

Data-driven Evaluations for Eye Gaze SGDs

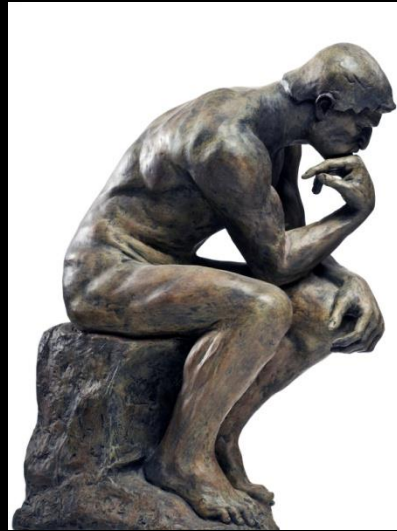
Lisa G. Bardach, MS CCC-SLP

ALS of Michigan

Lbardach@gmail.com



Re-thinking Evaluations



The Evidence

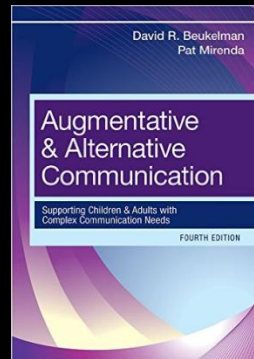
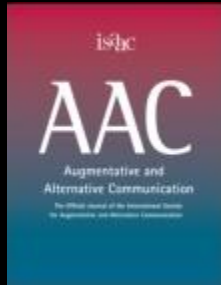
- Upwards of 75% of people diagnosed with ALS will ultimately lose their ability to speak (Hicks & Corcoran, 1993; Saunders et. al., 1981)
- Loss of speech function is common, loss of language and cognition are not (Ball, Beukelman & Bardach, 2007)
- Eye gaze is a promising method of accessing communication, especially for individuals who were previously unable to use direct access methods (Ball, Nordness, Fager, Kersch, Pattee, & Beukelman, 2010)

- Techno-connectedness (use of technology to retain social contacts, reduce isolation, and normalize communication) is one of 5 recurring themes important to pALS (Fried-Oken & Bardach, 2005)
- One of the most significant developments in access technology for individuals with severe physical and communication impairments has been advances in eye tracking technology (Fager, Bardach, Russell, & Higginbotham, 2011)

- Adults with ALS with intact cognition and functional eye motor control have reported the ability to become proficient with eye gaze technology in a very short period of time (Ball, Nordness, Fager, Kersch, Pattee, & Beukelman, 2010)
- The ability to communicate verbally, unlike overall physical function, is directly related to overall QOL in patients with ALS. The initial period of speech impairment appears to have a particularly strong impact on QOL, and may be an important time for intervention (Felgoise, Zaccheo, Duff, & Simmons 2016)

- Because ALS is an acquired condition in adults (mean age of onset 56-63), most pALS had intact language at the time of disease onset.
- Direct access is typically preferable to indirect access

Evidence vs Data



VS



On a scale of 1-10 (10=most, 1=least), how important is the following:

Communication	1	2	3	4	5	6	7	8	9	10
Email	1	2	3	4	5	6	7	8	9	10
Internet Access	1	2	3	4	5	6	7	8	9	10
Text Message	1	2	3	4	5	6	7	8	9	10
Environmental Ctrl	1	2	3	4	5	6	7	8	9	10
Facebook/Social media	1	2	3	4	5	6	7	8	9	10
Music	1	2	3	4	5	6	7	8	9	10
Photos	1	2	3	4	5	6	7	8	9	10
E-media	1	2	3	4	5	6	7	8	9	10
Games	1	2	3	4	5	6	7	8	9	10
Skype/FaceTime	1	2	3	4	5	6	7	8	9	10
Make/receive phone calls	1	2	3	4	5	6	7	8	9	10
Other computer Functions	1	2	3	4	5	6	7	8	9	10
Computer specs	1	2	3	4	5	6	7	8	9	10
Overall mouse ctrl	1	2	3	4	5	6	7	8	9	10

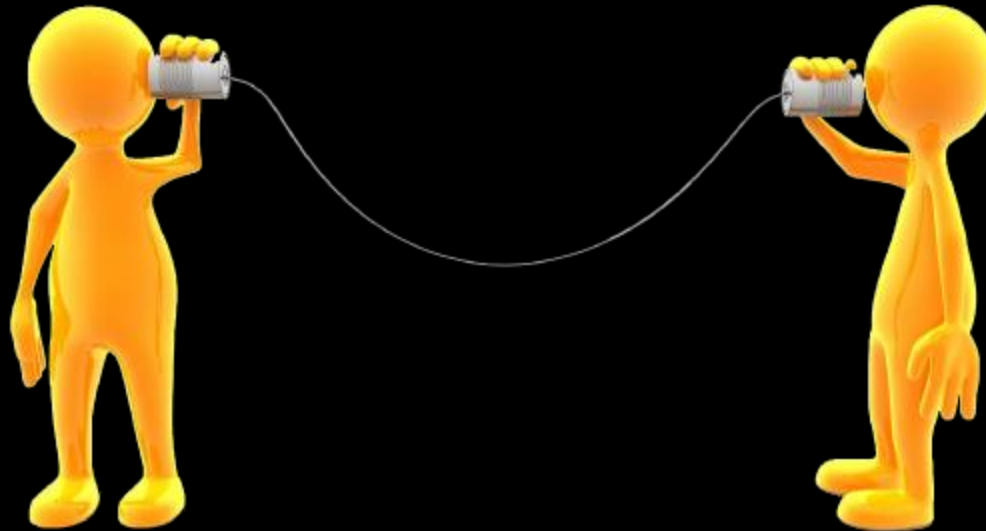
Premise

- pALS had intact language at onset
- pALS have different communication needs than the other populations we typically evaluate
- pALS are into techno-connectedness
- pALS have large overall skill set relative to other media
- **Need to be proactive**

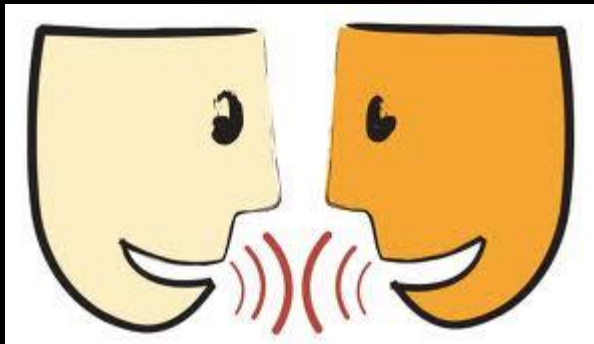
Typical Assessment Categories

- Speech
- Vision
- Hearing
- Physical Status
- Language and Cognition
 - Receptive language
 - Language representation method
 - Memory, attention, problem-solving
- Daily Communication Needs

How do we define communication?



Daily Communication Needs





Other communication categories

- Email
- Phone calls
- Social Media/Facebook
- Video chat (Skype, FaceTime)
- Text messages
- Real-time internet (chat rooms/forums/Q&A)
- Personal Alerting Systems

- Photos
- Environmental Control
- Games
- Music
- E-media
- Internet
- Other computer applications (word-processing, spread sheet, banking, creativity, etc)

Medicare's expanded definition of Communication

- Face-to-face
- Email
- Text
- Phone

Funding considerations

- Face to face is crucial
- Must still have severe speech impairment
- Distance communication (new Medicare guidelines)
 - Focus on communication task, not method
 - Mr. Smith needs to speak to wife daily to reassure he is safe while she is at work.
- Dual eligibility
- Avoid mention of items specifically excluded (videoconferencing)

What's Important?

Whenever anything major happens to me, you'll be the first to know after Facebook.



someecards

I should be working right Now. But saying hi to you Was more important.



someecards
user card

On a scale of 1-10 (10=most, 1=least), how important is the following:

Communication	1	2	3	4	5	6	7	8	9	10
Email	1	2	3	4	5	6	7	8	9	10
Internet Access	1	2	3	4	5	6	7	8	9	10
Text Message	1	2	3	4	5	6	7	8	9	10
Environmental Ctrl	1	2	3	4	5	6	7	8	9	10
Facebook/Social media	1	2	3	4	5	6	7	8	9	10
Music	1	2	3	4	5	6	7	8	9	10
Photos	1	2	3	4	5	6	7	8	9	10
E-media	1	2	3	4	5	6	7	8	9	10
Games	1	2	3	4	5	6	7	8	9	10
Skype/FaceTime	1	2	3	4	5	6	7	8	9	10
Make/receive phone calls	1	2	3	4	5	6	7	8	9	10
Other computer Functions	1	2	3	4	5	6	7	8	9	10
Computer specs	1	2	3	4	5	6	7	8	9	10
Overall mouse ctrl	1	2	3	4	5	6	7	8	9	10
Personal Alert	1	2	3	4	5	6	7	8	9	10

Additional information

- Internet access
 - Shopping
 - Research
 - Entertainment
- Environmental control
 - TV
 - lights, fan, door, thermostat,
- Music
 - Computer based (CDs, iTunes)
 - Internet based (Pandora, You Tube, Spotify)
 - Voice controlled (Alexa, Siri, Google)

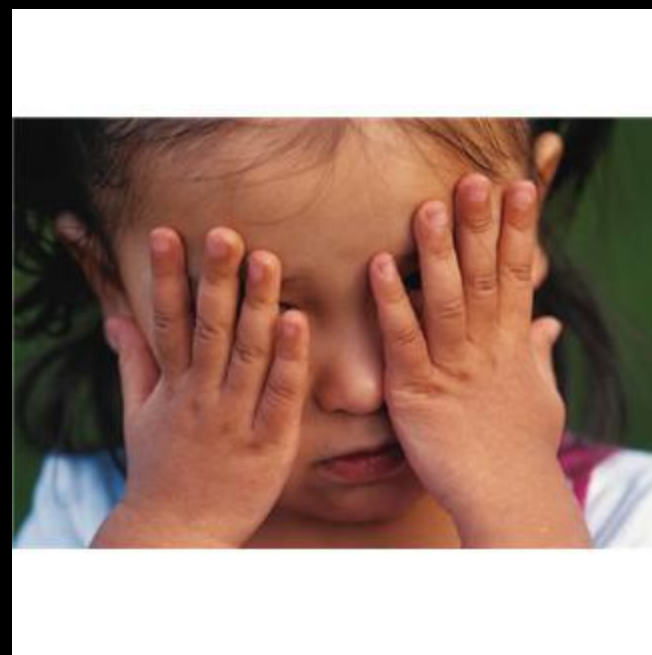
- Photos
 - Scrapbooking
 - Books, postcards, announcements
 - Website development
- Overall mouse control
 - navigating to websites with small items
 - software that needs precision movements
- Computer specs
 - Speed
 - Amount of data

N = 32

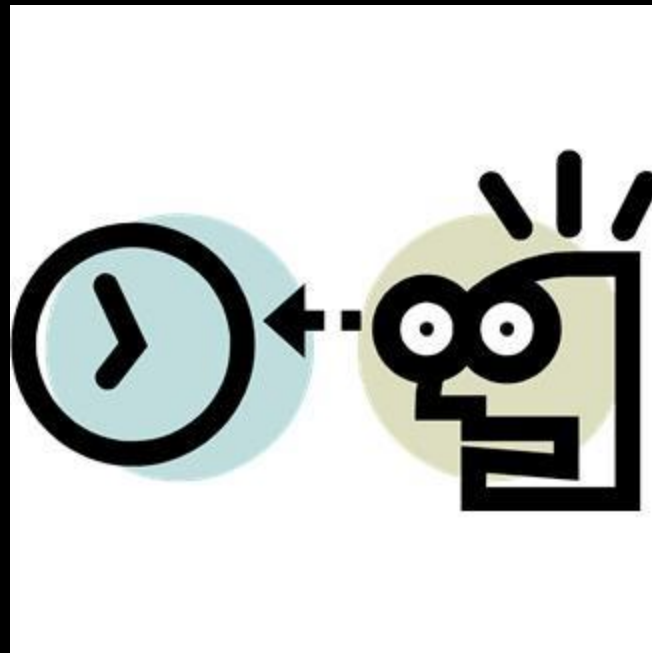
Category	Rated 9-10	%	Rank
Face-to-face communication	27	84 ⁰ %	1
Internet Access	27	84 ⁰ %	1
Environmental Control	21	66%	2
E-media	20	62%	3
Email	20	62%	3
Text messages	19	59%	4
Making/receiving phone calls	19	59%	4
Facebook/Social Media	17	53%	5
Overall mouse control	14	44 ⁰ %	6
Photos	12	38%	7
Music	11	34%	8
Games	9	28%	9
Other computer functions	7	22%	10
Computer specs	7	22%	10
Skype/Face Time	3	9%	11

So Many Categories. . .

- # of categories **15**
- # of categories rated 9-10 **7.2**
- # of categories seldom receiving 9-10 **1**



So Little Time



How to make the most out of your eval time?

- How much time does the average SLP have to do an SGD eval?
 - # of sessions?
 - Length of session?
 - Immediacy of need?

Pick the most important categories

*Should do f2f communication as this is what funding sources are most interested in.



pALS 1

- Age 54
- Speech status – 5
- Previous AT for communication
 - iPad mini with ClaroCom

Parameter	Rating
Communication	7
Email	8
Internet Access	10
Text Message	10
Environmental Control	7
Facebook/Social Media	10
Music	10
Photos (scrapbooking)	10
E-media	10
Games	10
Skype/FaceTime	4
Make/receive phone calls	1
Other computer functions	8
Computer specs	5
Overall mouse control	10

video



pALS 2

- Age 51
- Vent-dependent x 18 months
- Speech status = 5
- AT for communication
 - DynaVox V Max
 - Head mouse

Parameter	Rating
Communication	10
Email	10
Internet Access	10
Text Message	7
Environmental Control	10
Facebook/Social Media	7
Music	10
Photos	1
E-Media	10
Games	10
Skype/FaceTime	8
Make/Receive Phone calls	2
Other computer functions	2
Computer specs	10
Overall mouse control	10

Video talking

pALS 3

- Age 61
- Vent-dependent x 2 months
- Speech status – stage 2 with Passy-Muir
 - Only tolerates 1-2 hrs
 - Wife reads lips
- Minimal interest in technology

Parameter	Rating
Communication	10
Email	1
Internet Access	1
Text Message	1
Environmental Control	10
Facebook/Social Media	1
Music	10
Photos	10
E-Media	5
Games	1
Skype/FaceTime	1
Make/Receive Phone calls	6
Other computer functions	1
Computer specs	1
Overall mouse control	1

Results

- Tried SGD with head mouse and eye gaze
 - Some h/o dyslexia
 - TV remote is RF
- Alphabet board
- Referral for environmental control eval



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Client: _____

Date(s) of Eval: _____



	<u>Tobii I-series</u>	<u>Eyegaze Edge</u>	<u>Surface Pro/camera</u>	<u>FRS WinSlate</u>	<u>PRC Accent</u>
Spell / keyboard					
Navigate					
Word Prediction					
Error recognition					
Error correction					
Use of function keys					
Store phrases independently					
Retrieve phrases					
Calibration					
Needs typing feedback		I			
Click selection					
Speed					

Rate on a scale of 1-5, with one being poor and 5 being excellent.

Features

- Calibration
- Navigation
- Word prediction
- Error recognition
- Error correction
- Feedback
- Click selection type

How do you determine success?



Determiners of success

- Calibration
- Independence
- Speed
- Efficiency

Efficiency

pALS 1 typing

Accent
Dwell-free 1
Dwell-free 2

Speed

Video typing

pALS 4

- Age 43
- Speech Status 2
- Previous AT for communication
 - None

Parameter	Rating
Communication	10
Email	6
Internet Access	9
Text Message	9
Environmental Control	9
Facebook/Social Media	8
Music	7
Photos	6
E-Media	8
Games	7
Skype/FaceTime	7
Make/Receive Phone calls	9
Other computer functions	8
Computer specs	2
Overall mouse control	7

- **Systems**

- Eyegaze Edge (LC Technologies)
- I-15 (Tobii Dynavox)
- myGaze (Visual Integration)
- Accent 1400 (Prentke Romich Company)

pALS 4	I-15	Eyegaze Edge	myGaze	Accent
Spell	4	4	2	4
Navigate	4	2		
Word Prediction				
Error Recognition	4	3	3	3
Error Correction	4	3	3	4
Function Keys	4	4	3	4
Store Phrases	4	2		
Retrieve Phrases	4	3		
Calibration	4	2	2	4
Typing feedback	Shrinking dot	Click	Click	Dot
Click Selection	Dwell	Dwell	Dwell	Dwell
Speed	.6 sec	.8 sec	1.0 sec	.9

How well will it meet your needs?

Category	I-15	Eyegaze Edge	Accent 1400
Face-to-face communication	7	6	7
Internet Access	8	5	
Making/receiving phone calls	7		
Text Messages	8		7

Comparison

- I-15
 - Liked interface
 - Navigation and organization superior
 - Functional desktop access with gaze selection and mouse emulation
 - Concerned about size for out and about communication
- Accent 1400
 - Size/shape more amenable to interaction with others
 - Software not as intuitive

- Surface Pro 3
- PCeyeMobile with holder
- Tobii Communicator 5

pALS 4	I-15	Accent	Surface Pro
Spell	4	4	4
Navigate	4		5
Word Prediction			
Error Recognition	4	3	4
Error Correction	4	4	4
Function Keys	4	4	4
Store Phrases	4		
Retrieve Phrases	4		
Calibration	4	4	5
Typing feedback	Shrinking dot	Dot	
Click Selection	Dwell	Dwell	Dwell
Speed	.6 sec	.9	.8

Video surfing

Success of Intervention?



How well will it meet your needs?

Parameter	Rating
Communication	8
Email	7
Internet Access	7
Text Message	8
Environmental Control	7
Facebook/Social Media	7
Music	8
Photos	7
E-Media	7
Skype/FaceTime	8
Make/Receive Phone calls	
Other computer functions	7
Computer specs	6
Overall mouse control	7

How well is it meeting your needs?

- Challenges
 - Still limited #of phones working. Samsung Galaxy 6 worked for text and phone, 7 only for text.
 - Need TD beam app to connect phone

Pals 4

- I think the biggest thing about the system is finding all the abilities to make life more independent. A small investment and I can run all my tv's with it, thermostats, lights and smart switches already. On top of the communication stuff. I'm hoping to also add the ability to open my garage and garage door in the spring so I'll be able to go outside when I want on my own.
- I'm very happy with the system. Haven't figured out the phone yet but haven't tried.

pALS 5

- Age 54
- Speech status 3
- Previous AT for communication
 - None

- Important Features (April 2012)
 - Email
 - Internet access
 - Making/receiving phone calls
 - Other computer functions

Decided not to pursue eye gaze technology

- Systems

- Eyegaze Edge (LC Technologies)
- WinSlate 13 (FRS)
- Conversa (Words+)

- Important Features (April 2015)
 - Face-to-face communication
 - Email
 - Internet access
 - Text messages
 - Facebook/social media
 - Photos
 - E-media
 - Making/receiving phone calls
 - Other computer functions
 - Overall mouse control

web design eval

pALS 5	FRS Winslate 13	Eyegaze Edge	Eye Pro with EZ Keys
Spell	2	5	Unable to get device
Navigate	4	5	to work consistently
Word Prediction	DNA	N/A	with Ian's setup
Error Recognition	5	5	
Error Correction	4	5	
Function Keys		3	
Store Phrases		DNA	
Retrieve Phrases		DNA	
Calibration	2	4.5	
Typing feedback	Click	Click	
Click Selection	Blink	Dwell	
Speed		.56 sec	

Pals 5

- “Lisa, as you know, I use the eyegaze system 2 different ways. During the day 11:00 am to 7:00 pm the eyegaze is an interface tool with my PC. 99% of the time it's typing and moving the mouse. the remainder is the use of the environmental control module. Night time 7:00 pm to 9:00 am it's eyegaze only.”
- “Until I went into the hospital I had not tried any of the communication tools. But this was a life saver the last 4 days as I was to weak to talk. I wish I would have practiced and familiarized my self with this before crunch time came”

pALS 5 gets his own Eyegaze Edge



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Success of Intervention?



How well will it meet your needs?

Category	Eval	After 8 months	19 months
Face-to-face communication	8	10	10
Email	10	10 (1 w/ email app)	10
Internet Access	10	10	10
Other Computer Functions	10	10	10
Overall Mouse Control	10	10	10
Text Messages		1	8 (Google Voice)
Facebook/Social Media		10	10
Photos		10	10
E-media		10 (Kindle app)	
Making/receiving phone calls		1	8 (Google Voice)
Environmental Control (rated 5)		9	10 (apps)

- No face to face but I do use it for long google home commands
- Internet use: Fantasy Sports, Online Poker, Facebook, You Tube, Market research for businesses I consult for, control my lights, switches, outlets, video camera, garage door.

Category	Rating			
	p1 1	p2 2	p3 19	p4 31
Face-to-face communication	8	10	10	10
Email	7	2	10	10
Internet Access	7	7	10	10
Text message	8		8	
Environmental Control	7		10	
Facebook/social media	7	6	10	10
Music	8	6		10
Photos	7		10	10
E-Media	7	9		10
Games		9		10
Video Chat (Skype, FaceTime)	8	3		
Making/receiving phone calls			8	
Other computer functions	7		10	
Computer specs	6		10	10
Overall Mouse control	7		10	10

Questions?

