

# The State of the Arts in Mobile Augmentative and Alternative Communication (AAC) Devices for People with Dementia: Evaluation of Features and Functions

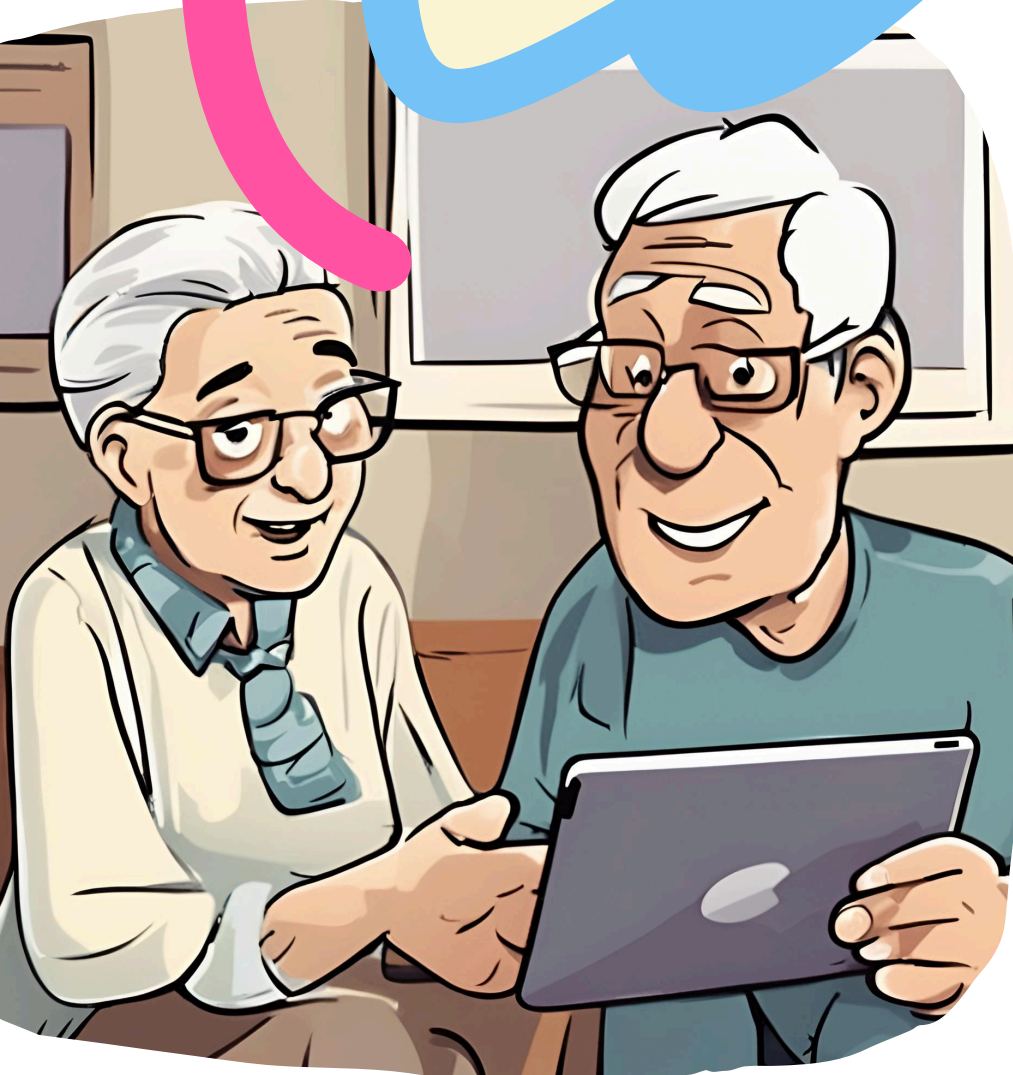
## WHAT WE LEARNED:

There are several commercial AAC apps available, though none are designed specifically for the needs of people living with dementia and many families may find it difficult to balance quality of existing apps with affordability.



## BACKGROUND

- Alzheimer's disease or related dementia (ADRD) may result in communication disorders that can create challenges in daily and clinical care and have negative impacts on the person with ADRD and their care partners [1-6].
- The use of augmentative and alternative communication (AAC) methods can improve the communication skills for people with ADRD, which can increase their self-determination, independence, and quality of life [4,7-8].
- There has been an increase in the number of commercially-available AAC apps that can be downloaded and used by people with ADRD and their care partners on their mobile devices. However, AAC devices are used by people with a variety of communication disorders (e.g., stroke, autism) and it is unclear the extent to which existing apps are appropriate for use within care and caregiving settings for ADRD.
- This study involved a systematic review of AAC apps that are available commercially for Apple and Android platforms, where the research team evaluated the quality of identified apps as well as their potential for families to feasibly use them within home and community-based settings.



Use the QR Code to access the poster and reference list.

## METHODS

- The Google Play and Apple IOS App stores were searched in Oct/Nov 2023.
- Inclusion criteria: targeted adults, available in English, and offered a free version to test [9]. Apps were excluded if they only targeted children.
- Basic information about the included apps were documented and then the team evaluated the design and performance of each app using a revised version of the Mobile App Rating Scale (MARS), which was modified to focus on the needs of people with ADRD and their care partners [10].
- All team members were involved in identifying and evaluating the apps, which included two social workers, a nurse, and a speech-language pathologist.

Figure 1. PRISMA Flow Diagram for Systematic Review of Apps

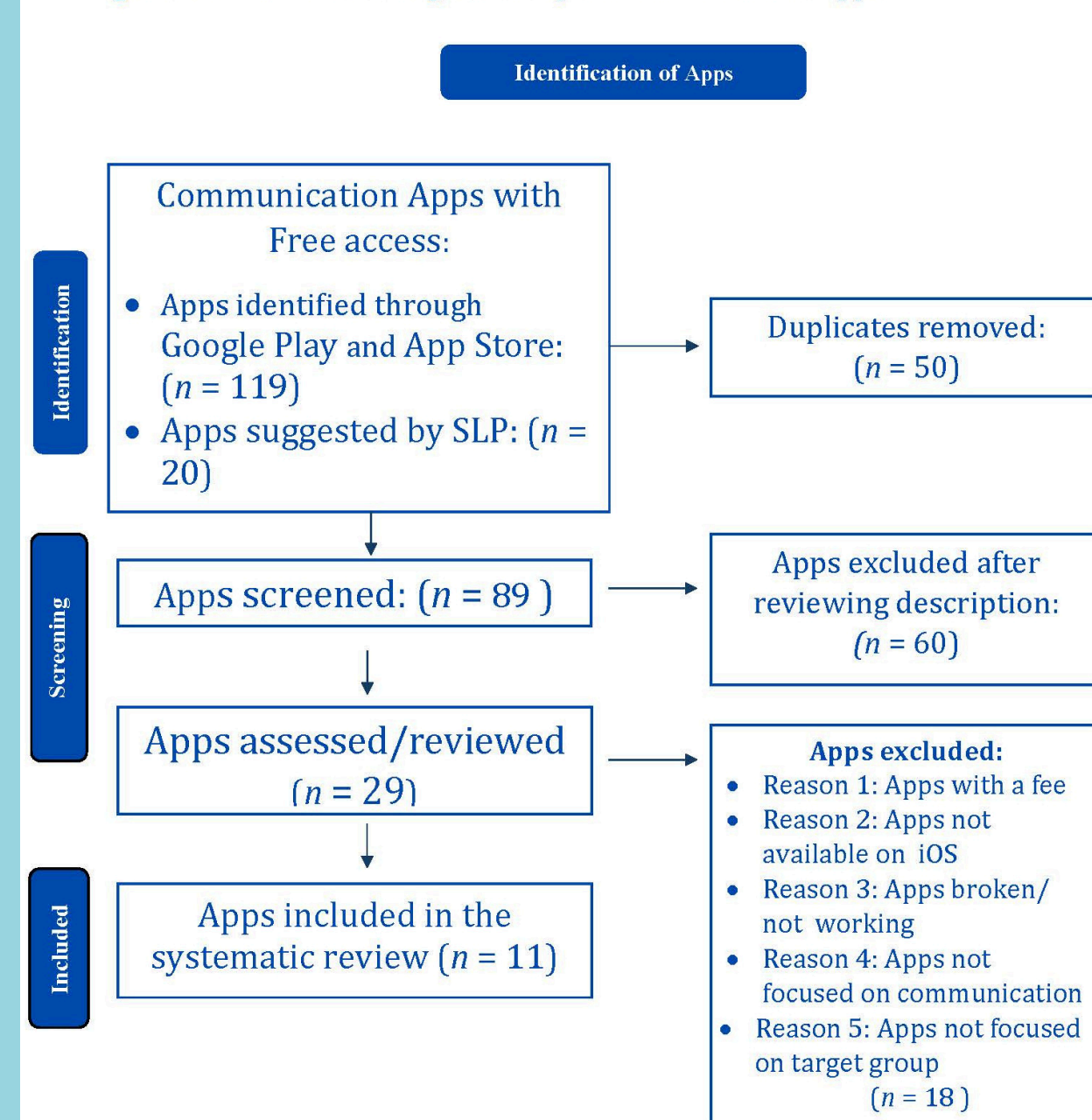


Table 1. App Characteristics

Characteristic	App Code										
	A	B	C	D	E	F	G	H	I	J	K
<b>App developer</b> Com = Commercial UK = Unknown	UK	Com	UK	Com	Com	F	Com	Com	Com	Com	Com
<b>Last Update</b>	6 M	<6M	>4Y	<6M	>6Y	<6M	6M	<6M	12M	<6M	<6M
<b>Platform:</b> I = IOS/Apple A = Android	I	I, A	I	I, A	I	I	I, A	I	I	I, A	I, A
<b>Multilingual (# of languages)</b>	Y (6)	N	N	N	N	N	Y (35) <sup>a</sup>	N	N	Y (13)	N
<b>Sound Capabilities:</b> U = User-recorded P = Prerecorded	P	P	U, P	P	P	P	U, P	U, P	U	P	P
<b>Technical Features:</b>											
Allows Sharing with Others	N	Y	Y	N	N	N	Y	Y	Y	N	Y
Has an App Community	N	UK	N	N	N	N	N	Y	N	N	N
Allows Password Protection	Y	Y	UK	UK	N	N	Y	Y	N	UK	Y
Requires login	Y	UK	UK	UK	N	N	N	UK	N	UK	Y
Sends reminders	N	N	N	UK	N	Y	N	UK	UK	N	Y
Needs web access to function	N	N	N	UK	N	N	N	UK	UK	N	UK

- Few apps were designed specifically for people with ADRD. Ex: Cognitive impairment may make it difficult for people to recognize simple line drawings, but most AAC apps use stick figures and other line drawings.
- All apps were listed as free to purchase, but many required in-app purchases, such as subscriptions or word banks, to fully function. Many families may find in-app purchases cost-prohibitive.
- Apps receiving the highest average quality scores [B,C,E,F,K] were only available in English.
- On average, apps performed highest in ease of use, navigation, and gestural design.
- They performed lowest on their graphics and visual appeal. Apps typically performed as described.
- All apps were developed by commercial sources with few indicating that they were credible sources for speech-language pathology. No evidence was found on the included apps in the scientific literature.
- Only one app was recommendable for people with ADRD, depending on the family's needs and level of impairment of the person with ADRD.

## RESULTS

Table 2. App Quality and Function Review Using the Mobile App Rating Scale<sup>a</sup>

MARS Item	APP Code											Mean
	A	B	C	D	E	F	G	H	I	J	K	
Entertainment	2	2	3	3	3	3	3	3	3	2	3	2.7
Interest	2	3	4	3	4	3	3	2	1	1	4	2.7
Customization	2	4	5	2	4	3	4	3	2	3	5	3.4
Interactivity	2	5	3	3	1	3	1	3	1	5	5	2.9
Target Population	3	3	3	3	3	3	2.5	3	3	3	3	2.9
Performance	2	4	4	2	4	5	2	1	2	1	5	2.9
Ease of Use	4	3	4	5	4	5	2	1	3	2	5	3.5
Navigation	4	3	4	2.7	4	5	2	1	3	3	5	3.3
Gestural Design	5	5	5	4	5	5	2	1	4	2	5	3.9
Layout	3	3	3	2	4	2	4	1	3	2	5	2.9
Graphics	3	2	1	2	4	2	4	1	2	2	1	2.2
Visual Appeal	2	2	1	2	3	2	3	1	2	2	2	2.0
Accuracy of App Description	2	2	5	2	4	5	3	1	4	4	5	3.4
<b>Average Rating</b>	<b>2.77</b>	<b>3.15</b>	<b>3.46</b>	<b>2.75</b>	<b>3.62</b>	<b>3.54</b>	<b>2.73</b>	<b>1.69</b>	<b>2.54</b>	<b>2.46</b>	<b>4.08</b>	
Credible Source for SLP <sup>b</sup>	UK	Y	UK	Maybe	Y	UK	UK	UK	UK	UK	UK	
Evidence-based	N	N	N	N	N	N	N	Y	N	N	N	
Recommended for ADRD	N	Maybe	N	N	Y	N	N	N	Maybe	N	Maybe	
Overall star rating (1-5)	1	2.5	2	1	4	2	1	1	1	2	3	

a. The MARS includes items regarding the quality of information offered through apps and any goals that it sets for the user activity, though neither were featured in any of the apps reviewed.  
b. SLP = Speech Language Pathology

