APPENDIX

Table A1. Lexical properties (mean, SD) of the cohort density and rhyme density manipulations in the spoken-to-written word matching experiment.

|  |  |  |  |
| --- | --- | --- | --- |
| Measure | Cohort Density |  | Rhyme Density |
| Dense | Sparse |  | Dense | Sparse |
|  |  |  |  |  |  |
| Sample item | BAG | BALL |  | BEAN | BENCH |
| N | 30 | 30 |  | 30 | 30 |
| Auditory file length (ms) | 626.3 (95.19) | 622.8 (90.7) |  | 613.5 (98.66) | 600.4 (102.85) |
| Number of phonemes | 3.40 (0.5) | 3.43 (0.5) |  | 3.40 (0.62) | 3.43 (0.68) |
| Log frequency  | 1.24 (0.68) | 1.29 (0.54) |  | 1.06 (0.33) | 1.02 (0.28) |
| Number of neighbors | 19.03 (9.69) | 14.97 (8.34) |  | 20.33 (8.99) | 10.80 (5.33) |
| Summed frequency of neighbors | 23.24 (14.02) | 18.04 (11.61) |  | 22.91 (11.59) | 11.04 (6.19) |
| Number of cohort neighbors | 96.37 (73.49) | 35.27 (19.8) |  | 48.63 (32.6) | 57.60 (41.21) |
| Summed frequency of cohort neighbors | 64.83 (48.8) | 25.75 (13.48) |  | 34.27 (22.75) | 39.58 (27.34) |
| Number of rhyme neighbors | 18.97 (11.90) | 14.60 (8.62) |  | 24.47 (10.16) | 4.70 (1.95) |
| Summed frequency of rhyme neighbors | 24.71 (23.44) | 17.88 (12.41) |  | 31.04 (21.19) | 4.35 (2.30) |
| Number of Spanish orthographic neighbors | 3.23 (4.25) | 1.53 (2.18) |  | 2.27 (2.82) | 1.47 (2.15) |
| Summed frequency of Spanish orthographic neighbors | 171.13 (269.48) | 464.32 (1624.18) |  | 74.78 (162.1) | 61.84 (139.62) |
| Number of Spanish phonological neighbors | 0.63 (1.30) | 0.47 (0.90) |  | 0.97 (2.48) | 0.57 (1.33) |
| Summed frequency of Spanish phonological neighbors | 1246.7 (1504.62) | 41.12 (100.52) |  | 133.75 (223.31) | 501.12 (680.04) |
|  |  |  |  |  |  |

Table A2. Experimental stimuli used in the spoken-to-written word matching task.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Target | Cohort distractor | Rhyme distractor | Onset neighbor of rhyme distractor | Offset neighbor of cohort distractor |
| **Dense Cohort Neighborhood** |  |  |
| bag | bat | tag | tab | chat |
| train | trunk | drain | draft | chunk |
| patch | pad | latch | lamb | dad |
| cap | cat | lap | lag | mat |
| lip | lid | hip | hint | kid |
| calf | cash | half | hang | sash |
| mop | mob | cop | cot | job |
| witch | wink | ditch | disk | think |
| bell | bet | cell | cent | jet |
| cone | comb | tone | tote | dome |
| hat | ham | rat | rag | clam |
| bear | belt | wear | wedge | felt |
| pan | pass | tan | tax | mass |
| hair | hand | pair | pal | land |
| can | camp | fan | fact | lamp |
| man | mash | clan | clerk | dash |
| tree | tray | spree | speech | play |
| fork | fold | pork | pole | mold |
| skull | sky | lull | lust | cry |
| band | back | stand | stick | rack |
| frog | freak | log | loft | peak |
| plug | plot | rug | rut | dot |
| bridge | brick | fridge | friend | kick |
| club | clog | tub | tug | hog |
| groom | grade | boom | book | shade |
| class | clock | grass | grief | rock |
| pear | peg | swear | swan | leg |
| brain | brew | gain | gang | crew |
| frame | frost | blame | bless | cost |
| match | map | batch | bath | gap |
| **Sparse Cohort Neighborhood** |  |  |
| judge | junk | nudge | nut | bunk |
| dog | doll | smog | smile | poll |
| bull | bush | pull | put | push |
| chick | chin | pick | pill | bin |
| wall | walk | hall | hawk | chalk |
| boat | bolt | stoat | store | colt |
| sheep | sheet | jeep | jeans | feet |
| chain | chest | main | maid | pest |
| knife | night | wife | wine | fight |
| hook  | hood | look | loom | mood |
| bone | bow | stone | stamp | row |
| cake | cane | lake | lace | lane |
| gun | gum | nun | numb | drum |
| throne | throw | phone | folk | crow |
| net | neck | pet | pen | trek |
| chair | check | stair | stage | wreck |
| yarn | yard | barn | bark | card |
| pump | pun | lump | lunch | sun |
| salt | sold | halt | horn | cold |
| fox | fog | box | boss | jog |
| horse | haul | force | form | maul |
| gift | gig | lift | link | wig |
| child | chime | wild | wipe | time |
| fence | fetch | sense | sect | stretch |
| vest | vent | rest | realm | rent |
| switch | swim | pitch | pin | trim |
| snake | snow | flake | floor | grow |
| thread | threat | bread | brow | sweat |
| goat | gold | float | flaw | hold |
| ball | bore | call | core | chore |
| **Dense Rhyme Neighborhood** |  |  |
| rake | rail | shake | shame | mail |
| tin | tick | grin | grip | click |
| bean | beach | dean | deal | peach |
| wire | wide | fire | find | hide |
| head | hem | spread | spice | gem |
| tide | tile | bride | brake | file |
| hail | haze | jail | jade | maze |
| shore | shawl | sore | sauce | crawl |
| pine | pile | line | lime | mile |
| chop | chock | stop | steam | dock |
| tap | tact | strap | step | pact |
| jar | jaw | car | cart | paw |
| king | kiss | string | stall | bliss |
| rose | rope | nose | note | hope |
| stain | steel | sprain | spoon | wheel |
| seal | seat | meal | meat | cheat |
| clay | clip | day | desk | ship |
| wing | wish | sting | stew | fish |
| flea | flask | sea | seam | task |
| deck | dent | peck | pep | tent |
| coke | cope | joke | jolt | pope |
| track | treat | slack | slice | wheat |
| plate | plan | gate | gauge | van |
| guest | guess | test | tell | mess |
| spot | speak | shot | shop | leak |
| slit | slap | wit | win | wrap |
| breeze | break | sneeze | snob | steak |
| blade | bloom | trade | trick | room |
| drink | drug | sink | sit | bug |
| skunk | skin | funk | fuss | gin |
| **Sparse Rhyme Neighborhood** |  |  |
| cape | cave | shape | shave | slave |
| lodge | lock | dodge | don | flock |
| song | sock | gong | golf | mock |
| tooth | tool | booth | boost | pool |
| tube | tune | cube | cute | dune |
| pup | puff | cup | cub | cuff |
| fudge | fun | smudge | smoke | bun |
| couch | count | vouch | vow | mount |
| duke | dude | fluke | flush | nude |
| wool | wood | school | scoop | stood |
| mouth | mouse | south | sound | house |
| rib | rink | crib | crate | blink |
| pig | pit | dig | dish | kit |
| roof | root | hoof | hoop | boot |
| dove | dust | glove | globe | rust |
| hedge | hen | ledge | lens | men |
| coach | coast | poach | poke | toast |
| tear | teach | gear | gills | reach |
| path | pack | math | mask | snack |
| sponge | spark | plunge | plum | shark |
| milk | mint | silk | sing | lint |
| disc | dill | whisk | wind | grill |
| pipe | pike | stripe | stock | bike |
| ranch | raft | branch | brat | shaft |
| cliff | clasp | sniff | snip | grasp |
| tribe | trash | bribe | brush | flash |
| cloth | clue | moth | moss | glue |
| bench | bend | trench | trail | spend |
| quilt | quiz | guilt | give | whiz |
| blonde | block | pond | pot | shock |
|  |  |  |  |  |

Table A3. Predictor models of spoken word recognition latency and accuracy in classroom learners of Spanish.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |
| Term | Response Latency | Response Accuracy |
| *b* | *SE* | *95% CI* | *t* | *p* | *b* | *SE* | *95% CI* | *z* | *p* |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| Intercept | 1729.90 | 38.36 | [1654.72, 1805.08] | 54.10 | **0.000** | 2.08 | 0.19 | [1.72, 2.44] | 11.31 | **0.000** |
| Density | 37.59 | 29.58 | [-20.39, 95.56] | 1.27 | 0.204 | -0.12 | 0.17 | [-0.46, 0.22] | -0.68 | 0.494 |
| Neighborhood type | -16.97 | 29.58 | [-74.95, 41.00] | -0.57 | 0.566 | -0.02 | 0.17 | [-0.35, 0.32] | -0.09 | 0.930 |
| Group | 60.24 | 25.36 | [10.53, 109.94] | 2.38 | **0.018** | -0.14 | 0.07 | [-0.28, -0.01] | -2.06 | **0.039** |
| Density-x-Neighborhood type | 52.98 | 29.58 | [-4.99, 110.95] | 1.79 | 0.073 | -0.12 | 0.17 | [-0.46, 0.22] | -0.69 | 0.490 |
| Density-x-Group | -20.13 | 6.84 | [-33.54, -6.73] | -2.94 | **0.003** | 0.03 | 0.03 | [-0.03, 0.09] | 0.89 | 0.372 |
| Neighborhood type-x-Group | 3.44 | 6.83 | [-9.94, 16.83] | 0.50 | 0.61 | -0.09 | 0.03 | [-0.15, -0.03] | -3.01 | **0.003** |
| Density-x-Neighborhood type-x-Group | 14.09 | 6.83 | [0.71, 27.47] | 2.06 | **0.039** | -0.01 | 0.03 | [-0.07, 0.05] | -0.36 | 0.721 |
|  |  |  |  |  |  |  |  |  |

Full model formula: RT (or accuracy) ~ Density\*Neighborhood type\*Group + (Density | participant) + (1 | item)