Towards designing language and cognition experiments on touchscreens: Gesture prevalence in infancy

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Introduction
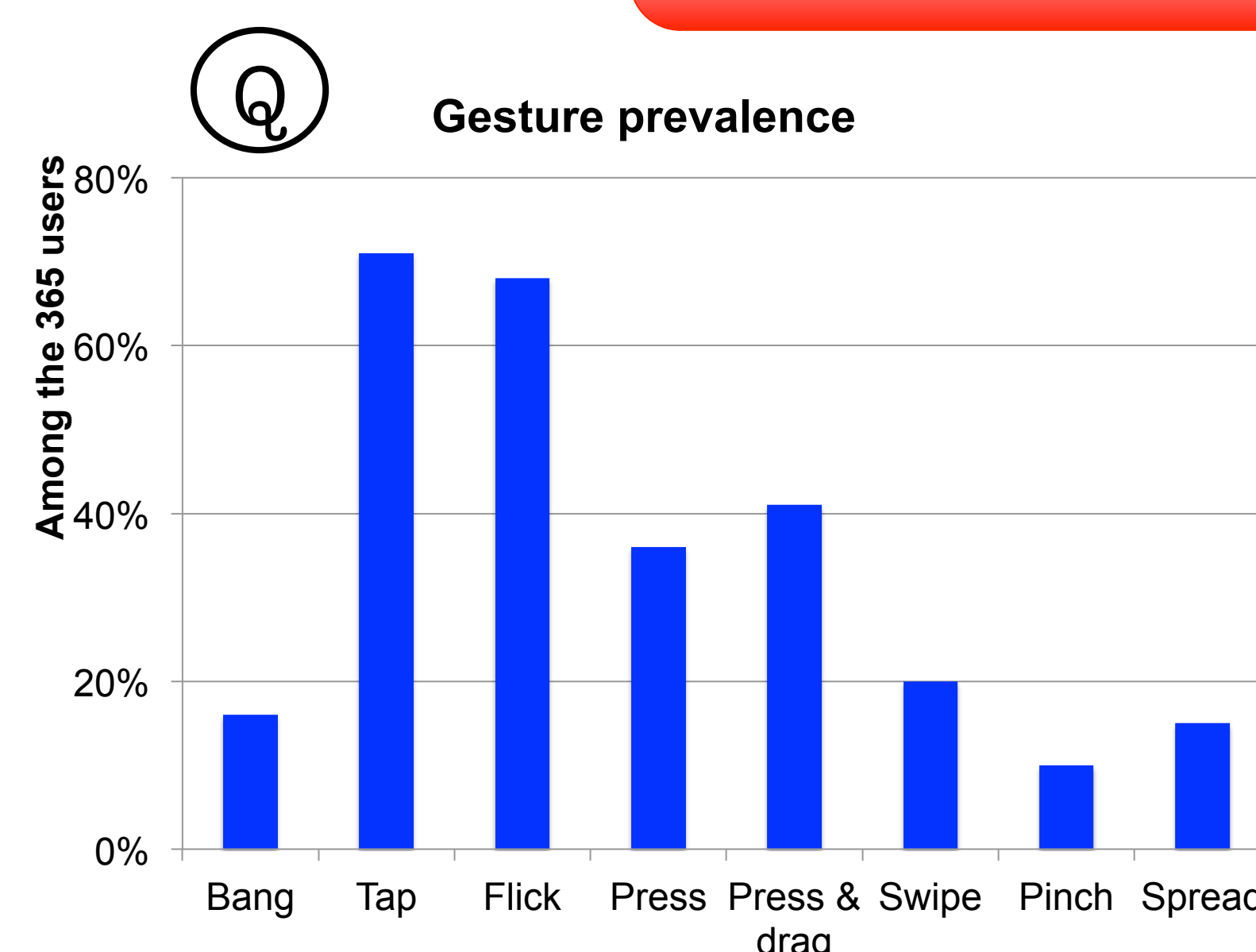
Kids love touchscreens!

Zero screen time under 2

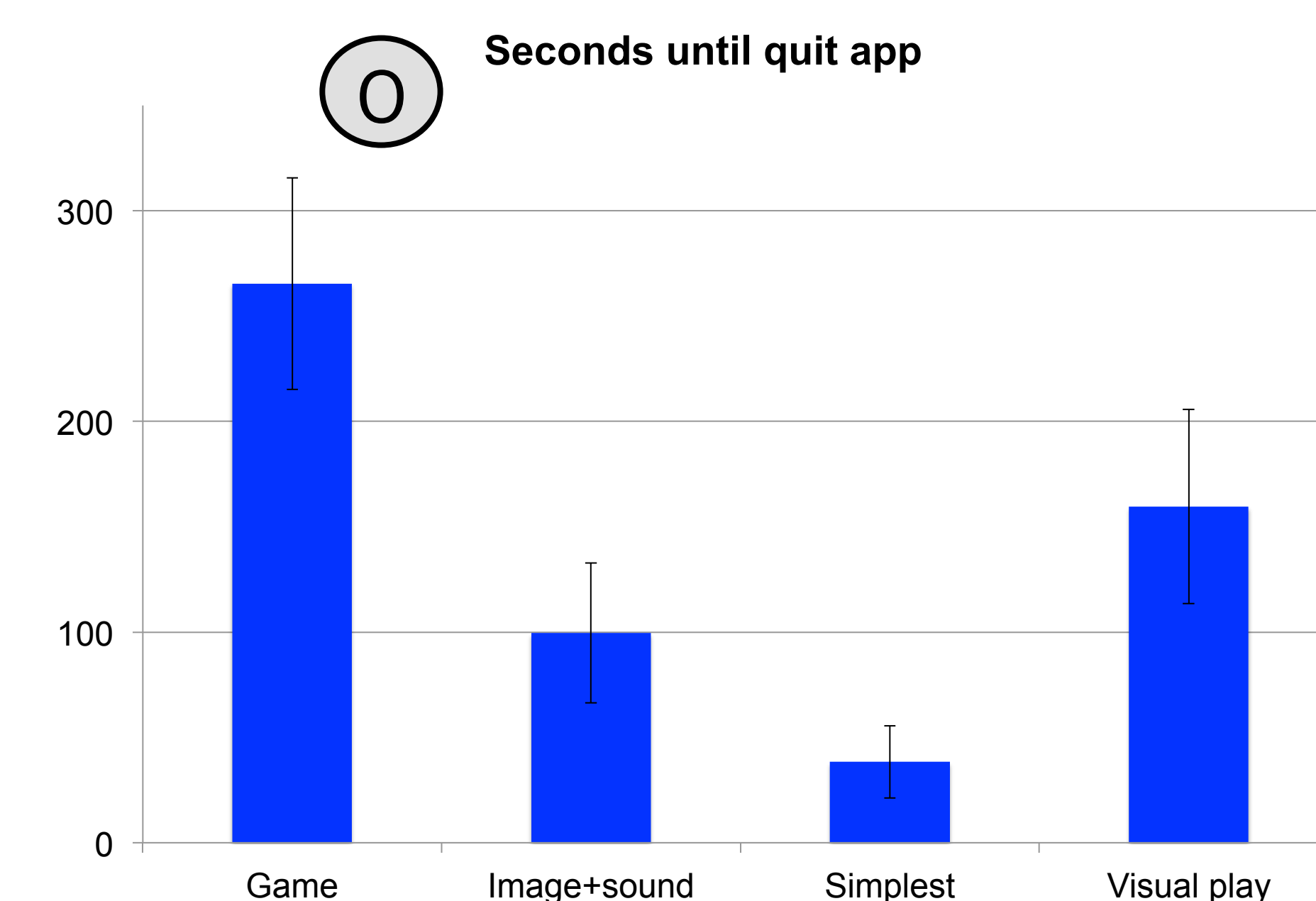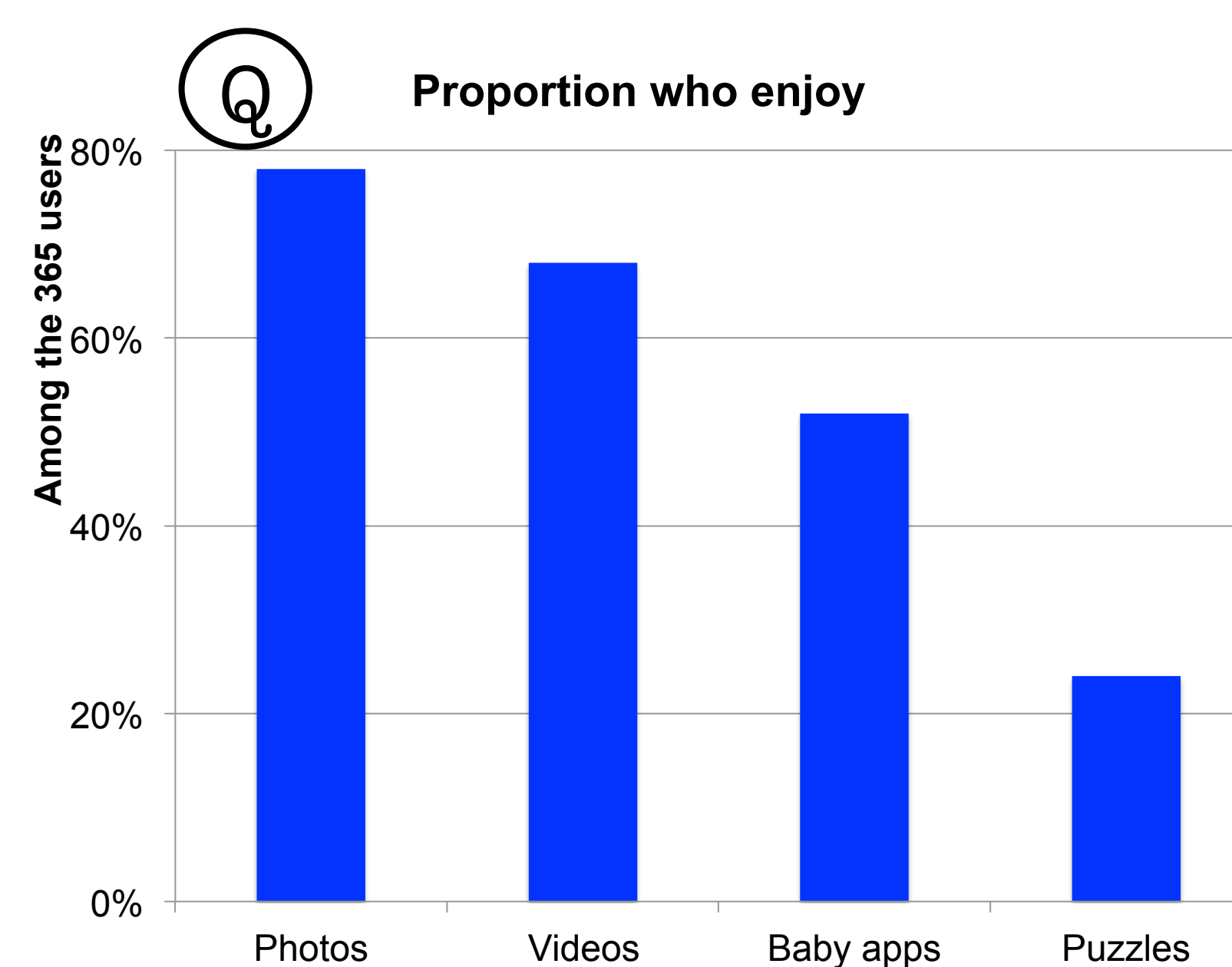Could we use touchscreens to study language and cognition?

YES!

(Q) Questionnaire (455 parents of 5-40mo): frequency and content of use, gestures

(O) Observation (3 never+ 2 seldom + 3 sometimes + 4 regularly; 18-36mo): gestures, temporal structure of play

(I) Intervention (4 never + 2 seldom + 2 sometimes + 1 regularly; 18-37mo): all 9 LENA* before and after 1 week of use; 3 also observed interacting with touchscreen
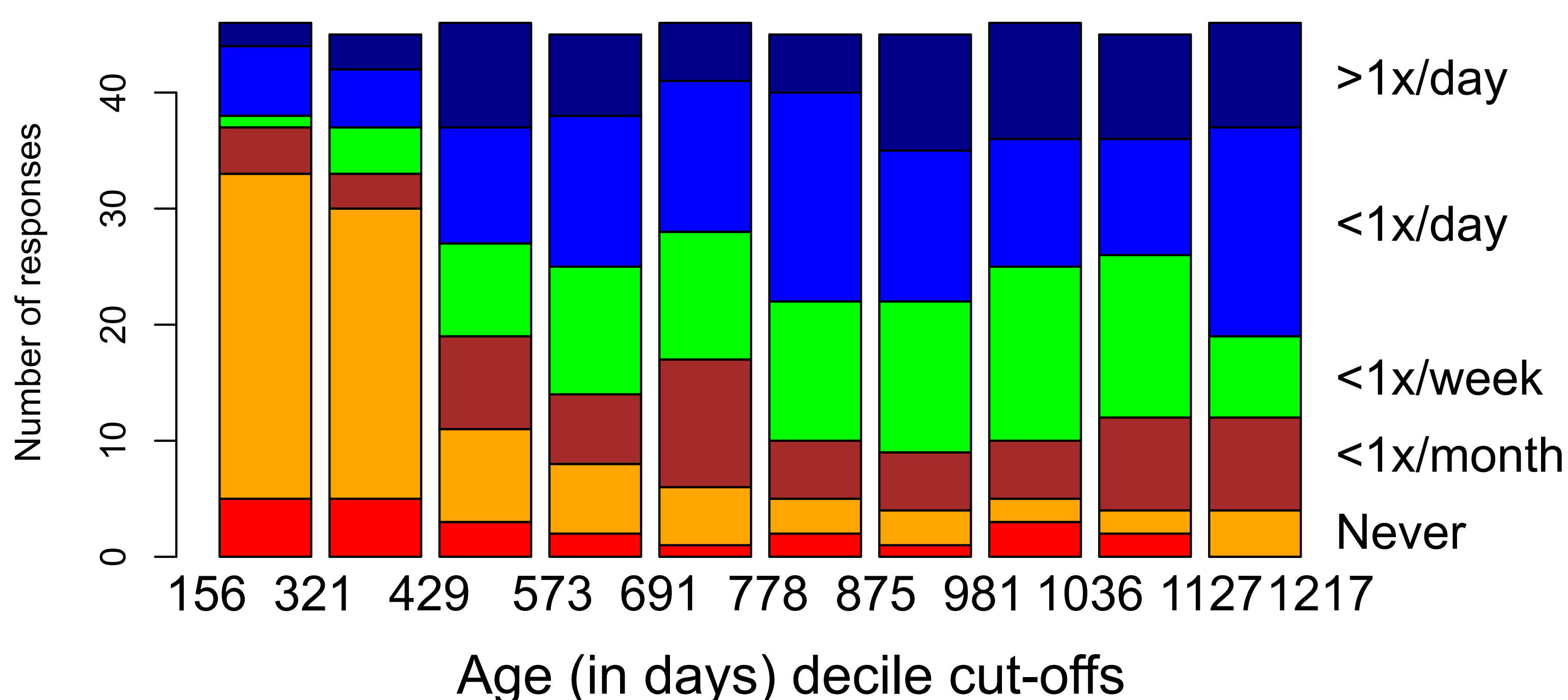*Language ENvironment Analyses

Take-home messages

- 18mo or older
- Use only tap + press + swipe
- Game-like structure, complex images

= Up to ~23 minutes' data over 6 days
With no negative effects on language use!

Are touchscreens ecologically valid?

(Q) Frequency of use by age

>1x/day
<1x/day
<1x/week
<1x/month
Never

Number of responses

156 321 429 573 691 778 875 981 1036 1127 1217
Age (in days) decile cut-offs

Before age 1y 6m: relatively rare
After age 1y 6m: most infants are users, frequency increases steadily

What gestures can toddlers master?

(Q) Gesture prevalence

Among the 365 users

Bang Tap Flick Press Press & drag Swipe Pinch Spread

Overall: Tap > Press > Swipe
↑ w/age: Pinch, spread, p&drag
↓ w/age: Bang (1y: 50% → 2y <10%)
↑ w/frequency of use: P&drag

(O) Tap, press, swipe in all toddlers

What activities do toddlers enjoy?

(Q) Proportion who enjoy

Among the 365 users

Photos Videos Baby apps Puzzles

(O) Seconds until quit app

Game Image+sound Simplest Visual play

(Q) Parents report photo and video viewing

(O) Most time spent on games + exploration of complex visual scenes

(I) Play times roughly halved after 1 week of use

Does sporadic touchscreen use have negative effects?

(I) LENA whole-day recording

6 days x 10-20 minutes tablet use

LENA whole-day recording

No difference in hourly Adult Word Counts, Child Vocalizations, Conversational Turns