



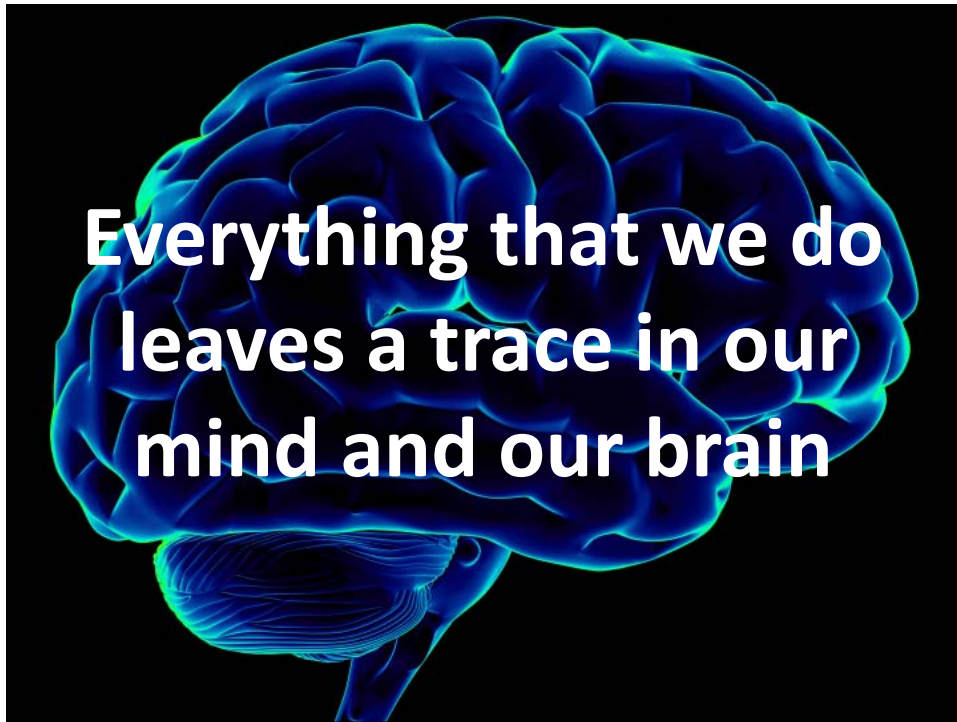
Multilingualism and Specific Language Impairment

Pascale Engel de Abreu - PhD
Associate Professor
Language and Cognitive Development Group
University of Luxembourg

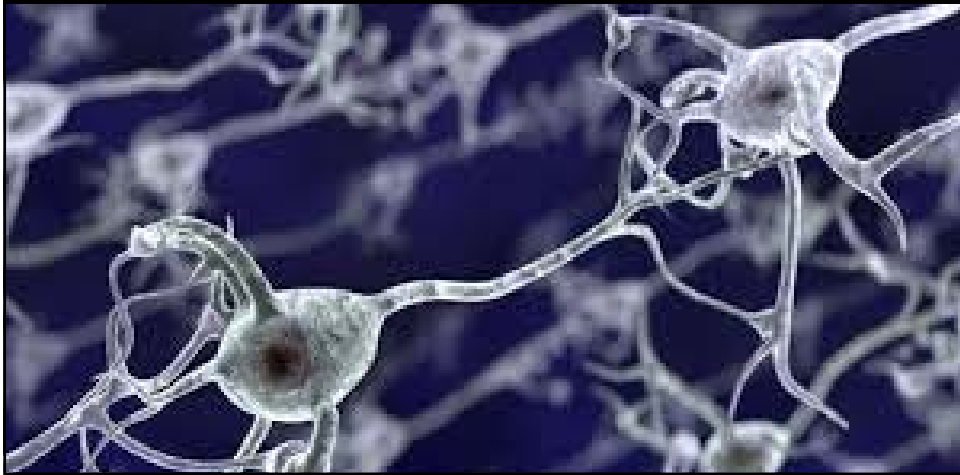


UNIVERSITÉ DU LUXEMBOURG





Neuroplasticity



Neuroplasticity





Hou Guozhu from China

10-year-old girl from Germany

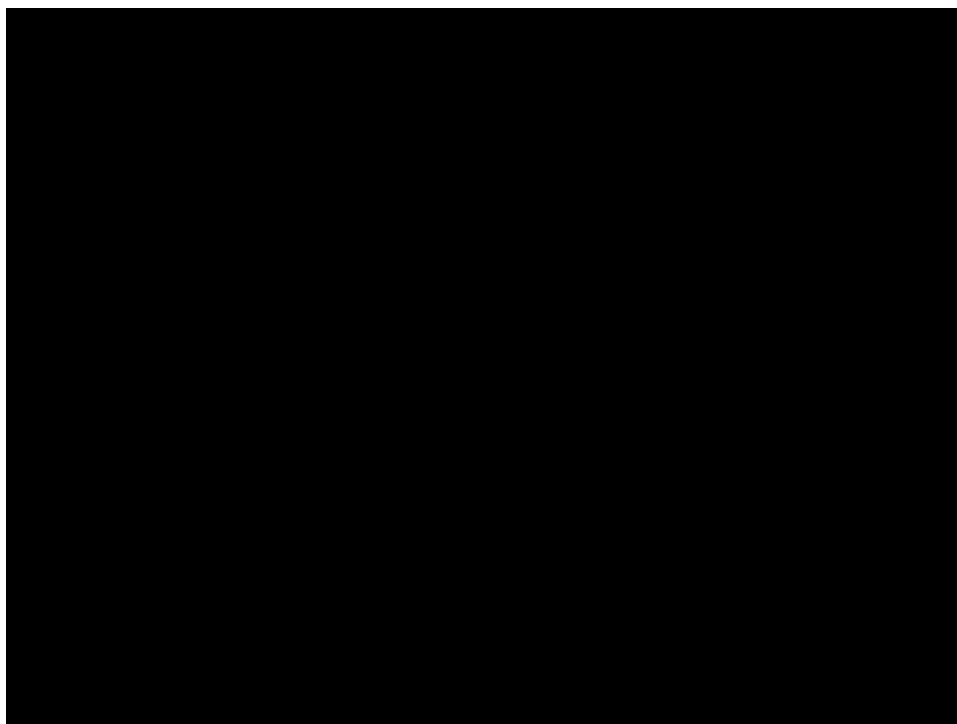
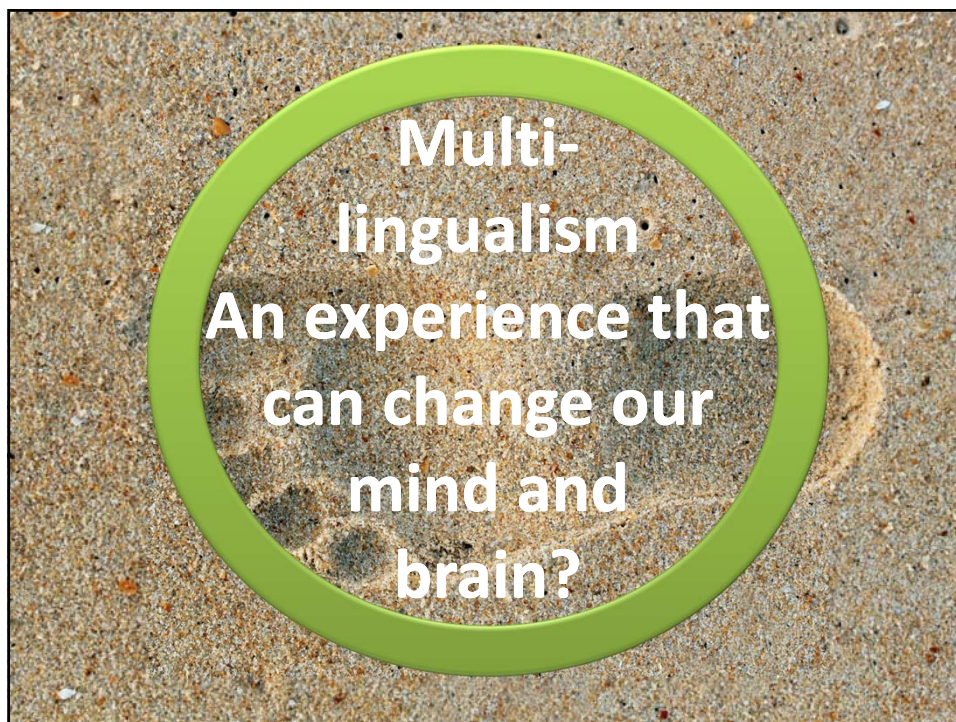
Examples of children with only one hemisphere

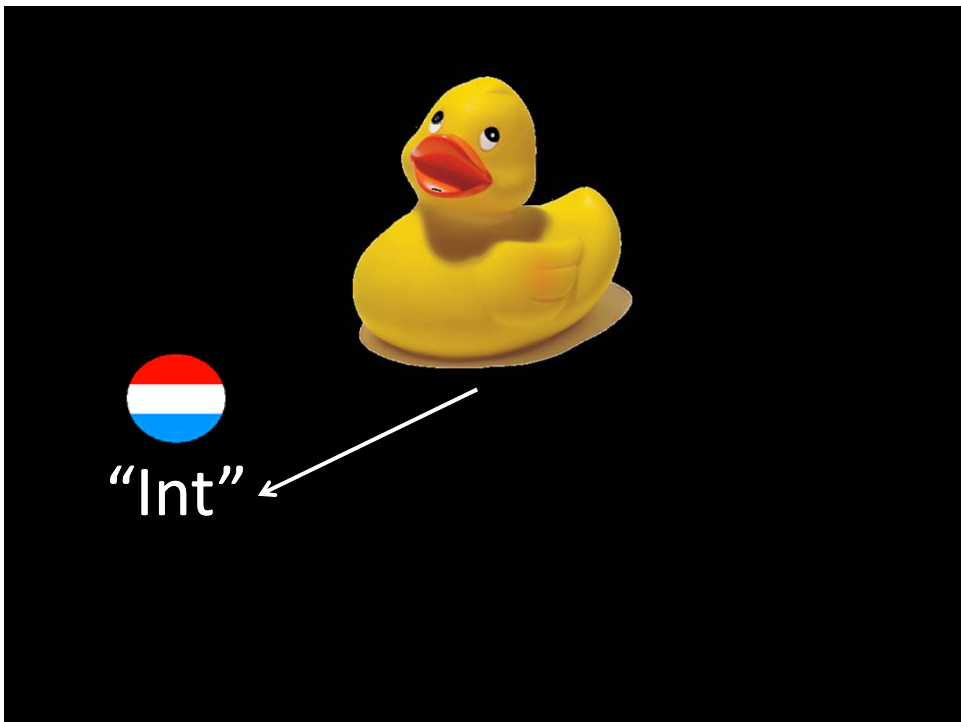
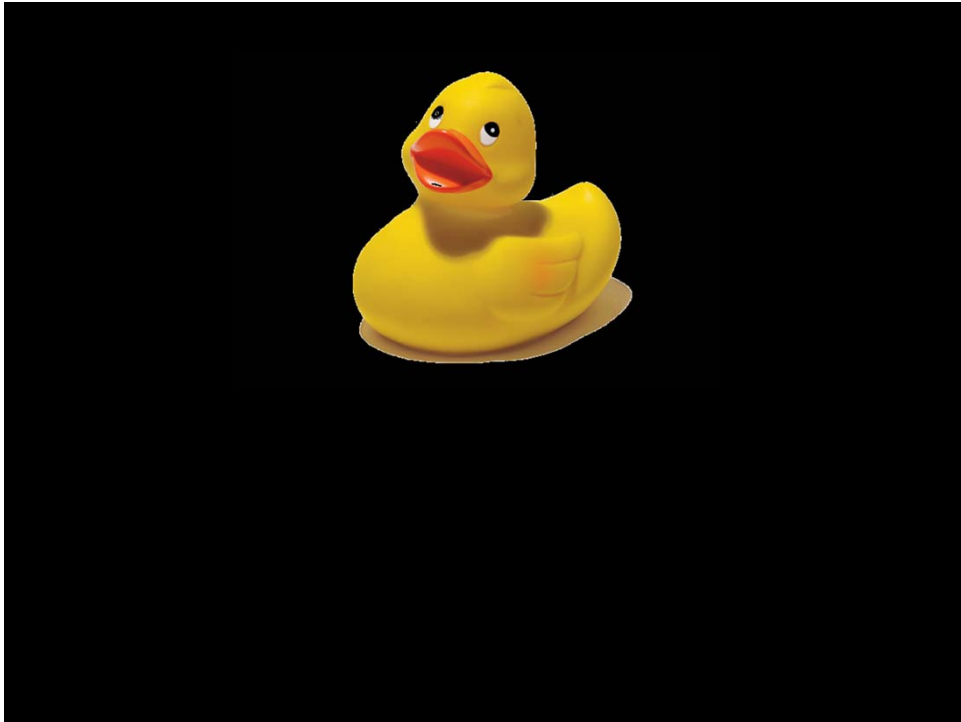
The remaining hemisphere compensated for the missing one

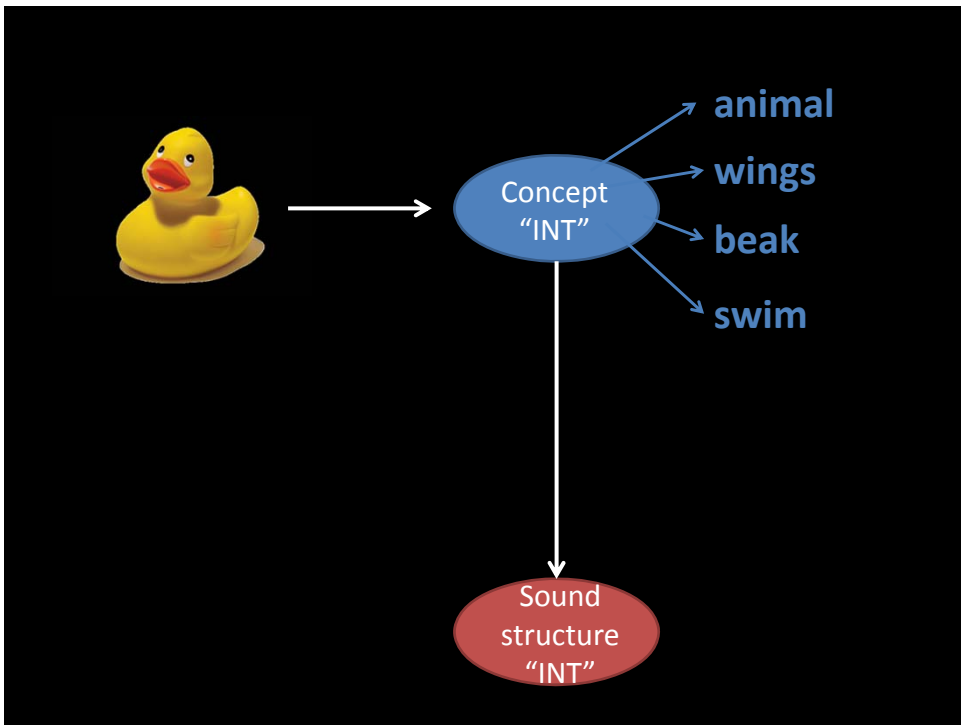
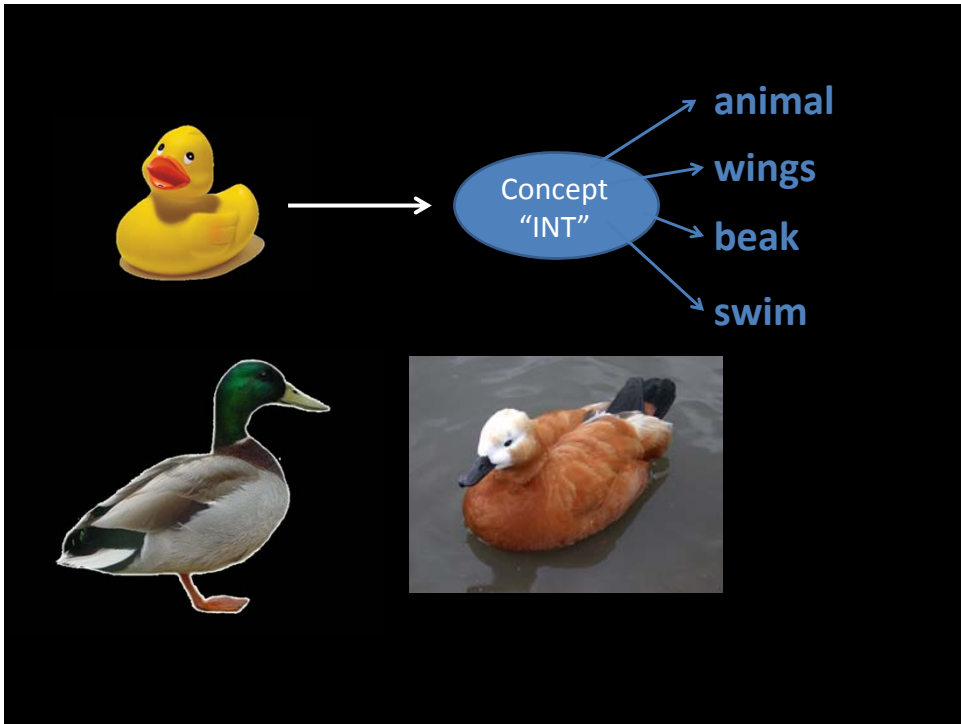


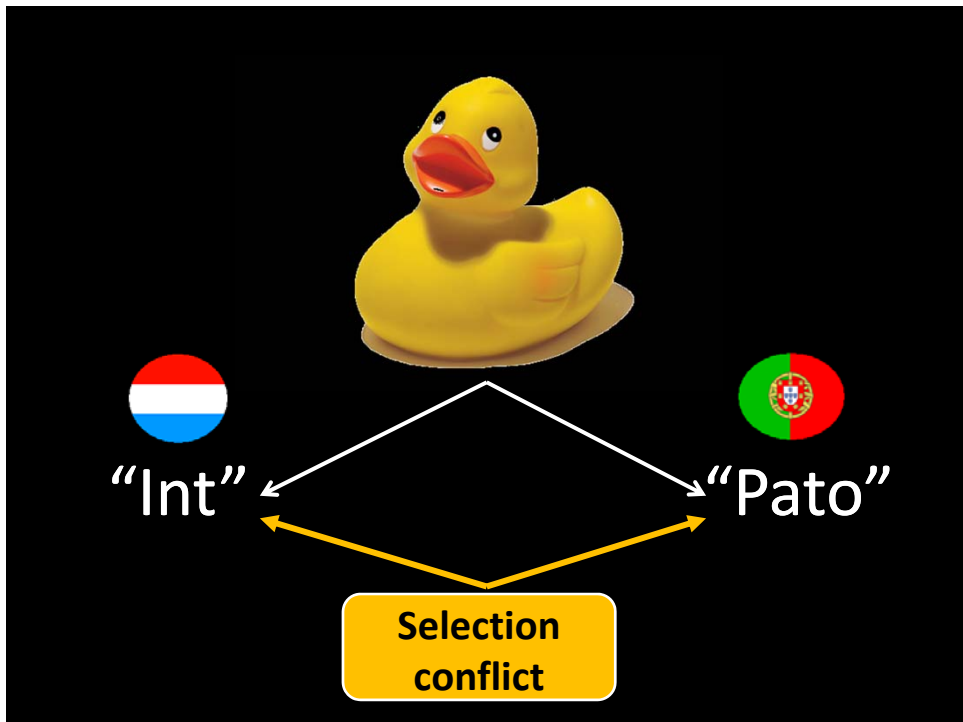
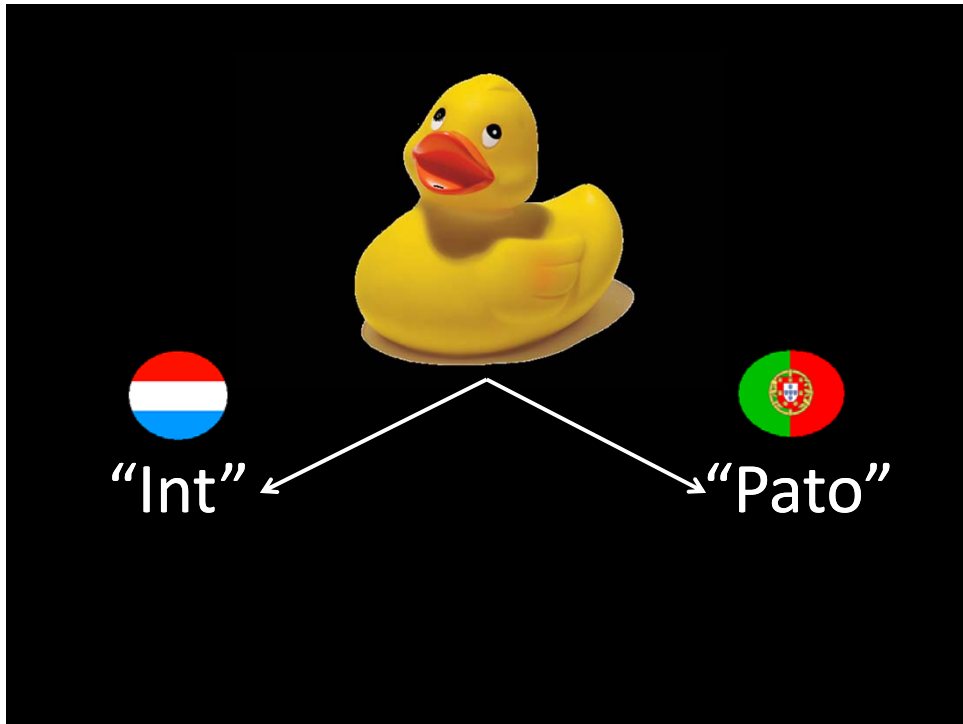
“Despite lacking one hemisphere, the girl has normal psychological function and is perfectly capable of living a normal and fulfilling life. She is witty, charming and intelligent.”

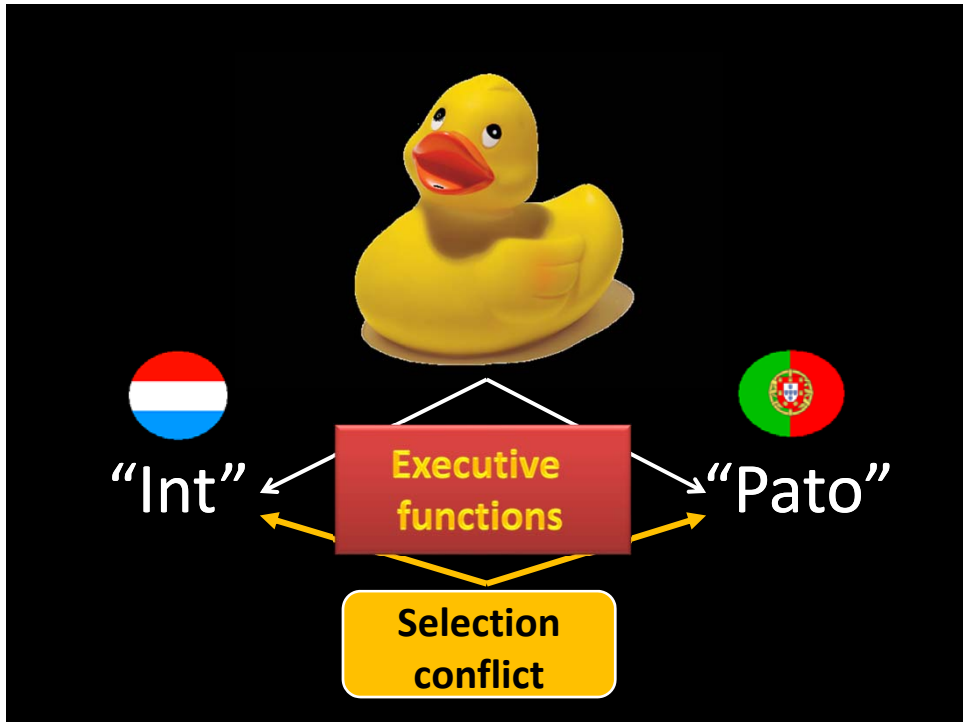
**Experiences can
restructure our mind
and brain**











Executive functions



Executive functions

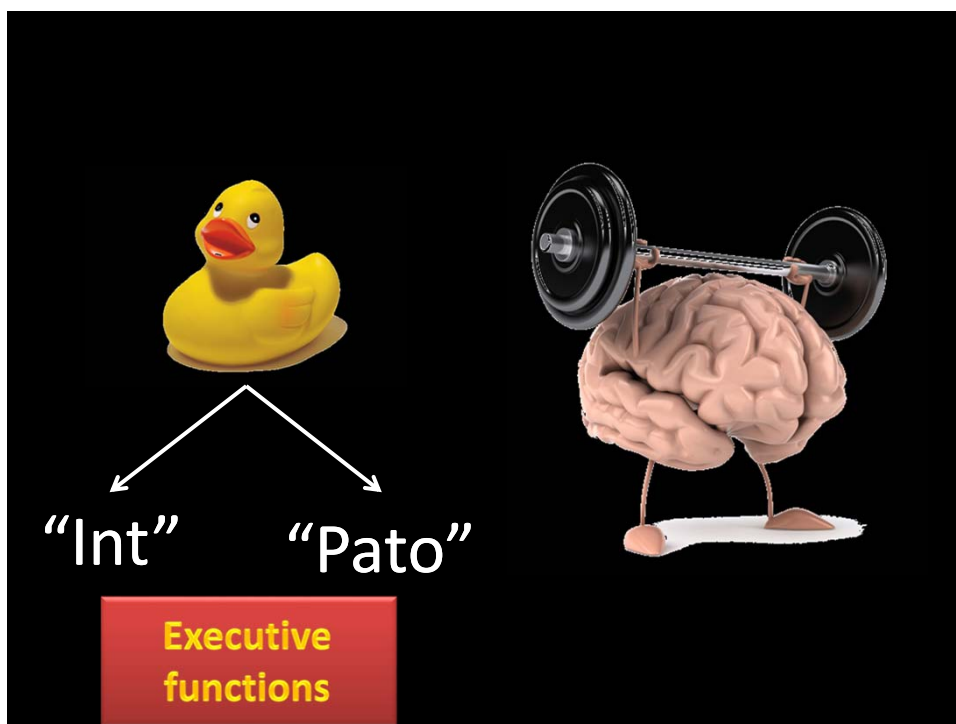
Working
memory


Inhibition

Switching


Engel de Abreu, Nikaedo, Puglisi, Abreu, Tourinho, Miranda,
Bueno, Befi-Lopes, & Martin (2013)









Anabela Cruz-Santos



Ellen Bialystok




Psychological Science
23(11) 1364–1371
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DOI: 10.1177/0956797612443836
http://jps.sagepub.com


**Bilingualism Enriches the Poor:
Enhanced Cognitive Control in
Low-Income Minority Children**

**Pascale M. J. Engel de Abreu¹, Anabela Cruz-Santos²,
Carlos J. Tourinho¹, Romain Martin¹, and Ellen Bialystok³**

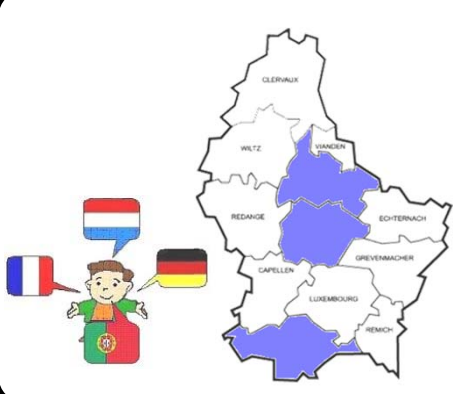
¹Educational Measurement and Applied Cognitive Science Research Unit, University of Luxembourg;
²Department of Educational Psychology and Special Education, University of Minho; and
³Department of Psychology, York University




Grant #CO09/LM/07

Bilingualism Enriches the Poor

Engel de Abreu, Cruz-Santos, Tourinho, Martin, & Bialystok, 2012



40 Portuguese-Luxembourgish bilingual children living in Luxembourg



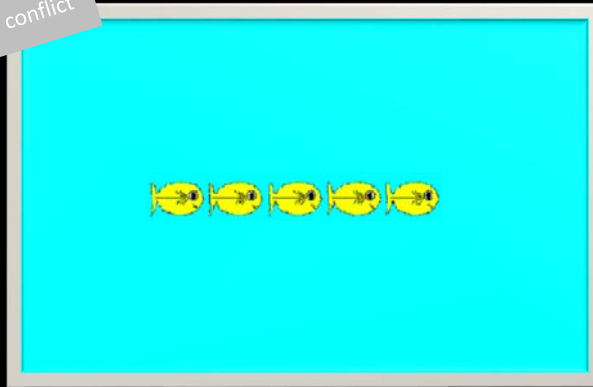
40 Portuguese monolingual children living in Portugal



Bilingualism Enriches the Poor

Engel de Abreu, Cruz-Santos, Tourinho, Martin, & Bialystok, 2012

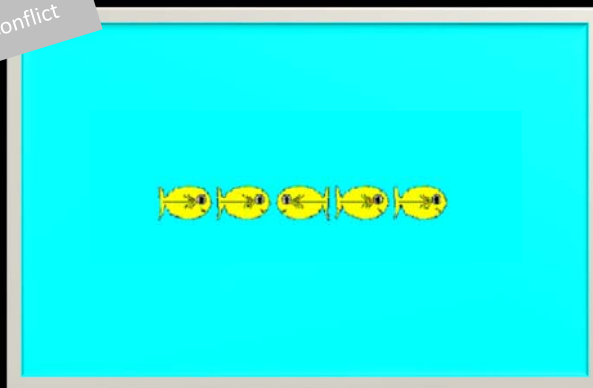
No conflict

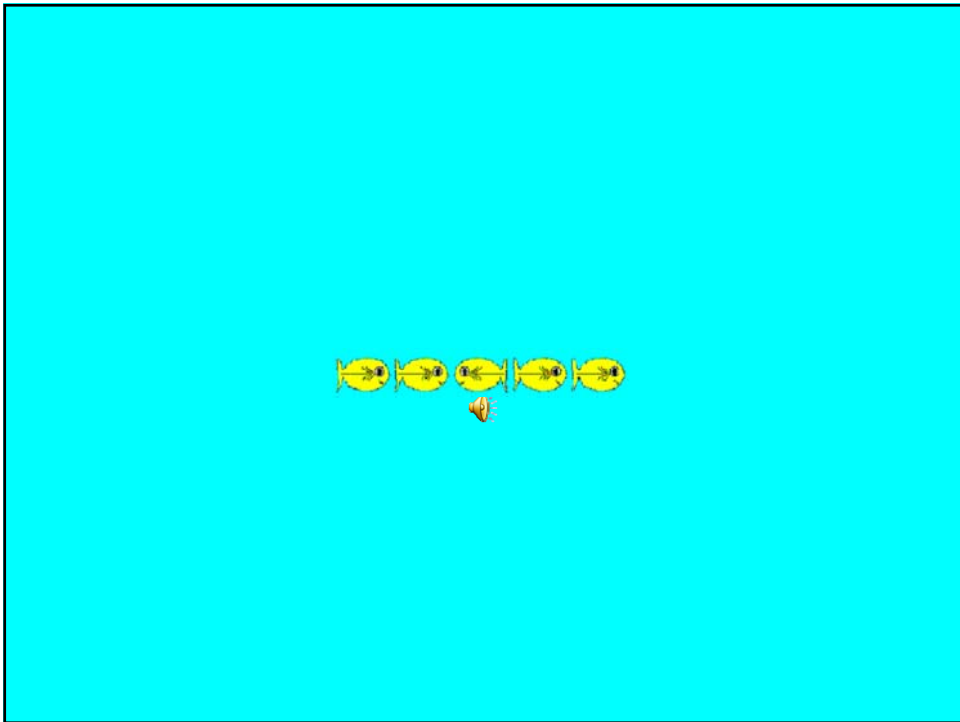
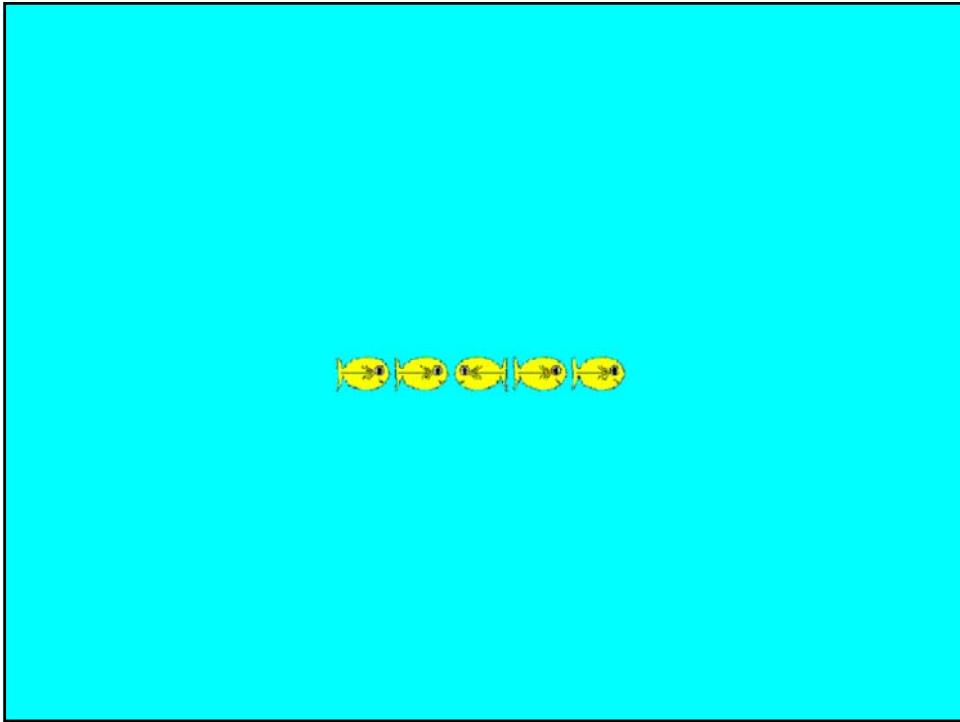


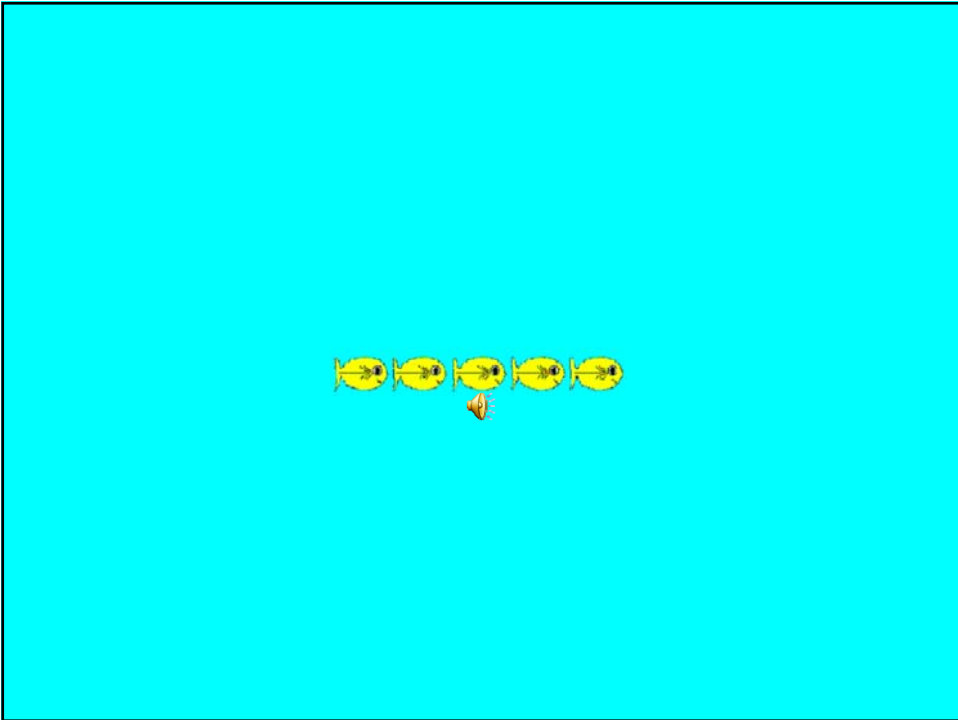
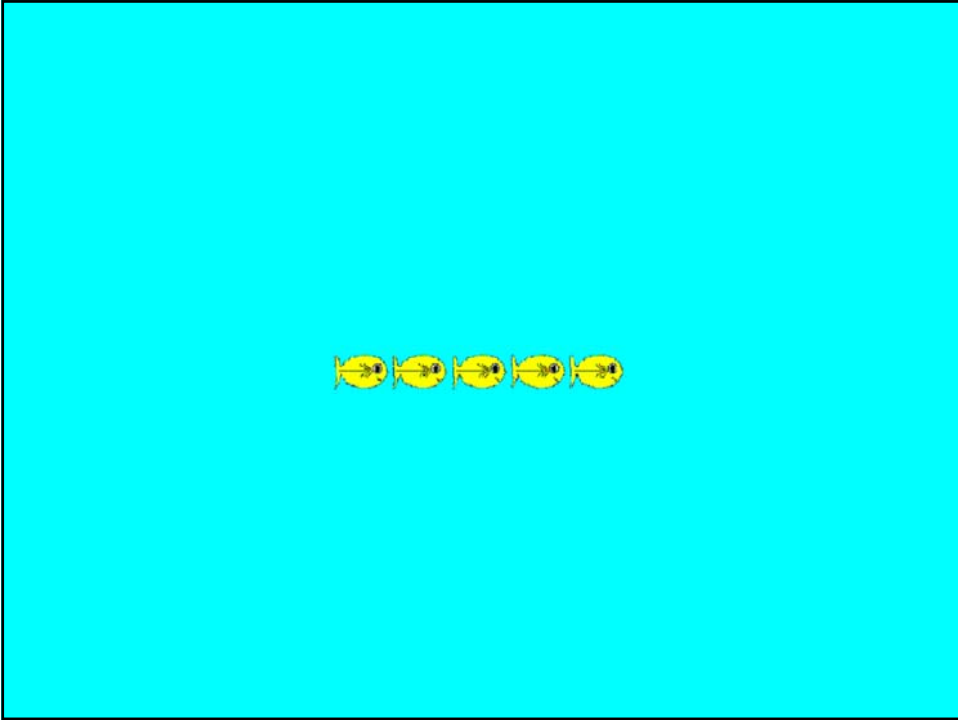
Bilingualism Enriches the Poor

Engel de Abreu, Cruz-Santos, Tourinho, Martin, & Bialystok, 2012

Conflict







Bilingualism Enriches the Poor

Engel de Abreu, Cruz-Santos, Tourinho, Martin, & Bialystok, 2012

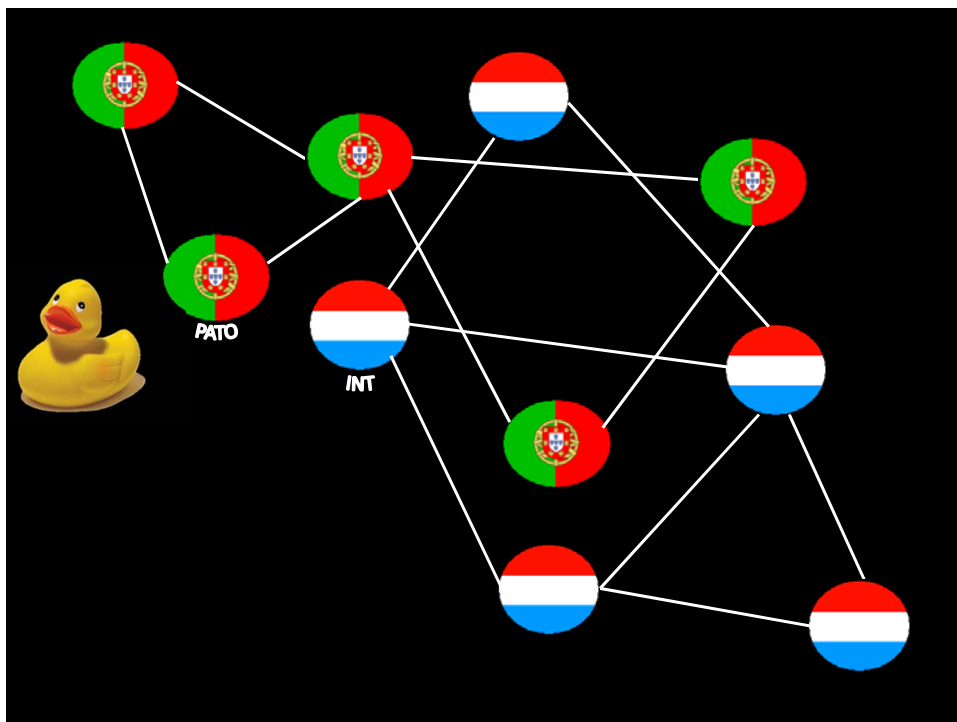
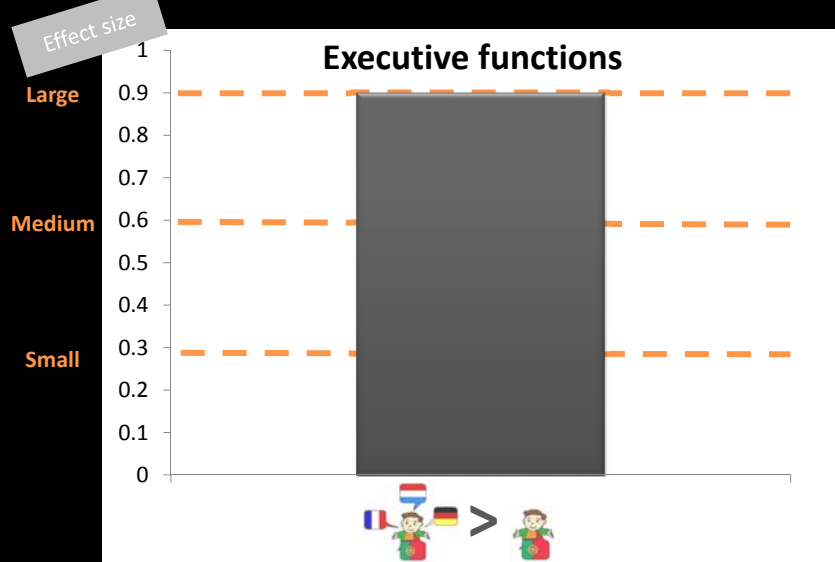
Bilingualism Enriches the Poor

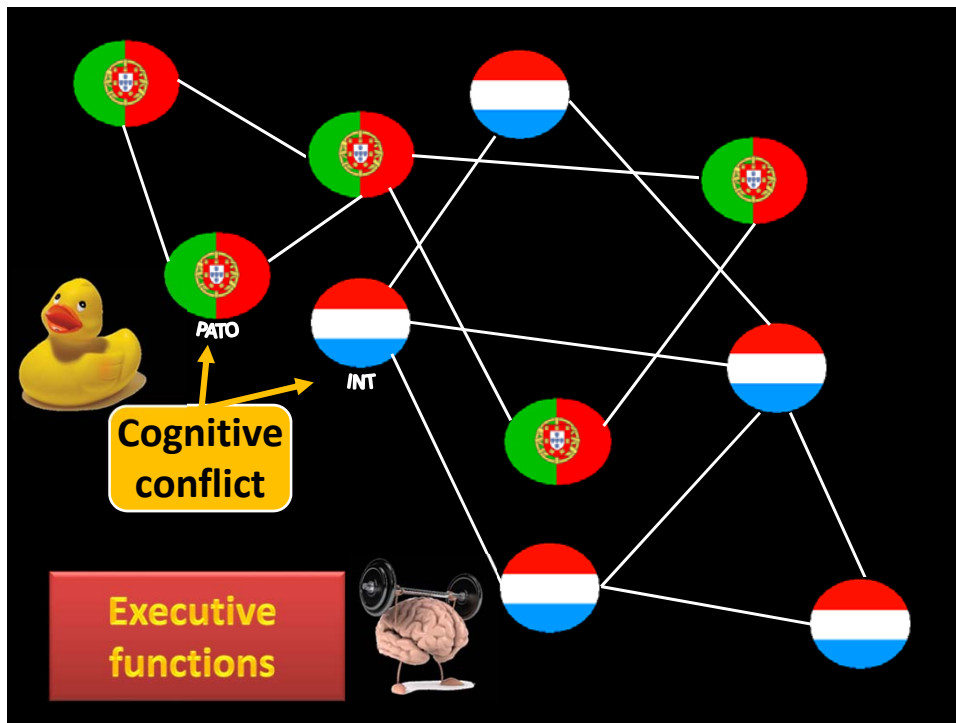
Engel de Abreu, Cruz-Santos, Tourinho, Martin, & Bialystok, 2012



Bilingualism Enriches the Poor

Engel de Abreu, Cruz-Santos, Tourinho, Martin, & Bialystok, 2012





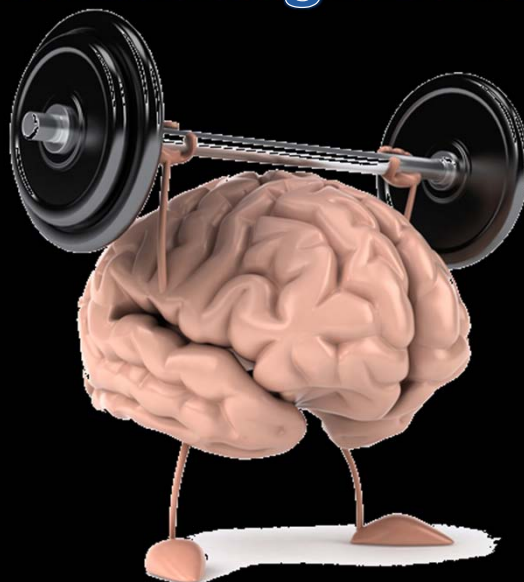
Executive functions and multilingualism in older ages



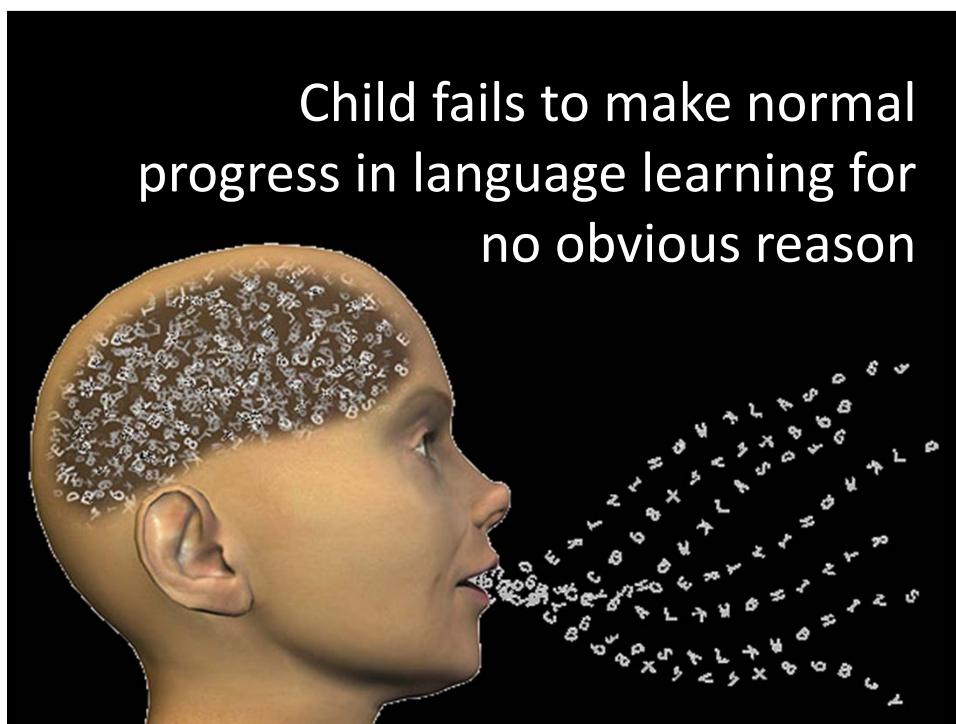
Symptoms of dementia/
Alzheimer
develop 4-5
years later

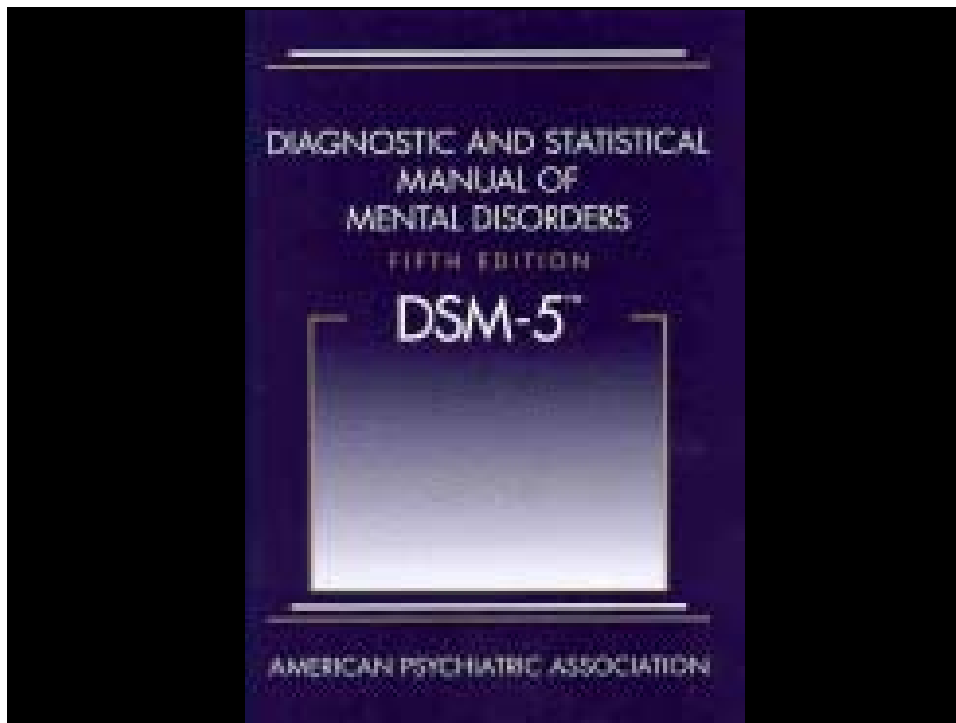
(Bialystok, Craik, & Freedman, 2007;
Craik, Bialystok, & Freedman, 2010)

Multilingualism



**Do children
with SLI show
this „cognitive
advantage“?**





Language disorder in DSM 5

Diagnostic Criteria

- **Persistent difficulties** in the **acquisition and use of language** across **modalities** (i.e., spoken, written, sign language or other) due to deficits in comprehension or production that include:
 - ❖ Reduced **vocabulary** (word knowledge and use)
 - ❖ Limited **sentence structure** (ability to put words and word endings together to form sentences based on the rules of grammar and morphology)
 - ❖ Impairments in **discourse** (ability to use vocabulary and connect sentences to explain or describe a topic or series of events or have a conversation)
- Language abilities are substantially and quantifiably **below those expected for age**, resulting in **functional limitations** in effective communication, social participation, academic achievement, or occupational performance, individually or in any combination.
- Symptom **onset** in **early developmental period**.
- Difficulties are **not better explained** by intellectual disability (intellectual development disorder), global developmental delay, hearing or other sensory impairment, motor dysfunction, or another mental disorder or medical condition.

*The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (Copyright © 2013).
American Psychiatric Association. All rights reserved*

In practice, however.... Simple characterisation is deceptive

Deciding who should or should not be regarded as having SLI can be extremely difficult



Major problems

- Discrepancy between IQ and language level
- Heterogeneity of SLI
- Comorbidity with and differentiation from other developmental disorders

Major problems

- **Discrepancy between IQ and language level**
- Heterogeneity of SLI
- Comorbidity with and differentiation from other developmental disorders

Discrepancy between IQ and language level

SLI diagnose: traditionally – discrepancy between language and nonverbal IQ

Language standard score – 78 (1.5 SD below mean)
Nonverbal IQ standard score – 85 (1 SD below mean)

Bishop (1994): one twin with SLI other twin with similar language profile but no discrepancy criterion

Language impaired children benefit as much from language therapy as low IQ language impaired children

Look if you find evidence for SLI.

There is a huge magnetic machine. It took a picture inside the brain. You could talk but not move your head because that would ruin the whole thing and they would have to start all over again. After it's all done they show you your brain on a computer and they see how large it is. And the machine on the other side of the room takes pictures from the computer. They can take pictures instantly. Ohm and it was very exciting.

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17 year old woman with an IQ of 50

(Bellugi, Marks, Bihrle, & Sabo, 1988)

Discrepancy between IQ and language level

SLI diagnose: traditionally – discrepancy between language and nonverbal IQ

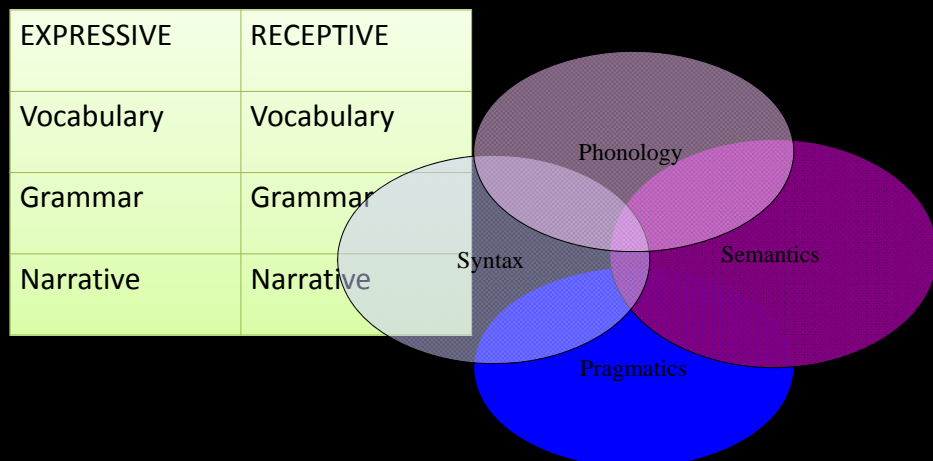
- No discrepancy criterion but nonverbal IQ within normal limits (often above 80)
- Nonverbal IQ is irrelevant: focus on the language profile

Major problems

- Discrepancy between IQ and language level
- **Heterogeneity of SLI**
- Comorbidity with and differentiation from other developmental disorders

Heterogeneity of SLI

Many different aspects of language can be affected in SLI



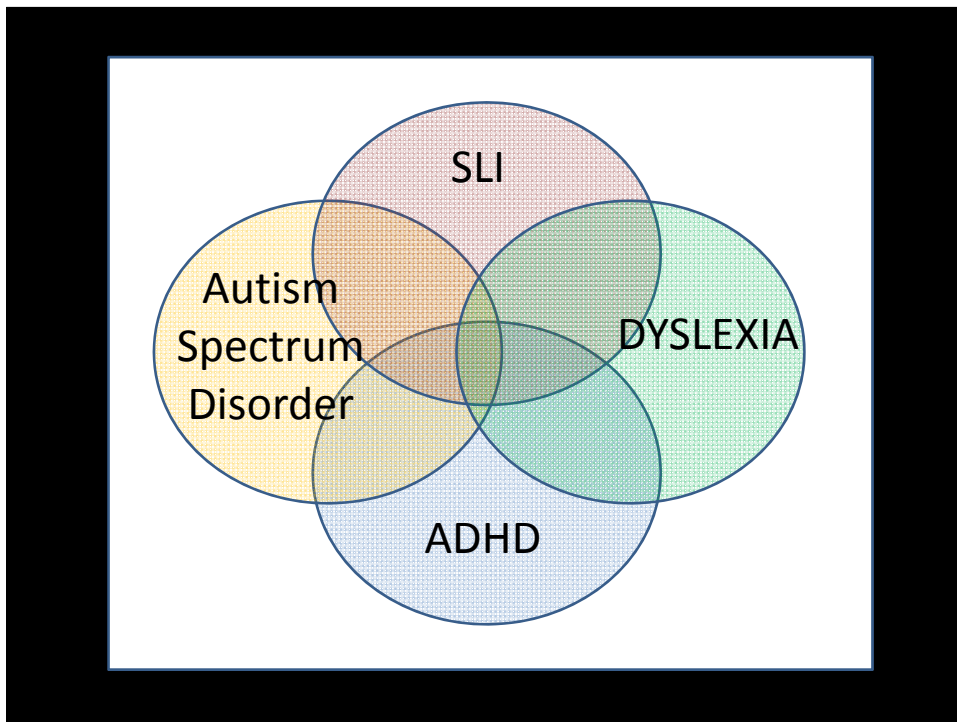
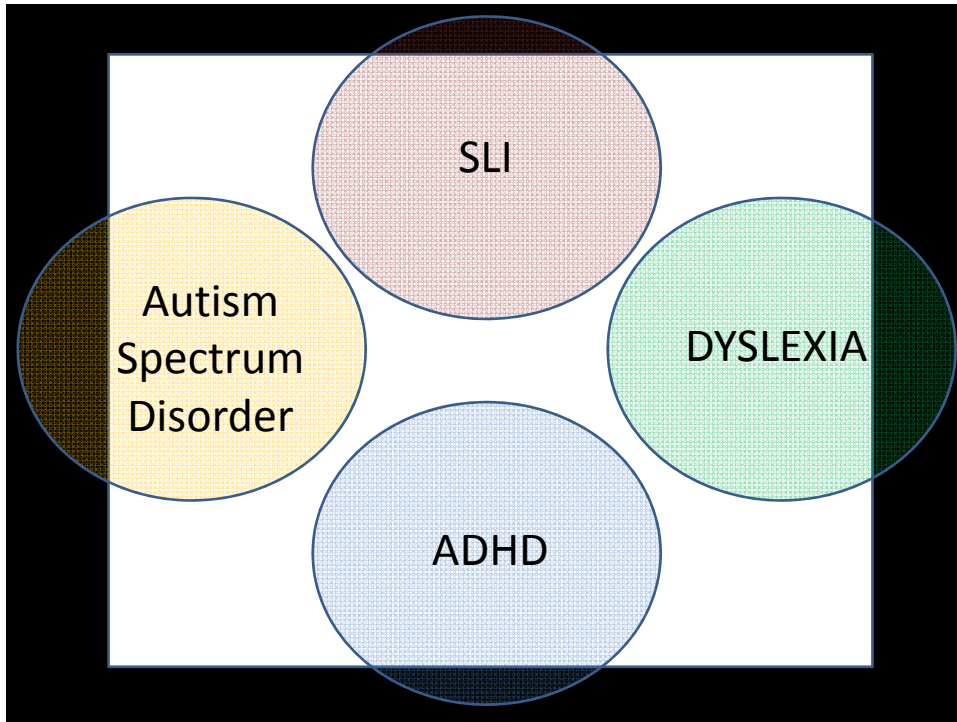
Major problems

- Discrepancy between IQ and language level
- Heterogeneity of SLI
- **Comorbidity with and differentiation from other developmental disorders**

Children with SLI have high rates
of ADD (Beitchman, Brownlie & Wilson, 1996),
developmental co-ordination
disorder (Powell & Bishop, 1992),
literacy problems (Bishop & Adams, 1990), and
impairment of social interaction
(Brinton, Fujiki, 1993)

**Comorbidity is
the rule
– not the
exception!**

(Gilger & Kaplan, 2001)



Same child – different diagnosis

- Educational psychologist – Dyslexia
- Speech and language therapist – SLI
- Psychiatrist – Autism Spectrum Disorder
- Pediatrician – ADHD



Comorbidity

Poses challenges for how we categorize disorders and think about their causes.



What causes SLI?

Neurodevelopmental disorders

Disorders where **abnormal neurodevelopment is inferred**: actual cause is unknown e.g. developmental dyslexia, autistic spectrum disorder, SLI, developmental dyscalculia



Types of Theory

- **Linguistic theories** (deficits in “innate” linguistic rules)
 - Gopnik & Crago’s feature blind hypothesis
 - Rice & Wexler extended optional infinitive (EOI)
- **Cognitive theories**
 - Tallal’s rapid auditory processing hypothesis
 - Gathercole and Baddeley’s phonological memory hypothesis
- **Hybrid theories**
 - Leonard’s phonetic substance hypothesis

Types of Theory

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Engel de Abreu, Cruz-Santos & Puglisi, 2014

International Journal of Language and Communication Disorders

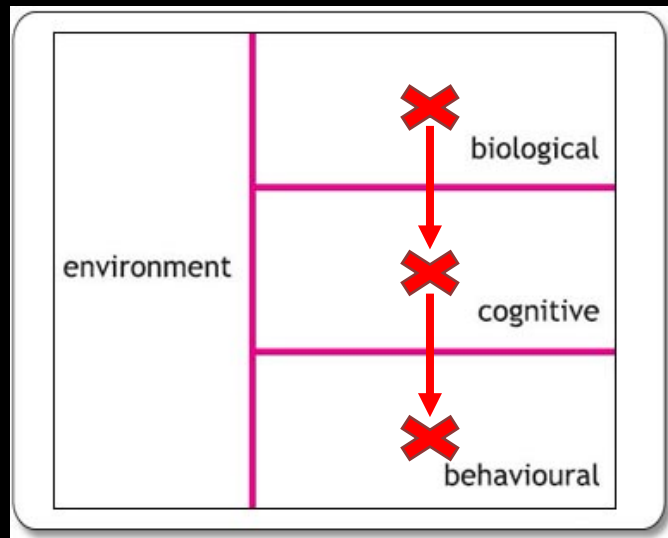


Verbal working memory

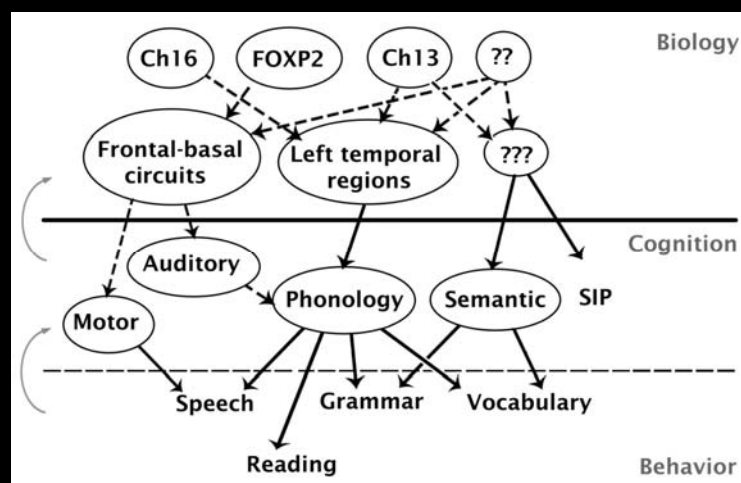
Bi-SLI < TD-Monolingual = TD-Bilingual

Specific verbal working memory limitations in SLI constrain the processing and storage of speech material which negatively impacts language learning

Single deficit models of SLI



Multiple deficit models



Multiple deficit models

No single etiological factor is sufficient for a complex disorder like SLI

Instead etiology involves the interaction of multiple risk and protective factors

What about genes?



Genetic influences on Specific Language Impairment

SLI runs in families

Rates of language learning difficulties are higher in relatives of those with SLI, compared with controls of similar background

Twin studies

Monozygotic twins (MZ):
“identical twins”
Same DNA sequence,
genetically identical



Dyzygotic twins (DZ):
“non-identical twin”
~ 50% identical genes

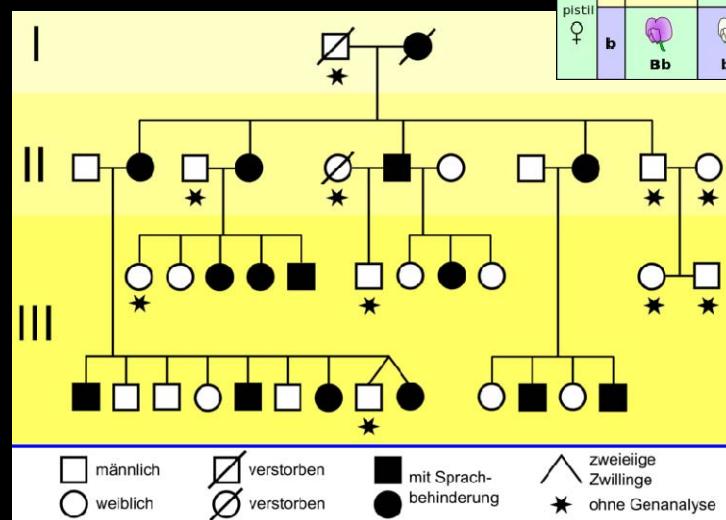
Twin studies

SLI diagnose in co-twin more likely if MZ than if DZ twins (Bishop, North, & Donlan, 1995)

KE family



		pollen ♂	
		B	b
pistil ♀	B	BB	Bb
	b	Bb	bb



If affected parent
50%
chance of
having SLI

Hurst, Baraitser, Auger, Graham, & Norell, (1990)

A gene for language? FOXP2?

FOXP2

FOXP2 gene – located on chromosome 7
clear-cut genetic mutation to explain all language disorders?

DNA change in KE family is very unusual

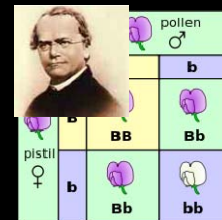
FOXP2 mutation – rare in individuals with language impairments

Genetic influences on Specific Language Impairment (SLI)

Language impairments behave like “complex” multifactorial disorders

Can run in families but not according to simple Mendelian genetics!

Genes do not act in isolation in a predetermined way



Complex human traits are influenced by numerous genes that interact with one another, **and with the environment**, to produce a specific phenotype!

Genes might determine if it is likely to have problems but do not say anything about how **specific** the problems will be or how likely they are to **resolve**



**SLI and
multilingualism**

SLI is just as likely in a multilingual child as in a monolingual child

Multilingualism does not make it more likely to have SLI

Multilingualism does not cause SLI!

Signs of SLI are the same as in a monolingual child

- difficulties in learning new words
 - understanding sentences
 - explaining things

Difficulties will be present in all
the languages

Important to get a clear picture
of the language development in
the first/home language

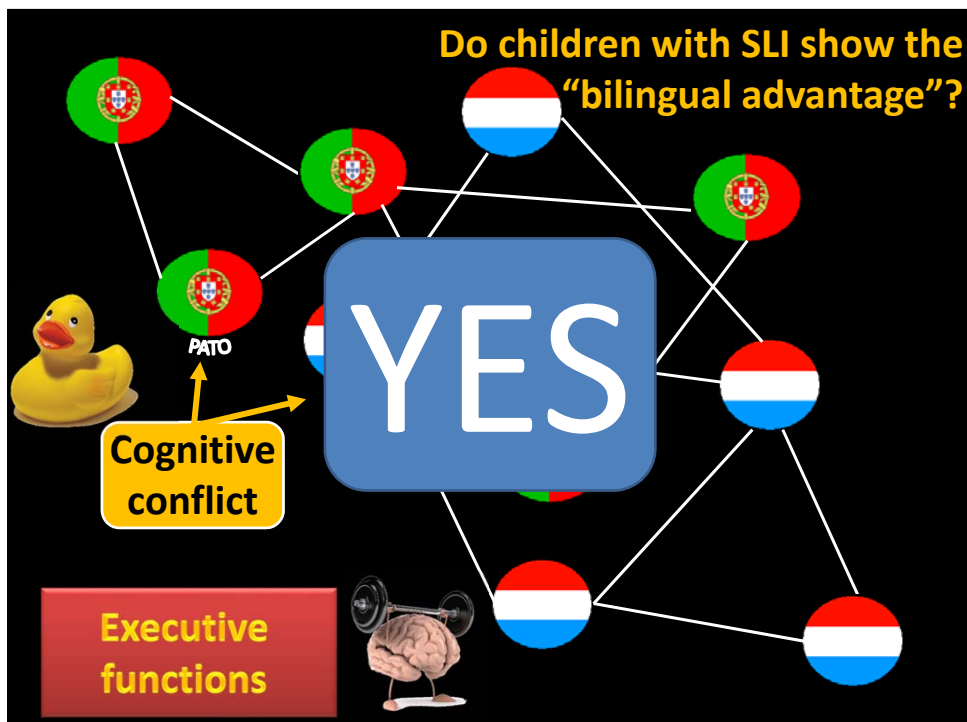
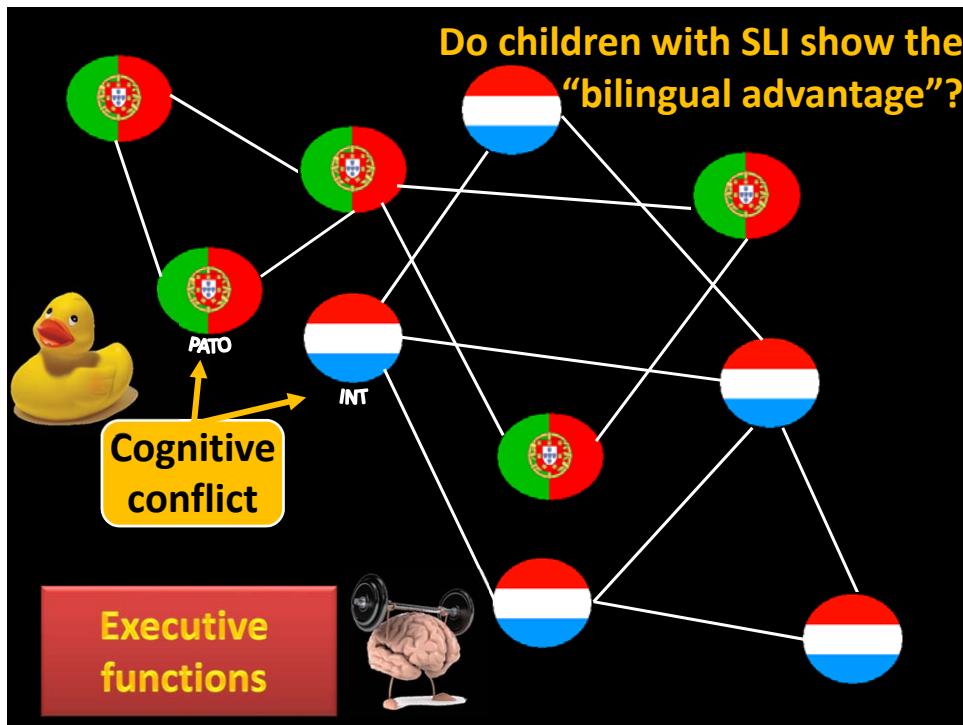
Just being behind in vocabulary
is not an indication of SLI

If children manage to learn new
words and react to appropriate
intervention there might not be
a need for concern

Lack of code switching can be a concern

Children with SLI sometimes have difficulties linking the meanings and labels for words in one language with the label in the other language

Do children with SLI show the „cognitive advantage“?



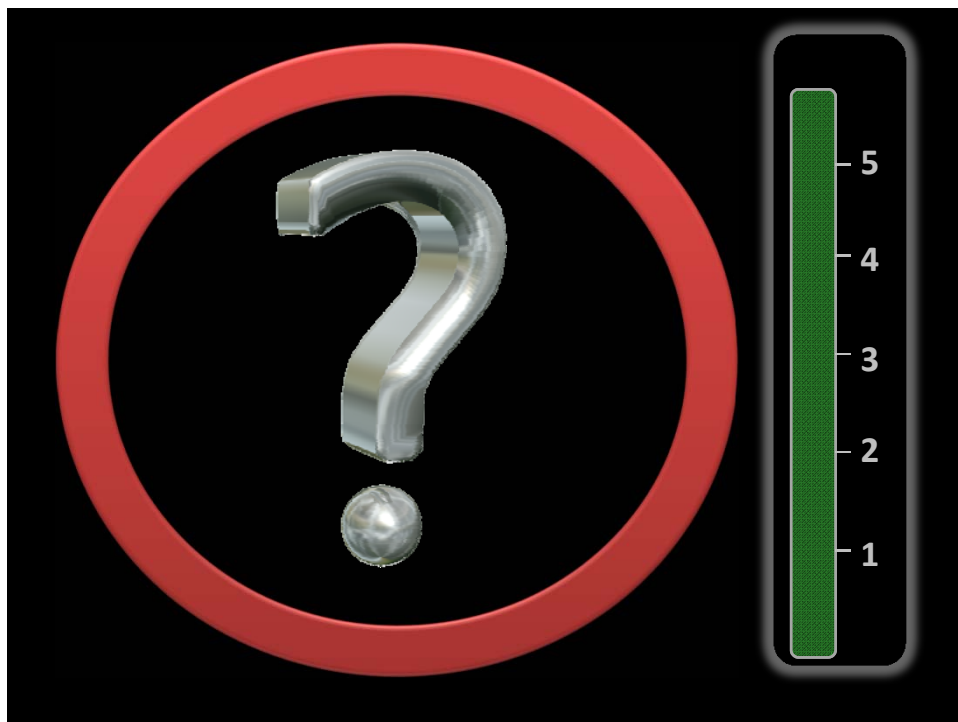
Engel de Abreu, Puglisi, Cruz-Santos & Befi-Lopes, 2014



Executive function tasks

Monolingual SLI < Monolingual TD &
multilingual SLI

Multilingualism protection against some of
the cognitive limitations usually associated
with SLI?





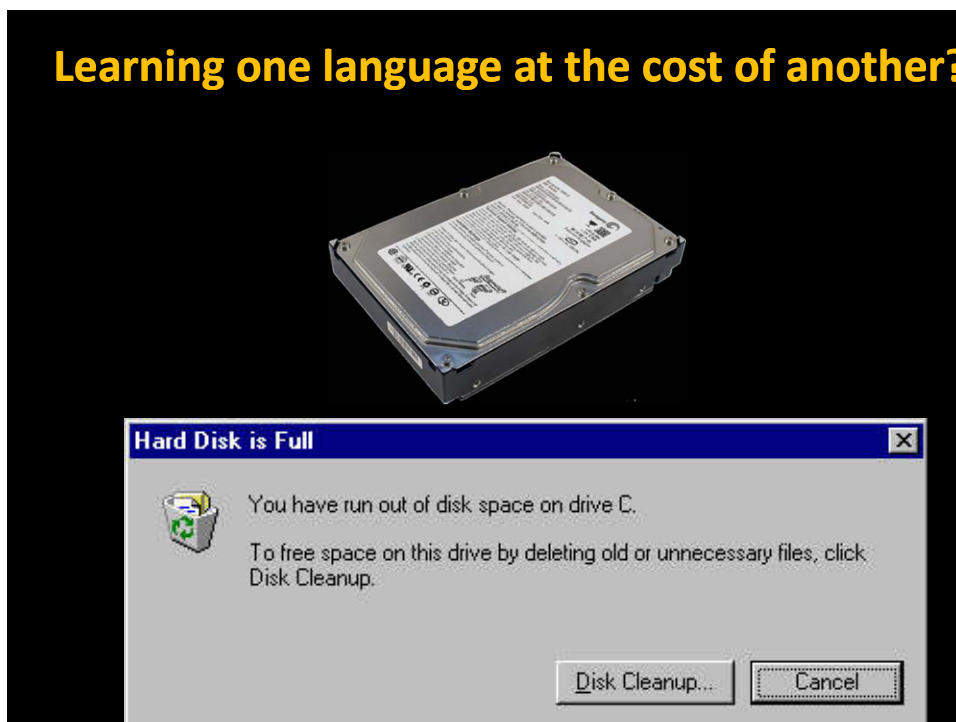
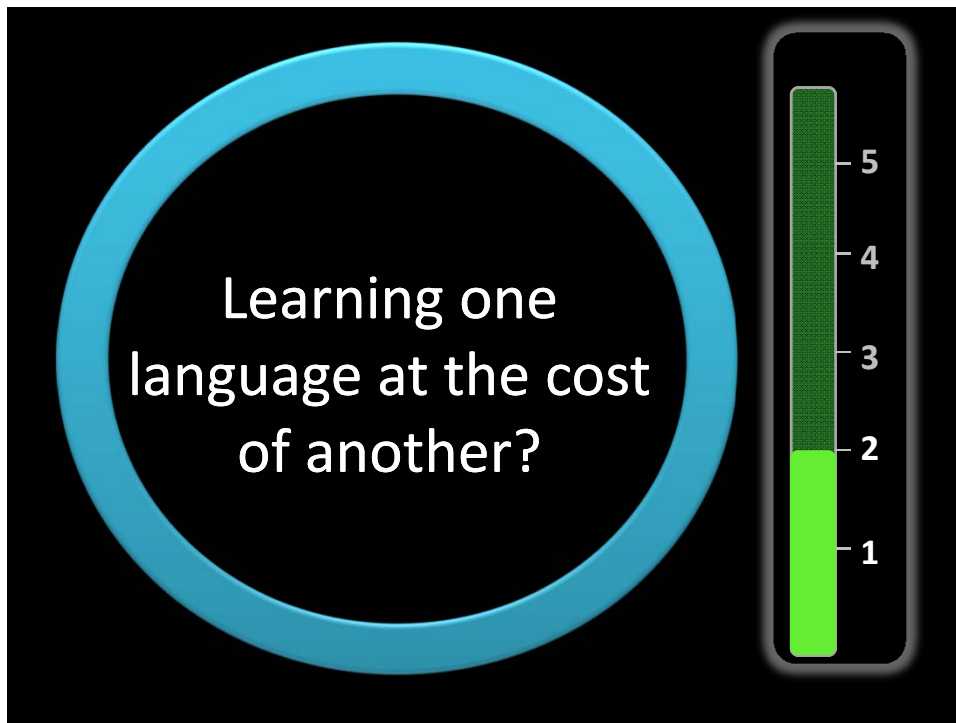
Can children with SLI become bilingual?



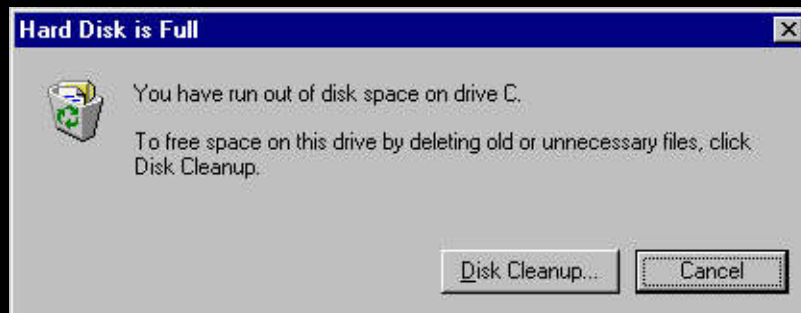
Children with SLI can and do become bilingual.

Bilingual children with SLI will learn both their languages more slowly than monolinguals.

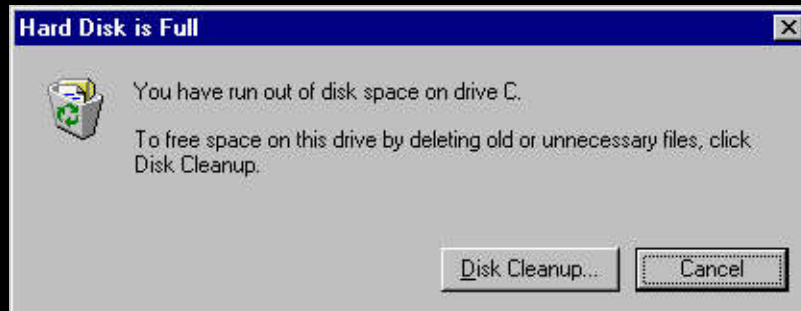
Growing up bilingually does not make SLI worse.

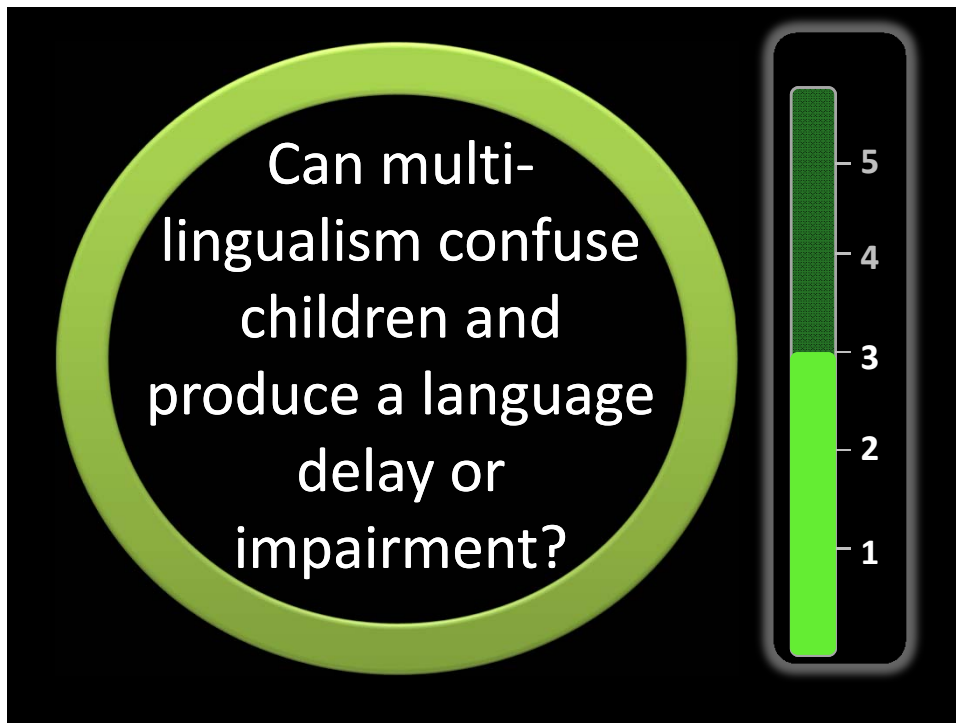


Learning one language at the cost of another?



Learning one language at the cost of another?





Can multilingualism confuse children and produce a language delay or impairment?

➤ Mixing is normal

The image contains two icons: a red circular icon with a white hand pointing down, and a white hand mixer.

Can multilingualism confuse children and produce a language delay or impairment?



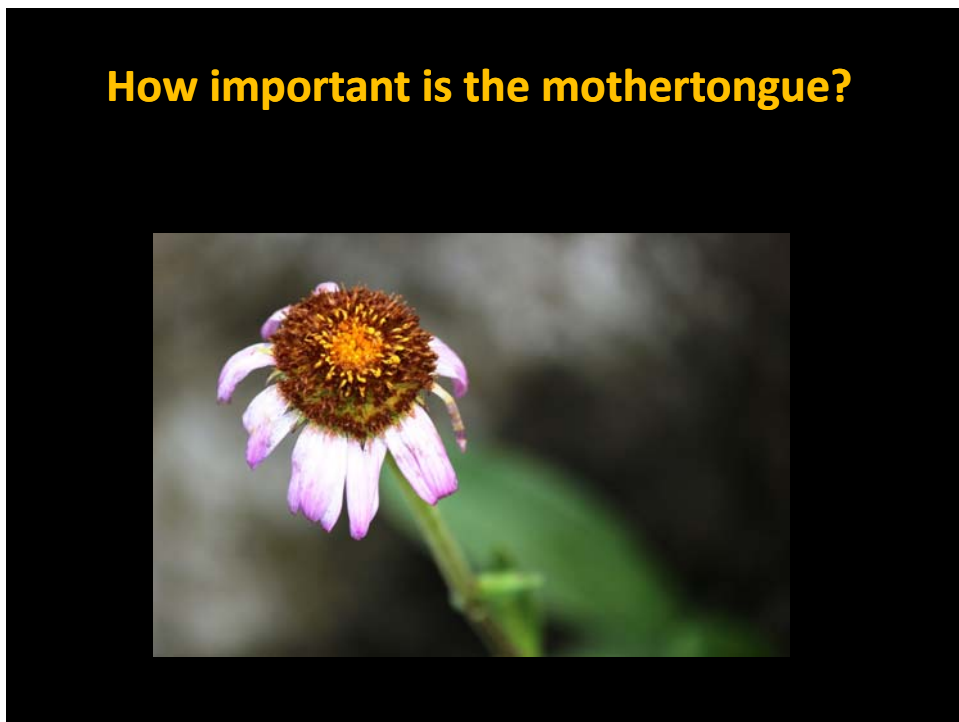
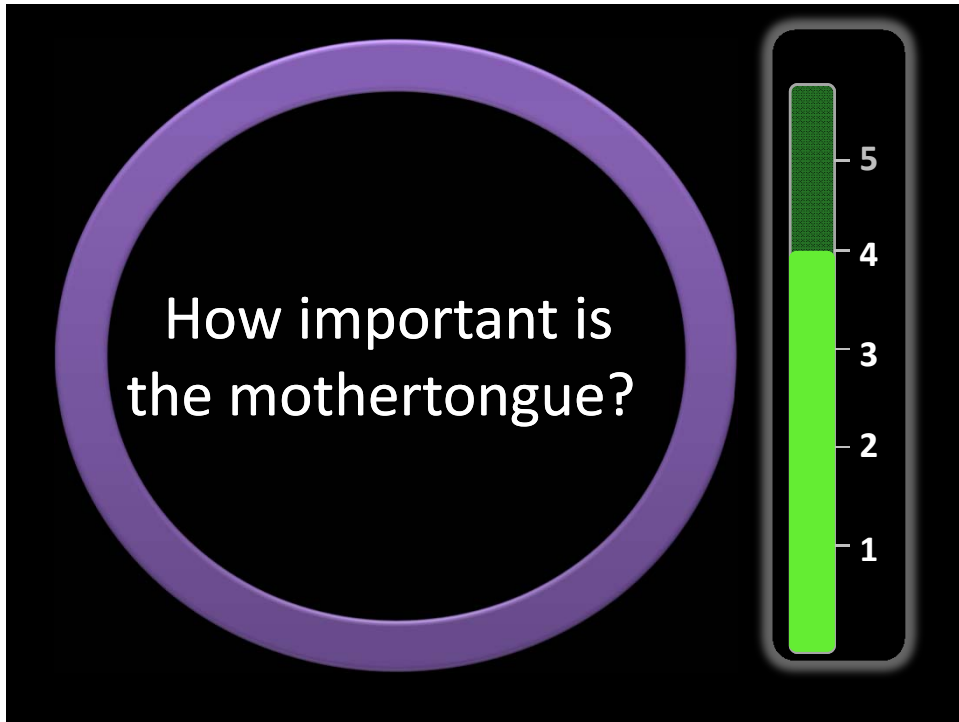
- Mixing is normal
- Language milestones - same for monolinguals



Can multilingualism confuse children and produce a language delay or impairment?



- Mixing is normal
- Language milestones - same for monolinguals
- Multilingualism does not cause a language delay or impairment



How important is the mothertongue?



If the mothertongue is not used:

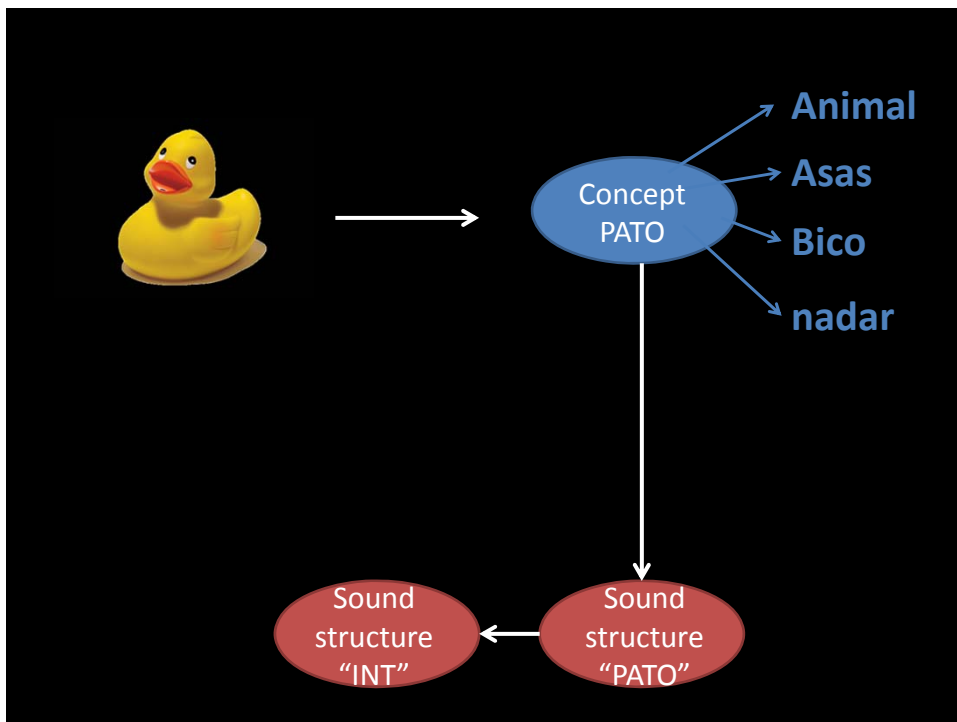
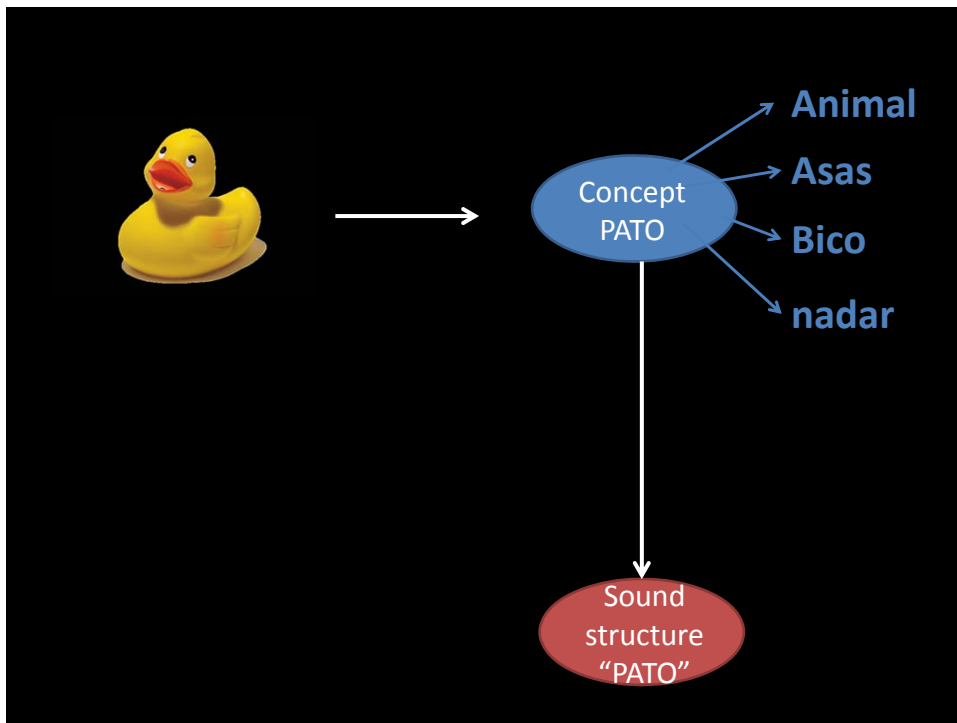
- No cognitive advantage
 - Culture, identity
 - School languages not necessarily better

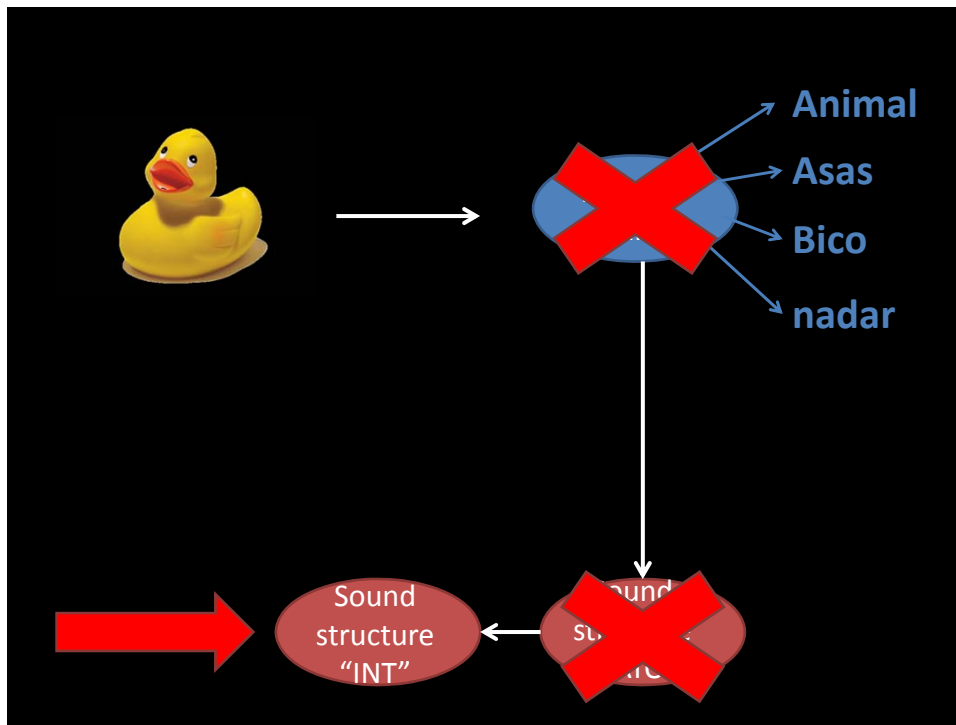
How important is the mothertongue?

Second language builds on first

Strong knowledge base in first language facilitates second language acquisition







My child should become a fluent multilingual –
What should I pay attention to?

A vertical bar chart on the right side of the slide. The chart has a scale from 1 to 5. The bar is filled with green and reaches the level of 5. The numbers 1, 2, 3, 4, and 5 are positioned to the right of the bar.

My child should become a fluent multilingual What should I pay attention to?

- Sufficient input through **human interaction**



My child should become a fluent multilingual What should I pay attention to?

- Sufficient input through **human interaction**
 - **high quality language**

regularly, different contexts, rich language, listening, stimulate discussions



Parent training : listen and stimulate discussions

Teacher training: long and elaborate sentences

My child should become a fluent multilingual What should I pay attention to?

- Sufficient input through **human interaction**
 - high **quality** language
 - create a **real need** to use the language



My child should become a fluent multilingual What should I pay attention to?

- Sufficient input through **human interaction**
 - high **quality** language
 - create a **real need** to use the language
 - **naturalistic** context





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The Language and Cognitive Development Group