The Second Biennial International Conference on the Science of Language and the Brain (SOLAB)

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Intro to Applications of Eye-tracking in Language Studies

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SOLAB
Linguistic Society of Iran
Allameh Tabataba'i University
Tarbiat Modares University
Shiraz University

Workshop Content

Fundamentals

1. Why measuring gaze behavior?
2. How does vision work?
3. How does an eye tracker work?
4. Choose your eye tracker
5. How do eye trackers compare?
6. When is an eye tracker «good» for us?

Data collection and analysis

1. Eye Tracker Calibration
2. Practical Advice for Data Collection
3. Types of Software
4. Basic Metrics
5. Define Areas of Interest (AOIs)
6. Eye Tracking Metrics
7. Data Visualization
8. Pupillometry

Applications in Language studies

1. Reading
2. Reading models
3. Key variables in reading
4. Practical guidelines for a reading experiment
5. What is the visual world paradigm?
6. Spoken word recognition
7. Other studies
8. What do we measure?
9. The preferential looking paradigm
10. Practical guidelines

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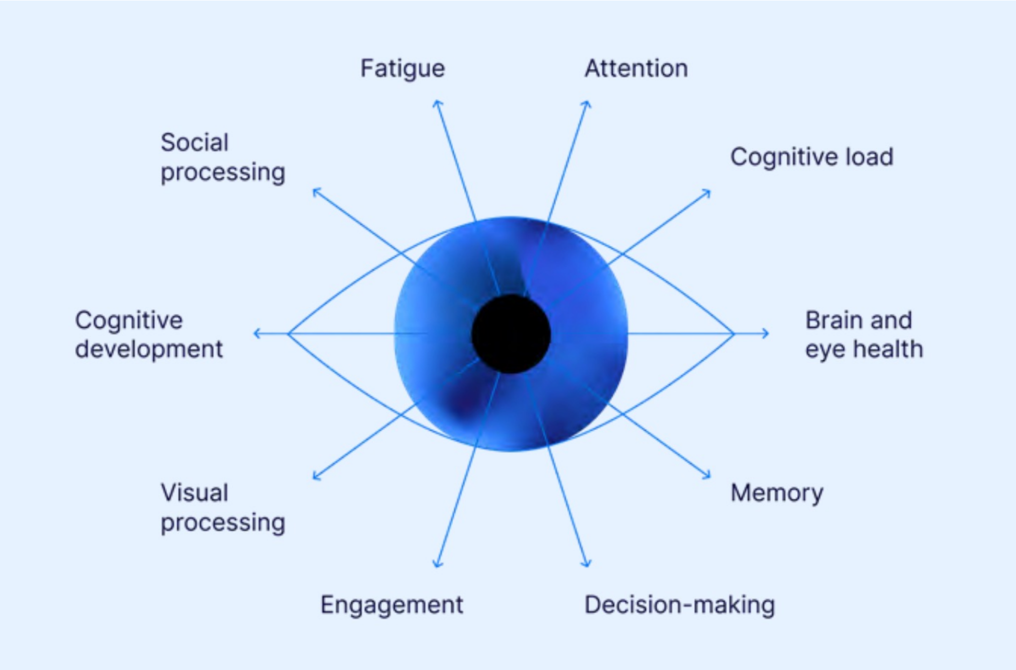
Fundamentals

Why measuring gaze behavior?

Eye-mind link hypothesis
The eyes look where the mind is engaged

Look = processing
Greater processing → longer look



Tobii, «The fundamentals of eye tracking»

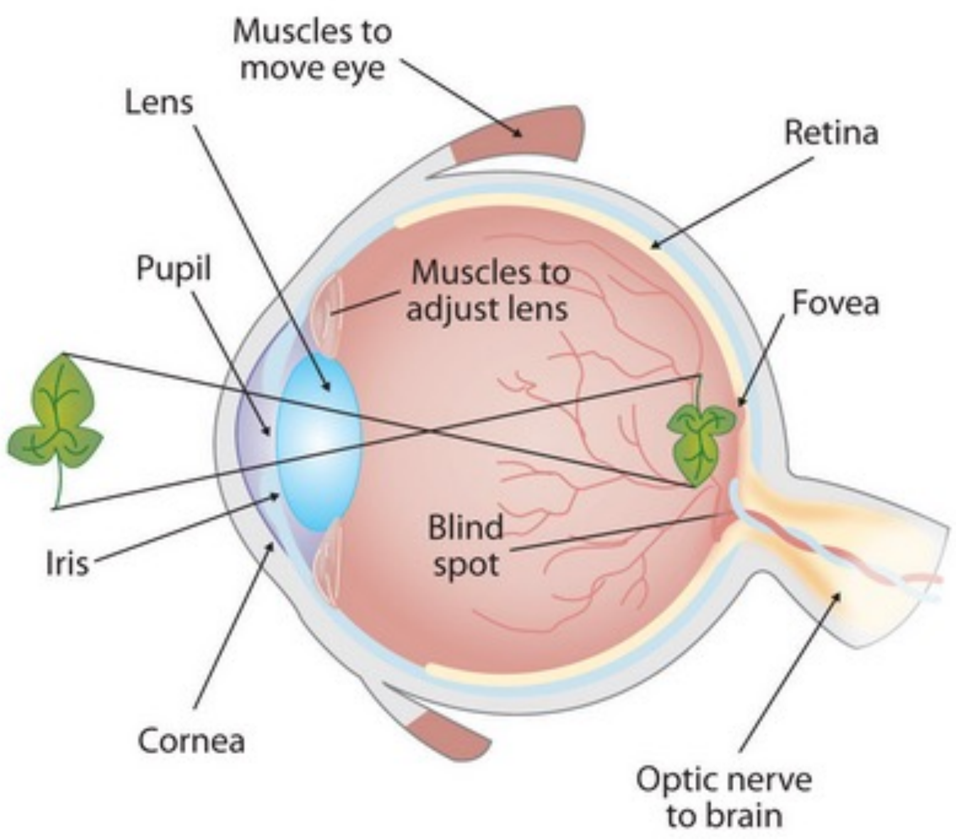
Eye tracking
↓
Language:

Visual
(reading)

Auditory
(spoken language)

Multimodal
(audio-visual inputs)

How does vision work?



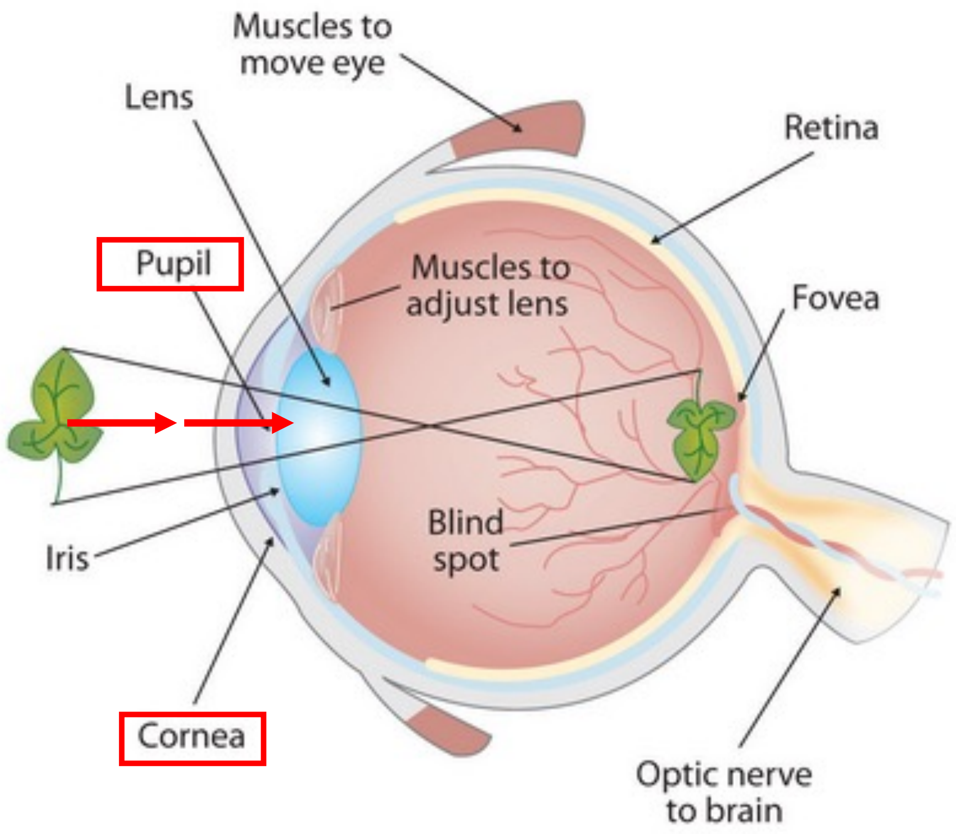
Fovea
area of highest visual acuity

Fixations
brief stop of the eye to process information

Saccades
rapid movements that shifts the point of fixation

How does vision work?

Fundamentals Data Applications



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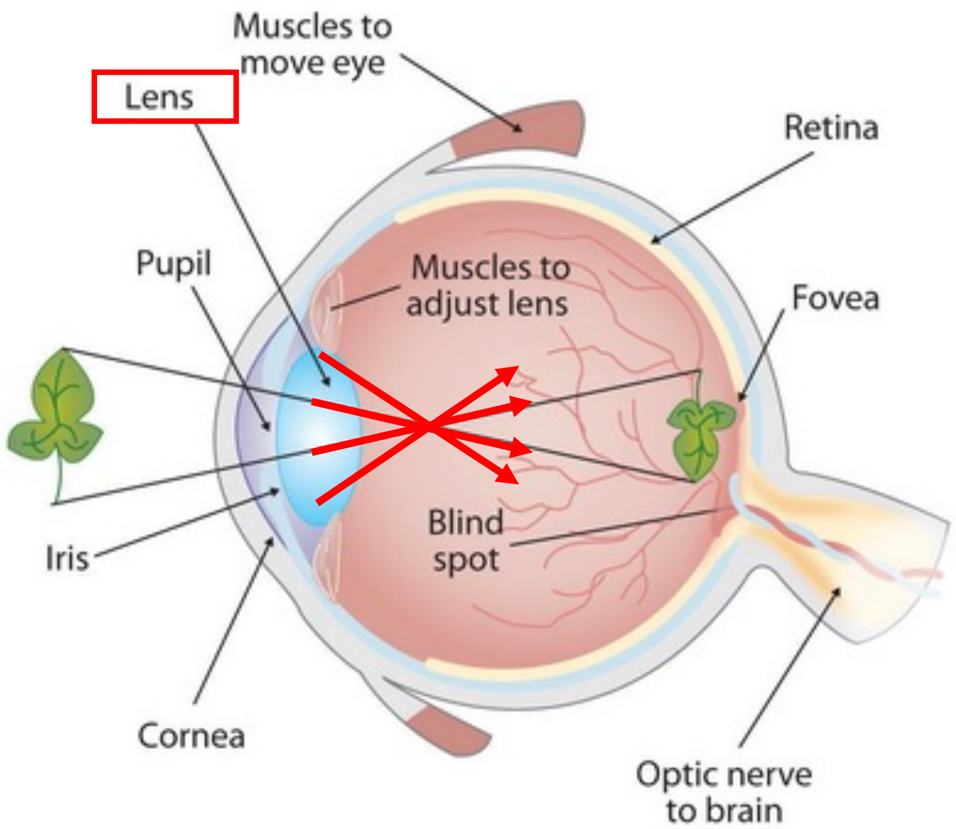

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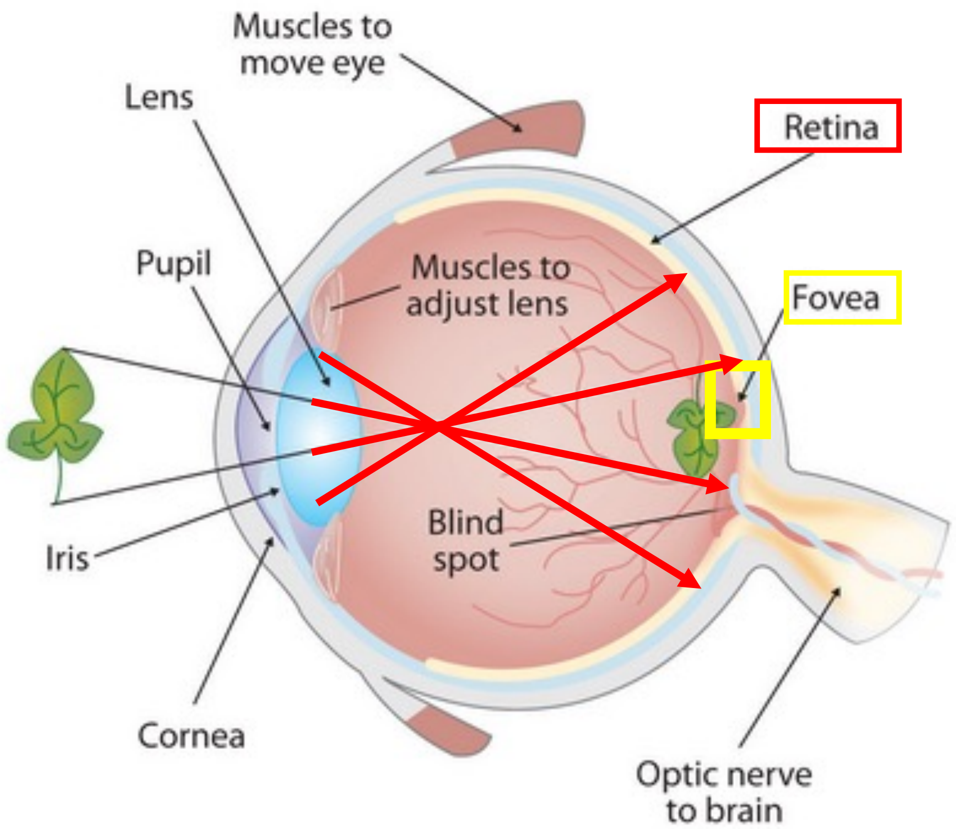


Fovea
area of highest visual acuity

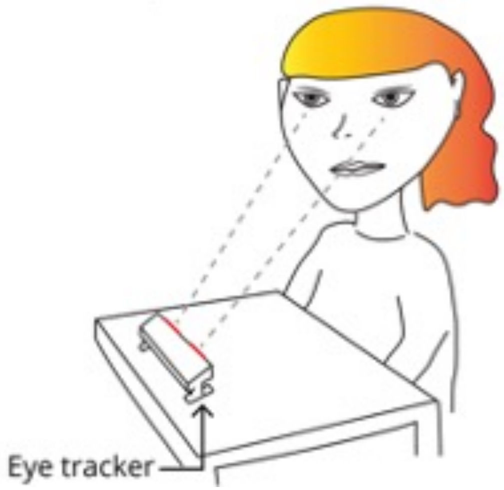
Fixations
brief stop of the eye to stabilize the image on the fovea

Saccades
rapid movements that shifts the point of fixation

How does an eye tracker work?

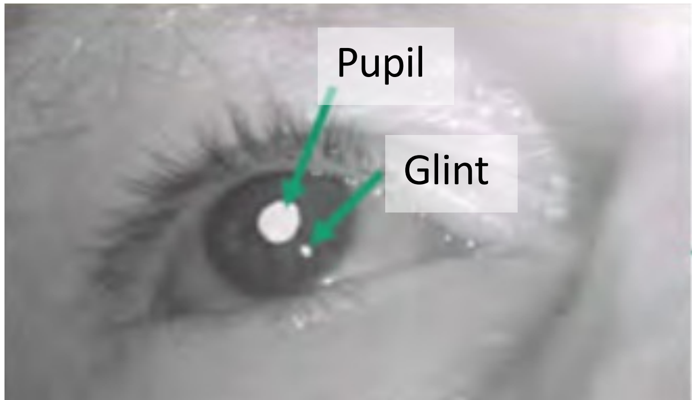
Pupil Center Corneal Reflection (PCCR)

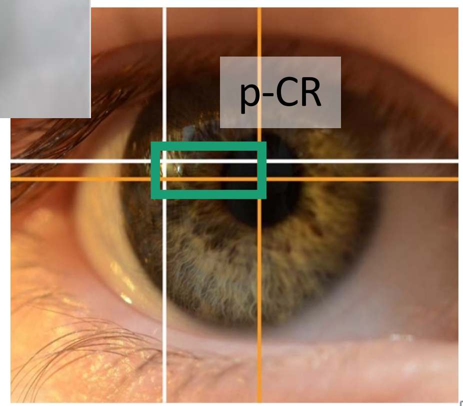
Infrared light is reflected by the center of the pupil and the cornea (glint)



Pupil minus corneal reflection (p-CR)

Algorithms calculates gaze by subtracting the glint from the pupil center position



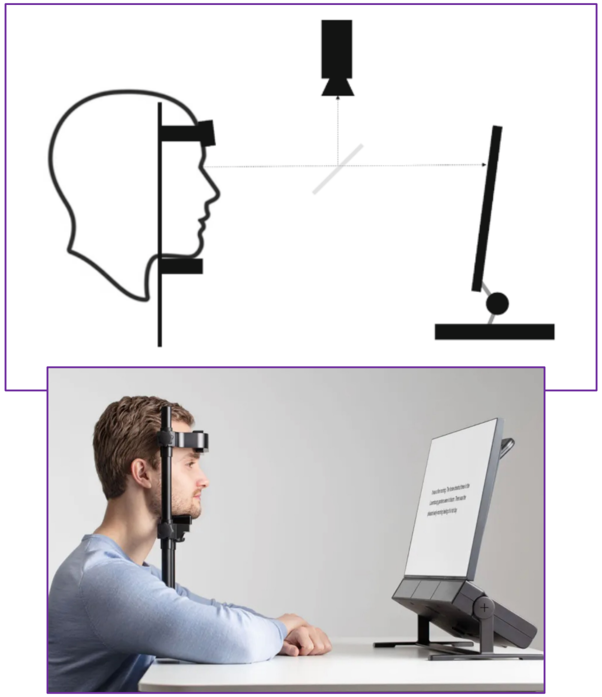


Valtakari et al., 2021
Tobii, «The fundamentals of eye tracking»
iMotion, «Eye Tracking: The Complete Pocket Guide»

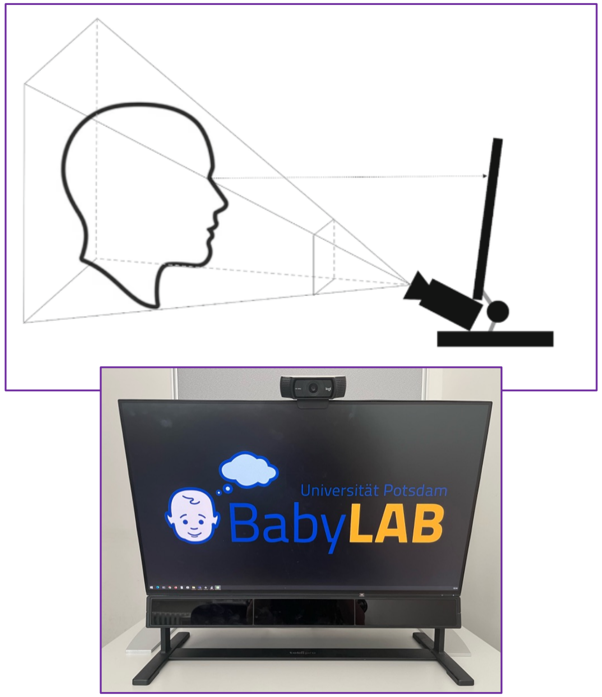
Choose your eye tracker

Screen-based

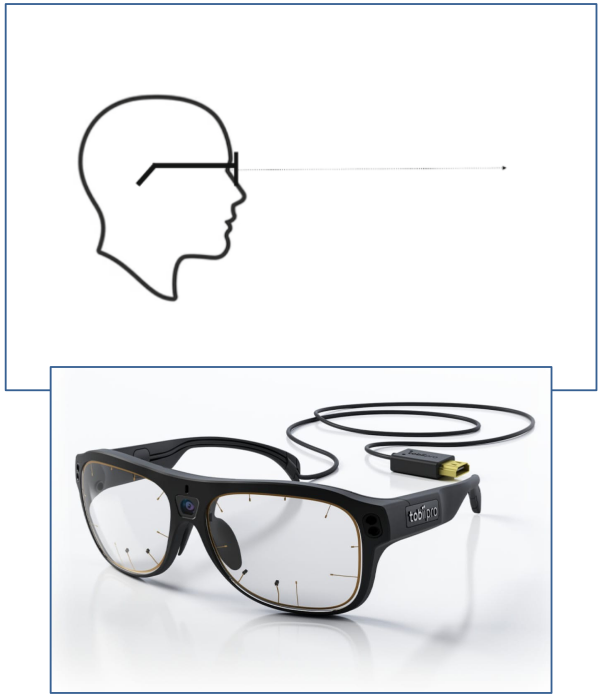
Wearable



head-restricted set up



head-boxed set up



Nyström et al., 2025
Valtakari et al., 2021
https://www.tobii.com/products/

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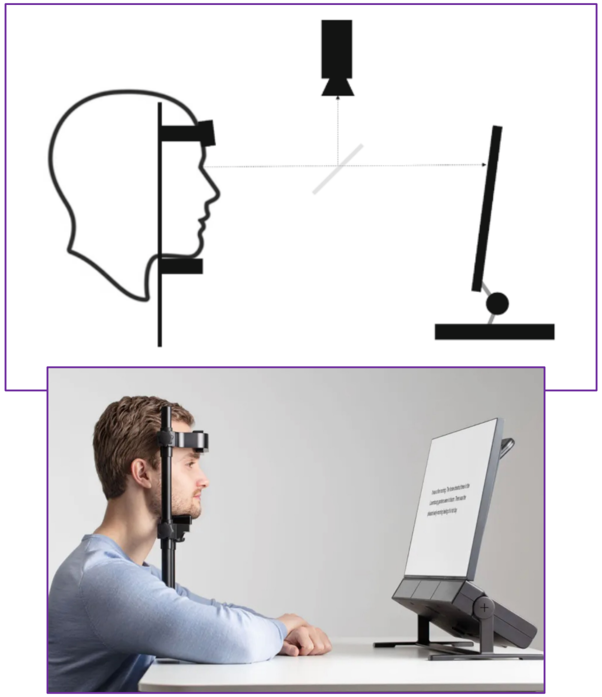
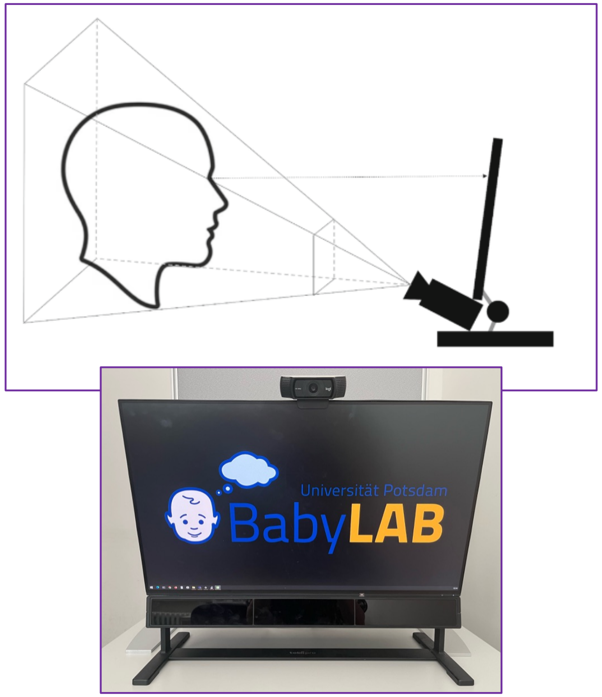
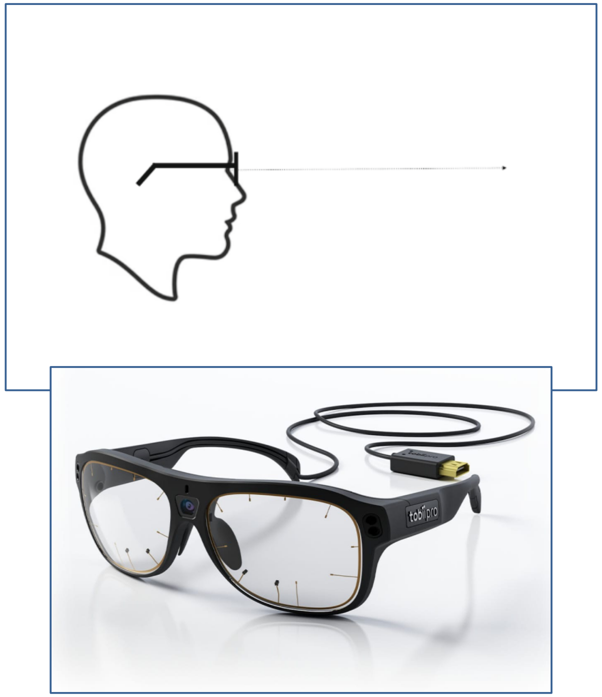
Choose your eye tracker

Screen-based





Wearable



Dual setups?

Eye tracking in human interaction: Possibilities and limitations

Niilo V. Valtakari [1] · Ignace T. C. Hooge [1] · Charlotte Viktorsson [2] · Pär Nyström [2] · Terje Falck-Ytter [2,3,4] · Roy S. Hessels [1]

Accepted: 28 November 2020 / Published online: 6 January 2021

Nyström et al., 2025
https://www.tobii.com/products/

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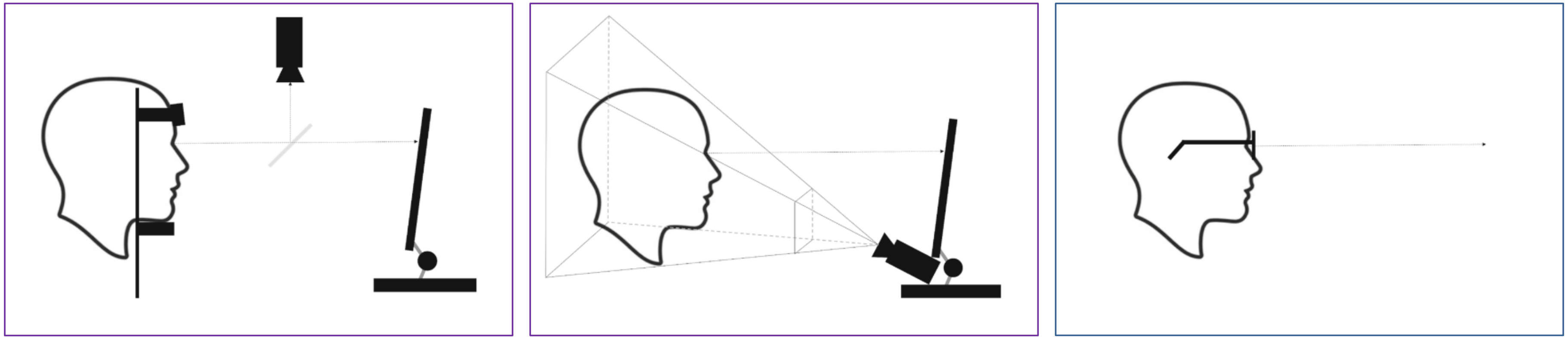
How do eye trackers compare?

Screen-based	Wearable



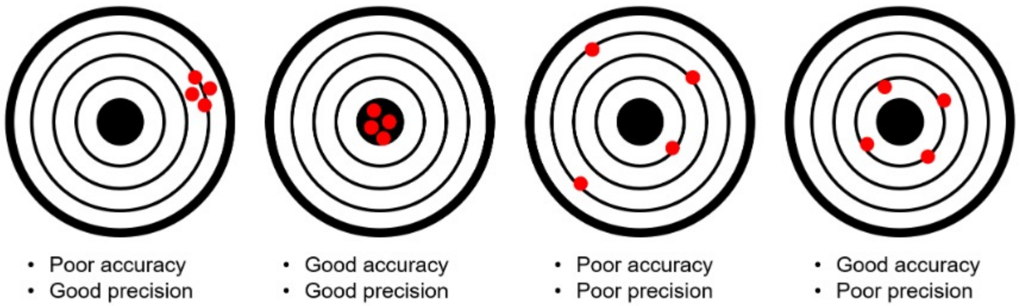
Nyström et al., 2025

Screen-based	Wearable
✓ Precision; high data quality	✓ Freedom of movement
✗ Restricted head movement	✗ Lower precision; complex analysis

When is an eye tracker «good» for us?

Accuracy
closeness between actual and reported gaze position

Precision
consistency of repeated measurements



Kasneci et al,. 2024

Good data!

When is an eye tracker «good» for us?

Always keep in mind **your** experimental condition.

Tobii Pro Spectrum User Manual

Sampling frequency	60, 120, 150, 300, 600 or 1200 Hz (max. frequency de ware version)
Precision	0.01° RMS* in optimal conditions (applying Savitzky-(tings listed in the test report) 0.06° RMS* in optimal conditions (raw signal)
Accuracy	0.3° in optimal conditions
Binocular eye tracking	Yes
Eye tracker latency**	Mean latency < 2 ms at 1200Hz (SD < 0.2 ms)*

A good tracker **for us** minimizes errors in accuracy and precision
under our experimental condition.

How do we obtain good data quality ?

Practical advice for data collection

Fundamentals Data Applications

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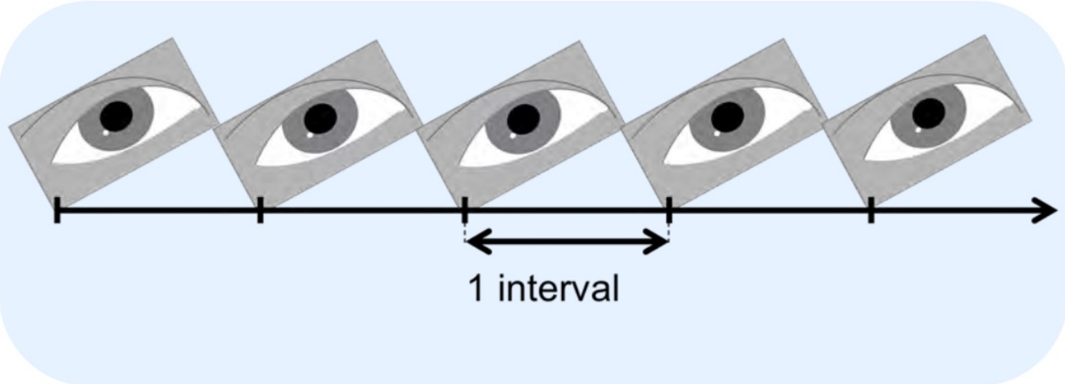
When is an eye tracker «good» for us?

Sampling rate

how many times per second gaze is recorded (Hz)



Sampling frequency (Hz)	Sampling interval (ms)
30	33.33
60	16.67
120	8.33
250	4
300	3.33
600	1.67
1200	0.83

higher sampling rate
=
more detail
(fast eye movements)
↓
large data files
more expensive

Data collection and analysis

Types of software

- **Proprietary** software (from manufacturers)
- **External** software for design/analysis (via SDK in PsychoPy, MATLAB, Presentation, self-written scripts)

Company	Software for Experiment design	Software for Data analysis
Tobii	Tobii Pro Lab	Tobii Pro Lab
SR Research Eye Link	Experiment Builder	Data Viewer
SMI		Be Gaze
Open source		OpenGaze (Pyhton) iView X SDK (SMI) OpenEyes Gaze Parser PyGaze (Python library) EyeRecToo …

Adapted from
Roccaforte & D'Alesio, 2022

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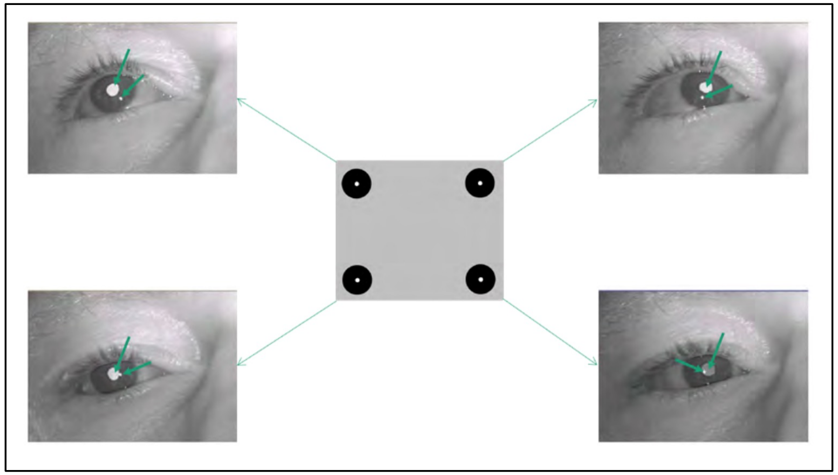
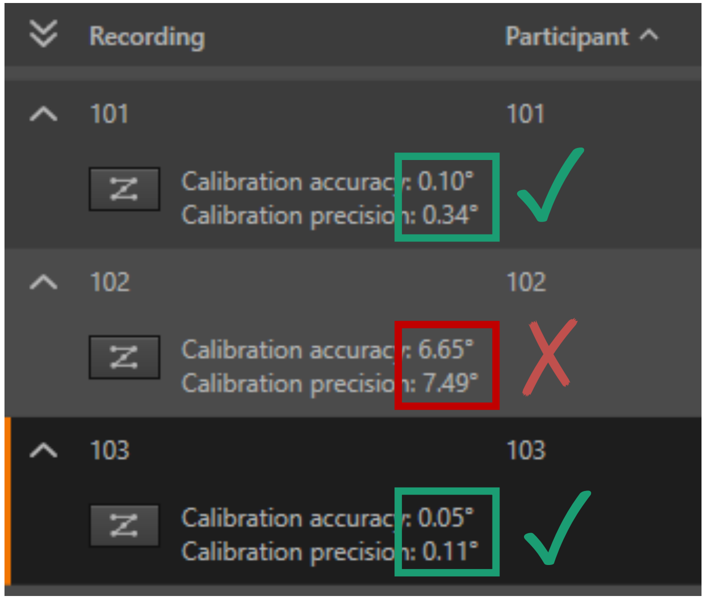
Eye tracker calibration

Calibration

the process of adapting the eye tracker to the participant's eyes to ensure accurate gaze data





Kasneci et al,. 2024
Tobii, «The fundamentals of eye tracking»

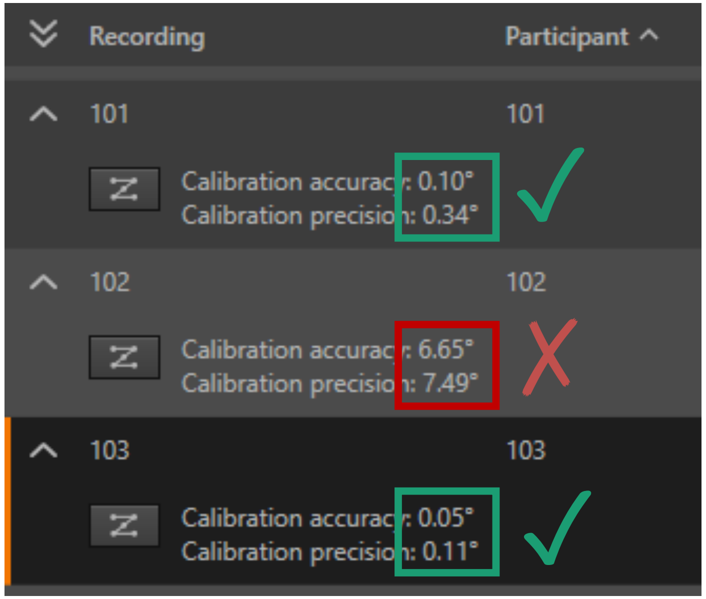
Eye tracker calibration

Calibration

Consider your experimental condition:

Working with **adults**?

- aim for optimal values (close to 0°)
- values **<1–2** are acceptable



Calibration

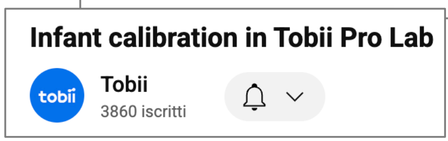
Consider your experimental condition:

Working with **infants and toddlers**?

- prioritize participants' **attention** over perfect calibration
- prioritize a **stable position within** the head box over achieving high accuracy
- create an **engaging calibration** with images, videos, and sounds

use animal icons instead of dots

Want infant calibration tips?



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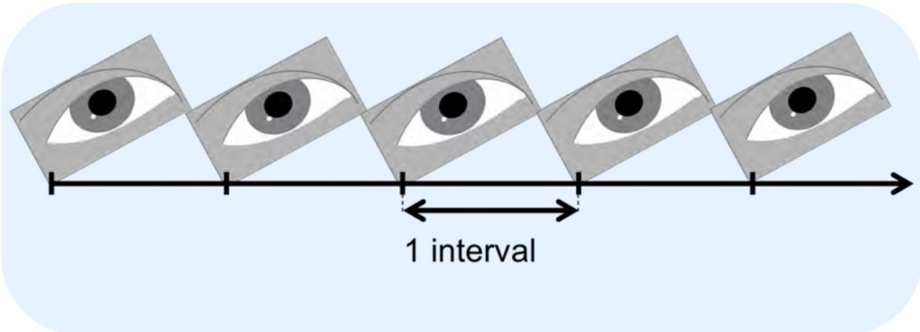
Basic metrics

Gaze points: basic unit → x and y coordinates of eye position, at a given moment (sampling interval)



Sampling frequency (Hz)	Sampling interval (ms)
30	33.33
60	16.67
120	8.33
250	4
300	3.33
600	1.67
1200	0.83

Tobii, «The fundamentals of eye tracking»

1	time	xPos	yPos
396	4717	-296	43
397	4725	-298	39
398	4733	-297	43
399	4742	-298	39
400	4750	-298	44
401	4758	-298	36

gaze point

position on the screen

sampling interval

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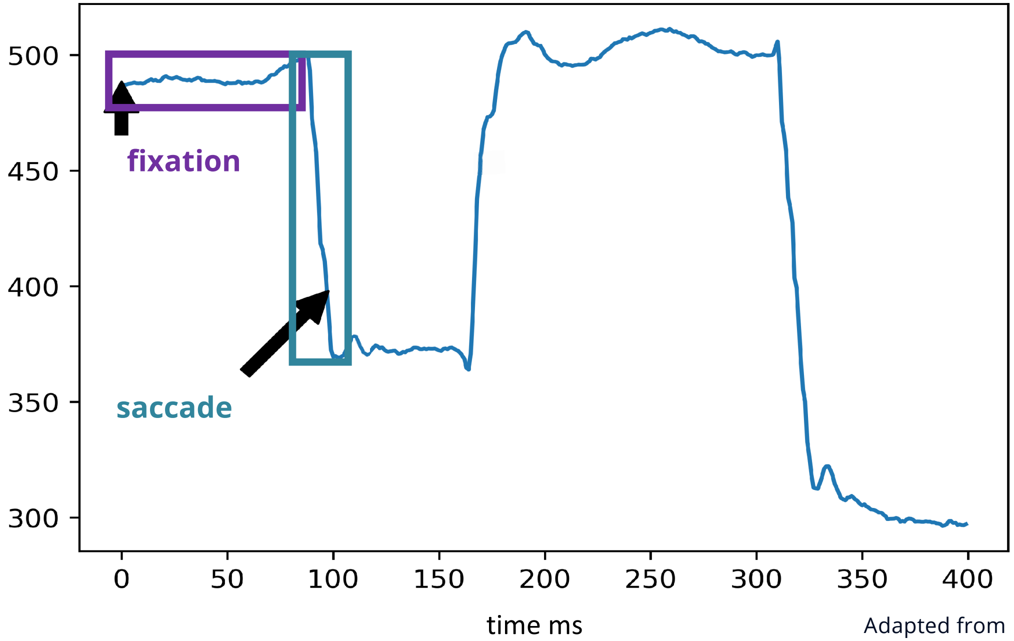
Basic metrics

Fixations: a series of gaze points close in time (100 – 300ms) and space → extract detailed visual information

Saccades: eye movements between fixations → bring the fovea from one point to the other

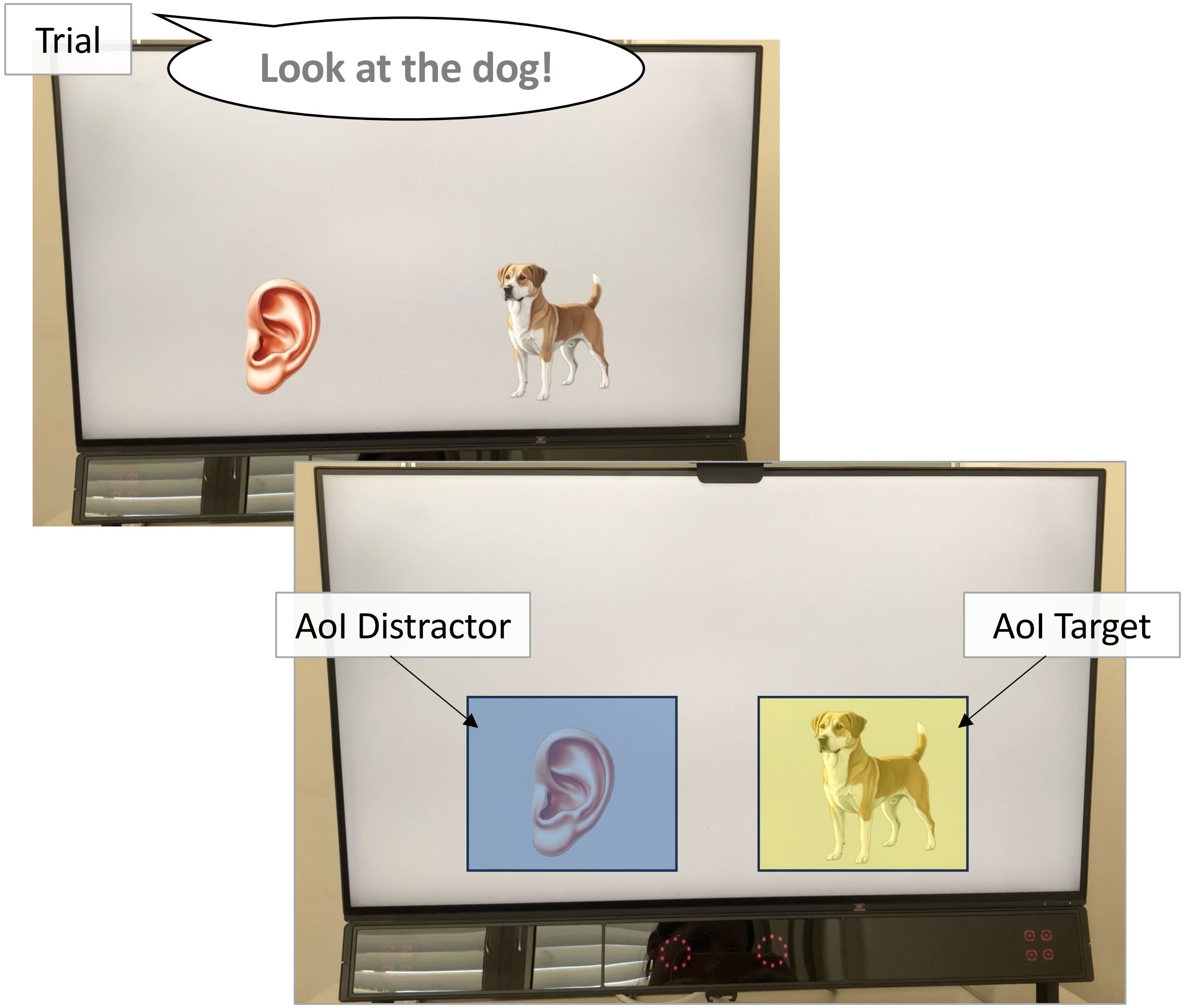


Adapted from
Birawo & Kasprowski, 2022

Data analysis

Define Areas of Interest (AoI)

First step of analysis: define Areas of Interest



BabyLAB Potsdam/Arianna Colombani

Areas of Interest
user-defined subregions of a displayed stimulus.

Extract separate metrics for each AOI to evaluate the gaze behaviors in two or more specific areas in the same trial.

Eye tracking metrics

Metric	Scale	Definition
Fixation		
Time to first fixation	Time	The time period from entering the AOI until the first fixation is made
First fixation duration	Time	The duration of the first fixation made in an AOI
Gaze duration	Time	The sum of all fixations on a word prior to an eye movement to another word
First pass reading time	Time	The sum of all fixations recorded for a multi-word interest area up to the point when the eyes leave the interest area
Second pass time	Time	The summed duration of all fixations that are made within an interest area when the eyes visit the area for the second time; This includes cases where the interest area was originally skipped
Rereading time	Time	The summed duration of all fixations in an interest area except for those fixations made during first pass
Average fixation duration	Time	Mean of fixation duration on each AOI
Total fixation duration	Time	The summed duration of all fixations in an AOI
Number of fixations	Count	The number of fixations made in an AOI
Proportion of fixations	Count	The proportion of total fixations that are directed to an AOI, or the number of fixations between AOIs and between experimental groups
Fixation position	Space	Location of a fixation

Roccaforte & D'Alesio, 2025

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Eye tracking metrics

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Rereading time	Time	The summed duration o interest area except for those fixatio pass
Average fixation duration	Time	Mean of fixation d
Total fixation duration	Time	The summed d AOI
Number of fixations	Count	The numbe
Proportion of fixations	Count	The pro rected t betwe expe
Fixation position	Space	Lo

Saccade		
Saccade duration	Time	The amount of time that is takes to actually move the eyes
Saccade count	Count	The number of saccades counted within an AOI
Saccade length	Space	The distance between two consecutive fixations
Dwell		
First pass time	Time	Time spent for the first entering of an AOI until leaving
Rereading time	Time	Summed duration of revisited time spent within an AOI
Total reading time	Time	Total time spent within an AOI or spent for a reading task
Total visit duration	Time	The summed duration of all visits to a particular interest area
Total number of visits	Count	The total number of visits made to an AOI
Dwell rate	Count	The number of entries into a specific area of interest per minute
Regression		
Regression path duration/go-past time	Time	The time spent on the word itself and any prior parts of the sentence before the reader moves past the critical word to the right
Regression rate	Count	The number of regressions per second, per line, or paragraph, etc.
Regression in	Count	A regressive eye movement that lands in a predefined interest area
Regression out	Count	A regressive eye movement that is launched from a given interest area
Skip		
First-pass skipping rate	Count	The proportion of participants who skipped an AOI when first encountering it
Skip count	Count	The total number of times an interest area was skipped

Roccaforte & D'Alesio, 2025

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Eye tracking metrics

Many metrics! → choose based on your research question

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Pupil		
Pupil diameter	Space	The pupil size for the current position of the eye
Pupil dilation latency	Time	The time elapsing between the onset of increased luminance (or other stimulus) and the beginning of pupil dilation
Blink		
Blink rate	Count	The number of blinks per unit of time
Blink duration	Time	The complete time from when the eyelid starts moving down until it is fully up again
Gaze pattern		
Heatmap	None	The visualization of the screen display, overlaid with a smooth landscape of fixation data represented in different colours
Scanpath	Space	An ordered set of fixations points (depicted by circles) connected by saccades (depicted by lines)

Roccaforte & D'Alesio, 2025

SOLAB

Eye tracking metrics

Many metrics! → choose based on your research question

Fixation

- time to first fixation
- first fixation duration
- gaze duration

Saccade

- saccade duration
- saccade count

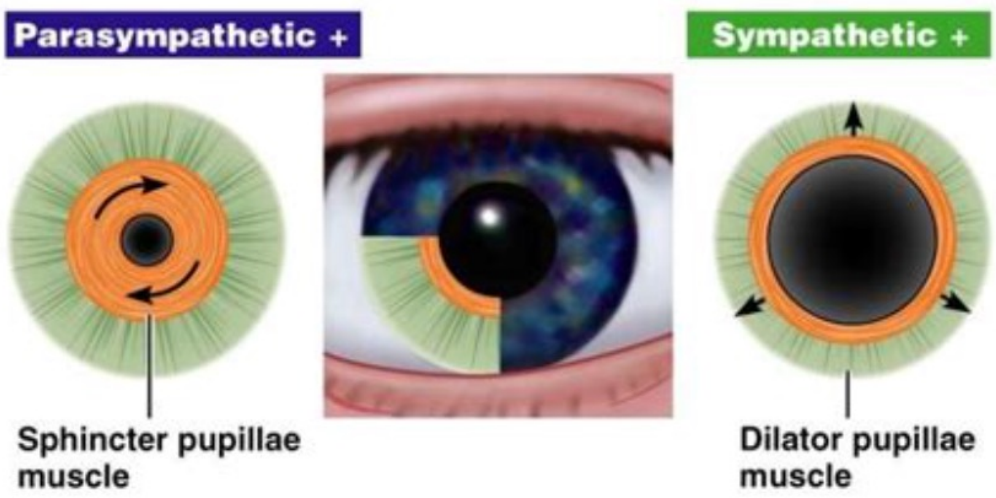
Pupil

- pupil diameter
- pupil dilation latency

Pupillometry

Pupil dilation reflects mental processes.

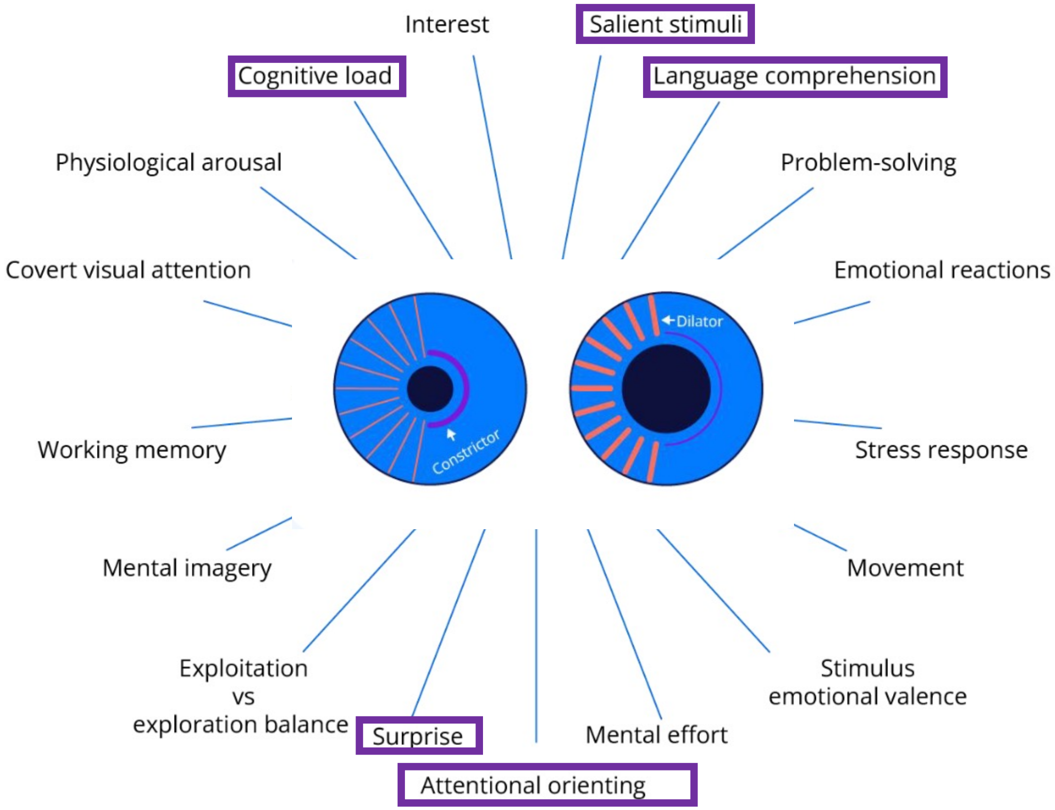
Involuntary. Mostly respond to light variations.
When lighting is constant size reflects changes in cognitive processes.



Locus coeruleus → norepinephrine → dilation
↑
arousal, attention, cognitive demands, etc…

Pupillometry

Pupil dilation is involuntary and reflects mental processes.



In language studies:

- Syntactic complexity
  (Schluroff, 1982; Just & Carpenter, 1993)
- Grammaticality violations
  (Gutiérrez & Shapiro, 2010)
- Sentence comprehension
  (Wright & Kahneman, 1971)
- Context integration
  (Engelhardt et al., 2010)
- …

adapted form
Tobii, "Eye Tracking for Pupillometry Insights"»

Pupillometry

Fundamental info:

- Recorded with gaze data (same sampling rate)
- Highly **sensitive** to light → keep brightness constant
- **Slower** than gaze
  - e.g. response to light increase: latency ~200 ms, peak 500–1000ms
  - task-evoked response: delay: 200–300 ms, peak ~1200 ms (500–2000 ms)

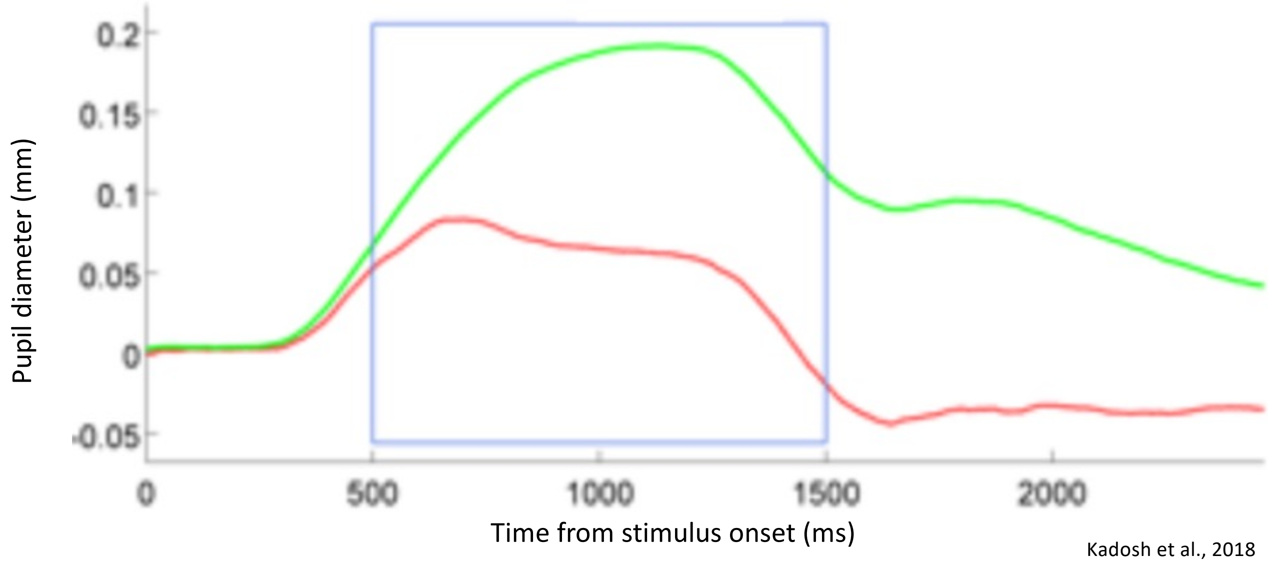
Stimuli:

- Keep brightness and color **constant**
- Allow for **2–3 s window** for the pupil response to unfold
- + **≥3 s intertrial** interval → avoid carryover effects
- Eye position affects pupil size
- Physical responses (e.g. button press) affect pupil size

Pupillometry

Metrics and visualizations

Pupil		
Pupil diameter	Space	The pupil size for the current position of the eye
Pupil dilation latency	Time	The time elapsing between the onset of increased luminance (or other stimulus) and the beginning of pupil dilation



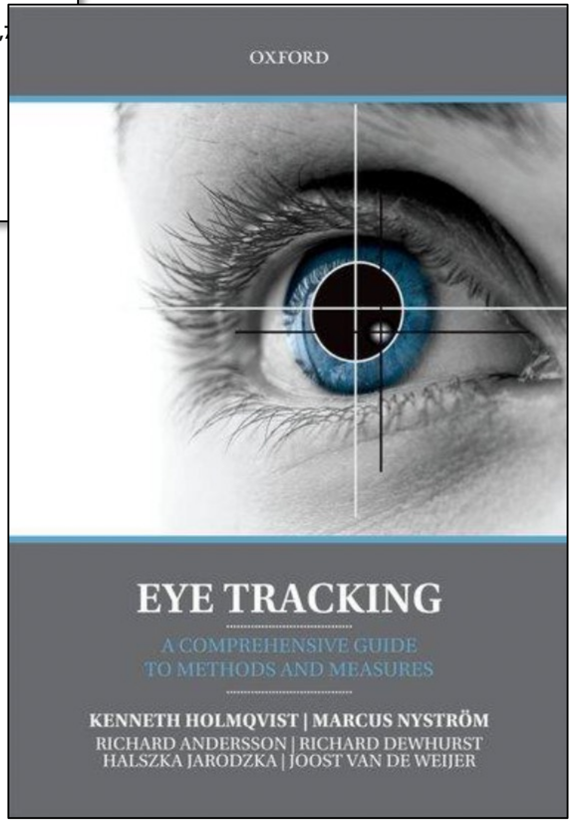
Kadosh et al., 2018

Suggested reading

From pre-processing to advanced dynamic modeling of pupil data

Lauren Fink[1,2] · Jaana Simola[3,4] · Alessandro Tavano[5] · Elke Lange[1] · Sebastian Wallot[6,7]
Bruno Laeng[8,9]

Accepted: 20 February 2023

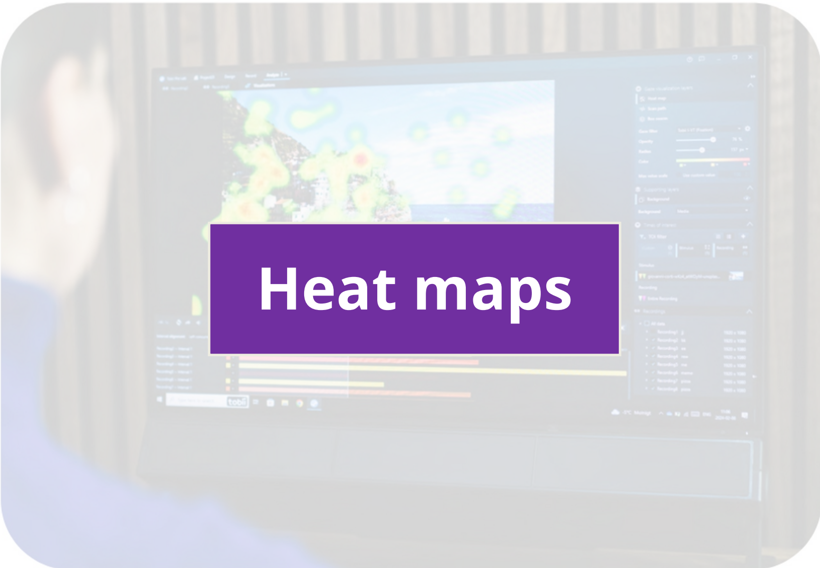


Pupillometry
(with a focus on children and language)

Tom Fritzsche
University of Potsdam
tom.fritzsche@uni-potsdam.de

Universität Potsdam BabyLAB

Data visualization



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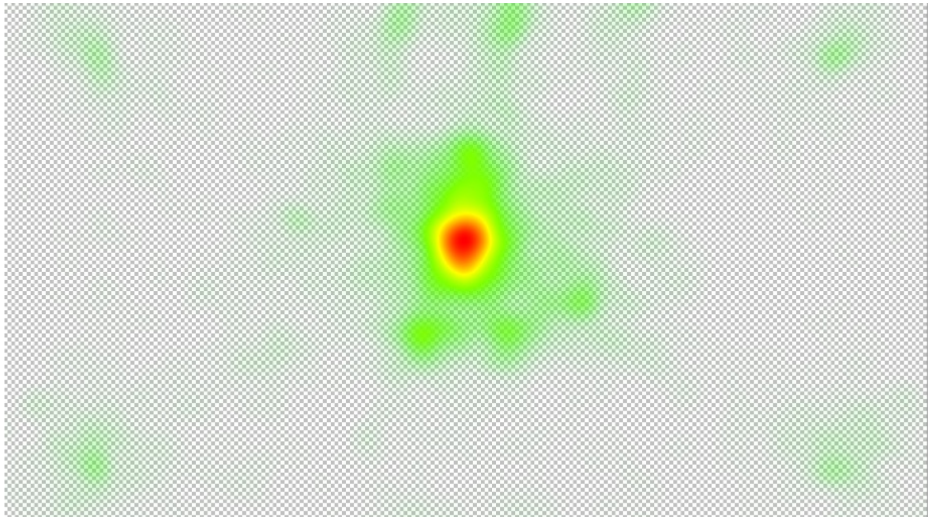
Data visualization

Heat map:

- warm color = longer/more fixations

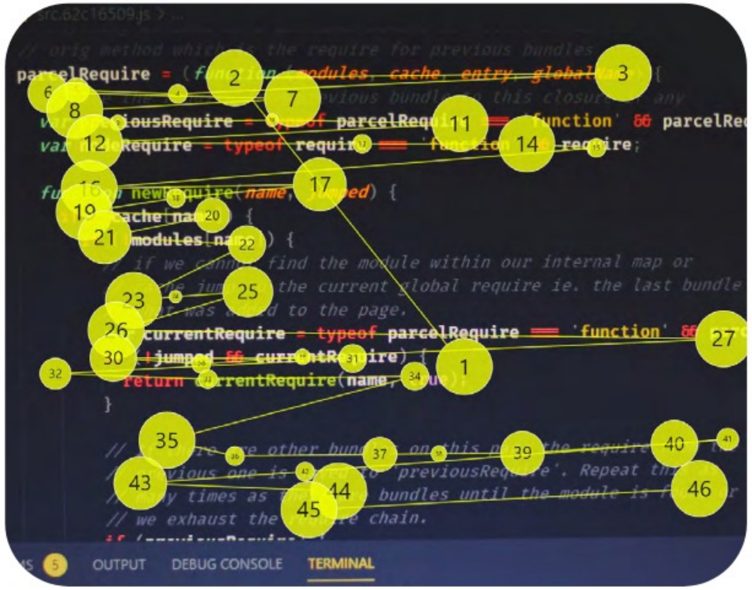


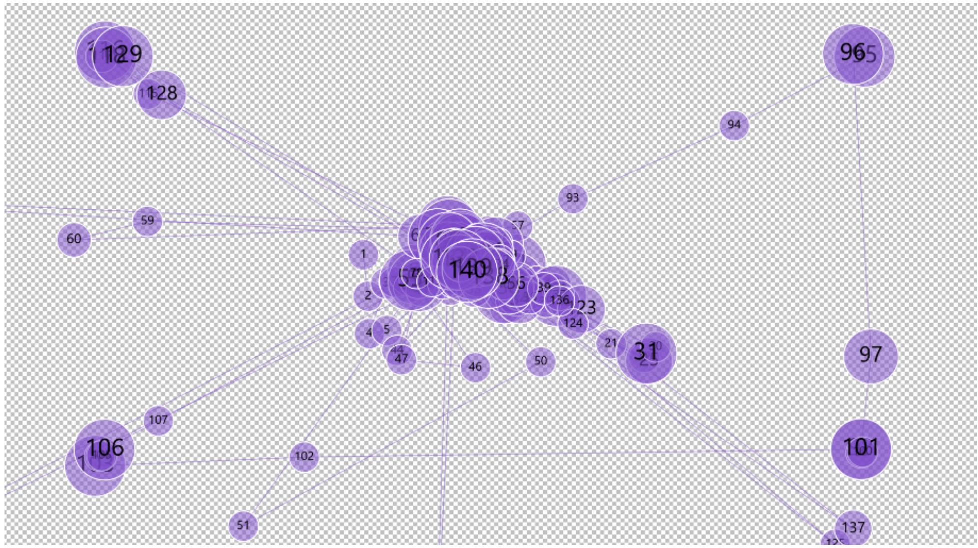
Heat map of a 5-point calibration screen

Data visualization

Scan path:

- circle = fixation
- circle size = total fixation duration
- numbers = fixation order





Scan path of a 5-point calibration screen

Practical advice for data collection

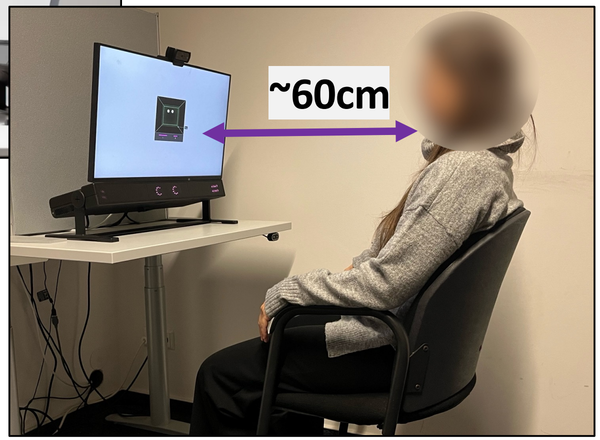
Maximizing calibration and data collection

Control the **environment**:

- Stable, **moderate lighting** (avoid sunlight and darkness)
- Neutral background

Control **position**:

- **Minimize head movement**
  - Chin rest
  - Comfortable setup with chair



trade-off between natural behavior and data quality

Practical advice for data collection

Working with infants and toddlers

Position:

- Sit on **baby chair**
- Sit on **caregiver's lap**
- Caregiver helps to stabilize

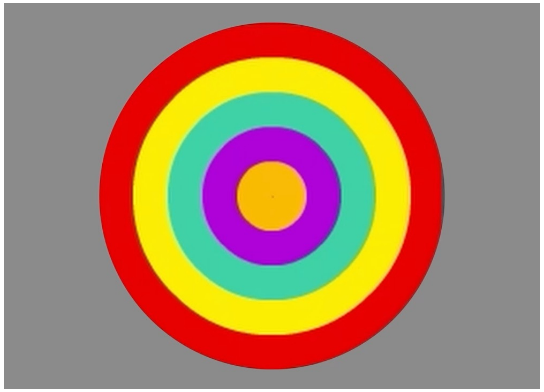
BabyLAB Potsdam/Thomas Hölzel

https://www.tobii.com/solutions/

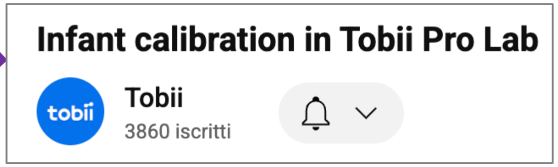
Working with infants and toddlers

Engagement:

- Keep tasks **short** (avoid repetition)
- Use colorful, audiovisual **attention-getters**
- Frame as **game-like** narrative with small rewards



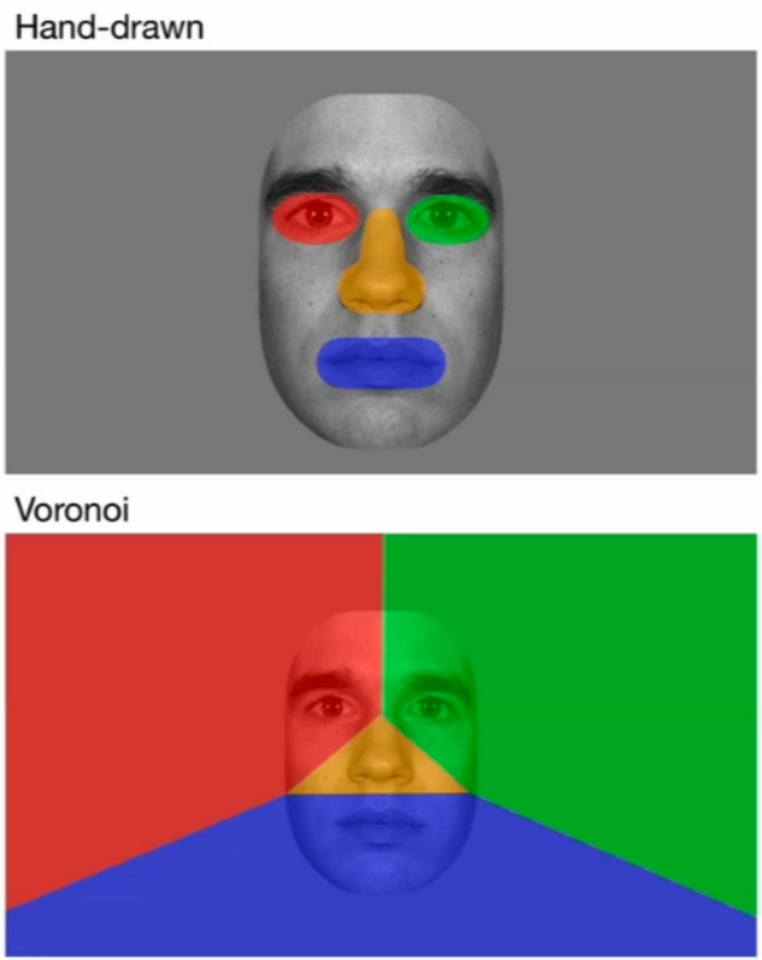
Want infant calibration tips?
https://www.youtube.com/watch?v=R0X3Bd8PKI0



Practical advice for data collection

Use **large** Areas of Interest (AOIs)

Compensate for head movements and a less precise and accurate calibration



Hessels et al., 2016

good

better!

Practical advice for data collection

Movement and data loss are inevitable…

Dalrymple, K. A., Manner, M. D., Harmelink, K. A., Teska, E. P., & Elison, J. T. (2018). An Examination of Recording Accuracy and Precision From Eye Tracking Data From Toddlerhood to Adulthood. *Frontiers in Psychology*, 1–12. http://doi.org/10.3389/fpsyg.2018.00803

20% excluded toddlers

Hessels, R. S., Hooge, I. T. C., & Kemner, C. (2016). An in-depth look at saccadic search in infancy. *Journal of Vision*, *16*(8), 10. http://doi.org/10.1167/16.8.10

30% excluded infants

Birmingham, E., Smith Johnston, K. H., & Iarocci, G. (2017). Spontaneous Gaze Selection and Following During Naturalistic Social Interactions in School-Aged Children and Adolescents With Autism Spectrum Disorder. *Canadian Journal of Experimental Psychology/Revue Canadienne De Psychologie Expérimentale*, *71*(3), 243–257. http://doi.org/10.1037/cep0000131

All eye-tracking data excluded

… but **following the tips** and **planning carefully** will help keep data quality high.

SOLAB

Applications in language studies

Applications in language studies

Reading

Visual World paradigm

Preferential Looking paradigm

Applications in language studies

Reading

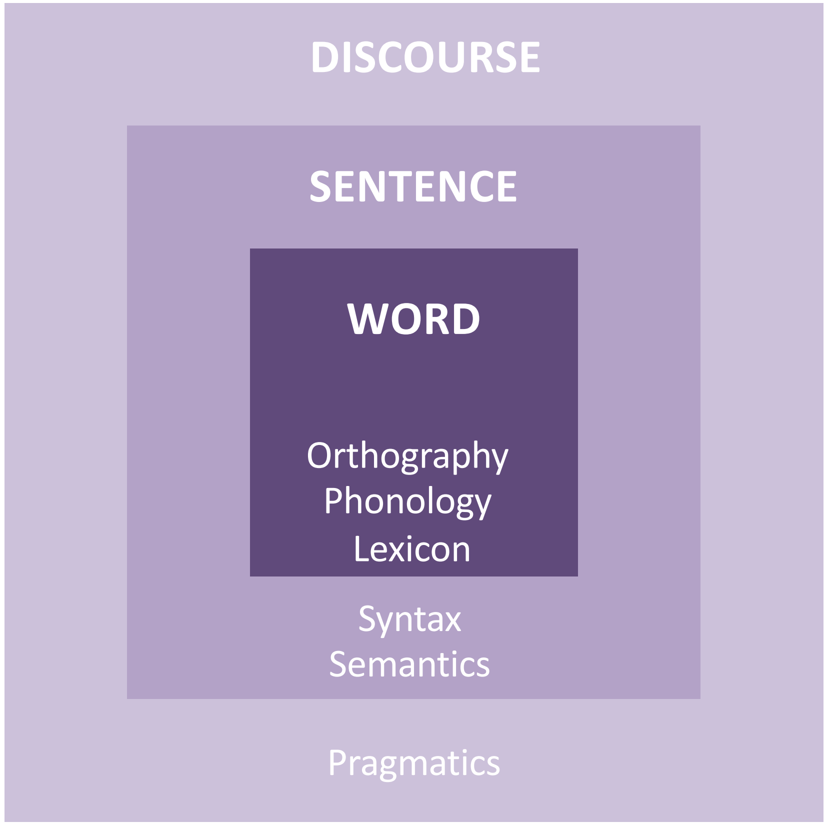
Visual World paradigm

Preferential Looking paradigm

Reading

Reading research shows how eye movements reflect multiple levels of language processing.

single word
multi-word units
texts



not only lexical level but higher-order processes too

Key variables in reading

Length
number of characters
≈ 14–15 to the right of fixation

Frequency
How often a word occurs in the language.

Predictability
How expected a word is in a given sentence context.
Measured with cloze tests (*«He mailed a letter without a______»*)

Orthographic familiarity, grammatical category, semantic ambiguity, ...

Roccaforte & D'Alesio, 2025

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Key variables in reading

Typical reading measures:

First fixation duration	Time	The duration of the first fixation made in an AOI
Gaze duration	Time	The sum of all fixations on a word prior to an eye movement to another word
Total reading time	Time	Total time spent within an AOI or spent for a reading task
Regression rate	Count	The number of regressions per second, per line, or paragraph, etc.
Skip count	Count	The total number of times an interest area was skipped

Research showed different

- **Fixation time:** longer for long, low-frequency, and unpredictable words *(e.g., Just & Carpenter, 1980; Rayner & Duffy, 1986)*
- **Skipping rate:** higher for short, high-frequency, and predictable words *(e.g., Rayner, 1998)*
- **Regressions:** more frequent for syntactically complex or semantically unexpected words *(e.g., Frazier & Rayner, 1982; Staub & Goddard, 2019)*

Roccaforte & D'Alesio, 2025

Reading Models

Reading model = formalized hypothesis about how **attention shifts** and word **recognition unfolds** over time.

Serial models:

Words are processed **one by one**

E-Z Model
(Reichle et al., 2006)

Parallel models:

Multiple words can be processed **in parallel**

SWIFT Model (Engbert et al, 2005)

OB1-Reader Model (Snell et al., 2018)

Hybrid/ completion models:

Glenmore Model
(Reilly, Radach, 2003)

Different models make different assumptions about how words are processed.

Practical guidelines for a reading experiment

Linguistic parameters:

- Control **length, frequency, predictability** across condition:
  - Use **corpora** to estimate frequency
  - Collect **cloze test** data to determine predictability
    («He mailed a letter without a______»)
- **Match words** for lexical category

↓

Manipulate only the variable relevant to your research question

- Use **filler trials** to mask your manipulated variable
- Interleave experimental trials with **simple questions** to keep focus

Practical guidelines for a reading experiment

Visual parameters:

- Keep sentences on **one line**
- Add **spacing** to avoid overlapping saccades
- Leave **margin** between text lines
- Avoid AOIs at **sentence edges** or before punctuation
- Use **monospace** font (`Courier New`)
- Prefer gray / black backgrounds to reduce eye strain
- Leave **empty margins** at screen edges

Applications in language studies

Reading

Visual World paradigm

Preferential Looking paradigm

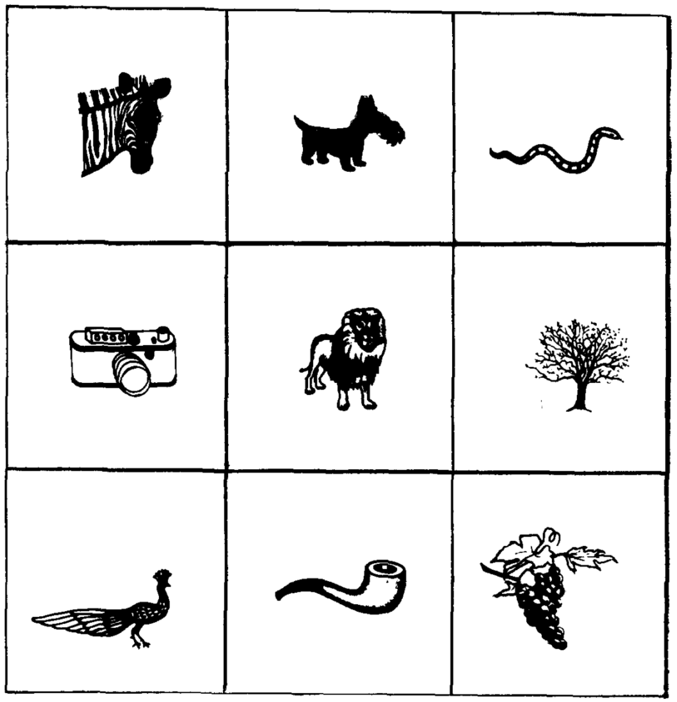
What is the Visual World Paradigm?

The Visual World Paradigm **integrates auditory linguistic input with visual stimuli**, which can be either extralinguistic (e.g., pictures or scenes) or linguistic (e.g., isolated words).

→ Aim: study language comprehension as it unfolds (auditory language processing)

Advantages:

- Natural
- suitable for non-readers (e.g., children, special populations)

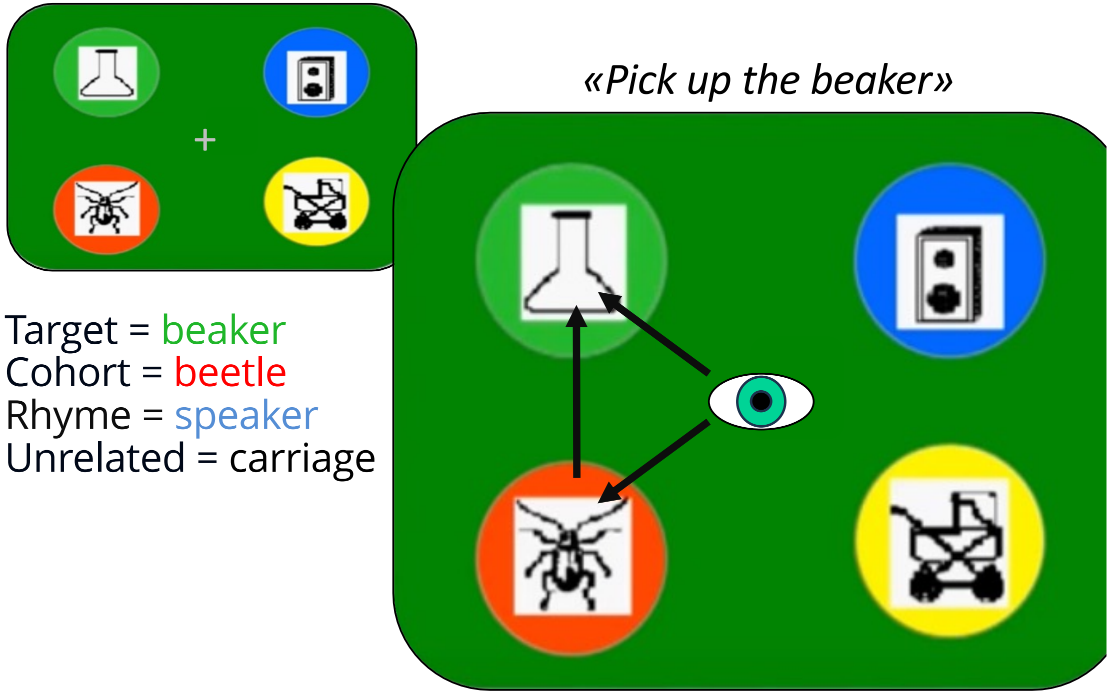


Cooper, 1974

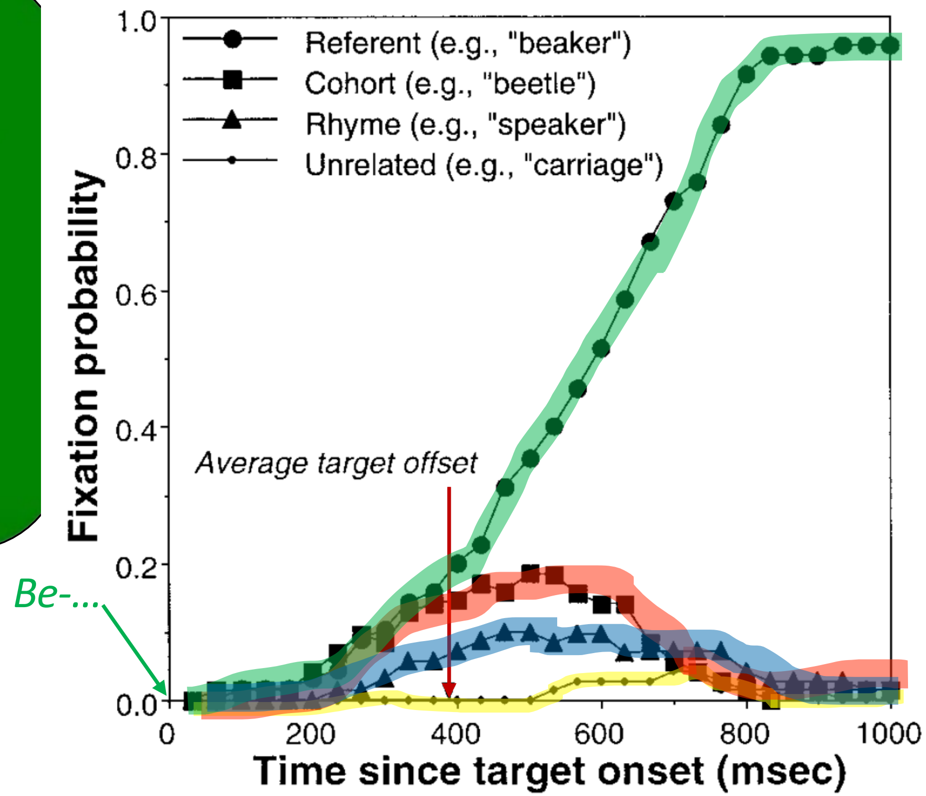
→ There is a **direct link** between **auditory processing** and **visual attention**.

Spoken word recognition

How **spoken word recognition unfolds over time**.



Target = beaker
Cohort = beetle
Rhyme = speaker
Unrelated = carriage



Word recognition is **incremental**
Listeneres don't wait until a word is finished.
Processing start immediately.

adapted from Alopenna et al. (1998)
Images from M.Tanenhaus

Other studies

The Visual World Paradigm has been used to study many aspects of. language processing:

- **Tanenhaus et al. (1995)** → Real-time integration of linguistic and visual information
- **Altmann & Kamide (1999)** → Predictive processing: listeners use verb meaning to anticipate upcoming referents before they are mentioned.
- **Trueswell et al. (1999)** → Syntactic ambiguity resolution: visual context guides parsing and interpretation.
- **Snedeker & Trueswell (2003)** → Early integration of prosody: intonational cues help disambiguate syntactic structure.

…

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Applications in language studies

Reading

Visual World paradigm

Preferential Looking paradigm

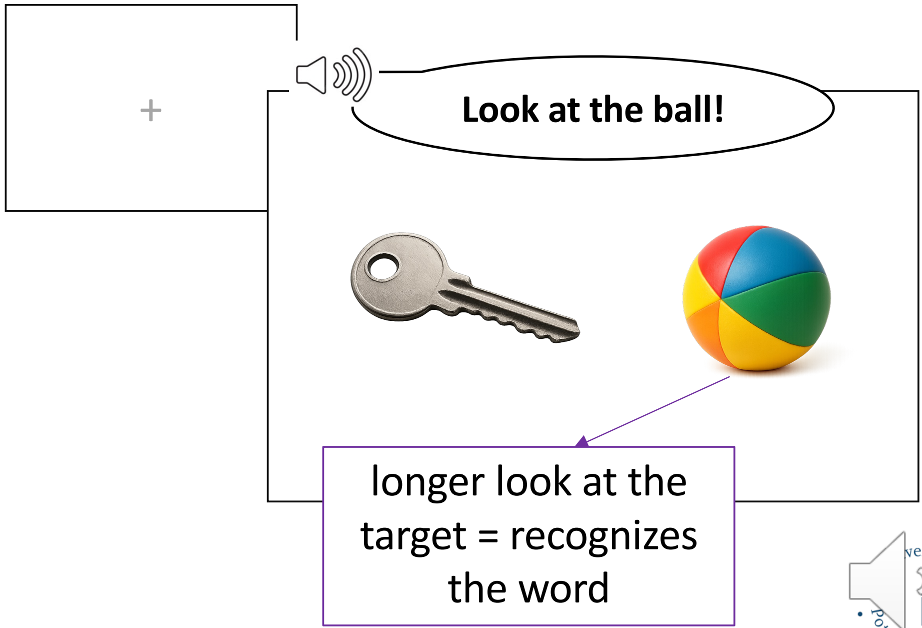
The Preferential Looking Paradigm

One of the most used methods to study **language comprehension in infants and toddlers.**

Basic assumptions:

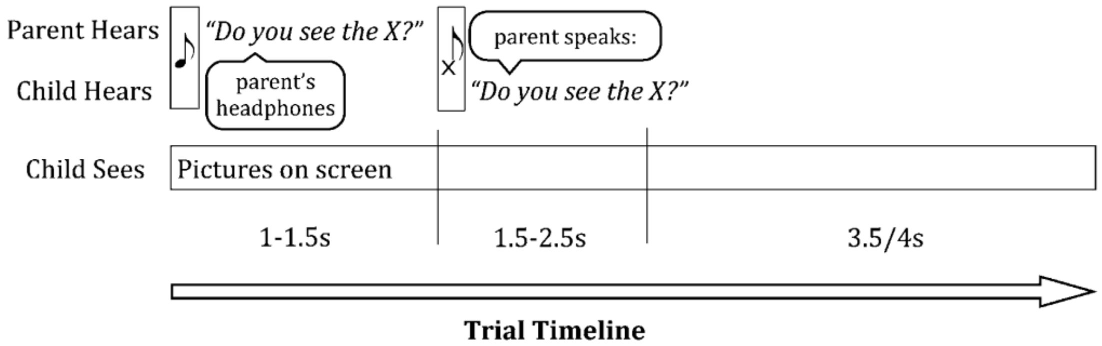
- **Where** and **how long** a child looks reflects **what they understand**.
- **Longer looks** at the target vs distractor = **comprehension**

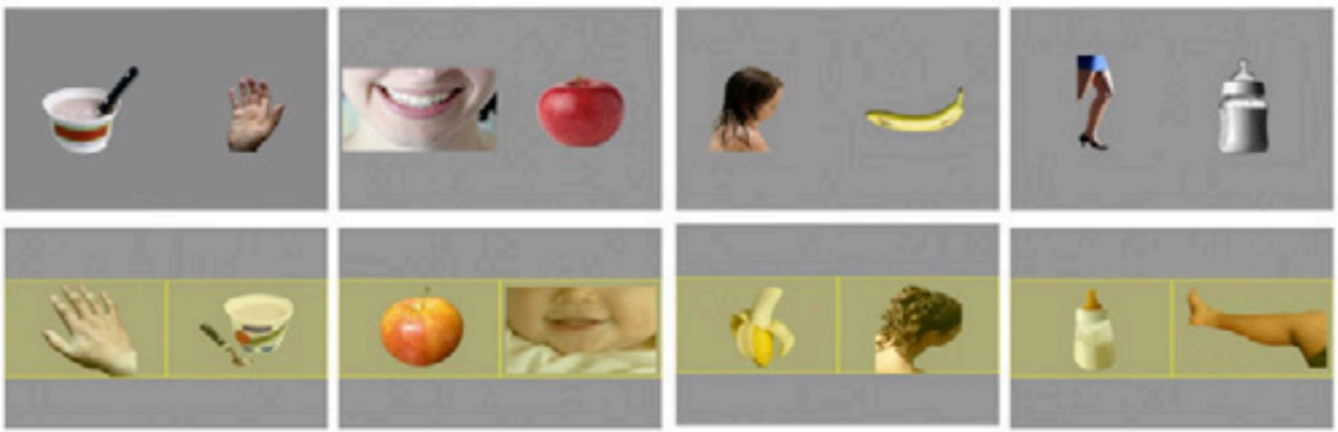
Image adapted from Labvanced



Vocabulary comprehension

Infants as young as 6 months know the meanings of common nouns





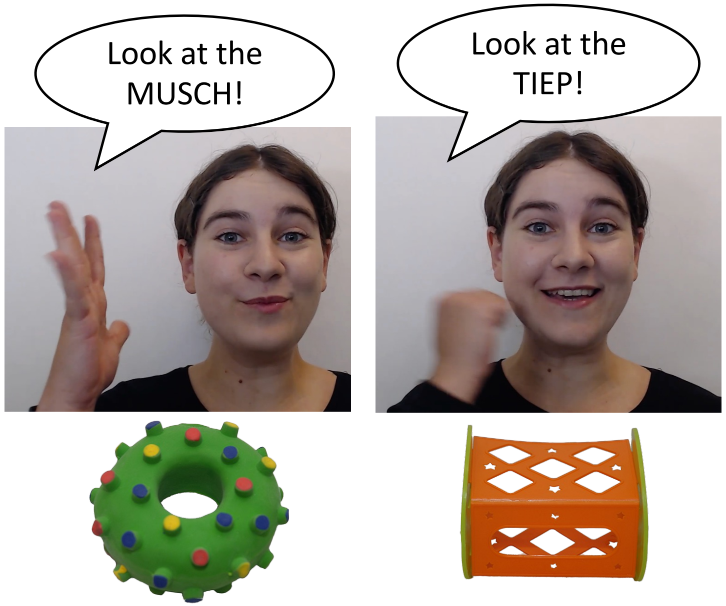
Bergelson & Swingley, 2012

The Preferential Looking Paradigm

Language Learning

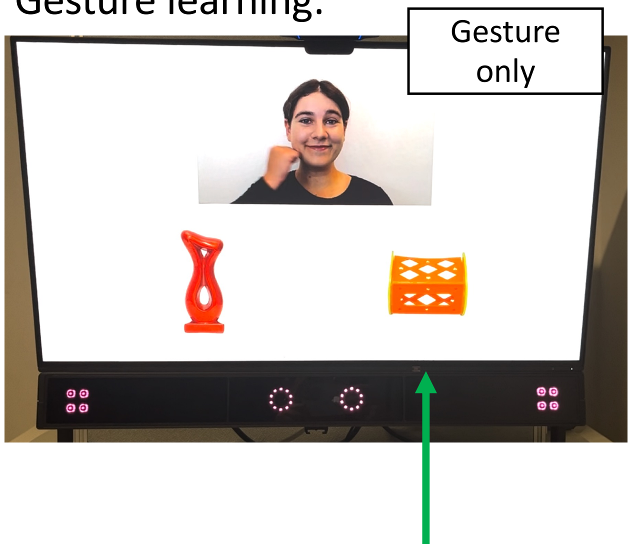
An example with **novel gestures** learning (14–month-old infants).

Familiarization

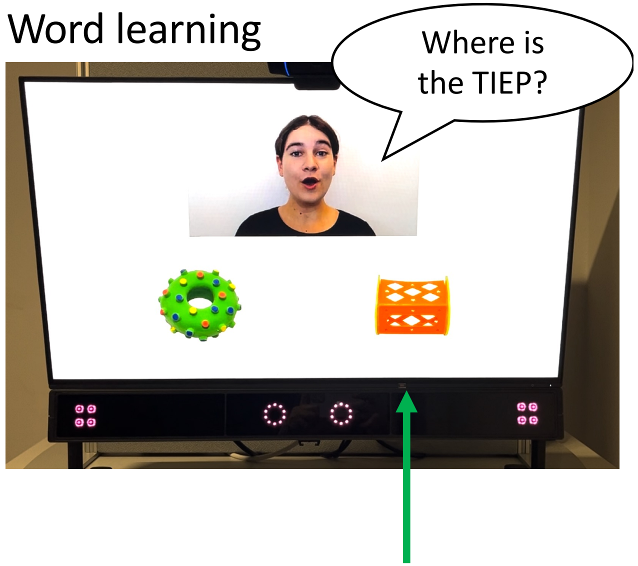


Test

Gesture learning:



Word learning



If infants learned the associations, they would **look longer at the correct referent –**whether the cue is the **word** or the **gesture**.

BabyLAB Potsdam/Arianna Colombani

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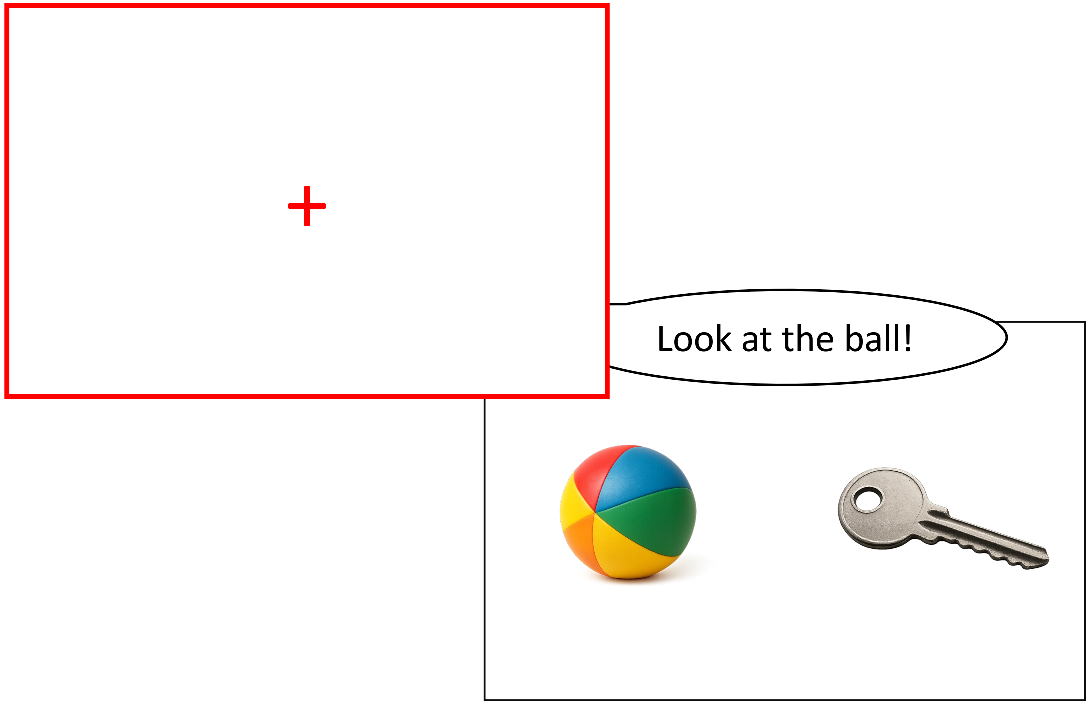
Practical guidelines

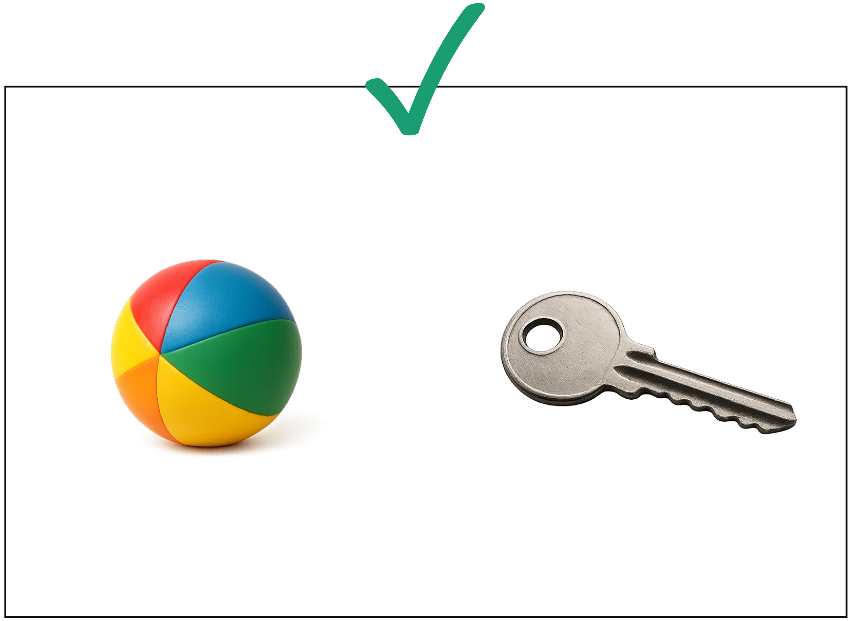
Start each trial with a **fixation cross** for consistent gaze alignment



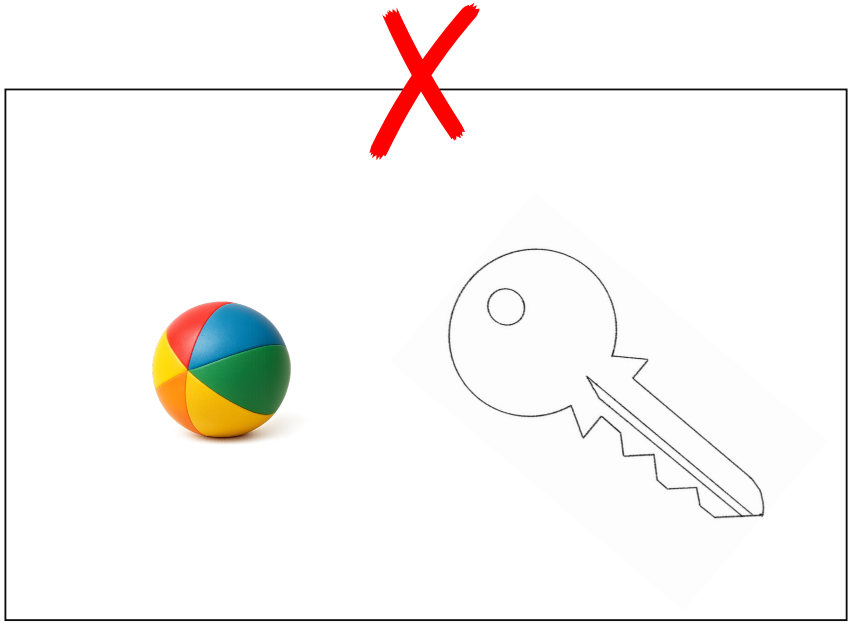
Counterbalance item position across trials

Practical guidelines

Control **object size** and **visual salience**



same size and salience



different size and salience

Practical guidelines

Use **homogeneous images**
- style
- background
- color palette → salience

Generative AI tools (Leonardo.ai, DALL·E, MidJourney) can help create your set of images

Colombani et al., in review

same style, salience, and color palette

different styles and salience

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Practical guidelines

Fundamentals Data Applications

Pre-test for **naming agreement**

- test with **external participants**
- use **databases**
  - e.g. Snodgrass e Vanderwart (1980)
  - e.g., Multipic (Duñabeitia et al., 2022).

couch?

sofa?

Duñabeitia et al., 2022

Practical guidelines

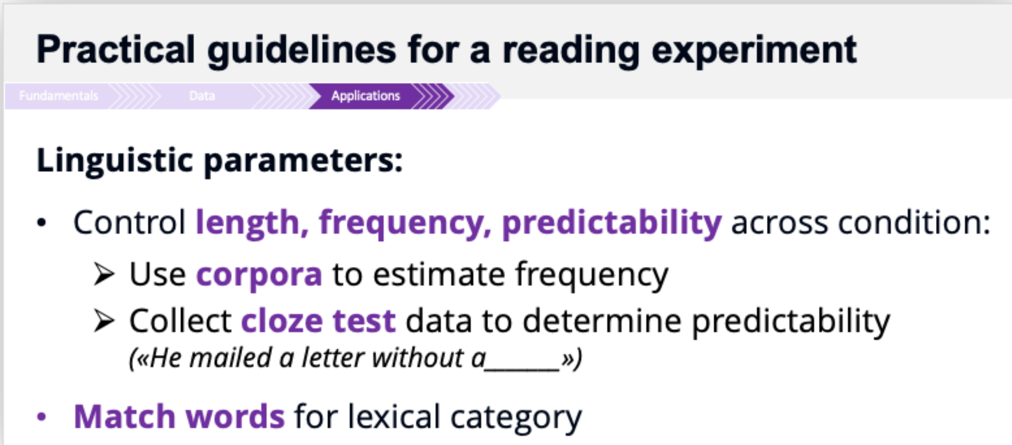
Control the **phonological parameter** of the spoken words

- Keep consistent
  - Syllable **structure**
  - Syllable **count (**prefer monosyllables)
- **Onset**: Different onsets help discrimination

CVC vs. CVC is easier to compare than CVC vs. CVCC

Ball vs Sofa is easier to discriminate than Ball vs Baby

and the **linguistic parameters** too



Practical guidelines for a reading experiment

Fundamentals Data Applications

Linguistic parameters:

- Control **length, frequency, predictability** across condition:
  - ➢ Use **corpora** to estimate frequency
  - ➢ Collect **cloze test** data to determine predictability
    («He mailed a letter without a______»)
- **Match words** for lexical category

Edit audio files so target words have **consistent onset/offset** across items

Recommended readings

Recommended readings

Tobii's series «The fundamentals of eye tracking» :

The fundamentals of eye tracking part 1: The link between theory and research question

Roy S. Hessels
Ignace T. C. Ho

The fundamentals of eye tracking part 2: From research question to operationalization

Ignace T. C. Hooge[1,2]
Richard Andersson[7] ·

The fundamentals of eye tracking part 3: How to choose an eye tracker

Marcus Nyström[1] ·
Roger Johansson[5] ·

The fundamentals of eye tracking part 4: Tools for conducting an eye tracking study

Diederick C. Niehorster
Dan Witzner Hansen[6] ·

The fundamentals of eye tracking part 5: The importance of piloting

Roy S. Hessels[1] · Diederick C. Niehorster[2,3] · Marcus Nyström[2] · Richard Andersson[4] · Gijs A. Holleman[5] · Ignace T. C. Hooge[1]

Tobii's white papers:

tobii

A complete guide to the fundamentals of eye tracking

Eye tracking for pupillometry insights

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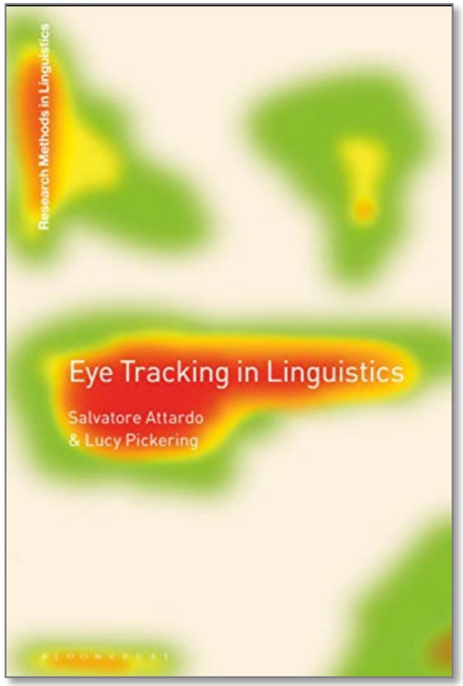
Recommended readings

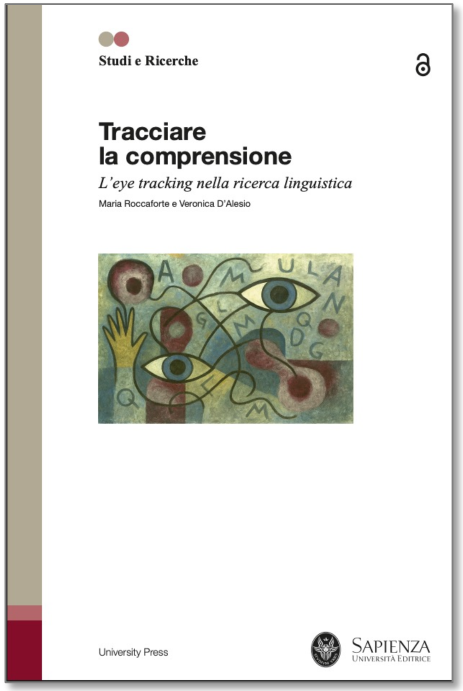
Manuals and tutorials:

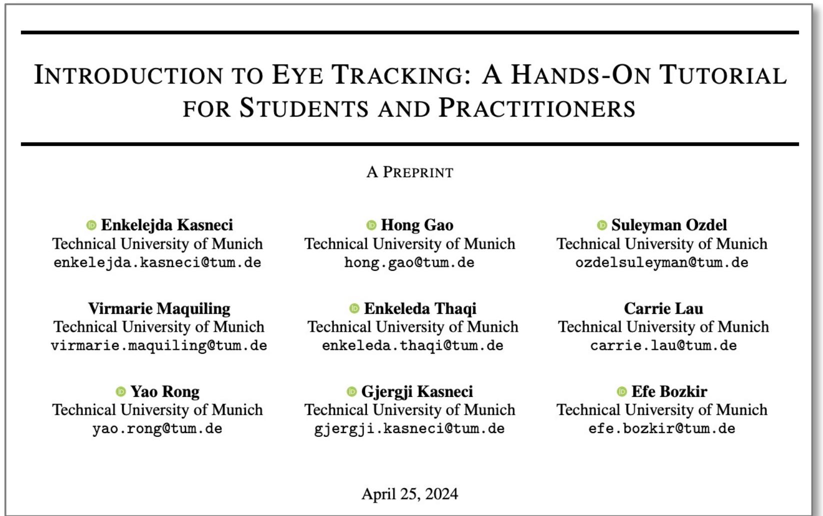
Attardo, S., & Pickering, L. (2023). *Eye tracking in linguistics* (First publishing). Bloomsbury Academic.

Roccaforte, M., & D'Alesio, V. (2025). *Tracciare la comprensione. L'eye tracking nella ricerca linguistica*. https://doi.org/10.13133/9788893773874

Kasneci, E., Gao, H., Ozdel, S., Maquiling, V., Thaqi, E., Lau, C., Rong, Y., Kasneci, G., & Bozkir, E. (2024). *Introduction to Eye Tracking: A Hands-On Tutorial for Students and Practitioners* (No. arXiv:2404.15435). arXiv. https://doi.org/10.48550/arXiv.2404.15435






INTRODUCTION TO EYE TRACKING: A HANDS-ON TUTORIAL FOR STUDENTS AND PRACTITIONERS

A PREPRINT

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Efe Bozkir, Technical University of Munich, efe.bozkir@tum.de

April 25, 2024

Recommended readings

Video resources:

How to set a Preferential Looking experiment in Tobii Pro Lab:
https://www.youtube.com/watch?v=j4jdD6q1D1Q

Webcam Eye Tracking for Infants and Toddler (Labvanced):
https://www.youtube.com/watch?v=6m2n-L-Nzf4

Infant calibration in Tobii Pro Lab : https://www.youtube.com/watch?v=R0X3Bd8PKI0

Labvanced Blog: https://www.labvanced.com/content/research/en/blog/

How Do You See? Visual Structures & Pathway - Visual Cortex - Occipital Lobe:
https://www.youtube.com/watch?v=rozqChRO0zY

What Can Our Eyes Tell Us About Language? Eye Tracking:
https://www.youtube.com/watch?v=uXx73W0uyCg

Suggested papers:

Conklin, K., & Pellicer-Sánchez, A. (2016). Using eye-tracking in applied linguistics and second language research. *Second Language Research*, *32*(3), 453–468. https://www.jstor.org/stable/26375858

Valtakari, N. V., Hooge, I. T. C., Viktorsson, C., Nyström, P., Falck-Ytter, T., & Hessels, R. S. (2021). Eye tracking in human interaction: Possibilities and limitations. *Behavior Research Methods*, *53*(4), 1592–1608. https://doi.org/10.3758/s13428-020-01517-x

Thank you!

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https://clmrnn.github.io/

Workshop Content

Fundamentals

1. Why measuring gaze behavior?
2. How does vision work?
3. How does an eye tracker work?
4. Choose your eye tracker
5. How do eye trackers compare?
6. When is an eye tracker «good» for us?

Data collection and analysis

1. Eye Tracker Calibration
2. Practical Advice for Data Collection
3. Types of Software
4. Basic Metrics
5. Define Areas of Interest (AOIs)
6. Eye Tracking Metrics
7. Data Visualization
8. Pupillometry

Applications in Language studies

1. Reading
2. Reading models
3. Key variables in reading
4. Practical guidelines for a reading experiment
5. What is the visual world paradigm?
6. Spoken word recognition
7. Other studies
8. What do we measure?
9. The preferential looking paradigm
10. Practical guidelines

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ADDITIONAL SLIDES