

Purdue RVL-SLLL American Sign Language Database

by

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1. Why we created this database.

Development of automatic recognition systems for American Sign Language (ASL) needs a comprehensive database that provides a range of signed material under controlled and less-controlled lighting conditions. The database we created contains (a) handshapes in isolation and in single signs, (b) the American fingerspelling alphabet, (c) numbers, (d) movement in single signs, and (e) examples of short discourse narratives for testing sign recognition in connected linguistic contexts.

All of these are produced by 14 fluent Deaf ASL signers under controlled lighting conditions in a professional studio. All except the short narratives are also produced in less than superior lighting conditions.

These data can provide the recognition algorithm developer with the opportunity to move from simple recognition situations in the best of circumstances to more complex recognition situations with challenging lighting situations.

The database was collected with support from the National Science Foundation Linguistics Program under Grant No. 99-05848 and 0414953.

2. What is in the database

Full technical details on the ASL database are provided in

<http://cobweb.ecn.purdue.edu/RVL/Publications/Martinez02Purdue.pdf>

In any instances of informational conflict, the technical report that you are currently reading should supersede the earlier description in the above reference.

Here we also provide additional information on reading the filenames and understanding the sign coding.

a. Filenames code:

Signer code	xx	01-14
Type	y	M (for motion), H (for handshapes), A (for alphabet), N (for number), P (for paragraph)
File number	zz	1-43 (for motion), 1-10 (for paragraphs), 1-20 (for handshapes)
Lighting	u	-D(iffuse), -C(ontrast)

Examples:	01-M-1-C	Subject 1, Motion 1, Contrast lighting
	01-A-D	Subject 1, Alphabet, Diffuse lighting

b. Glosses for signs

Glosses for sign languages (SLs) are generally written in capital letters. Remember that glosses are names for signs – they do not indicate special handshape, movement, orientation, or place of

articulation information that would allow you to determine how the sign is made or exactly what it means in a given context. They also do not indicate grammatical uses of facial expressions (for example, brow raise is used in yes/no questions; a particular kind of head nod means that an event is completed).

c. Data organization

The data are organized as follows:

1. Alphabet
2. Numbers 1-20
3. Handshapes with 2 example signs for each
4. Signs in isolation to show different motions
5. Paragraphs to show connected discourse

(1) Alphabet

The handshapes in American fingerspelling that correspond to each letter of the written alphabet. This particular set of fingerspelled handshapes is unique to North America (except French Quebec) and is not used in England or elsewhere. England uses a two-handed alphabet.

(2) Numbers

There is enormous variation in how the numbers are signed, especially 16, 17, 18 and 19, which differ dialectally. Also numbers for different purposes (e.g. counting, keeping score, telling time, talking about ages, etc) vary in their palm and finger orientation. The numbers presented here are from *counting* in Indiana.

(3) Handshapes and Two Examples

Handshape Gloss	Example 1	Example 2
1. O	EMPTY-HEAD	NONE
2. C	DRINK	SEARCH
3. babyO	PERFECT	PICK-ON
4. X	MUST	APPLE
5. E	EAST	ELEVATOR
6. A	DAILY	GIRL
7. 5	FATHER	TREE
8. B	HOUSE	PRESENT (VERB)
9. open-8	YOU-JERK!	SICK
10. F	FRUIT	CAT
11. W	WATER	WEDNESDAY
12. Y	SAME	THINK-FOR-YOURSELF
13. I	DEAF-SCHOOL	INTERVIEW
14. V	VINEGAR	DIVE
15. R	ROPE	RONNIE WILBUR
16. H/U	HONOR	HARD-OF-HEARING
17. L	LEGAL	LIBRARY
18. 1	YOU	ONLY-ONE

19.	3	CAR-ALONG-PATH	LOUSY
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(4) Motions: Signs in isolation

Two-handed signs may either have both hands moving together or one hand held still (the basehand) and the other moving. Examples listed in brackets (e.g. [cf 17]) are ones that might be of interest for analytical comparison.

Motion type	Example sign
1. up	PUT (on a shelf)
2. down	PUT (straight down)
3. away to target-center	PUT (center of table)
4. diagonal away to target-left	PUT (left edge of table)
5. left to right (probably arc)	LEFT-GIVE-RIGHT
6. right to left (probably arc)	RIGHT-GIVE-LEFT
7. away from signer-center to target-center	I-GIVE-YOU
8. center-addressee toward signer-center	YOU-GIVE-ME
9. diagonal from signer-center to target-left	I-GIVE-LEFT
10. diagonal from signer-center target-right	I-GIVE-RIGHT
11. diagonal addressee-center to target-left	YOU-GIVE-LEFT
12. diagonal addressee-center to target-right	YOU-GIVE-RIGHT
13. handshape change; close to open; facing down	DROP
14. handshape change; close to open; facing away	THROW-(OUT)
15. orientation vertical to orientation horizontal	DAY
16. alternating left-right arc swing	TENNIS
17. toward signer (from unspecified start)	MY
18. Z-shape (zig-zag) [3 strokes – straight to right, diagonal down to left, straight to right]	PIZZA
19. elbow-pivot circle in vertical plane	SOMEONE
20. elbow-pivot circles in vertical plane	ALWAYS
21. elbow-pivot orientation out to orientation in	ONLY-ONE
22. away [two-handed; cf 3 above]	CC AWAY
23. toward [two-handed; cf 17]	CC TOWARD
24. up [two-handed; cf 1]	CC UP
25. down [two-handed; cf 2]	CC DOWN
26. to left [two-handed; cf 4, 9]	CC LEFT
27. to right [two-handed; cf 10]	CC RIGHT
28. away from signer-head; handshape change; close to open [two-handed; cf loc & motion 22; handshape change 13; orientation 14)	INFORM
29. toward signer-face [two-handed; cf 17]	POINT-TO-EYE
30. left to right with handshape change open to close at signer-forehead	FORGET
31. diagonal down upper left to lower right at signer-shoulder to waist	KING
32. elbow-pivot orientation up to orientation down [two-	HAPPEN

handed; cf 21]	
33. elbow-pivot orientation out to orientation in [lower cheek]	APPLE
34. elbow-pivot orientation out to orientation in [upper cheek]	ONION
35. contact leftside-nose to rightside-nose [cf 31]	FLOWER
36. contact center-forehead down to contact center-chin [cf 31, 35]	PARENTS
37. diagonal away from vertical basehand [fingertips oriented up]	SKILLED
38. bounce from motion down to contact with vertical basehand [fingertips oriented out]	ILLEGAL
39. motion down to contact with vertical basehand [fingertips oriented out]	LEGAL
40. fist to open hand	INFLUENCE
41. index and middle finger wiggle	CL:V-WALK
42. thumb wiggle	2-TO-3
43. index finger closed to open	UNDERSTAND

(5) Paragraphs

Fingerspelled loan signs (signs originally derived from fingerspelling but no longer merely fingerspelled) are written with # before the gloss (e.g. #FLA for Florida). Pronominal reference is written as a combination of person (first 1-p, second 2-p, and different third persons 3a, 3b, etc). Name signs are usually written as the first letter of the person's name (e.g. "E") with the rest of the name filled in if relevant ("E(mily)"). Signs that take more than one English word to translate are written with hyphens between the words: TWO-DAYS-AGO is ONE sign. Pauses between signed utterances are shown with dots ... Remember that ASL is not English; it is a separate language with its own grammar and the glosses really don't tell you very much about what is actually being signed (they don't include the grammatical information).

An English translation of each paragraph is given in 'plain text' below the glosses. Remember that the glosses represent what the signer was supposed to sign. Like any speaker, signers may make adjustments to what they actually sign in order to make it more comfortable in their dialect. If it is critical to your research to have exactly the same glosses across signers, you should consult someone fluent in American Sign Language (ASL) to help you ignore any signs that may have been added that you don't wish to analyze.

1. NEWSPAPER READ 1-P, AWFUL #STORM IN #FLA. HOMES, CARS, TREES, DESTROY. PEOPLE ABOUT 25 DIE, ABOUT NOT SURE. HOMES, CARS, AND TREES WERE ALL DESTROYED. 'I read in the newspaper about a bad storm in Florida.'
2. LONG-AGO 1-P LITTLE-CHILD, ENJOY CLASSES ALL. CLASS FAVORITE , LANGUAGE. BEST! 'A long time ago when I was a child, I enjoyed all my classes. My favorite class was language.'
3. SORRY! 1-P DOWNSTAIRS. CLOTHES HEAP DIRTY HAVE-TO WASH. 1-P NOT SEE LIGHT-FLASH.

<p>'I'm sorry I didn't see the light flashing. I was downstairs doing the laundry.'</p>
<p>4. KNOW-THAT "E(MILY)" BORN GIRL BABY. HAPPEN TWO-DAYS-AGO. FIRST GIRL. 'Guess what, Emily had a baby girl two days ago. It's her first daughter.'</p>
<p>5. SHOCK 1-P! DISCOVER GOOD FRIEND DIE. THINK HEART-ATTACK. NOT-KNOW ...SEEM SICK HE, NOT-KNOW 1-P. 'I am so shocked to learn that my good friend died. I think it was a heart attack, but I'm not sure. I didn't know that he had been sick.'</p>
<p>6. FRIEND BUY COMPUTER, HAVE EVERYTHING. SEEM TO ME, IMPRESS 1-P NOTHING. EXPENSIVE! 'Apparently, my friend bought me a computer that has everything. I'm not that impressed because it's so expensive.'</p>
<p>7. ALWAYS MY DAUGHTER, TAP-SHOULDER, ICE-CREAM, POP. 1-P BLEW-UP, TELL-HER LATER, DON'T BOTHER ME. 'My daughter always bothers me for ice cream or soda. I lost my temper and told her not to bother me till later.'</p>
<p>8. WRONG YOU. MEETING STARTS TIME TWO, YOU-TELL-ME NOON. WHAT'S-THE-MATTER-WITH-YOU? 'You were wrong! The meeting started at 2 p.m. You told me that it was at noon. What's wrong with you?'</p>
<p>9. YESTERDAY FUN. FAMILY ... HUSBAND, DAUGHTER. SON LEAVE GO #LAKE, SWIM ALL-DAY. 'Yesterday was fun. My family, including my husband, son and daughter, went to the lake and swam all day.'</p>
<p>10. KNOW-THAT DEAF SCHOOL HAVE NEW DORM. OLD NOT DESTROY, SURPRISE ME. BUILD NEW NEXT-TO BUILD. BEAUTIFUL. 'Guess what, our Deaf school has a new dorm! The old one was not destroyed which really surprised me. The beautiful new dorm was built right next to the old one.'</p>

3. How to navigate the database

In order to search the database for files that meet your specifications, we have created an interface to the database. It consists of several categories which you can select from. By holding down the control key, you may select multiple items from the same category. To deselect an item, hold down the control key and click on the item you wish to deselect.

In the first box select either contrast or diffuse to determine what lighting condition the video clip(s) should have. If neither is selected, both types of lighting conditions will be returned. Shown here is the location of the box described in this paragraph.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

Light Conditions Contrast Diffuse	File Type Alpha-Numeric Handshape Motion Paragraph			
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - E: EAST, ELEVATOR 06 - A: DAILY, GIRL 07 - S: FATHER, TREE 08 - B: HOUSE, PRESENT 00 - ODEM B: YOU LEFKI SICK	Motion 01 - up 02 - down 03 - away to target-center 04 - diagonal away to target-left 05 - left to right (parabolic arc) 06 - right to left (parabolic arc) 07 - away from signer-center to target 08 - center addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glosses 1-p 25 ABOUT ALL ALL-DAY ALWAYS AWFUL BABY BEAUTIFUL
Subject Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09 Number 10 Number 11 Number 12 Number 13 Number 14	Sex Male Female	Glasses Yes No	Color of Shirt light grey grey dark grey	Length of Sleeves Long Sleeves Short Sleeves No Sleeves
	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

Light Conditions

Contrast

Diffuse

In the second box, you may select what type of signs you would like: alpha-numeric, handshape, motion, or paragraph. If any item is selected in this box only items of this type will be returned, regardless of what is selected in the second row of windows. Shown below is the box described in this paragraph.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - E: EAST, ELEVATOR 06 - A: DAILY, GIRL 07 - S: FATHER, TREE 08 - B: HOUSE, PRESENT no_ODEN.B: YOU JEK! SICK	Motion 01 - up 02 - down 03 - away to target-center 04 - diagonal away to target-left 05 - left to right (parabolic arc) 06 - right to left (parabolic arc) 07 - away from signer-center to target 08 - center addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glosses 1-p 25 ABOUT ALL ALL-DAY ALWAYS AWFUL BABY BEAUTIFUL
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	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

File Type

Alpha-Numeric
 Handshape
 Motion
 Paragraph

The second row of windows allows you to further specify the type of signs you would like to have. If nothing is selected in the box explained above, use the second row of boxes instead to narrow your selection. Below you can see a mixture of selections of the first two rows of boxes.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

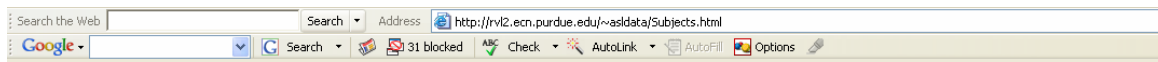
Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - E: EAST, ELEVATOR 06 - A: DAILY, GIRL 07 - 5: FATHER, TREE 08 - B: HOUSE, PRESENT 00 - ODEUR: YOU, JERK! SICK	Motion 01 - up 02 - down 03 - away to target-center 04 - diagonal away to target-left 05 - left to right(parabolic arc) 06 - right to left(parabolic arc) 07 - away from signer-center to target 08 - center-addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glosses 1-p 25 ABOUT ALL ALL-DAY ALWAYS AWFUL BABY BEAUTIFUL
Subject Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09 Number 10 Number 11 Number 12 Number 13 Number 14	Sex Male Female	Glasses Yes No	Color of Shirt light grey grey dark grey	Length of Sleeves Long Sleeves Short Sleeves No Sleeves
	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

Show Thumbnails Clear All Search

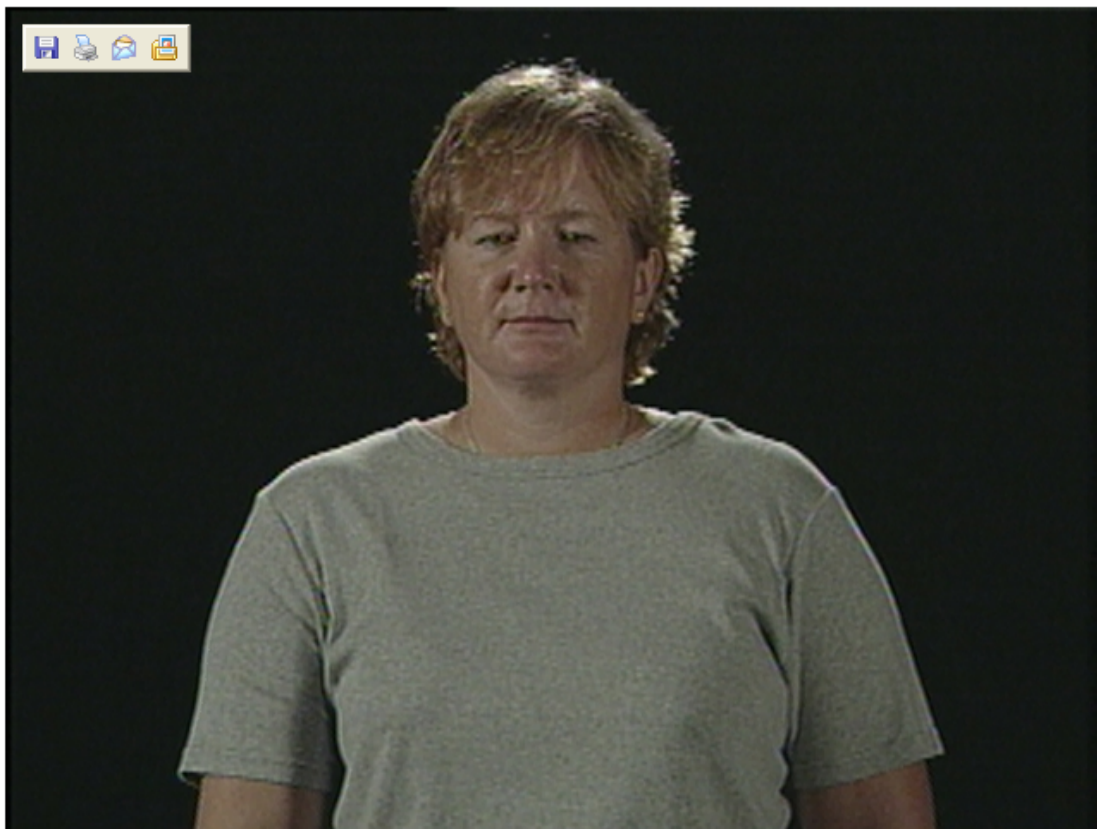
The third row of boxes contains information regarding the subjects. There are two different ways to select the subjects you wish to see. The first is that by pressing the button that says “Show Thumbnails” you can see clips of the subjects themselves.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

Light Conditions		File Type	
Contrast Diffuse		Alpha-Numeric Handshape Motion Paragraph	
Alpha-Numeric	Handshape	Motion	Paragraph
Alphabet Numbers	01 - O: EMPTY HEAD, NONE 02 - C: DOWN, SEARCH 03 - D:BY O: EXACTLY, PICKY 04 - K: MUST, APPLE 05 - E: EAST, ELEVATOR 06 - A: DAILY, GRS. 07 - S: FATHER, TREE 08 - R: HOUSE, PRESENT 09 - G: M: YOUR, M: ONE, KICK	01 - up 02 - down 03 - away to target-center 04 - diagonal away to target-left 05 - left to right (parabolic arc) 06 - right to left (parabolic arc) 07 - away from signer-center to target 08 - center-addresses toward signer	Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09
containing glosses			
1 p 25 ABOUT ALL ALL DAY ALWAYS AWFUL DADY DISAPPOINTED			
Subject	Sex	Glasses	Color of Shirt
Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09 Number 10 Number 11 Number 12 Number 13 Number 14	Male Female	Yes No	light gray gray dark gray
	Handedness	Writing on Shirt	Length of Sleeves
	Right-Handed Left-Handed	Yes No	Long Sleeves Short Sleeves No Sleeves
<input type="button" value="Show Thumbnails"/> <input type="button" value="Clear All"/> <input type="button" value="Search"/>			



To see a bigger picture of the subjects, click on the link below them.



Then you can select the subjects by subject number.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
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	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

Show Thumbnails Clear All Search

Instead of selecting the subjects based on their images, you can select them based on other qualifications, such as the color of their shirt, the length of their sleeves, etc, as shown below.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - E: EAST, ELEVATOR 06 - A: DAILY, GIRL 07 - S: FATHER, TREE 08 - B: HOUSE, PRESENT 09 - OPEN: YOU, JERK, SICK	Motion 01 - up 02 - down 03 - away to target-center 04 - diagonal away to target-left 05 - left to right(parabolic arc) 06 - right to left(parabolic arc) 07 - away from signer-center to target 08 - center-addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glasses 1-p 25 ABOUT ALL ALL-DAY ALWAYS AWFUL BABY BEAUTIFUL
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	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

Show Thumbnails Clear All Search

The third choice is to select the subjects based on their images, and then also some other qualifications that you might not be able to tell based on an image, like whether they are right or left-handed. An example of this is shown below.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected Directions

Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - E: EAST, ELEVATOR 06 - A: DAILY, GIRL 07 - S: FATHER, TREE 08 - B: HOUSE, PRESENT no...ODEN R-YOU LERKL SICK	Motion 01 - up 02 - down 03 - away to target-center 04 - diagonal away to target-left 05 - left to right(parabolic arc) 06 - right to left(parabolic arc) 07 - away from signer-center to target 08 - center-addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glosses 1-p 25 ABOUT ALL ALL-DAY ALWAYS AWFUL BABY REAMITTEH
Subject Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09 Number 10 Number 11 Number 12 Number 13 Number 14	Sex Male Female	Glasses Yes No	Color of Shirt light grey grey dark grey	Length of Sleeves Long Sleeves Short Sleeves No Sleeves
	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

Show Thumbnails Clear All Search

If at some point, you decide that you would like to clear all of your selections, you may press the “Clear All” button and all of your selections will be deselected.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected

Directions

Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - F: FAST, ELEVATOR 06 - A: DAILY, GIRL 07 - S: FATHER, TREE 08 - E: HOUSE, PRESENT 09 - OPEN & YOU: FEEL SICK	Motion 01 - up 02 - down 03 - away to target center 04 - diagonal away to target-left 05 - left to right (parabolic arc) 06 - right to left (parabolic arc) 07 - away from signer center to target 08 - center, addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glosses 1-p 2S ABOUT ALL ALL-DAY ALWAYS AWFUL BABY DEAF/DEAFBL
Subject Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09 Number 10 Number 11 Number 12 Number 13 Number 14	Sex Male Female	Glasses Yes No	Color of Shirt light grey grey dark grey	Length of Sleeves Long Sleeves Short Sleeves No Sleeves
	Handedness Right-Handed Left-Handed	Writing on Shirt Yes No		

When you are satisfied with your selections, press the “Search” button to see a list of all of the files that meet your qualifications.

Select Criteria for Video Clips, any boxes without any selections will be treated as if everything in the box were selected

Directions

Light Conditions Contrast Diffuse		File Type Alpha-Numeric Handshape Motion Paragraph		
Alpha-Numeric Alphabet Numbers	Handshape 01 - O: EMPTY-HEAD, NONE 02 - C: DRINK, SEARCH 03 - BABY O: EXACTLY, PICKY 04 - X: MUST, APPLE 05 - F: FAST, ELEVATOR 06 - A: DAILY, GIRL 07 - S: FATHER, TREE 08 - E: HOUSE, PRESENT 09 - OPEN & YOU: FEEL SICK	Motion 01 - up 02 - down 03 - away to target center 04 - diagonal away to target-left 05 - left to right (parabolic arc) 06 - right to left (parabolic arc) 07 - away from signer center to target 08 - center, addressee toward signer	Paragraph Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09	containing glosses 1-p 2S ABOUT ALL ALL-DAY ALWAYS AWFUL BABY DEAF/DEAFBL
Subject Number 01 Number 02 Number 03 Number 04 Number 05 Number 06 Number 07 Number 08 Number 09 Number 10 Number 11 Number 12 Number 13 Number 14	Sex Male Female	Glasses Yes No	Color of Shirt light grey grey dark grey	Length of Sleeves Long Sleeves Short Sleeves No Sleeves
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