

The list of utterances used to train ASPECT’s intent model:

|                     |                        |                        |
|---------------------|------------------------|------------------------|
| 3-4 shut the door   | go away                | pine                   |
| a big apple         | go bye bye             | pizza                  |
| a big apple tree    | go bye-bye             | plane                  |
| a big mud puddle    | goat                   | pokey                  |
| a cow says moo-moo  | goldfish               | pool                   |
| a good book         | goldfish crackers      | pop                    |
| a really big puddle | goofy                  | potato                 |
| anyway              | goofy goat             | potty                  |
| apple               | grapes                 | price                  |
| apple tree          | halloween treat        | prize                  |
| are you done        | hammer                 | pudding                |
| at the end          | hammer and nails       | pup                    |
| babe                | hankie                 | puppet                 |
| baby                | happy                  | puppet game            |
| bagels              | hat                    | puppy                  |
| ball                | helicopter             | put bubbles in the tub |
| banana              | high                   | puzzle                 |
| bare                | hike                   | refrigerator           |
| barney              | holiday fun            | rice                   |
| bat                 | hot dog                | running                |
| bath                | how                    | sandwich               |
| bathtub             | how many               | school                 |
| bear                | how much do you want   | schoolbus              |
| bed                 | hug                    | see                    |
| bee                 | I like bagels          | see tuba               |
| big table           | I like computers       | shine                  |
| bike                | I like to play sports  | shirt                  |
| binky               | I want                 | shoe                   |
| binky boo           | I want a break         | sit                    |
| bologna             | I want a long break    | skittle                |
| bologna sandwich    | I want a puppy         | slide                  |
| bone                | I want a small puppy   | slider                 |
| bones and muscles   | I want juice           | soda                   |
| boo                 | I want pecan ice cream | spaghetti              |
| book                | I want some ice cream  | spoon                  |
| bow                 | I want to go           | strawberries and cream |
| bow wow             | I want yogurt          | swimming               |
| bowl                | ice                    | swimming pool          |
| boyfriend           | ice cream              | syrup                  |
| breakfast and lunch | icky                   | table                  |
| broken              | I’m all done           | taco                   |
| brown               | in the swimming pool   | teacher                |
| brown puppy         | is los                 | ted                    |
| brush               | itches                 | teddy                  |

|                        |                           |                            |
|------------------------|---------------------------|----------------------------|
| brush my hair          | it's in the swimming pool | teddy bear                 |
| bubble                 | juice                     | tell it like it is         |
| bubblegum              | king                      | the big piece of cake      |
| bubbles                | kit                       | the big sun                |
| bubbles in the tub     | kitty                     | the big sun is yellow      |
| bumble                 | kitty cat                 | the cat is climbing        |
| bumble bee             | knife                     | the clown's                |
| bun                    | lakehouse                 | the clown's face           |
| bunny                  | lego                      | the clown's funny face     |
| buzz                   | let the water out         | the clown's funny red face |
| buzzer                 | let's color               | the dog                    |
| bye                    | let's color the picture   | the dog is barking         |
| bye-bye                | let's go home             | the dog is brown           |
| cake                   | let's read                | the library's closed       |
| can I go               | let's read a good book    | the man is driving         |
| can I go outside now   | little brown puppy        | the pencil                 |
| can I go potty         | look at my new snow boots | the water is running       |
| can you fix it please  | lost                      | this is my nose            |
| car                    | macaroni                  | three                      |
| cat                    | make a bowl               | three four shut the door   |
| cheese                 | make a bowl of oatmeal    | tickle                     |
| cheese and crackers    | many                      | tide                       |
| chips                  | medicine                  | time to go                 |
| chocolate pudding      | meow                      | time to go to bed          |
| climbing               | mice                      | tired                      |
| coloring               | might                     | tomato                     |
| coloring book          | milk                      | tonight                    |
| come up                | milk and cookies          | too                        |
| come up with a guess   | mitten                    | toy                        |
| cookie                 | mom                       | treat                      |
| cookie monster         | mom and dad               | tree                       |
| cover me u             | mommy                     | trick                      |
| crackers               | money lender              | trick or treat             |
| cried                  | monk                      | truck                      |
| cry                    | monkey                    | tub                        |
| cup                    | monster                   | tuba                       |
| daddy                  | moo                       | tubby                      |
| dentist                | movie                     | tubby toy                  |
| dimes and quarters     | mud puddle                | tummy                      |
| dip                    | my fries                  | turn left at the corner    |
| do you play            | my little brown puppy     | TV                         |
| do you play soccer too | my new pencil is lost     | twelve                     |
| do you want some too   | my nose itches            | two puzzles                |
| doctor                 | my pencil is lost         | uh-oh                      |
| dog                    | my puppy                  | umbrella                   |

|                         |                       |                      |
|-------------------------|-----------------------|----------------------|
| doggy                   | my teacher            | under the big table  |
| doggy bone              | my tummy hurts        | under the table      |
| doll                    | nails                 | under the wood table |
| don't                   | newspaper             | up                   |
| don't let the water out | nighttime             | up in the air        |
| down                    | no                    | video                |
| drink                   | north is up           | video tape           |
| drive                   | nose                  | water                |
| driving                 | numbers tell the tale | water is running     |
| eat                     | nut                   | wet                  |
| eight                   | oatmeal               | wet mitten           |
| fat                     | octopus               | where did the man go |
| fat doggy               | oh                    | where is big bird    |
| fire                    | okay                  | where is my teacher  |
| flat                    | one                   | whine                |
| flip me upside down     | open                  | window               |
| fold the map            | open the book         | winnie the pooh      |
| food                    | open the book now     | wipe                 |
| forget about it now     | open up               | wonder               |
| fork                    | ouch                  | wonderful            |
| fried                   | outside now           | wow                  |
| fun                     | pajamas               | yellow               |
| funny                   | pancakes              | yes                  |
| funny king              | pancakes and syrup    | yogurt               |
| game                    | panda                 | you won the game     |
| get my blue pajamas     | pay                   | yuck                 |
| get my pajamas          | pea                   | yucky                |
| girlfriend              | peanut                | yumm-o               |
| give me pizza           | peanut hat            | yummy                |
| go                      | pencil                | yummy food           |

Table S1: Application of guidelines for developing interactive software for children with ASD to ASPECT.

| Guideline | Description   |
|-----------|---|
| 1         | The team members without the therapeutic experience visited the therapy center to observe children during their activities. In addition, video recordings of the sessions aimed at practicing echoic skills were watched.   |
| 2         | ASPECT replicated practice sessions aimed at improving echoic skills. The therapist selected utterances based on the child’s abilities and the intended objectives of the session.  |
| 3         | The study and the recruitment script were approved by the IRB. Each guardian was provided a consent form, while children were provided an assent form (if applicable).  |
| 4         | ASPECT replicated practice sessions aimed at improving echoic skills. We allowed for practice sessions familiarizing the child with ASPECT.   |
| 5         | All children whose data were reported completed 30 sessions. Data from children who had not completed 30 sessions or expressed maladaptive behavior were excluded from the study.   |
| 6         | A session with ASPECT ended in the same way a regular session with a therapist did.   |
| 7         | To maintain ecological validity, no special arrangements were made.   |
| 8         | The sessions were conducted by the therapist who was part of the research team.   |
| 9         | For child’s comfort, only their therapist was present during the sessions with ASPECT.  |
| 10        | Sessions with ASPECT were limited to 5 minutes. The therapist was allowed to end a session with ASPECT at any point (e.g., child’s discomfort, maladaptive behavior).   |
| 11        | The sessions with ASPECT were part of the overall therapy plan. It inherently had the same flexibility as the regular sessions.   |
| 12        | To maintain ecological validity, no changes to the room were made. The only new object was the Echo Dot used in the study. Many of the children were familiar with the device, commonly seen in their homes and the center. |
| 13        | ASPECT replicated practice sessions aimed at improving echoic skills. It mimicked the way a therapist would interact with the child during a session.   |
| 14        | Our study was conducted in the same spaces where the child had their regular sessions with the therapist.   |
| 15        | ASPECT replicated practice sessions aimed at improving echoic skills. It mimicked the way a therapist would interact with the child during a session. No additional stimuli were present.                                   |
| 16        | This version of ASPECT did not offer customization or adaptation other than utterances matching the child’s abilities and therapeutic objectives set by the therapist.  |
| 17        | No special interests and fears of the child were accommodated in this version of ASPECT.  |
| 18        | ASPECT allowed only the limited number of attempts per utterance. Children had no control over ASPECT.  |
| 19        | ASPECT was logging data to the extent permitted by the IRB.   |
| 20        | Even if a child failed to speak an utterance, ASPECT provided encouraging feedback.   |