

How Best to Learn Foreign Languages

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<http://masatohagiwara.net/shenzhen2018.html>

Baidu (2009 - 2010)



Duolingo (多邻国)



Pittsburgh, PA





279. (a) Trans la korto staras nia domo. Si logas trans la rivero.
Ili restas trans la maro. Li vagas trans montoj kaj maro.

(b) Across the field is a rose-garden. Stand and wait on-the-other-side-of the street. Scotland is there, across the valley.

KE

280. KE=that, used as a link-word joining two sentences (a "conjunction"). Mi kredas, ke vi estas prava, I believe (that) you are right. Here ke joins the sentences Mi kredas and vi estas prava. Mi scias, ke li logas tie, I know (that) he lives there. Mi bedaŭras, ke vi malsanas; I am-sorry (regret) (that) you are ill.

In English *that* is often omitted, but you must not omit the ke. Place a comma before ke, to divide the sentences.

281. Mi ĉial ĝojas, ke mi estas Esperantisto. Cu vi sentas, ke mi eraras? Nia opinio estas (ni opinias) (It is our opinion, we think), ke tio estas ideo idiota. Kiel vi supozas, ke tio ne estas ebla? Si pretendas (claims), ke ti estas reĝidino. Mi divenas (guess), ke vi estas okjara.

Mi respektas lin tial, ke (because, for the reason that) li estas tre modesta. (Tial ke=a strong form of car).

282. Tri gradoj de mar-malsano. (1) Mi kredas, ke mi mortas. (2) Mi scias, ke mi mortas. (3) Mi timas, ke mi ne mortas.
"Cu vi opinias, ke mi estas idioto?" "Tute ne! Tamen eble mi eraras."

283. Make sentences using ke after some of the words bedaŭr- (dir- frustr- gej- instru- jugt- kompren- konfes- konsent- leg- lern- memor- opinii- plend- predik- pruv- rakont- respond- rev- ripet- sci- sent- skrib- sonig- telefon- telegraf- jas. Do not forget the comma.

(b) Complete the following sentences. Ne forgesu, ke... Memoru, ke... Ne respondu, ke... Kredu al mi, ke... Li ofte assertas, ke... Kiel vi supozas, ke... Cu vi do timas, ke...? Cu vi vere suspektas, ke...?

THAT

284. This English word has many meanings, and must be translated accordingly. He says about that, that that "that" "that is in your essay is wrong. Li diras pri tio, ke tiu "that", kiu estas en via eseoj, estas malgusta.

285. She says (that) he is rich, but for-some-reason I do not suppose (that) that is true. Tell him (that) I am not a man of-that-kind. I feel (that) you are wrong on that matter. She asserts (that) she is right about that question. Do not believe that all that is in that book is true. That proves the earth is round.

KE JES, KE NE

286. The translation of ke jes, ke ne, depends on the context. Cu li estas tie? (Mi kredas, ke jes, I believe he is, I think so. Mi supozas, ke ne, I suppose he isn't, I suppose not). Cu vi komprenas? (Mi timas, ke ne, I'm afraid not. I fear I don't. Mi scias, ke jes, I know I do).

287. Write similar questions and answers, using ke jes, ke ne, after some of the verbs asert- (bedaŭr- dir- esper- ŝoj- insist- konfes- konsent- kred- opinii- ripet- sci- skrib- supoz- suspekt- telefon- tim- vid- jas (Compare 104-5).

NOTE ON PREPOSITIONS

288. Al, apud, de, dum, en, inter, kun, por, pri, sen, sub, super, sur, tra, trans, are prepositions (96).

289. In English conversation we often end a sentence with a preposition, thus: "What are you sitting on?" "Whom are you thinking of?"*—in spite of the famous rule "A preposition is a word you must not end a sentence with"! But in Esperanto you may NOT do this. Write, therefore: "Sur kio vi sidas?" "Pri kiu vi pensas?"

290. Translate these questions and answer them. What are you complaining of? Which town do you come from? What are we reading through? What are we fighting for? What is your money in? Whom are you sitting near? What are you doubtful about? Whom are you waiting for? What does an apple grow on? Whom are you writing to? What are you talking about? Whom are you dreaming of?

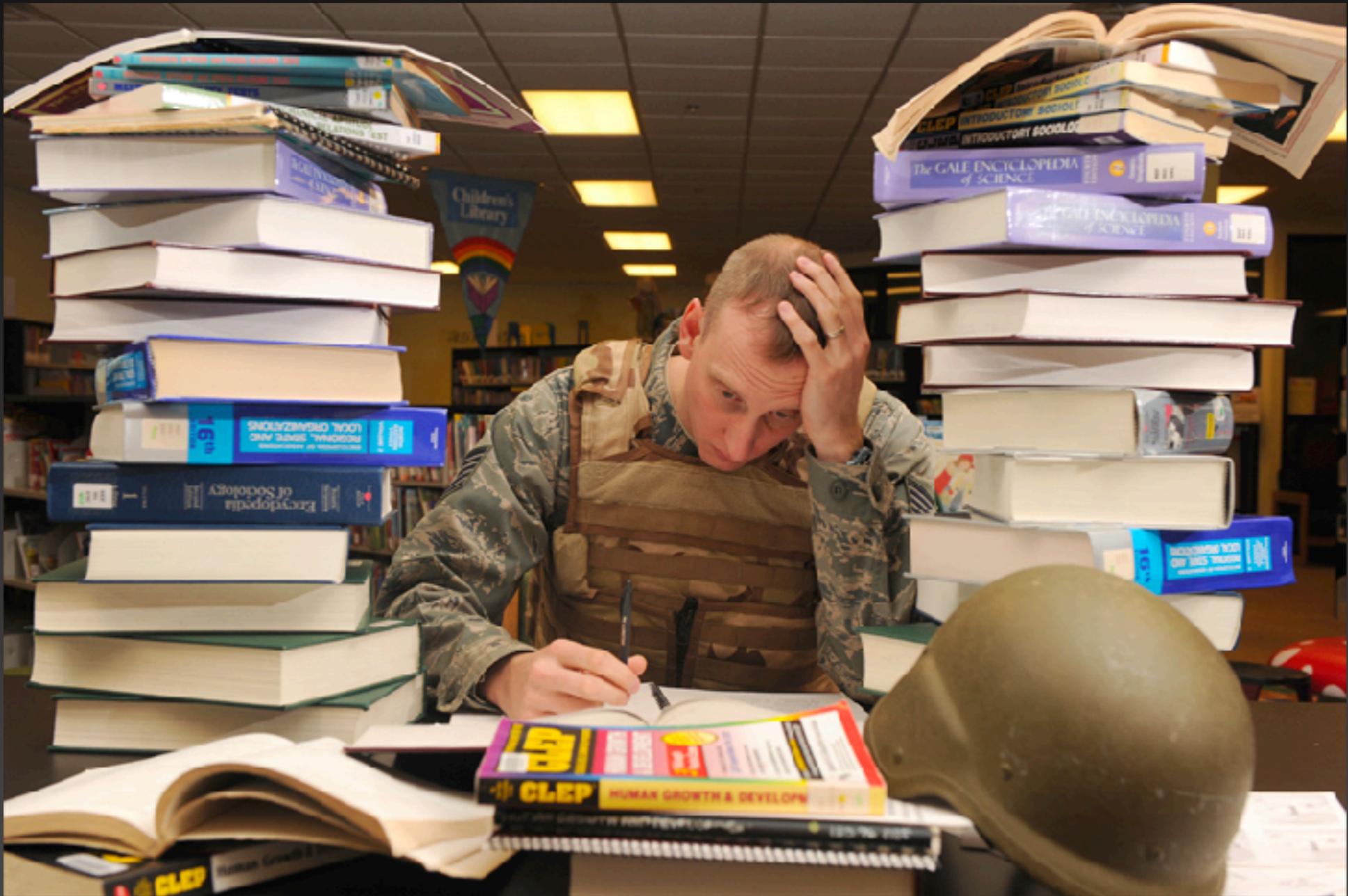
"SUBJECT" AND "OBJECT"

291. Most sentences contain (1) a SUBJECT (the thing or person we are talking about) and (2) a VERB (which says what the subject is or does). Thus, in *Ia suno brilas*, and *Ii staras tie*, *Ia suno* is the subject of the verb *brilas*, and *Ii* is the subject of the verb *staras*. The answer to *What?* *Who?* asked before a verb, is the subject of the sentence. *What shines?* (*Ia suno*). *Who stands?* (*Ii*).

292. Usually the subject comes before the verb. But it need not do so (20, 23). One may say, for example, *Brilas la suno. Tie staras li*.

*Even "What was the man who asked what you chose that book to be read to out of for up to?"!

Language Learning in 1998



(Source: US Air Force)

Language Learning in 2018



“Learning Esperanto used to be a solitary quest. You could practise it by sitting for weeks with a book and a dictionary, figuring out the rules and memorising the words. But there was usually no professor to correct your mistakes or polish your pronunciation.”

“Newer generations are not as patient, and they don’t have to be. Unlike most of their elders, who rarely had the chance to speak Esperanto, today’s speakers can use the language every day online.”

— Jose Luis Penarredonda, BBC, 2018

people learning a second language

1,200,000,000

(~16% of the world's population)

~800M satisfy three properties:

- learning English
- in a developing country
- to gain more opportunity

(Source: British Council)

duolingo

- More than 300 million registered users worldwide
- Currently offer 75 courses (teaching 27 distinct languages)
- Expanding to 90 courses soon
- Available on Android, iOS & Web
- 100% free content

(As of Aug. 2018)

Profile French Shop

Abs. Obj. 3 Pluperfect Nature

Materials Gerund Arts

Future Measures 2/3

Practice Weak Skills

Verbs: Gerund

Weakest words

faisant, disant,
agissant, ayant, étant

STRENGTHEN

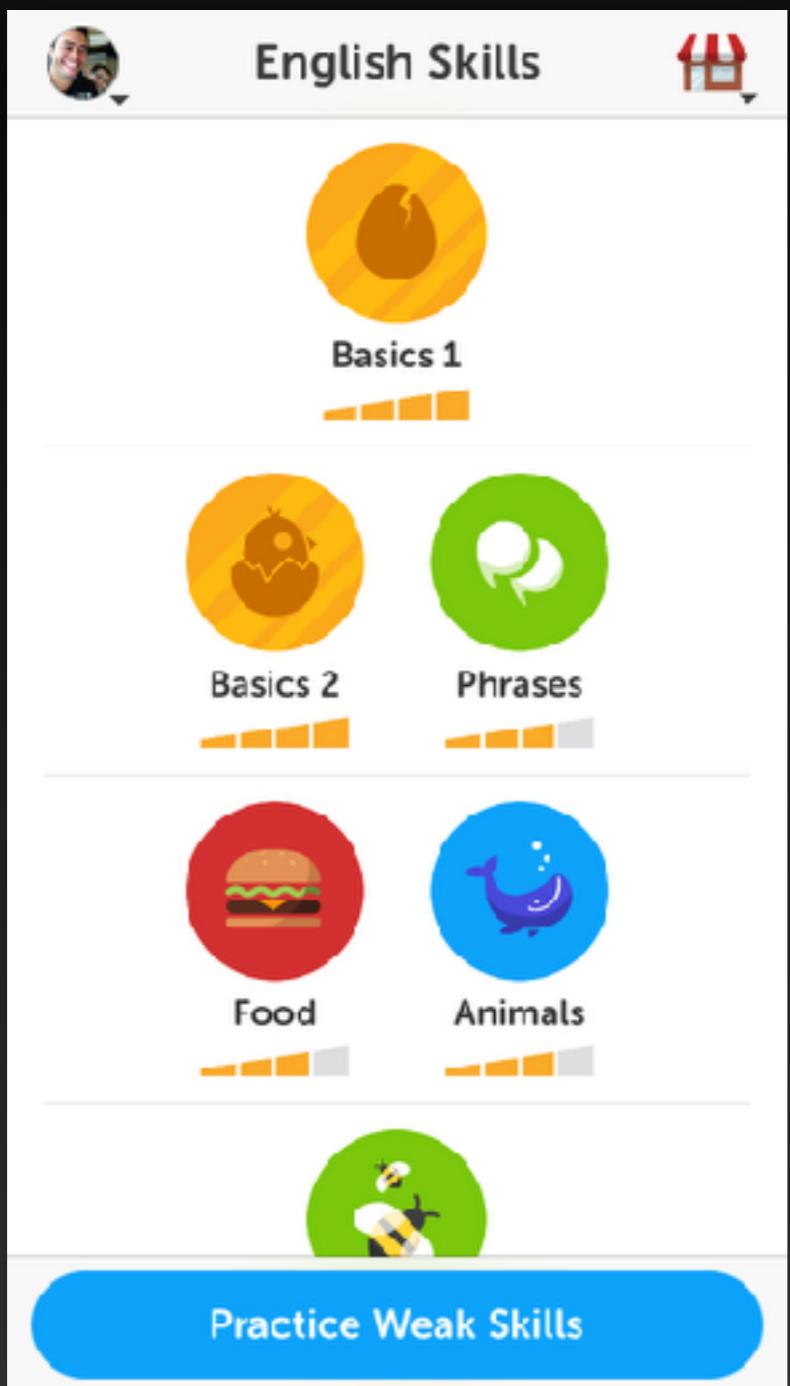
X

Being a child, he is small.

Étant une enfant, il est petit

"Enfant" is masculine, not feminine.
Étant un enfant, il est petit.

SHARE REPORT



34
hours

of Duolingo is
as effective as one
university semester

[Vesselinov & Grego, 2012]

Google Play

Top Free in Education

Duolingo: Learn Languages by Duolingo - FREE ★★★★☆

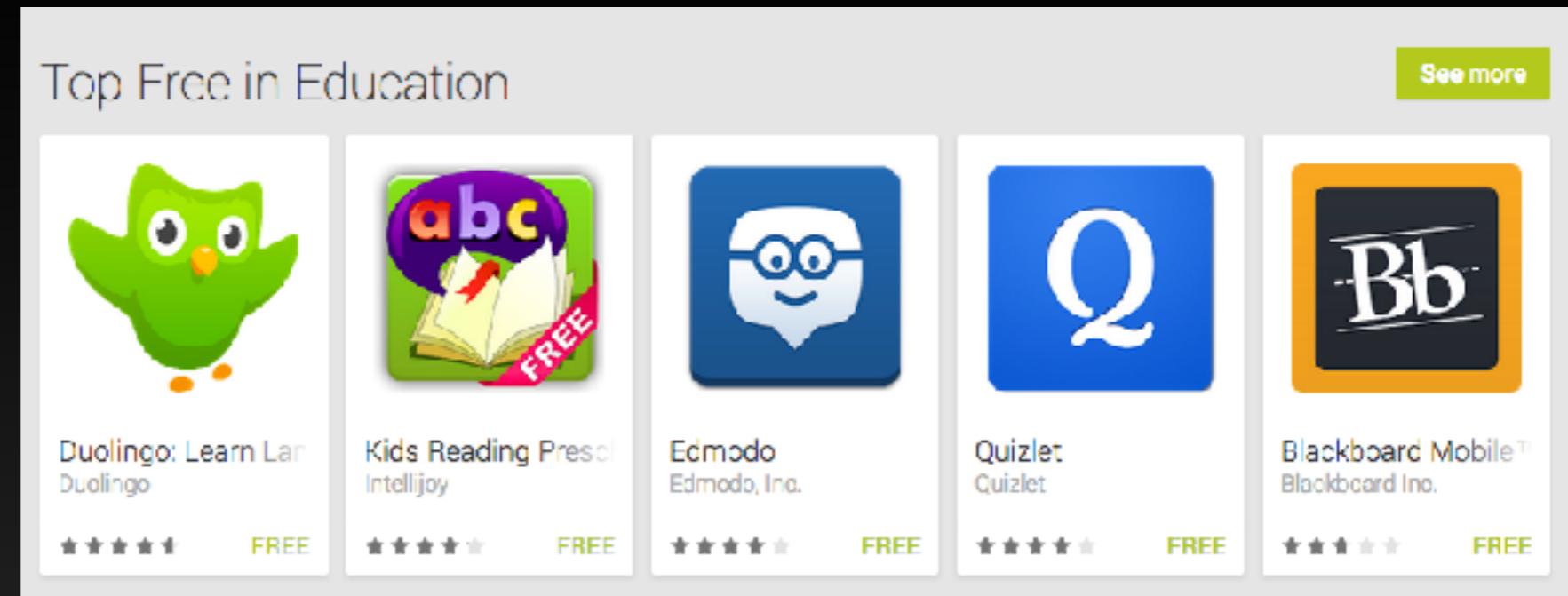
Kids Reading Preschool by Intellijoy - FREE ★★★★☆

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Quizlet by Quizlet - FREE ★★★★☆

Blackboard Mobile™ by Blackboard Inc. - FREE ★★★★☆

See more



iOS App Store

Top Free iPhone Apps

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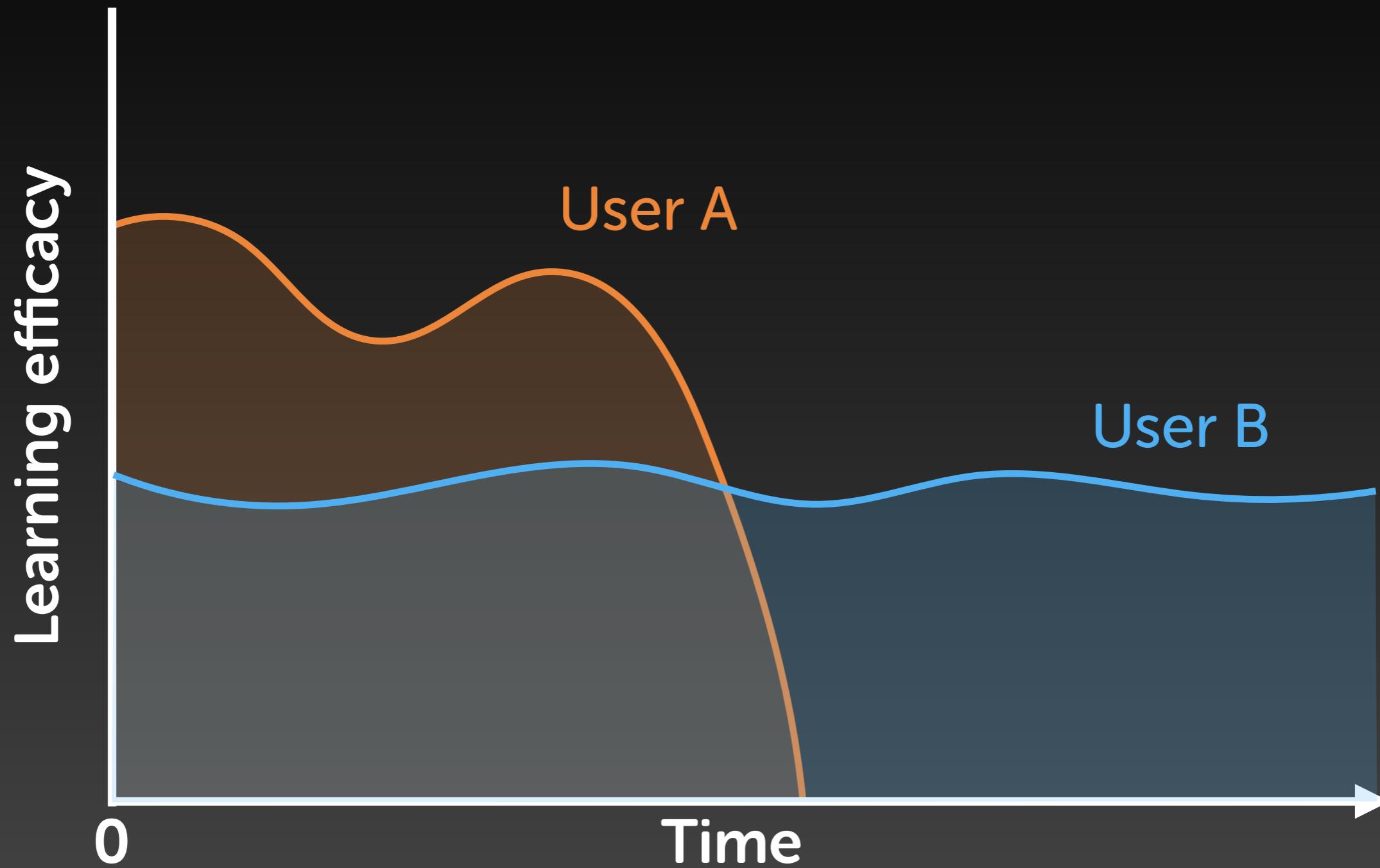


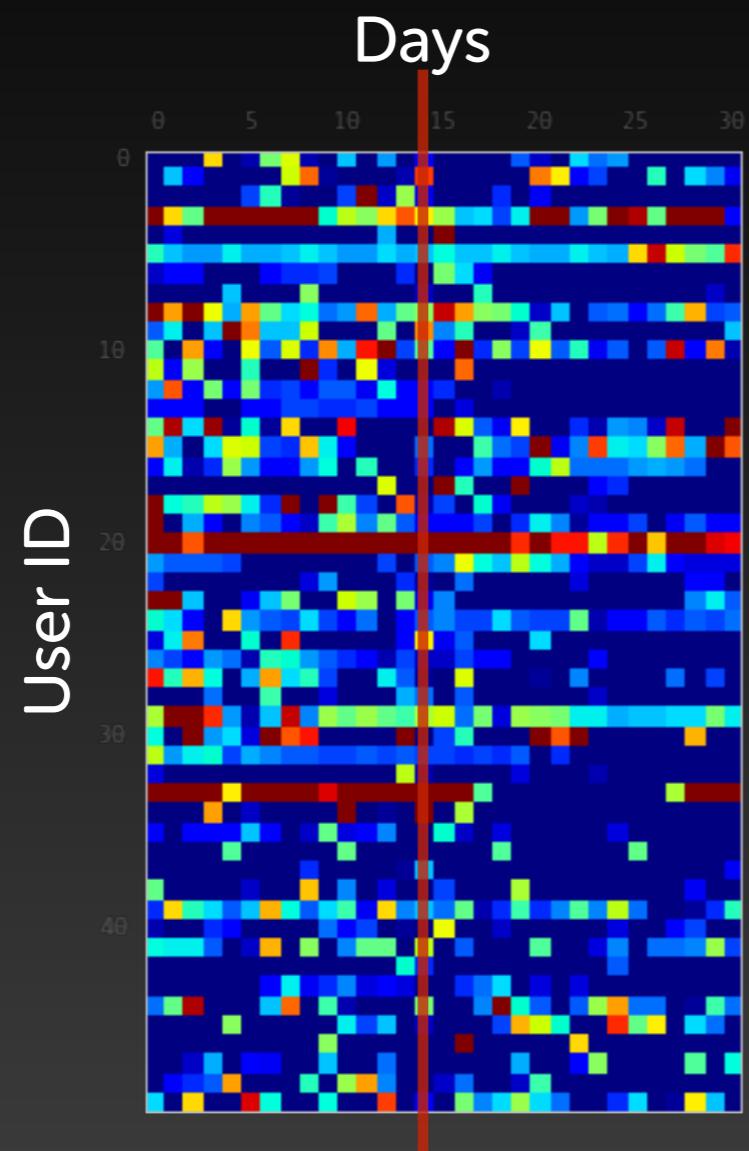
**What makes users
successful in learning
languages?**

“User attention is expensive”

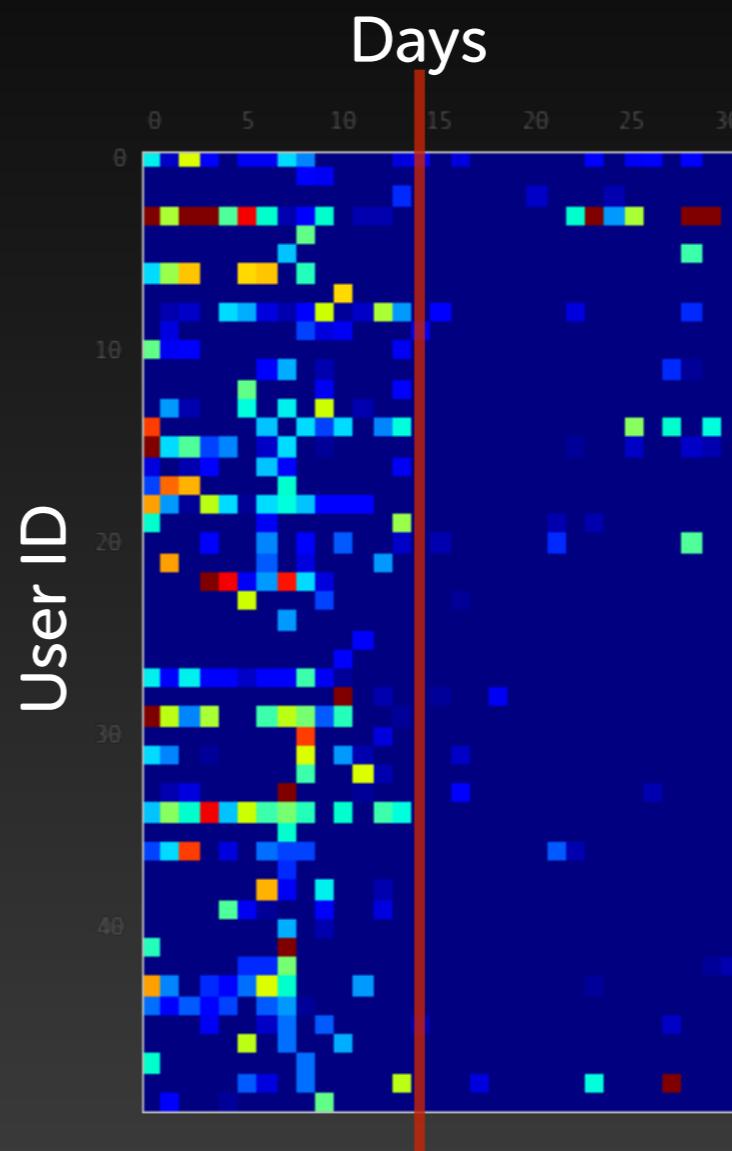


Source: Ultimate App Icons Set Sketch Resource

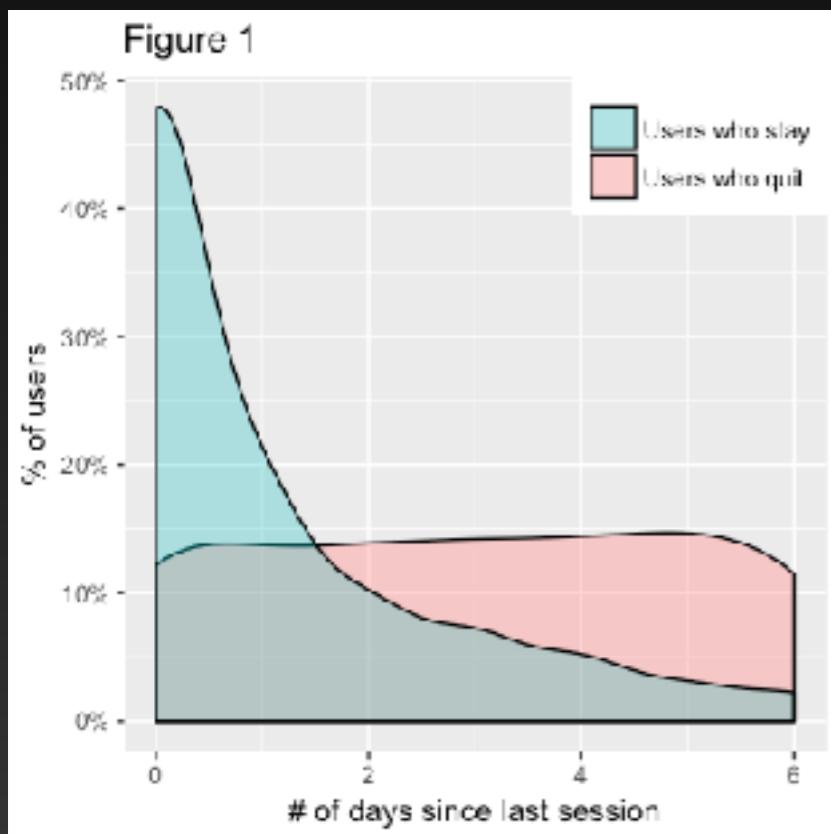




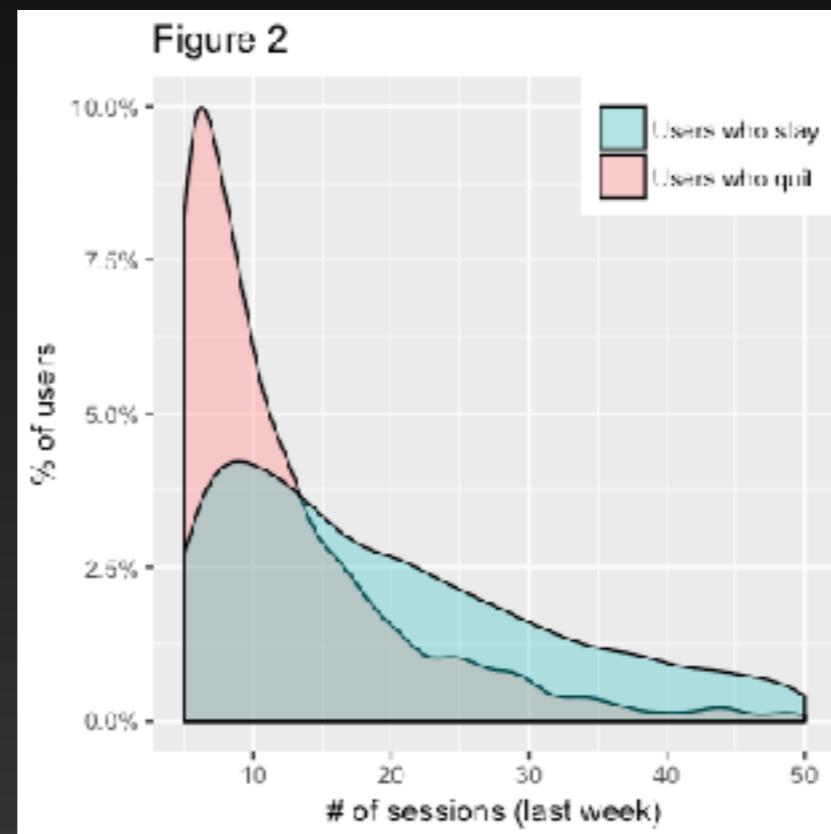
3,466 users who stayed



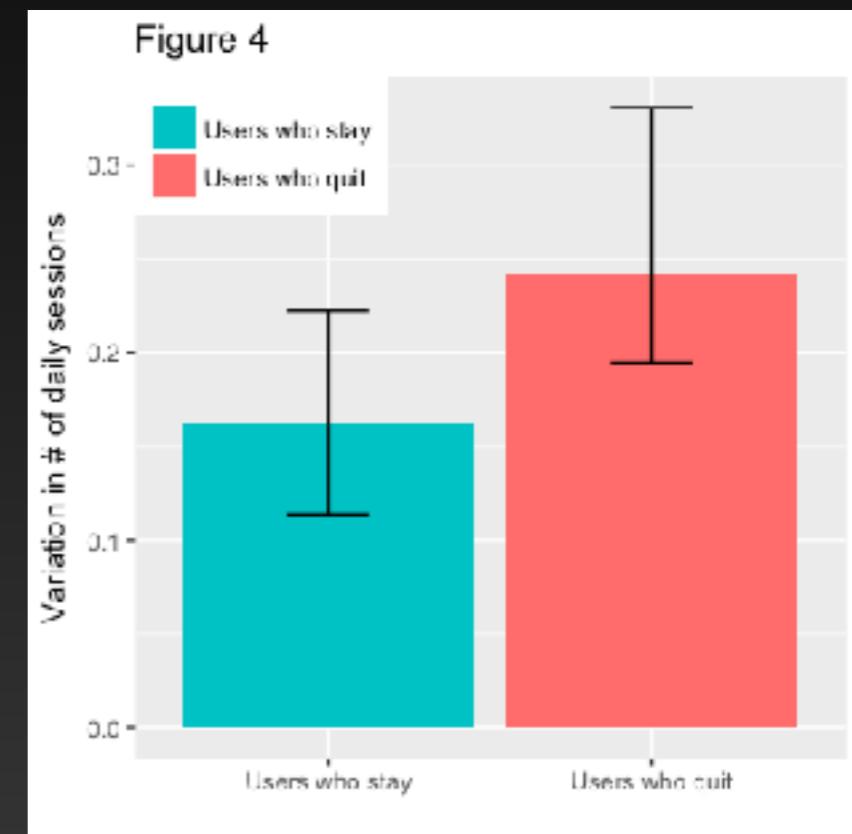
3,426 users who quit



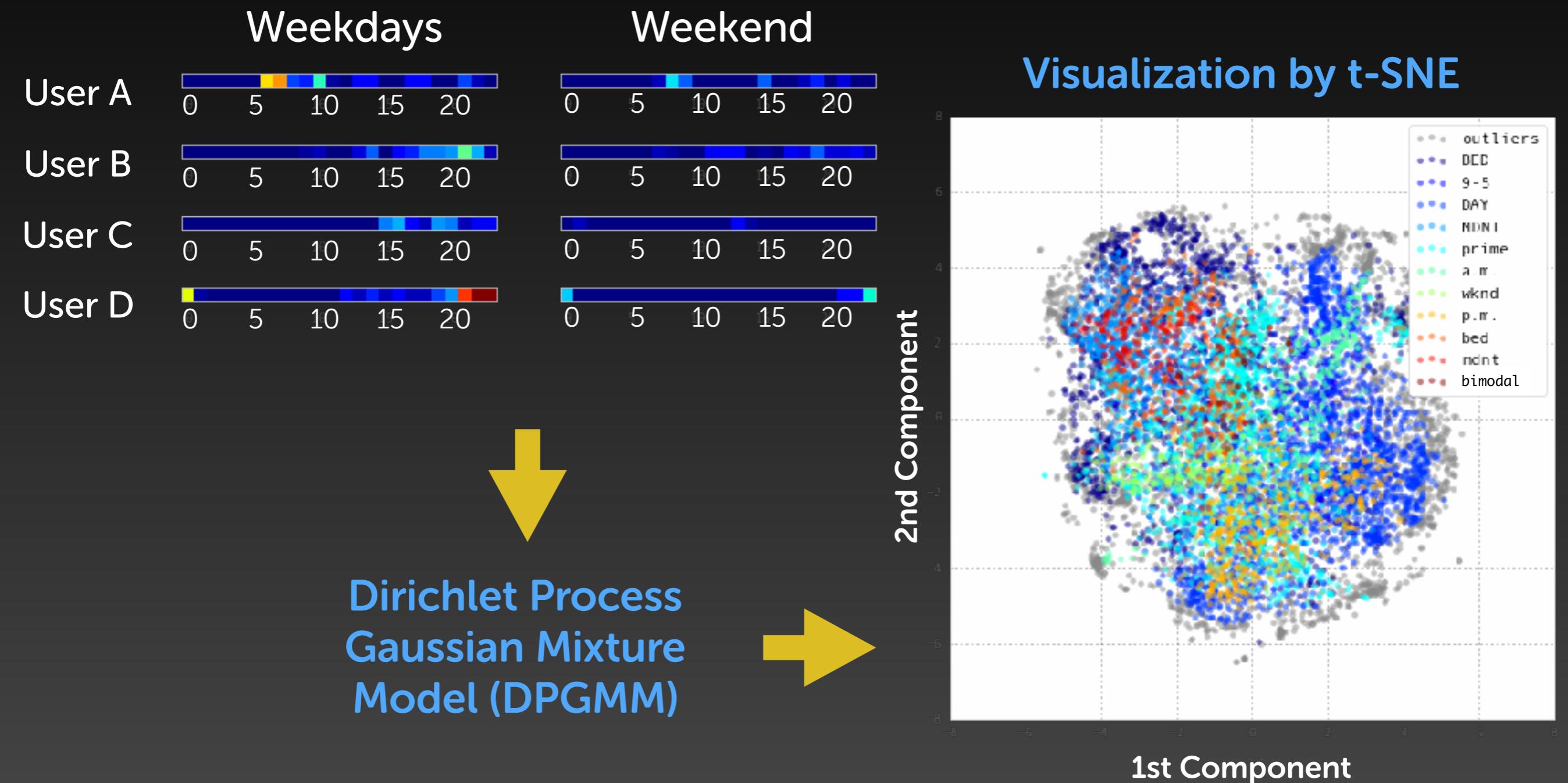
**# of days since
last session**

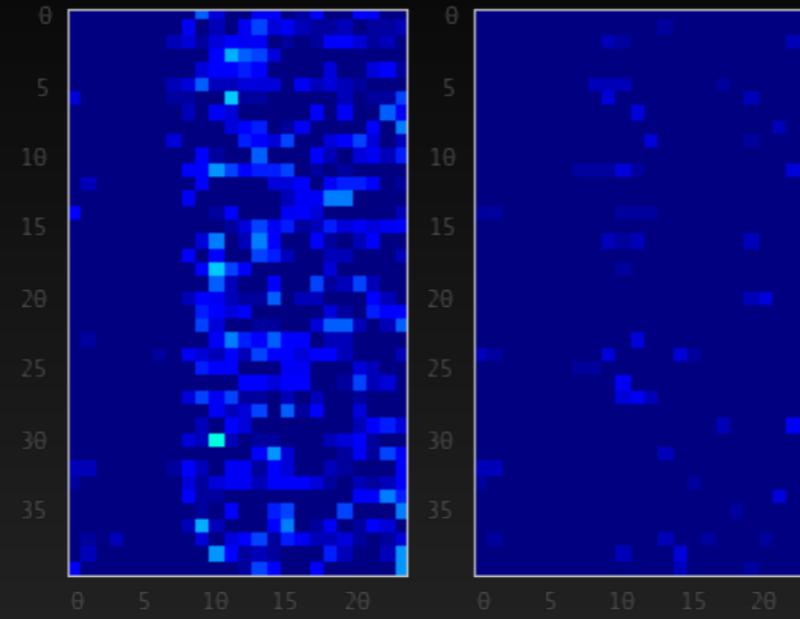


**# of sessions
(last weeks)**

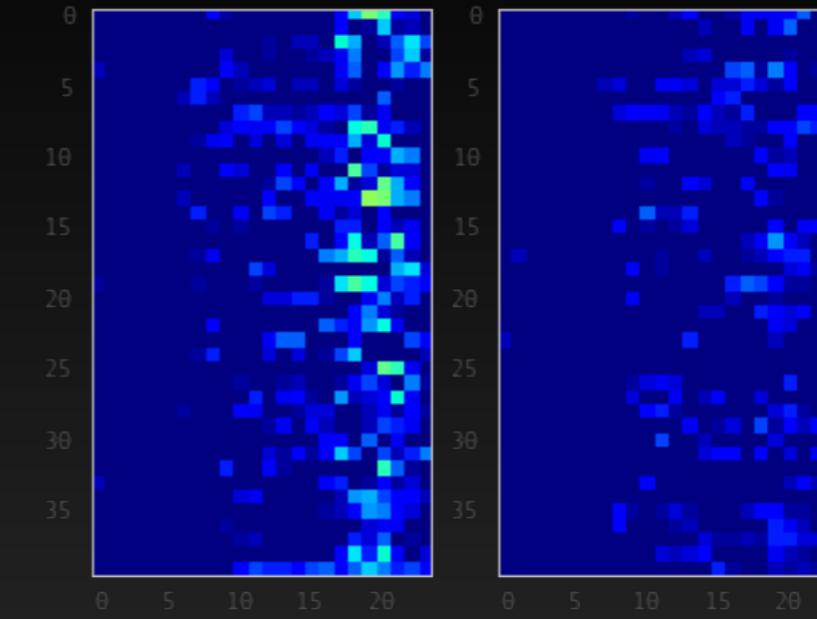


**Relative stdev of
daily # of sessions**

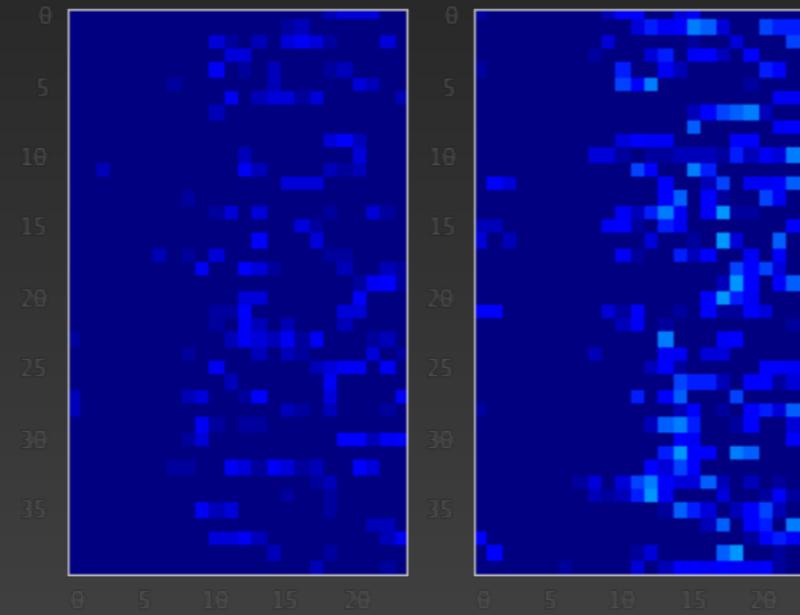




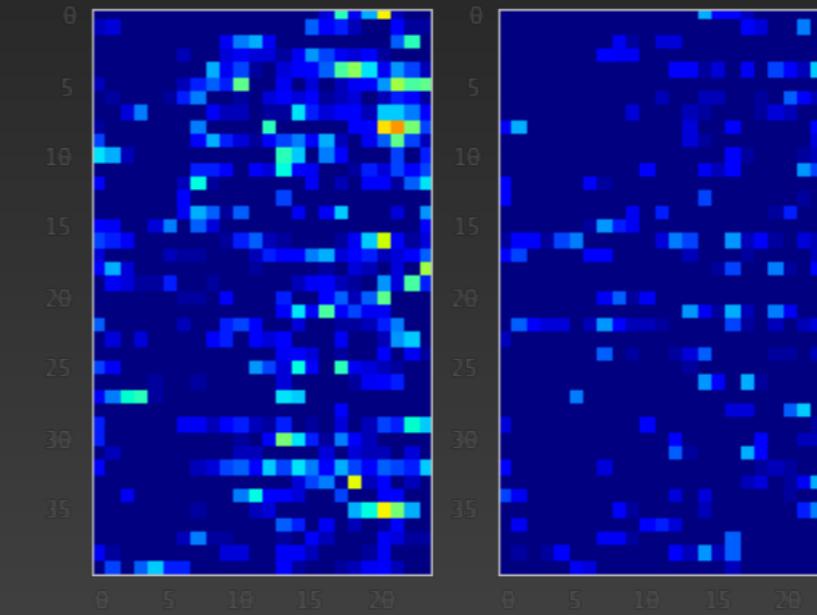
9-to-5



Prime time (~8pm)

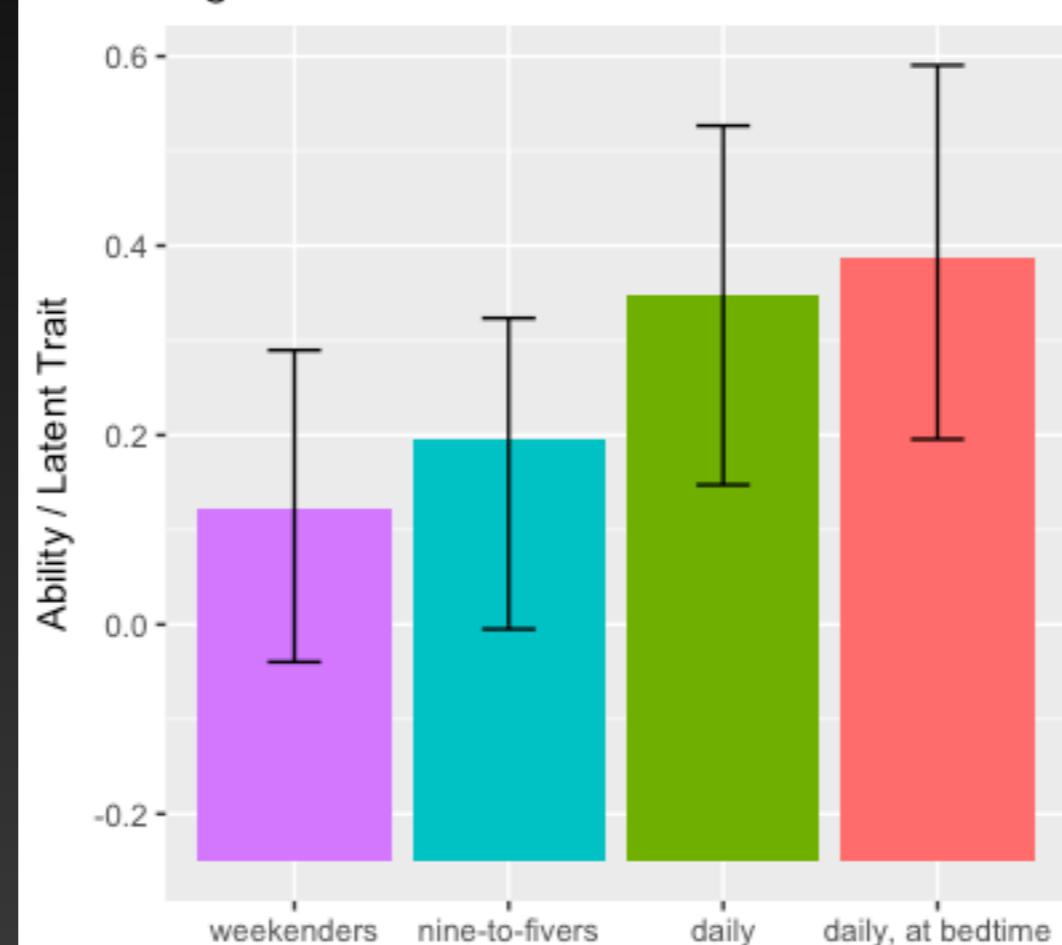


Weekenders



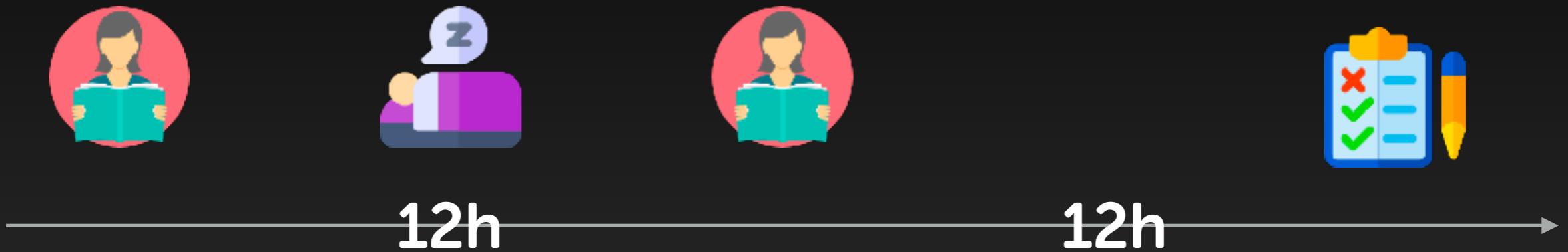
Arbitrary

Figure 3

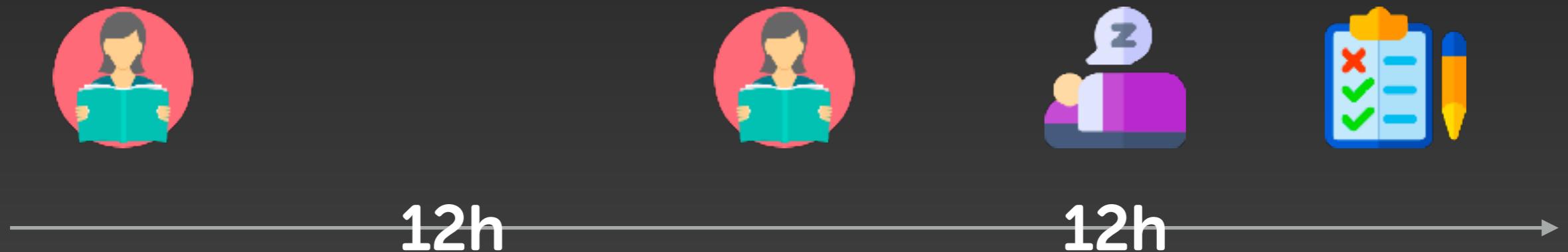


~30%+ retention
2x relearning

A



B



Source: (Mezza et al. 2016)

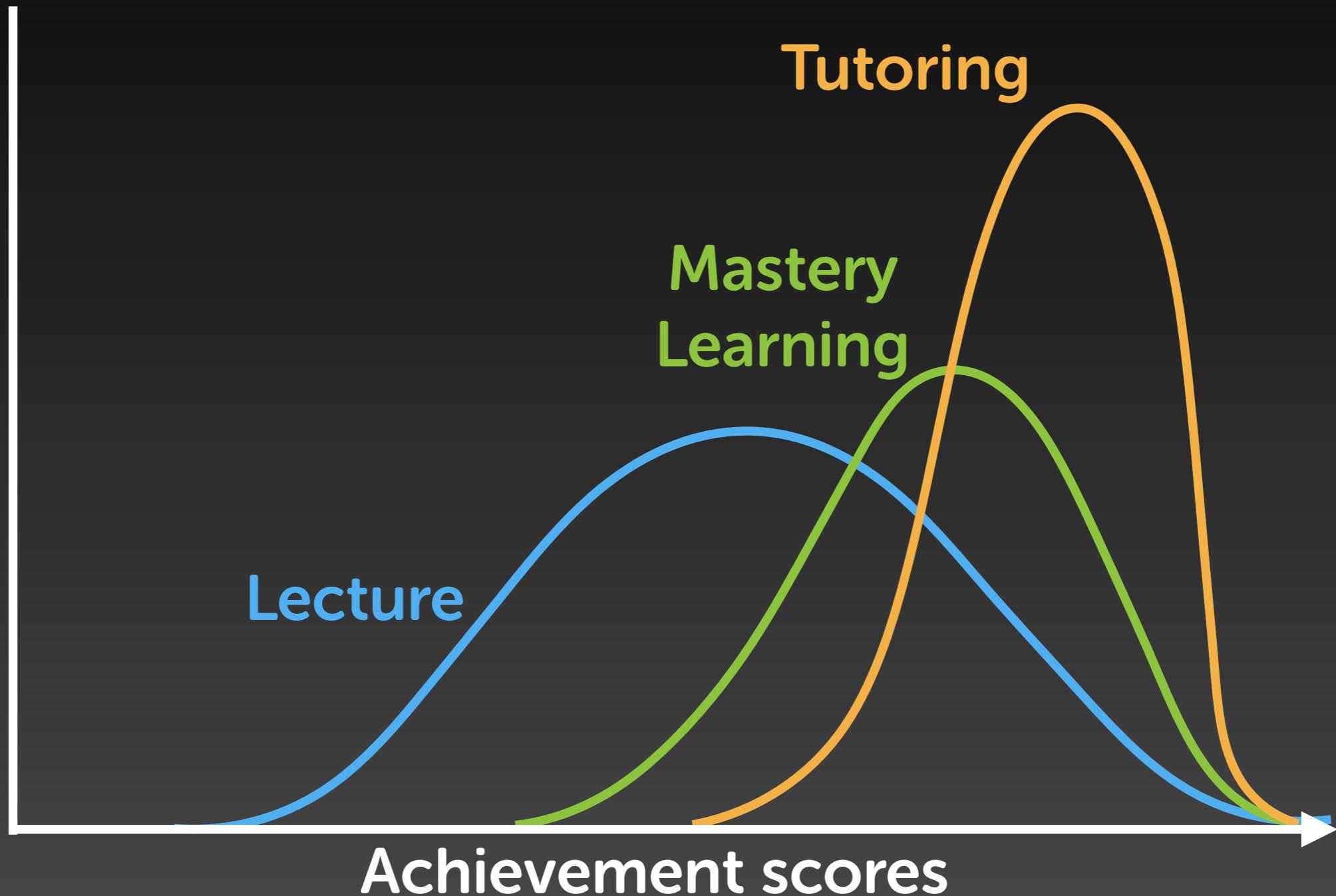
"Learning" by Icon Pond (Flaticon)
"Healthy Lifestyle" and "Employment" by Freepik (Flaticon)

Conclusion

- Frequency
- Consistency
- Don't "binge"
- Sleep

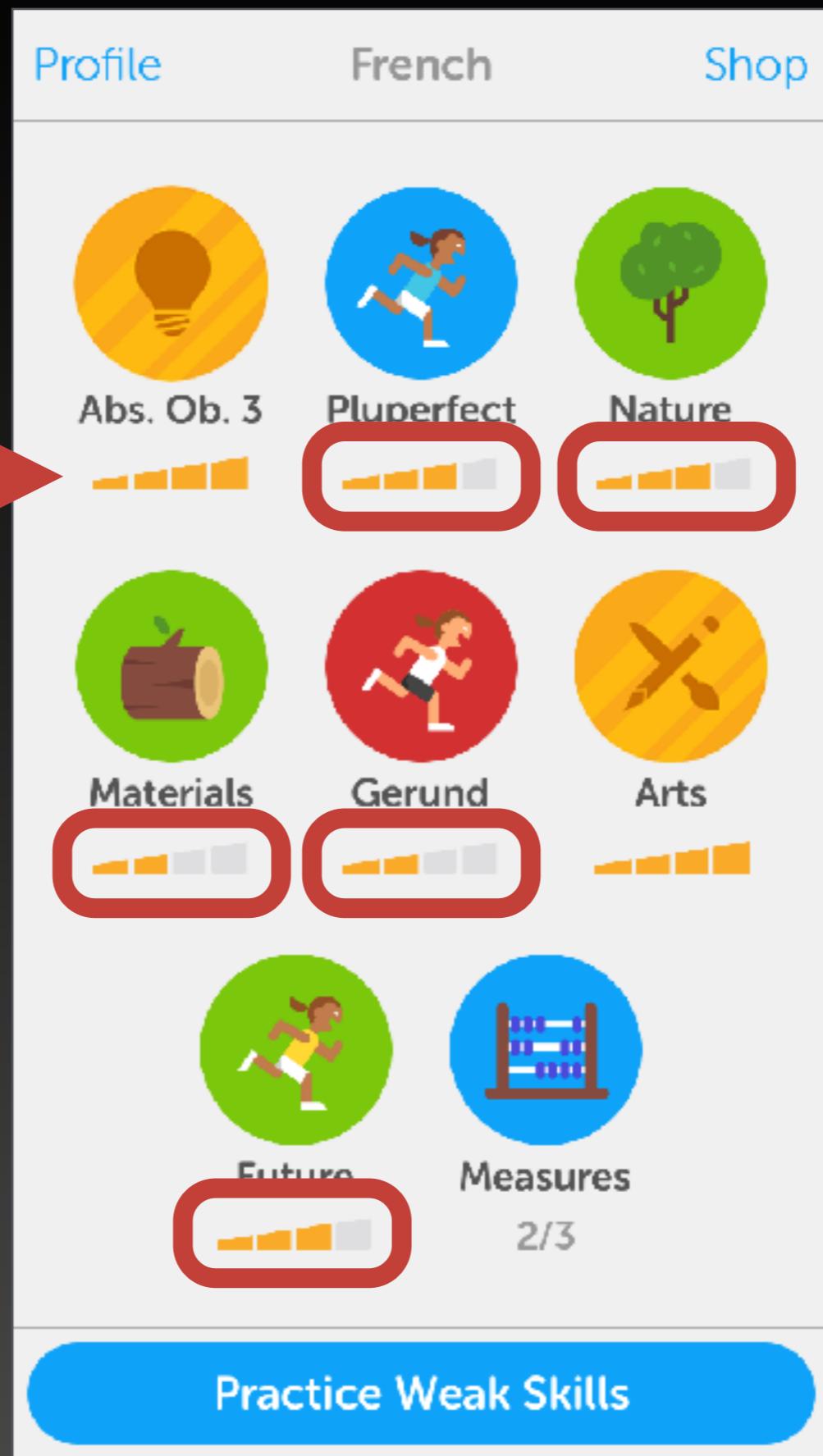
Modeling Learning and Forgetting

The 2 Sigma Problem

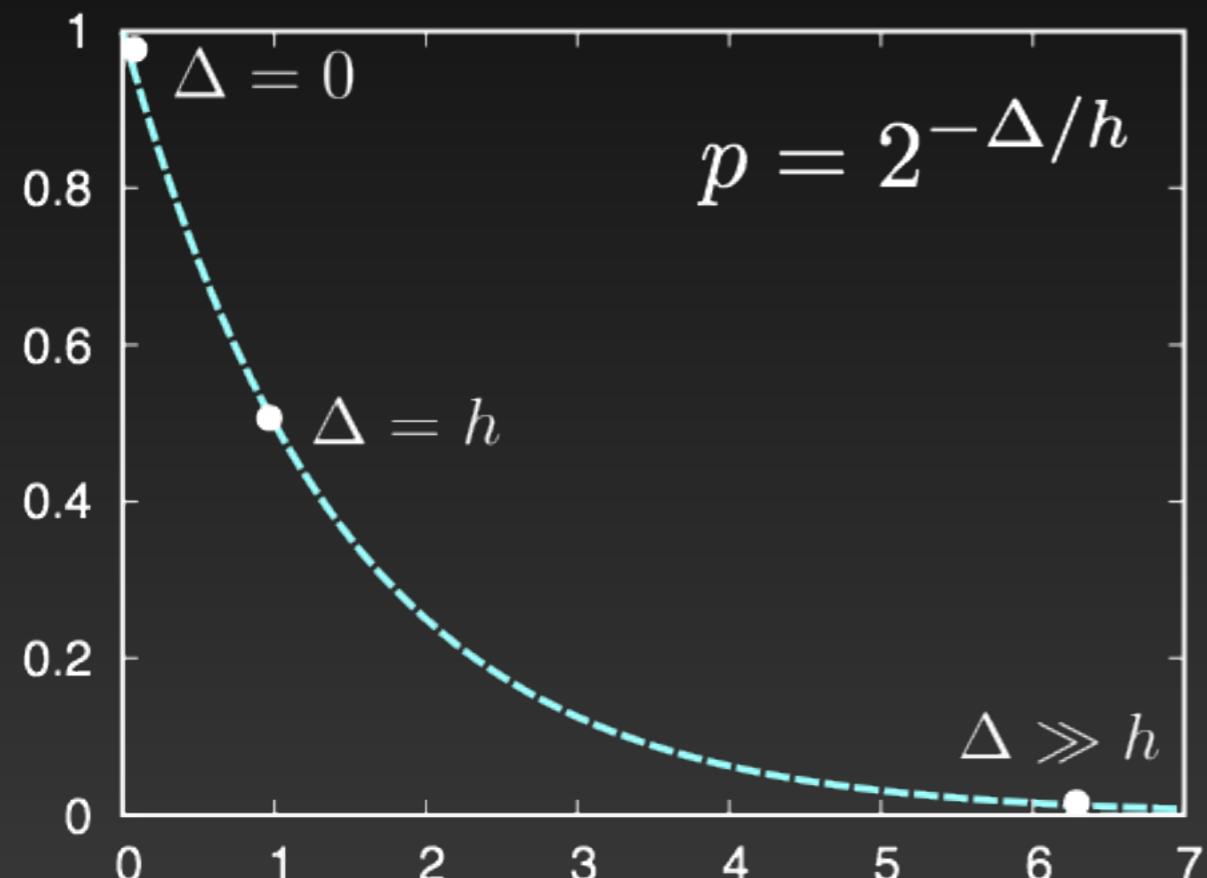


Source: (Bloom 1984)

Strength Bar



Forgetting Curve

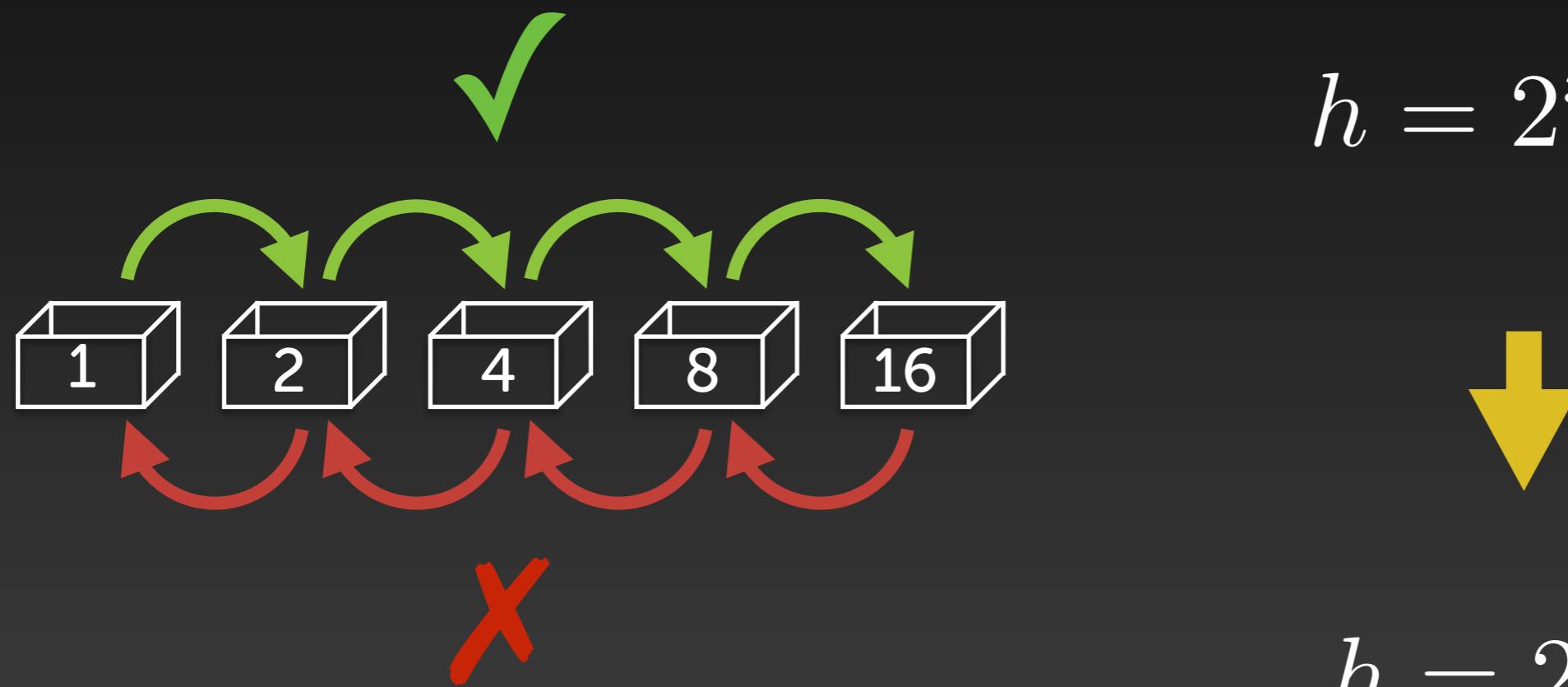


the **probability** p of a correct answer as a function of:

- **time** Δ since it last practice
- **halflife** h in user's memory

The Leitner System

(Leitner, 1972)



$$h = 2^{x \oplus -x \ominus}$$



$$h = 2^{\Theta \cdot x}$$

Student Performance Data

The image displays three screenshots from a language learning application, likely Duolingo, illustrating student performance data for translation tasks.

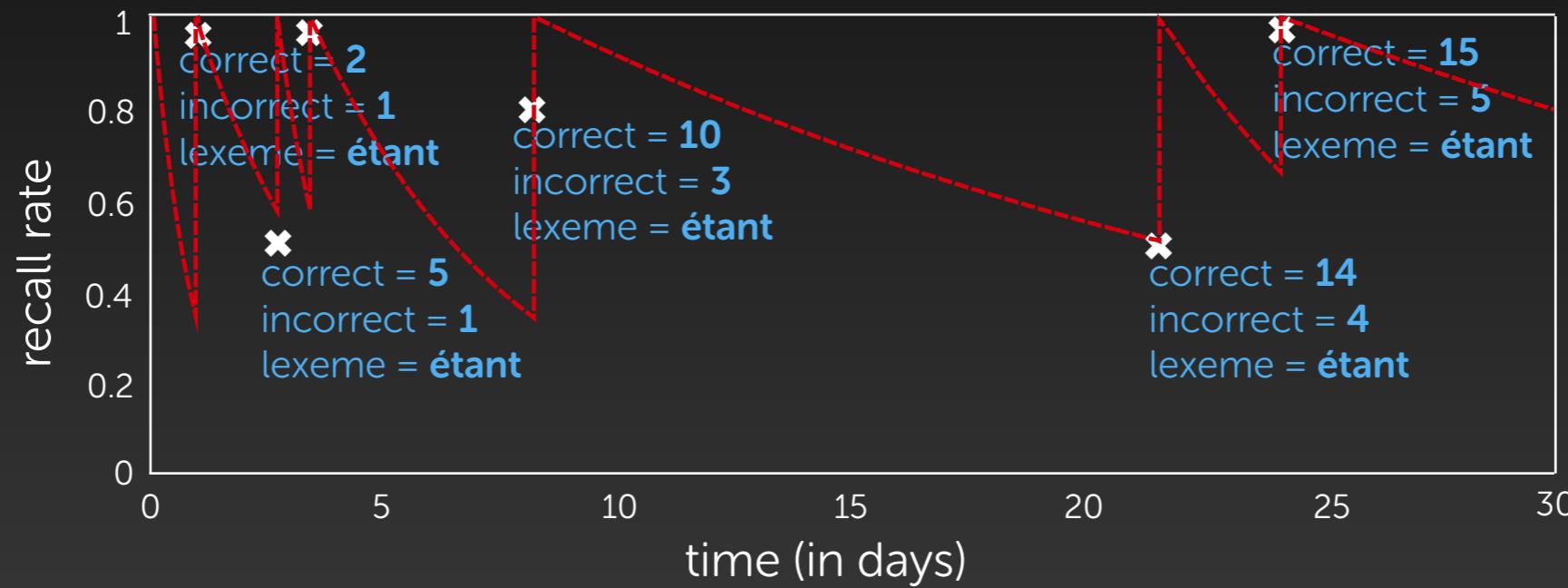
Screenshot 1: A "Type what you hear" task. The sentence is "They are your father's." The student typed "C'est celles de ton père." A green checkmark indicates the correct article usage ("celles"), while a red X and a message indicate an error in the verb form ("est" instead of "sont").

Screenshot 2: A "Type what you hear" task. The sentence is "I have a pen." The student typed "Yo tiene una bolígrafo". A green checkmark indicates the correct noun form ("una"), while a red X and a message indicate an error in the verb conjugation ("tienen" instead of "tengo").

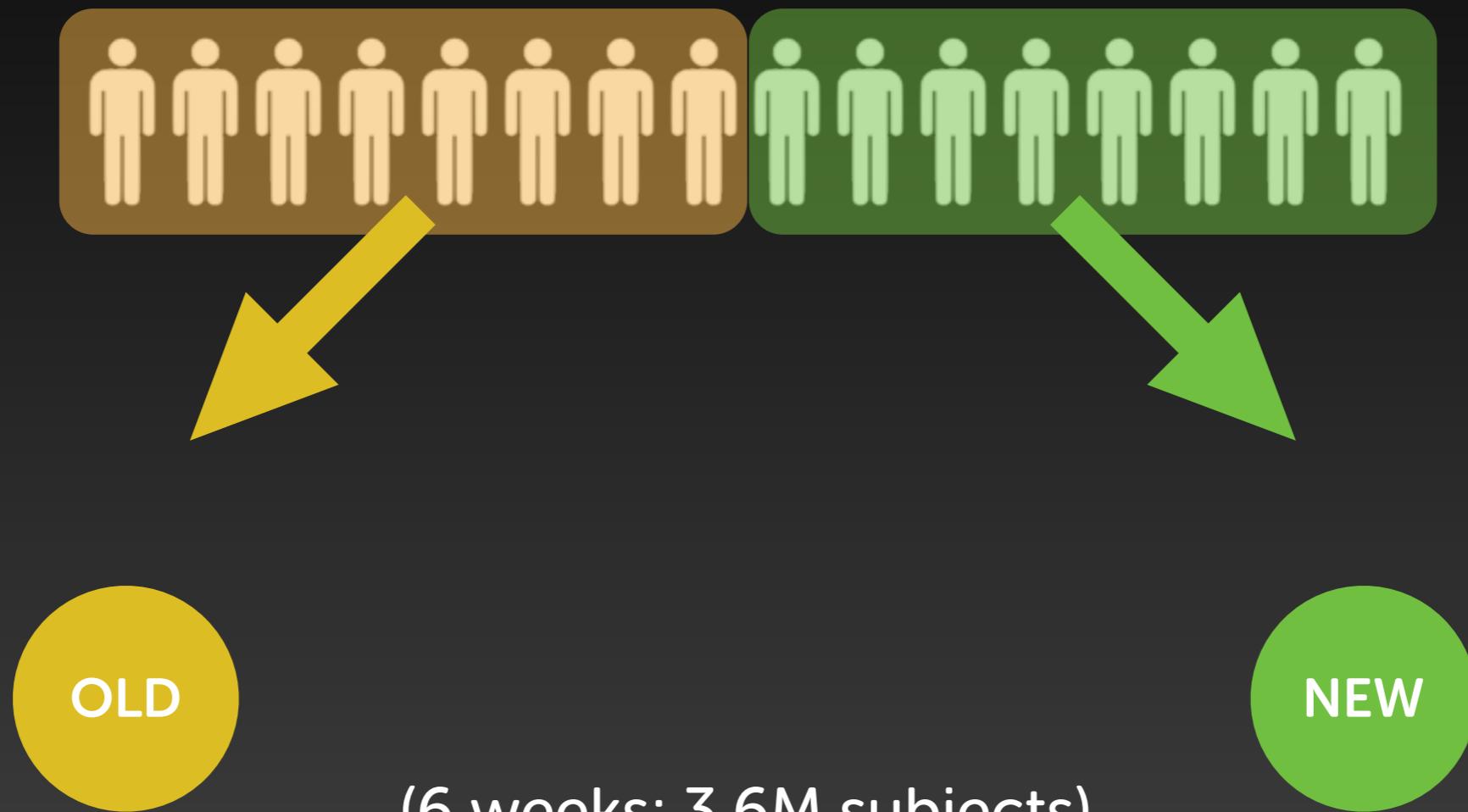
Screenshot 3: A "Translate this sentence" task. The sentence is "Das ist v...". The student typed "Ich habe einen Flug nach Deutschland." A green checkmark indicates the correct article usage ("einen"), while a red X and a message indicate an error in the verb form ("haben" instead of "habe").

can we **learn to predict** word halflife from these data?

Half-life Regression (HLR)



Results: User Experiment



all students
who returned the next day:
+1.7% (p<0.001)

How Best to Learn Anything



To Learn



----->
Time Exam

Practice Testing

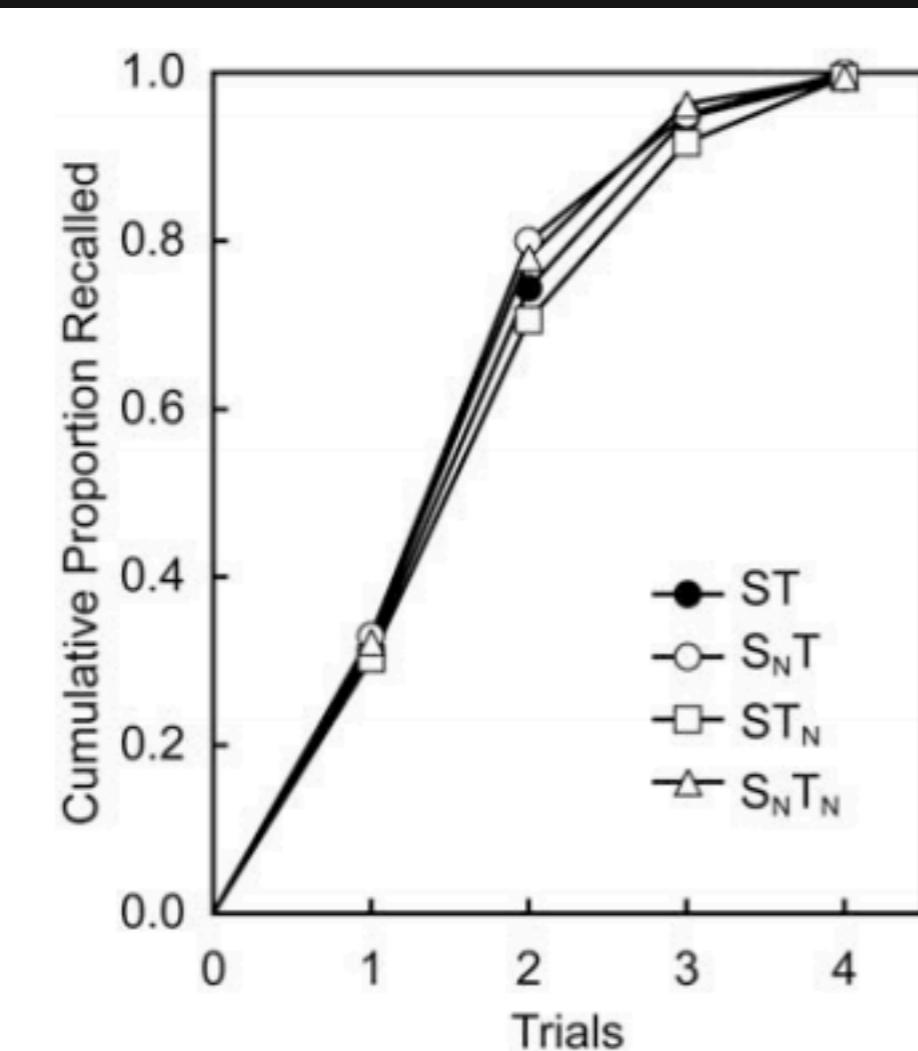
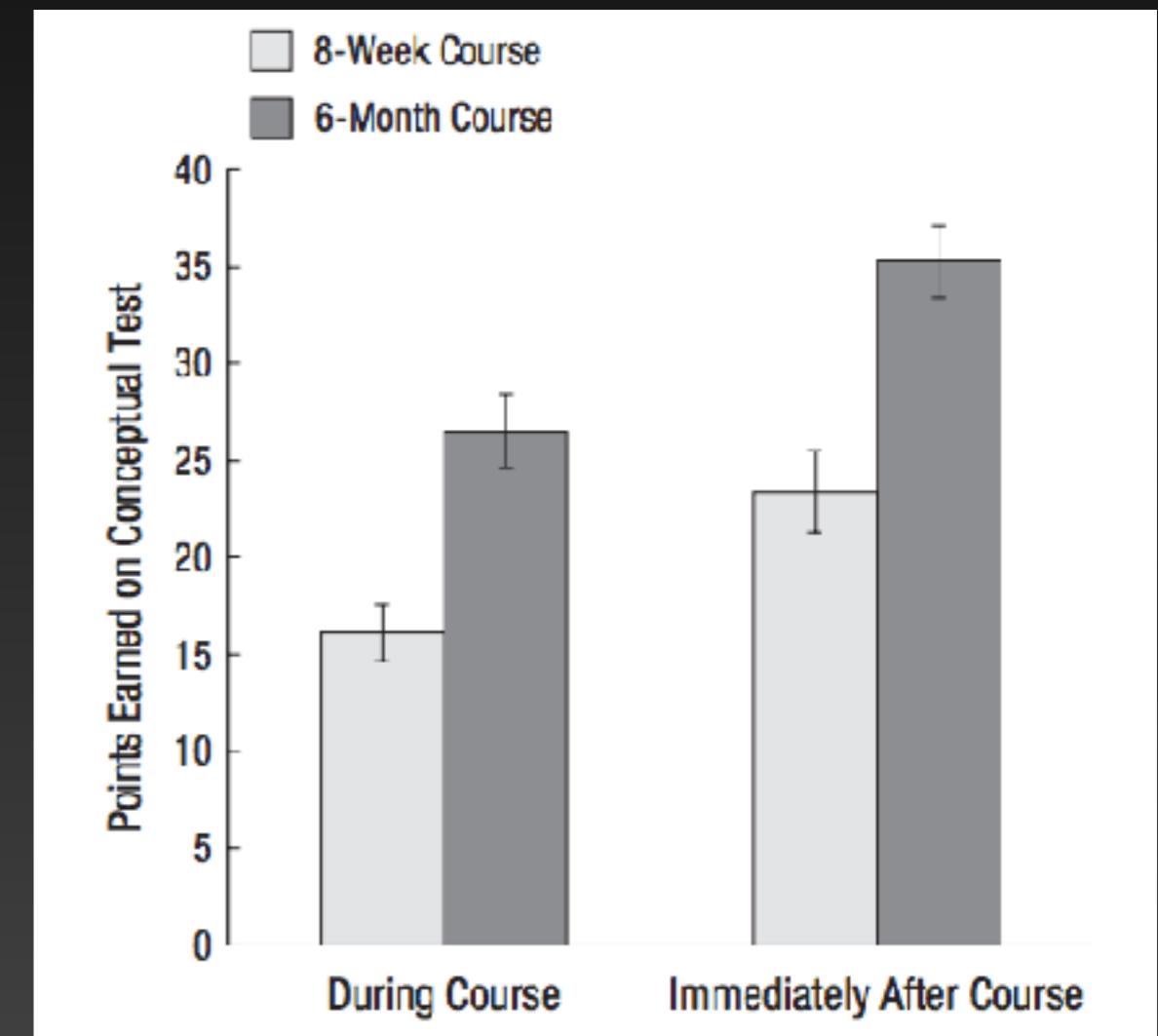
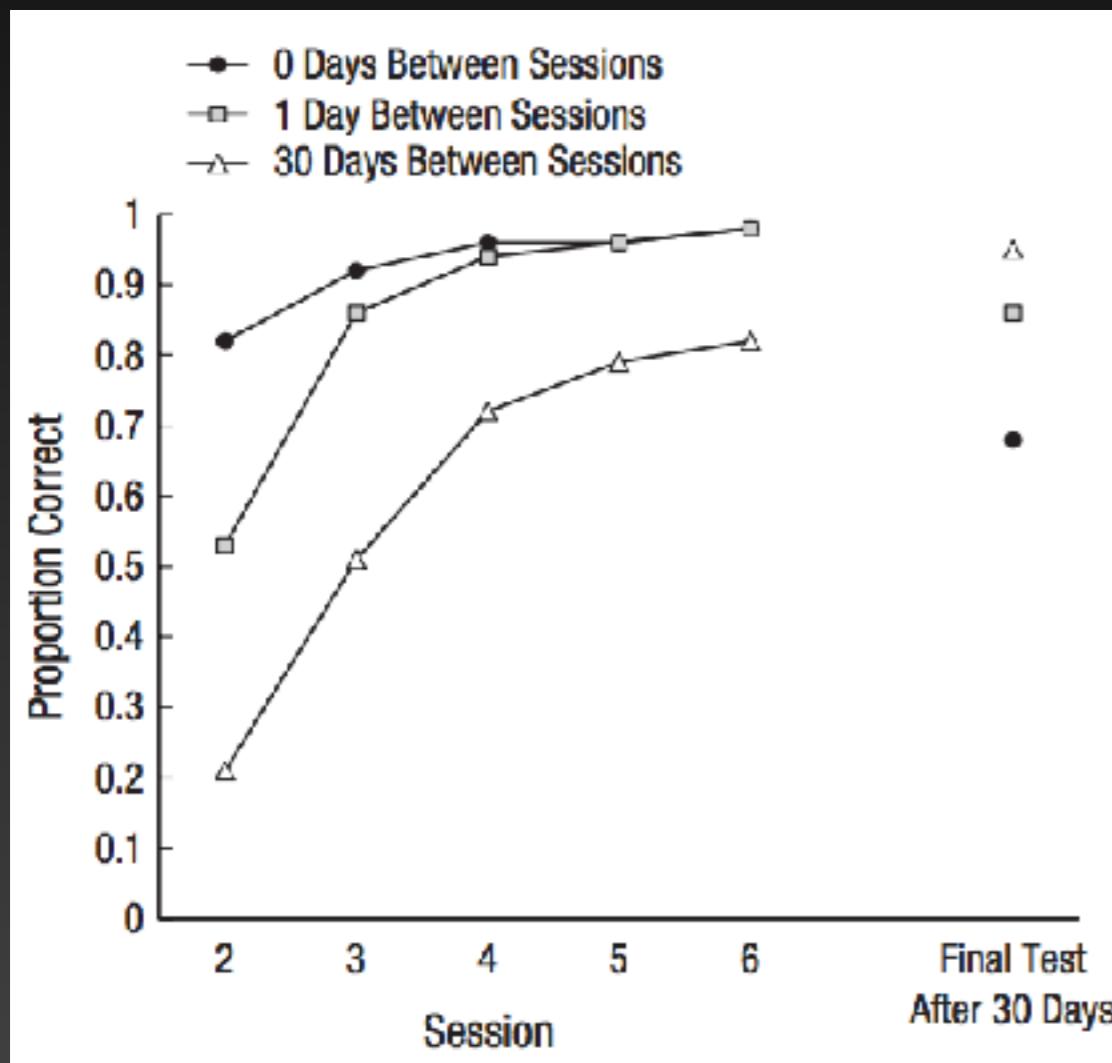


Fig. 1. Cumulative performance during the learning phase.



Fig. 2. Proportion recalled on the final test 1 week after learning. Error bars represent standard errors of the mean.

Distributed Practice

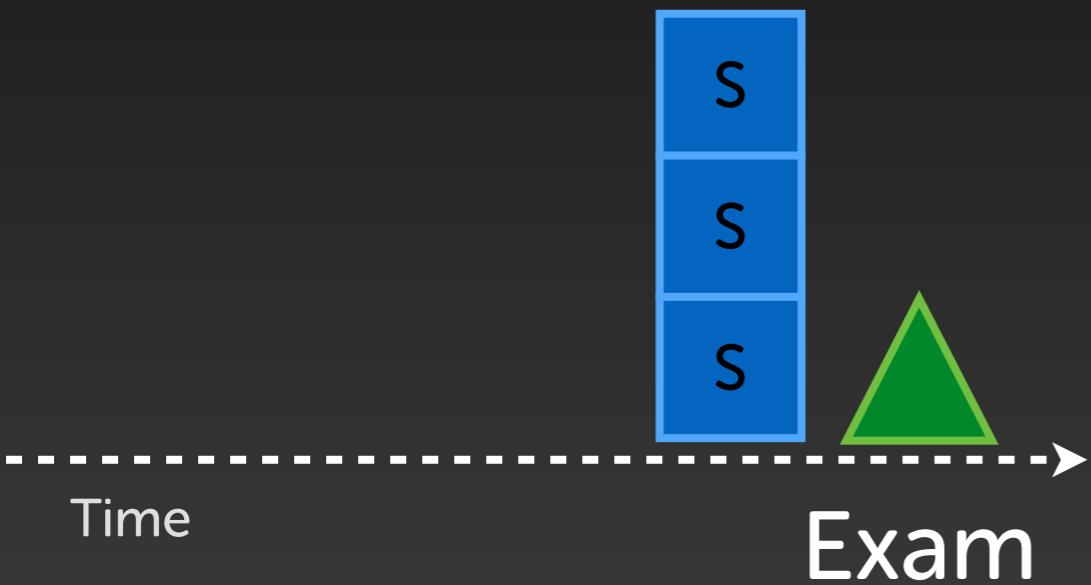


Translation of Spanish words [Bahrick 1979]

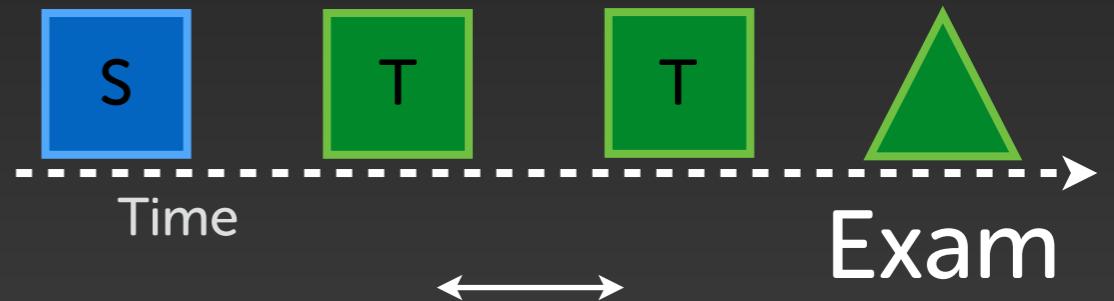
[Budé, Imbos, van de Wiel, and Berger 2011]

Distributed Practice

✗



✓



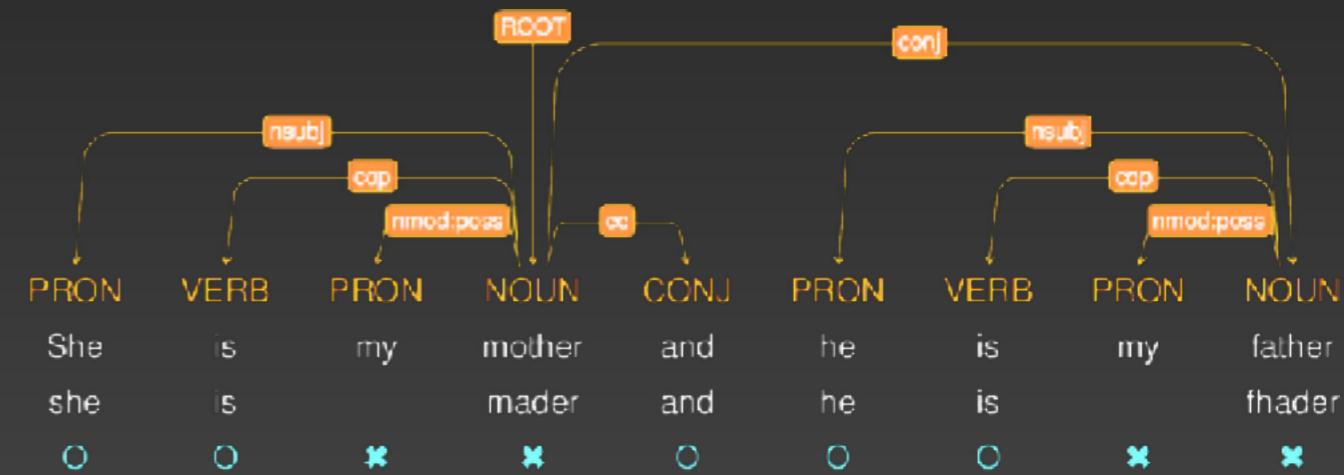
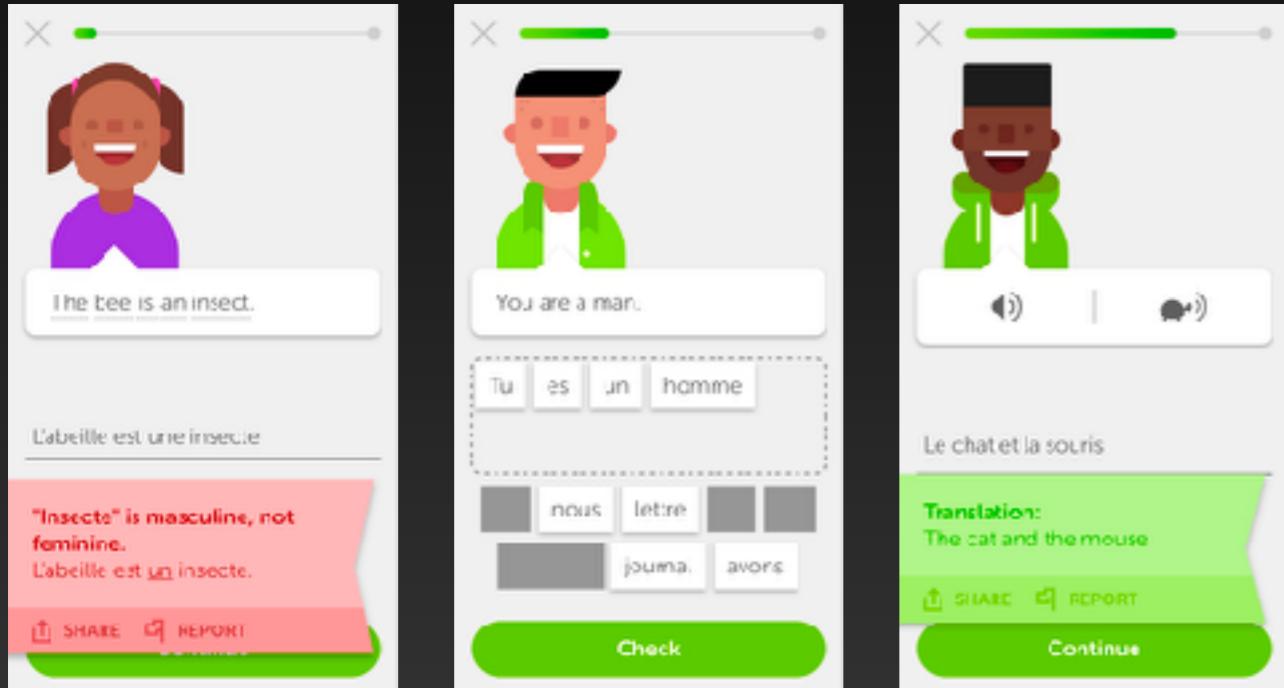
10%-20% of desired
retention period

[Cepeda et al., 2008]

Conclusion

- _____ is the largest language learning app with 300 million registered users
- Successful learners study language in a _____ manner (i.e., do not _____)
- _____ and _____ are the two key strategies for effective learning

Duolingo Second Language Acquisition Modeling (SLAM) Data



<http://sharedtask.duolingo.com/>

Thanks!

<http://masatohagiwara.net/shenzhen2018.html>

... and we're hiring!