1	2	3	4	5	6	7	8	9	10
Brice et al.	+			+			+		+	
Costa et al.	+		+							
D'Antonio et al.	+	+				+	+	+		
Gollan et al.	+									
Ivanova et al.	+									
Kowoll et al.	+	+								
Manchon et al.	+				+		+	+	+	
Peiter de Vreese et al.	+		+	+	+	+	+		+	+
Salvatierra et al.		+								

Key:  
 1- Naming  
 2- Verbal fluency  
 3- Translation  
 4- Code-switching  
 5- Automatic language  
 6- Spontaneous language  
 7- Comprehension  
 8- Following directions  
 9- Repetition  
 10- Verbal discourse  
 + Reported

## Results, cont.

### Naming

- In all studies, greater performance was seen in the L1 or dominant language

### Verbal fluency

- In all studies, greater performance was seen in the L1 or dominant language

### Translation

- In all studies, greater performance was seen in L1 to L2 translation and dominant to non-dominant language translation

### Code-switching

- Both studies reported inappropriate code-switching within all languages

### Automatic language

- Both studies reported parallel preservation of automatic language abilities

### Spontaneous language

- Both studies reported better performance of L1 in spontaneous language

### Comprehension

- Three out of four studies reported better performance in L1. Manchon et al. (2015) reported better performance in L2

### Following directions

- Manchon et al. (2015) reported parallel performance in both languages while D'Antonio et al. (2016) reported better performance in L1

### Repetition

- Two out of three studies reported better performance in L1. Peiter de Vreese et al. (1988) reported parallel performance in all languages spoken

### Verbal discourse

- Better performance in L1 was reported

## Conclusions

- This review was unable to draw definitive conclusions largely due to the heterogeneity of study designs, measures, and results
- Naming task performance was more frequently reported in the included studies
- L1 or dominant language performance was reported to be better preserved than L2 or non-dominant language in a majority of tasks across studies
- More research is necessary in the area of linguistic outcomes in bilingual individuals with dementia

## Discussion

### Implications:

- Assessments of bilinguals with dementia should be conducted in all of the individual's languages in order to yield an accurate ability profile

### Limitations:

- Studies were limited to those published in English which introduced potential publication bias
- Grey literature was excluded
- Some studies considered age of acquisition (L1/L2) while others considered mastery (dominant/non-dominant)

### Future research:

- Future research should seek to systematically tease one factor (language dominance, age of acquisition, word familiarity) from another in a more systematic fashion in order to draw appropriate conclusions

## References

References available upon request. Please contact the researchers with any follow-up questions at the following email addresses:

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