Bilingualism in Education: Implications for Bilingual Education and Minority Language Students

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Conference on Immersion an Dual Language Education

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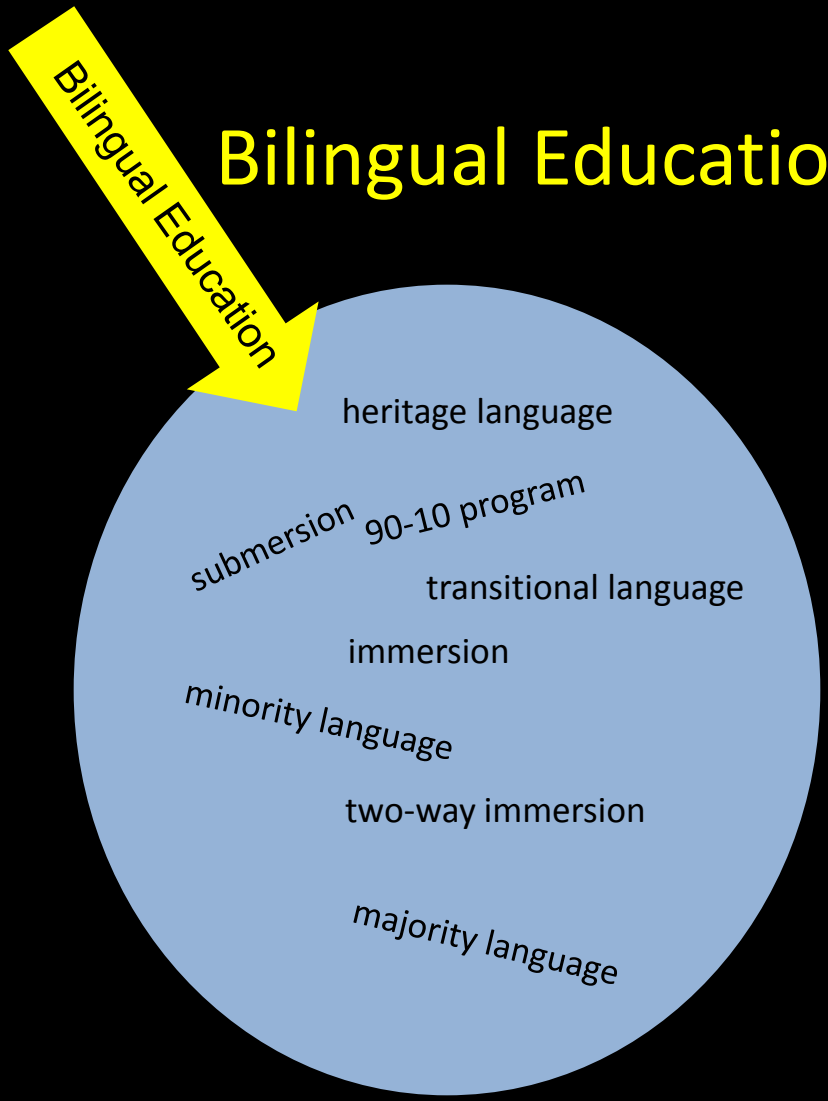
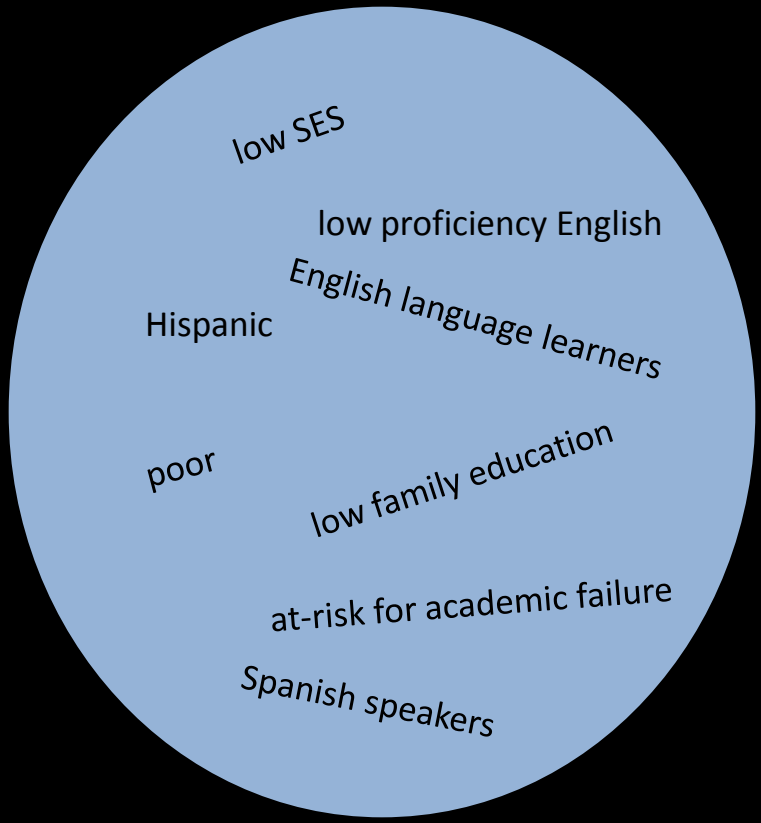
Bilingual Education: What do we Know?

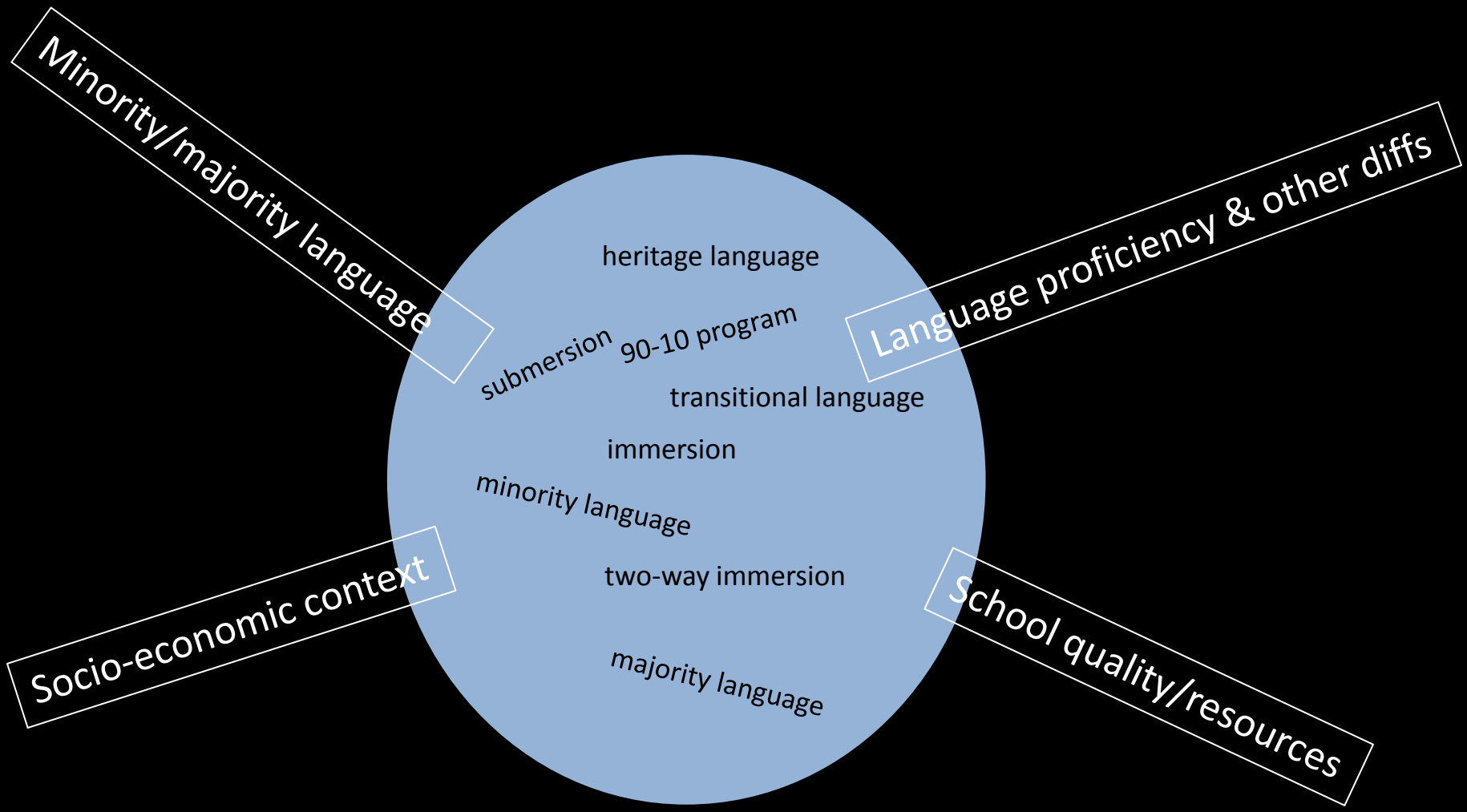


What is bilingual education?



US students in bilingual education

Factors in Outcomes of Bilingual Education



Any discussion of “bilingual education” requires considering details about the program and description of the children and context

Bilingualism and Bilingual Education

	Home Language	School Language
Bilingualism	Other	English
Immersion Education	English	Other
Dual Language Education	Spanish	English Spanish

Bilingualism and Bilingual Education

	English proficiency	At-risk factors
Bilingualism	???	No
Immersion Education	High	No
Dual Language Education	Low	Yes

Bilingualism and Bilingual Education

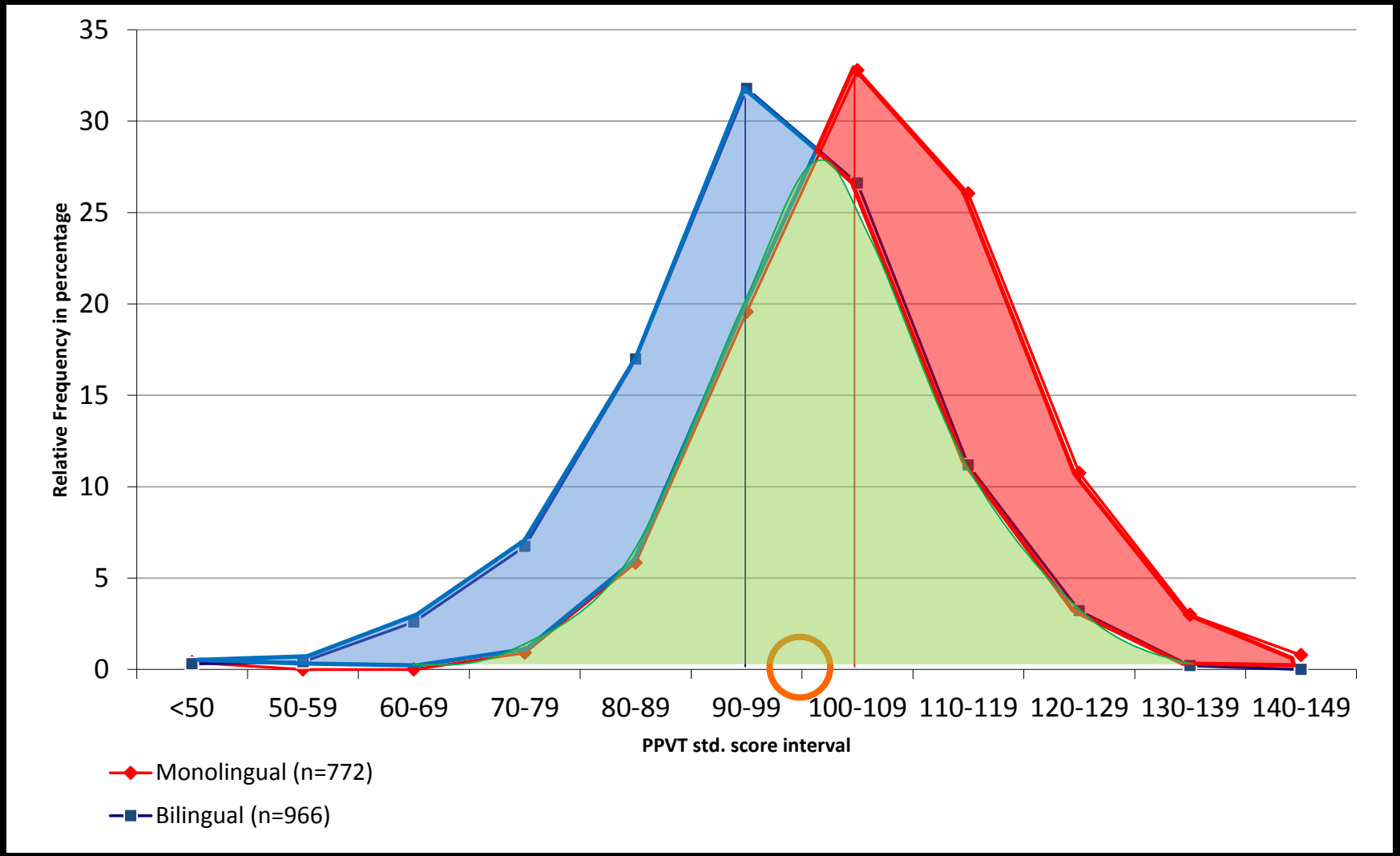
- Home bilingualism different from school-related bilingual education
- Bilingual education programs differ in important ways, so cognitive and educational outcomes will be different
- Underlying questions:
  1. What are the effects of these language configurations on children's cognitive development and academic success?
  2. How do the factors that differ across individuals and groups impact these effects?

Bilingual Minds

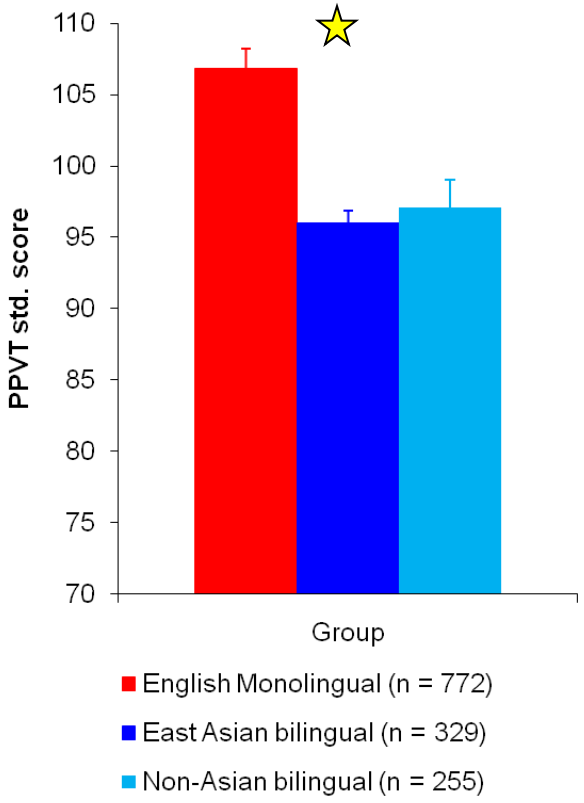
- Intense experiences lead to modifications of brain and cognitive processes (music, video gaming, etc.)
- For bilinguals, joint activation of languages requires a selection mechanism
- Lifelong need to select target language modifies brain and cognitive networks
- Main consequences of bilingualism:
  - Language acquisition and processing more effortful
  - Executive control (EC) more efficient
- Consider these consequences in the context of bilingual education

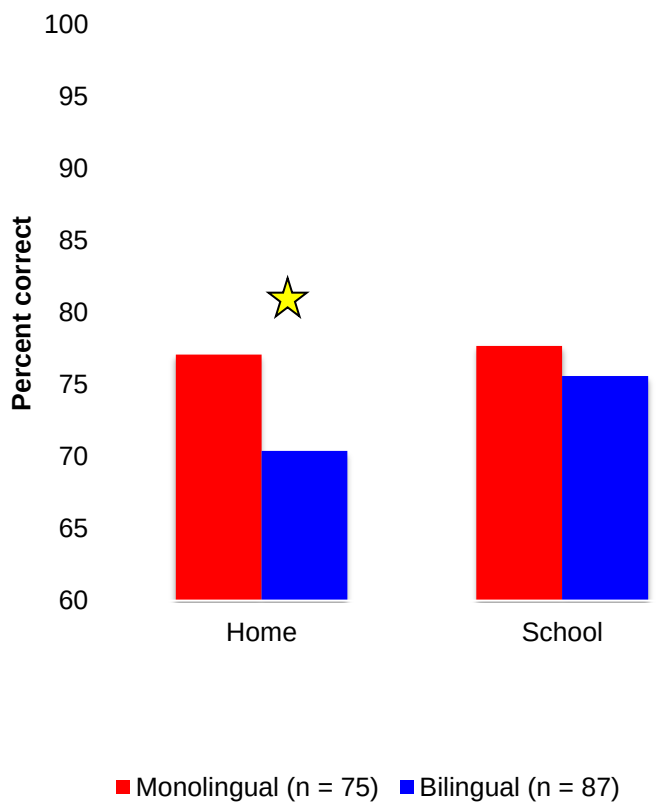
Linguistic Consequences: Bilingualism and Vocabulary

Bialystok et al., 2010, B:LC



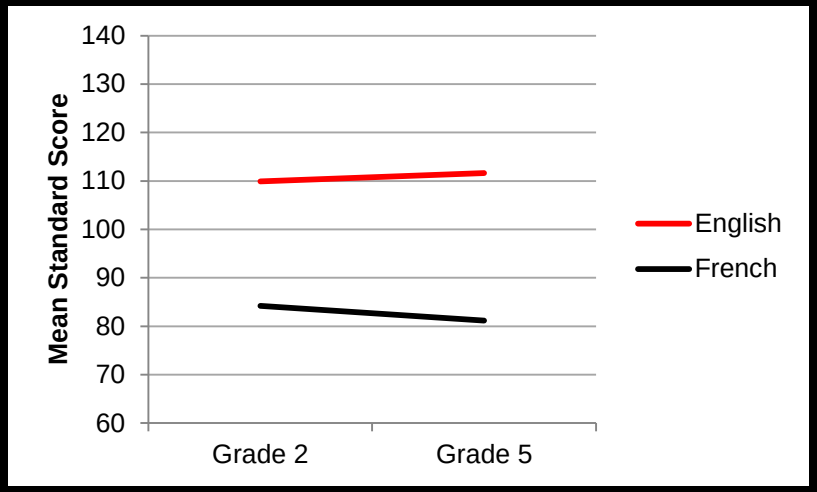
Differences Between Languages and Words



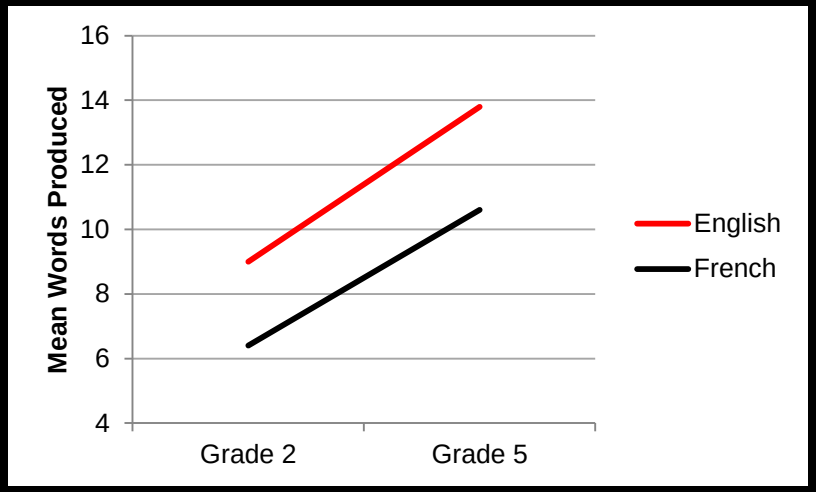


Language Proficiency in Immersion: How Bilingual?

English vs. French in Private French Immersion School

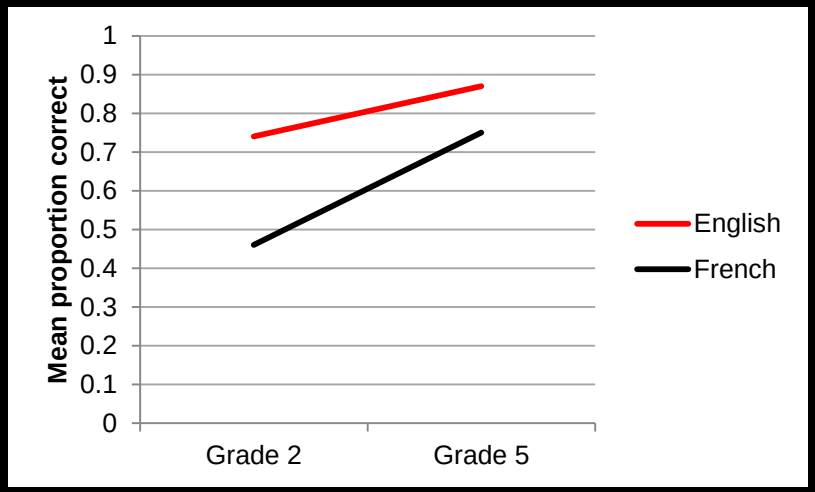


Vocabulary



Verbal Fluency

Bilingualism and bilingual education associated with lower vocabulary



Grammaticality Judgment

Cognitive and Brain Effects Across the Lifespan

- ✓1. Visual Language
- ✓2. Facial Scanning
- ✓3. Visual Attention

- ✓1. Conflict & other EF tasks RT/Acc
- ×2. Response inhibition
- ✓3. Flexibility/ shifting
- ✓4. Nonverbal working memory
- ✓5. ERP in EF tasks
- ✓6. Structural MRI grey and white

- ×1. Conflict & other EF tasks RT/Acc
- ✓2. ERP for EF tasks
- ✓3. fMRI for EF tasks
- ✓4. Structural MRI

- ✓1. Conflict & other EF tasks RT/Acc
- ✓2. Dementia symptoms
- × 3. Dementia incidence
- ✓4. ERP for EF tasks
- ✓5. fMRI for EF tasks
- ✓6. Structural MRI

✓ Group differences
× No group differences

Emergence of Bilingual Effects Through Education

Bialystok & Barac, 2012, Cognition

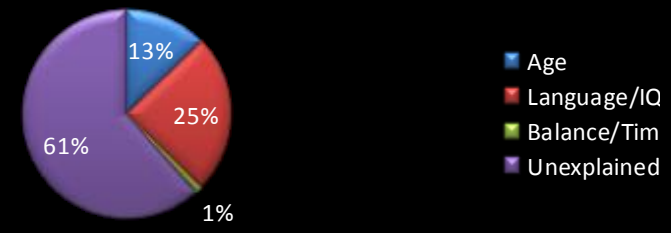
- Use continuous estimates of bilingualism and other factors
- Children in immersion programs becoming bilingual
- Study 1: 100 children, 7- to 9-years old, Hebrew education
- Study 2: 52 children, 10- to 11-years old, French education
- Metalinguistic (linguistic representation + EC) and EC tests
- Regression Model:

1. Child's age
2. K-bit nonverbal IQ
3. PPVT English vocabulary
4. Balance between two languages
5. Time spent in program

Metalinguistic Tasks

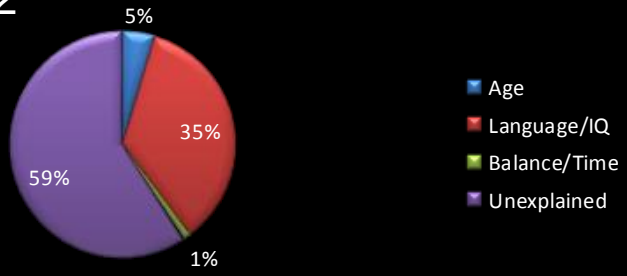
Wugs: R Sq = 38.4%

Study 1



Judgment: R Sq = 40.9%

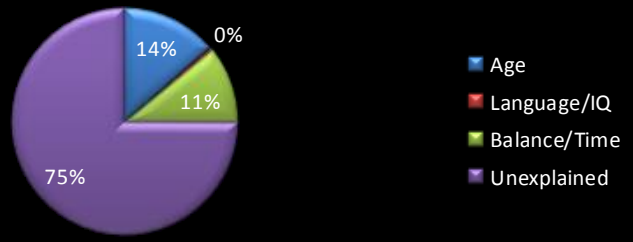
Study 2



Executive Control Tasks

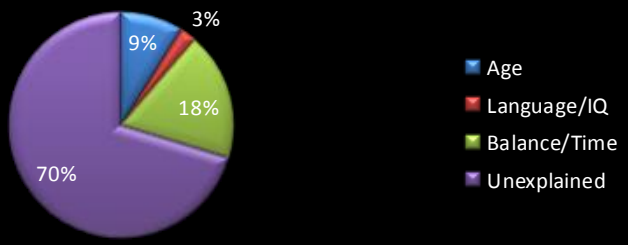
Flanker: R Sq = 25%

Study 1



GSC: R Sq = 29.7%

Study 2



More language proficiency → Metalinguistic outcomes

More bilingual experience → Executive control outcomes

Individual Differences in Effects of Bilingualism on Children's Executive Control

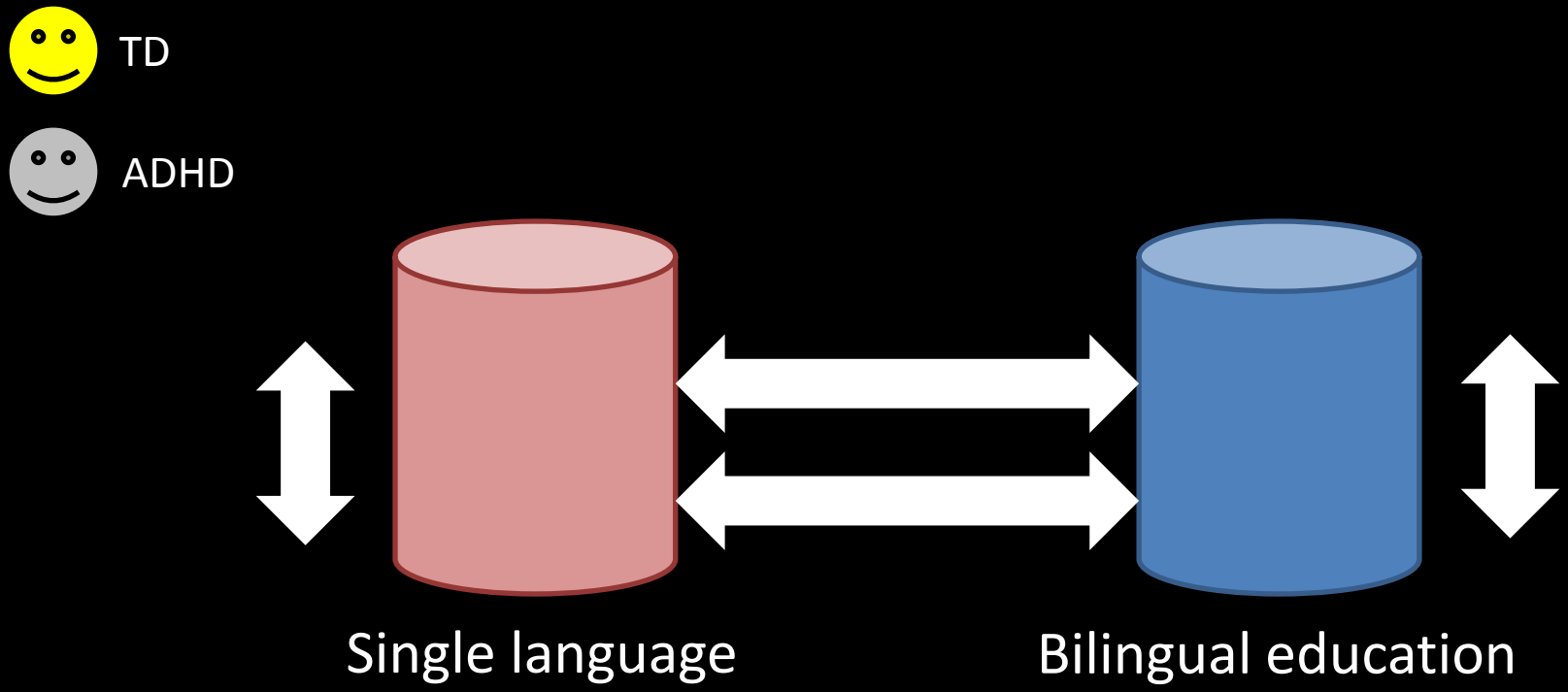
- Cognitive and academic outcomes multiply determined; bilingualism only one potential factor
- Other factors work in either direction (+ or -) on EC outcomes. Do they interact with bilingualism?
- Consider
  1. Attentional disorders/difficulties
  2. Socioeconomic status
  3. Sociocultural and socioeconomic risk factors

1. Attention Disorders in Education

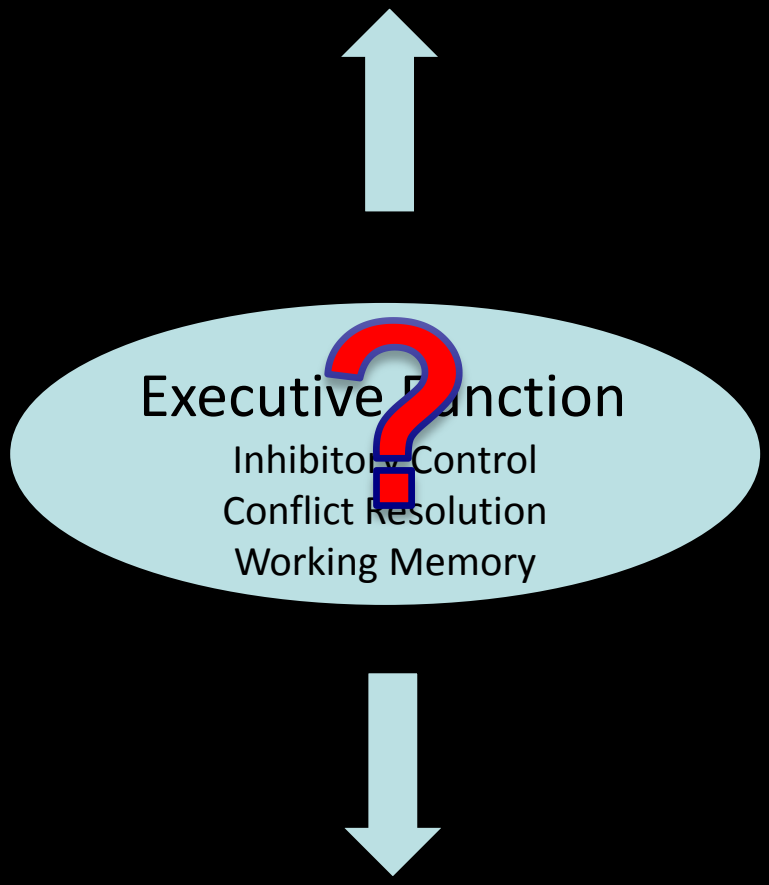
- Symptoms of ADHD include inattention, hyperactivity, impulsivity
- Children with clinical diagnosis constitute 5.9% to 7.1% of population
- Strong association between presence of symptoms and academic achievement
- Symptoms vary as well in typically-developing population
- Interaction with bilingualism?

Bilingual Education and Special Needs

- Concern about outcomes for children with challenges such as language and cognitive disabilities, ADHD, etc
- But compared to what?



Bilingualism



Attention Disorder (ADHD)

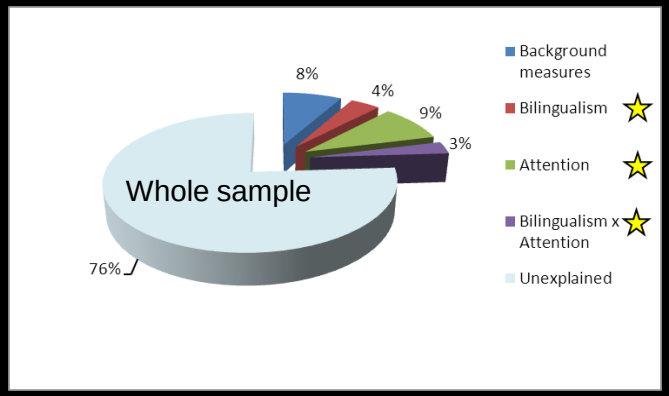
Levels of Attention and Degree of Bilingualism

Sorge, Toplak, & Bialystok, in press, Dev Sci

- Children vary in degree of bilingualism and degree of attention ability (excluding clinical ADHD)
- Examine relation between bilingualism and attention level
- Participants: 208 children, 8 to 11 years (M = 9.2)
- Typically developing population in public schools
- Diverse communities (33 different home languages)
- Three tests of executive function

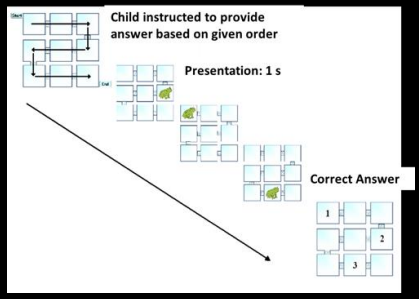
Flanker Task

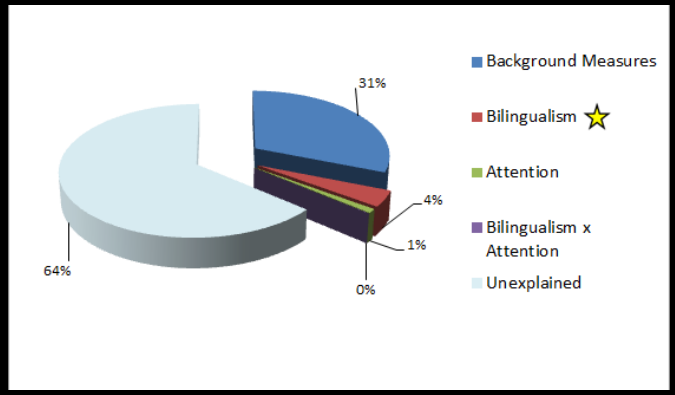
Conflict resolution



Frog Working Memory

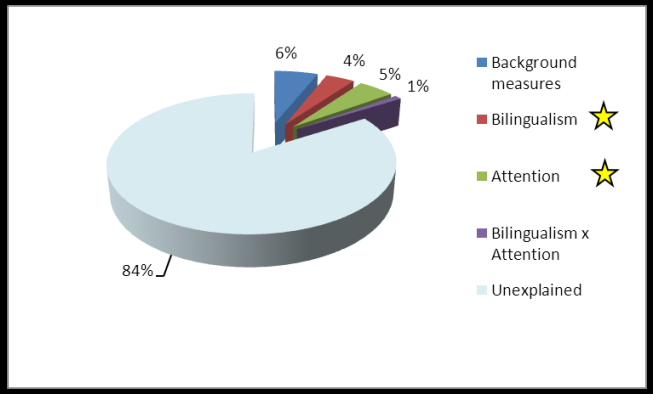
Spatial working memory





Stop Signal

Response inhibition



Summary of Results

- Bilingualism and attention both explain performance on tasks
- Greater bilingualism beneficial at all levels of attention ability
- Effect of bilingualism limited by integrity of attention system: In clinical ADHD (adults), bilinguals poorer than monolinguals on EF tasks

2. Do Bilingual Outcomes Depend on SES?

Calvo & Bialystok, 2014, Cognition

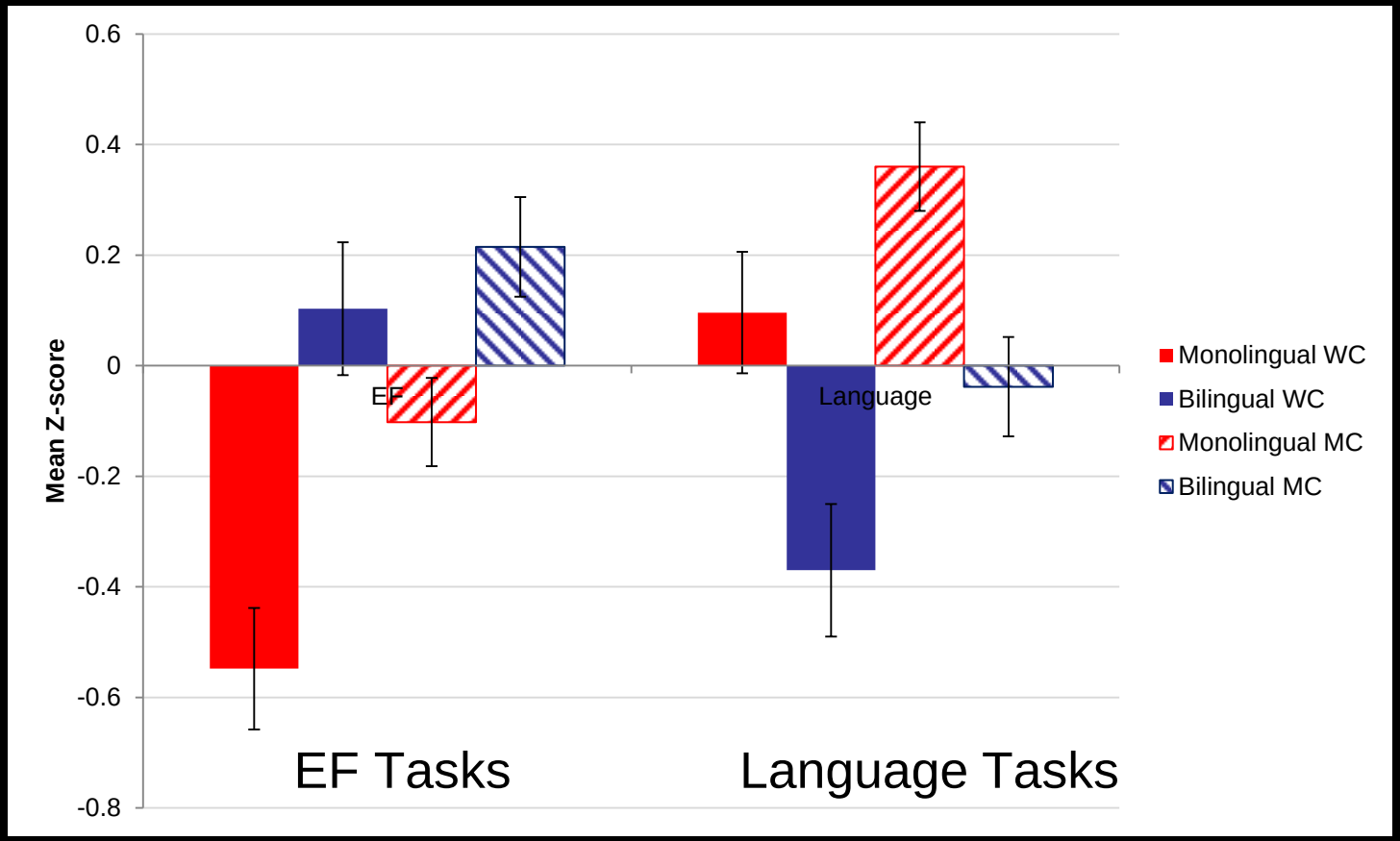
Group	N	Maternal Education (1-5)	Age (mo)	K-BIT (std.)
Working Class (WC) Monolingual	22	1.9	80	101.4
Working Class (WC) Bilingual	44	1.7	82	101.0
Middle Class (MC) Monolingual	52	3.5	81	102.2
Middle Class (MC) Bilingual	67	3.7	80	106.6

Cognitive Ability
K-bit matrices
Visual search

Language Ability
PPVT

Executive Control
Frog working memory
Flanker

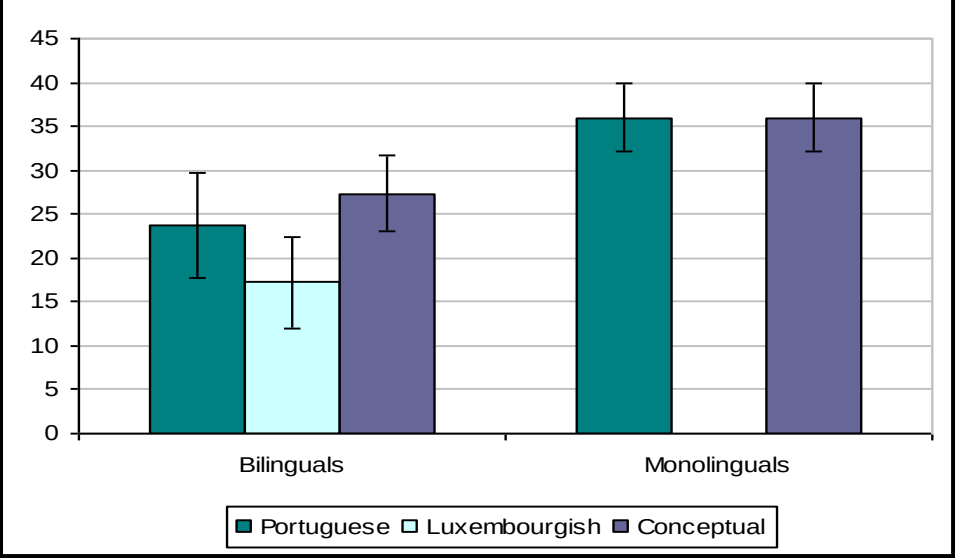
Results of Factor Scores



Effect of Bilingualism in Low SES Children

Engel de Abreu et al., 2012, Psych Science

- 80 8-year-olds
  - 40 Portuguese monolingual in Portugal
  - 40 Portuguese-Luxembourgish bilingual in Luxembourg
- Matched on school, family, income, education etc.
- Battery of language tasks and executive function tasks
- Bilinguals performed lower than monolinguals on language



Factor Analysis

Measures	Representation	Executive Control	Factor Scores Monolingual	Factor Scores Bilingual
Raven	**.71**	.01	.14	-.14
Odd-one-out	**.66**	-.14		
Dot matrix	**.77**	-.06		
Sky search	-.09	**.83**	.41	-.41
Flanker	-.06	**.85**		

Representation	Executive Control
Bilingual = Monolingual	Bilingual > Monolingual
d = 0.3	*d* = 0.9

3. Degree of Bilingualism in Low SES At-Risk Children

Thomas-Sunesson, Hakuta, & Bialystok, in press, IJBEB

- Children in central California, low SES, various degrees of bilingualism and bilingual education
- Largely children of Mexican immigrants
- 64 typically-developing children, mean age = 8.8 years

- Design:
- Background measures: age, parents education, IQ
- English proficiency: PPVT scores
- Bilingualism: ratio of English and Spanish proficiency

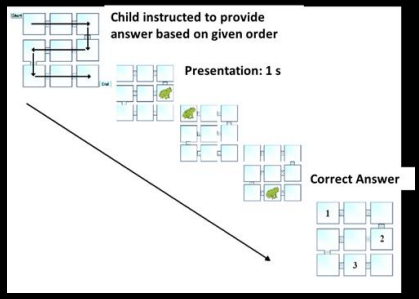
- Same three tasks from Attention study

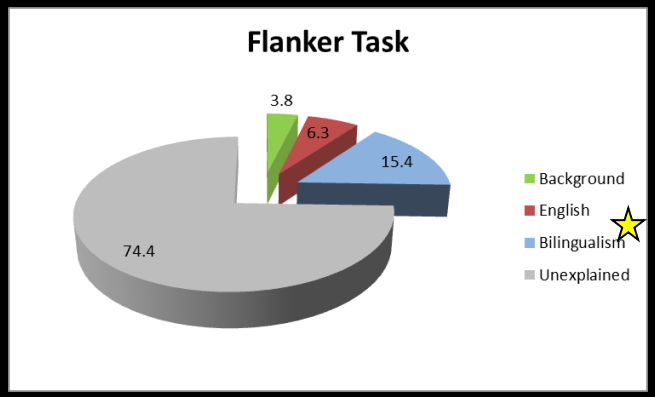
Flanker Task

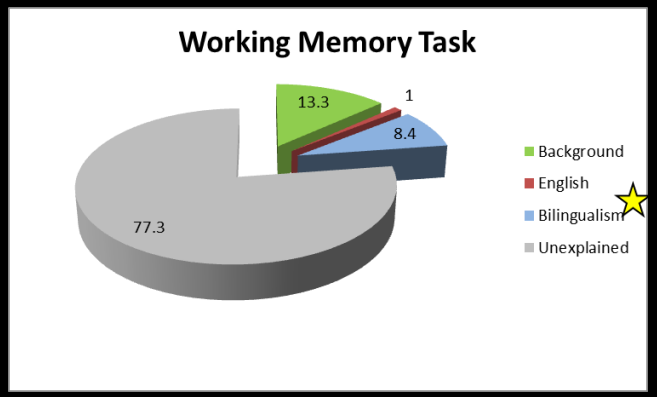
Conflict resolution

Frog Working Memory

Spatial working memory

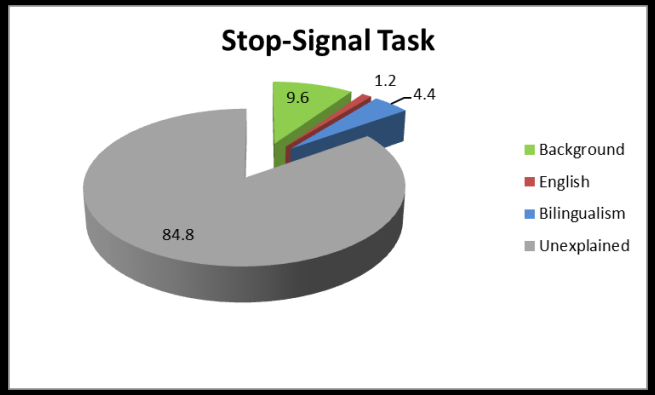






Stop Signal

Response inhibition



Conclusion:
Minority Language Children in Bilingual Education

- Bilingualism leads to poorer language proficiency (vocabulary) and better executive control
- Same pattern found for bilingual education
- Language and executive control outcomes also determined by SES, attentional control, and other at-risk factors
- These factors do not reverse or compromise the overall effects of bilingualism or bilingual education
- Education has important role in both creating and harnessing the positive effects of bilingualism for all children

THANK YOU

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