

# Lecture 5: CALL

## LING-351 Language Technology and LLMs

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Instructor: Hakyung Sung

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\*Acknowledgment: These course slides are based on materials by Lelia Glass @ Georgia Tech (Course: Language & Computers)

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# Review

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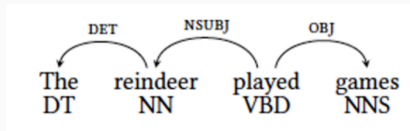
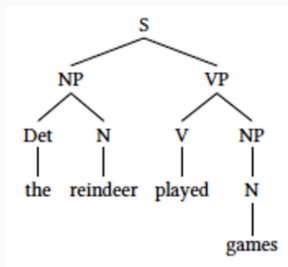
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- Part of Speech (POS)
- Phrasal category; Phrasal structure grammar
- Dependency grammar

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Review Quiz!

# Phrasal structure grammar vs. Dependency grammar

*The reindeer played games.*



## Lesson plan

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**Key idea:** CALL can encompass diverse ways technology supports human learning, requiring consideration of multiple cognitive aspects.



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# Introduction

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At the intersection of language learning and educational technology, the field of **Computer-Assisted Language Learning (CALL)** develops tools to support and enhance second language acquisition.

# Language learning

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You already picked up your **first language (L1)** as a baby



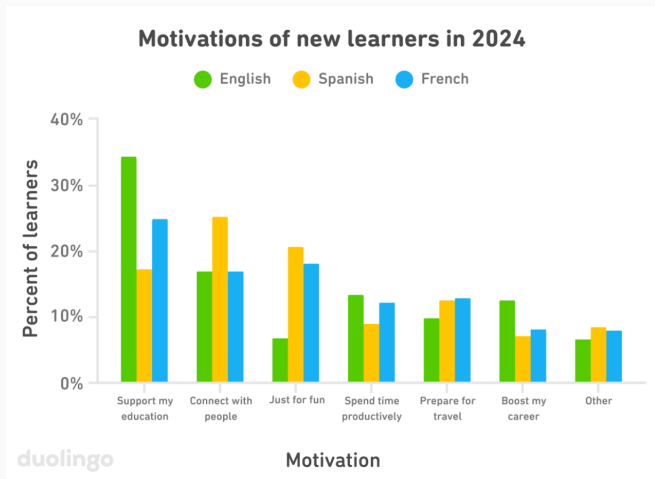
# Learning language

Later, you likely encountered a **second language (L2)** in a classroom or another country.



**L2** refers to any language learned after one or more L1s.

# Some data from *Duolingo*



Sourced from 2024 Duolingo language report : <https://blog.duolingo.com/2024-duolingo-language-report/>

# Some data from *Duolingo*

## Most popular languages studied on Duolingo in 2024



1. English



2. Spanish



3. French



4. German



5. Japanese



6. Italian



7. Korean



8. Chinese



9. Portuguese



10. Hindi

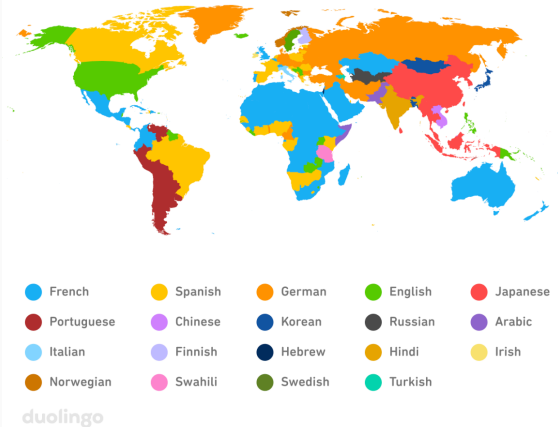
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# Some data from *Duolingo*

## Second most popular language studied on Duolingo in each country in 2024



Quick poll!

<https://app.sli.do/event/r39qUsYo6bUght7QBeV7s6>

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In what ways can this help or hinder?

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3. Does learning an L2 involve transferring knowledge from your L1?  
In what ways can this help or hinder?
4. Do motivation and social context matter more for L1/L2 acquisition?
5. Can technology change the way we think about L2 learning compared to traditional methods?

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- In short, there are many important **cognitive aspects** to consider when thinking about the design of CALL.

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- In short, there are many important **cognitive aspects** to consider when thinking about the design of CALL.
- We won't be able to cover every detail in this one class, but I'll highlight some key points. (The goal of this class is to give you a starting place.)

L1 vs. L2:

Differences in acquisition

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    - over-extension (e.g., *car* for trucks or golf carts)

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  - Complex sentences (~3 years+)

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- Long-lasting debate: nature vs. nurture

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  - Younger learners may achieve more native-like pronunciation
  - Older learners often progress faster initially, but may face limits in ultimate attainment

## L1-to-L2 transfer

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  - Similar syntactic structures (e.g., SVO in English and French)
  - Shared morphology (e.g., plural -s in English and Spanish)

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  - Phonology (e.g., Japanese learners omitting final consonants in English)
  - Morphosyntax (e.g., Korean learners omitting articles in English)

# Cross-linguistic influence

- Transfer can occur at multiple levels:
  - Phonological
  - Lexical
  - Syntactic
  - Pragmatic
- Not always one-way:
  - L1 → L2 (more common)
  - L2 → L1 (reverse transfer in bilinguals)

# Some theoretical perspectives on transfer

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- Interlanguage Theory
  - Proposed by Selinker (1972): Learners build an evolving “interlanguage” system
  - Influenced by L1, L2 input, universal grammar, and learning strategies
  - Explains why learners make systematic errors not found in either L1 or L2

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- Transfer as a double-edged sword
  - Positive: provides scaffolding, speeds up learning when L1 and L2 overlap
  - Negative: can fossilize into persistent errors (e.g., misordered syntax, pronunciation)
  - Extent of transfer depends on typological distance, proficiency, and learning context

Context:

Motivation and social factors

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# Practice and motivation in L2 learning

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  - Some achieve near-native fluency and professional use of L2
  - Others struggle with basic tasks despite years of exposure

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  - Functional communication for daily life
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  - Specialized skills (e.g., translation, interpretation)
- Even highly proficient learners may retain an L1 accent — showing success can be multidimensional

- Key factors linked to L2 attainment:

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# Attitude, motivation, and growth mindset

- Key factors linked to L2 attainment:
  - Intrinsic/extrinsic motivation
  - Positive attitudes toward the target language and culture
  - Willingness to take risks and make mistakes
- Motivation drives exposure, practice, and resilience in the face of difficulty

<https://www.youtube.com/watch?v=P6F0Rpg0KVo&t=92s>

- Duolingo motivates users not only with lessons, but also with features similar to social networking apps

# Duolingo and motivation

- Duolingo motivates users not only with lessons, but also with features similar to social networking apps
- Theories of motivation help explain why this works

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- Motivation increases when three needs are met:
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  - Competence: sense of progress (points, levels, streaks)
  - Relatedness: social connection (friends, leaderboards)

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  - Notifications, streak freeze, daily goals

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- Leaderboards and friend lists create social competition
- Similar to SNS: recognition and belonging motivate persistence
- Learners compare progress and are encouraged to “keep up”

# Coming back to CALL

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At the intersection of language learning and educational technology, the field of **Computer-Assisted Language Learning (CALL)** develops tools to support and enhance second language acquisition.

# What do we mean by CALL?

- Broad sense: Refers to the many ways computers intersect with education and society in language learning.
- Examples: multimedia textbooks, online dictionaries, digital writing tools, consuming media, and connecting socially with L2 speakers.

# What do we mean by CALL?

- Narrow sense: Describes instructional tools that deliver sequenced exercises, provide feedback on responses, and are often used in language assessment contexts.

## Example: *Fill-in-the-blank*

The detective lives \_\_\_\_\_ Baker Street.

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  - One correct answer: *on*?
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- **Sequencing:**
  - How to ensure the question is not too hard or too easy?



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- Recently, ITS are also used in domains like:
  - Math
  - Computer science (teaching coding skills)
- These domains are often **more constrained**, which may make:
  - Feedback and hints easier to automate
  - Learner modeling more reliable

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- How fun or useful is it for learners?
- Trade-offs:
  - Multiple choice: easy to grade, but limited expression
  - Free-text: richer data, but harder to parse and evaluate

[https://www.tandfonline.com/action/showAxaArticles?  
journalCode=ncal20](https://www.tandfonline.com/action/showAxaArticles?journalCode=ncal20)

# Review

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CALL can be also understood in a narrow sense, which

- focuses on specific instructional tools, such as assessments or practice exercises that provide feedback.