An investigation of bilingual and bi-dialectal children’s implicature understanding and executive control skills

Kyriakos Antoniou\textsuperscript{a, b, c}, Alma Veenstra\textsuperscript{a, b}, Mikhail Kissine\textsuperscript{b}, & Napoleon Katsos\textsuperscript{a}

\textsuperscript{a}University of Cambridge
\textsuperscript{b}Université libre de Bruxelles
\textsuperscript{c}Hellenic Open University

ka353@cam.ac.uk

Structural and Developmental Aspects ofBidialectalism
Tromsø, Norway
October, 2017
The effect of bilingualism on children’s language, pragmatic and cognitive skills

Gricean pragmatics

The present study

Conclusion
Bilingualism and development

- The impact of bilingualism on children’s language and cognitive abilities:
  - Vocabulary
  - Executive control
  - Pragmatics
Bilingualism and vocabulary

- Bilingual children
  - Smaller vocabularies in each of their spoken languages
  - Result of “input deficit”

(e.g. Bialystok et al., 2010; Gathercole & Thomas, 2009)
Bilingualism and Executive Control

- Bilingualism enhances children’s development of executive control.
  
  (e.g. Barac et al., 2014; de Abreu et al., 2012)

- Executive Control (EC):
  
  ✓ task-switching
  ✓ working memory
  ✓ Inhibition

  (Miyake et al., 2000)
Bilingualism and Executive Control

- Bilinguals out-perform monolinguals in executive control tasks

  ⇒⇒ Bilingualism enhances executive functions

  (e.g. Bialystok et al., 2009; Costa & Sebastián-Gallés, 2014)

- Some studies also find advantages even for speakers of two minimally distant languages or dialects (though the evidence is not very clear)

  (e.g. Costa et al., 2008; Antoniou et al., 2016; Blom et al., 2017; but see Ross & Melinger, 2016; Kirk et al., 2016; Scaltritti et al., 2017)
Bilingualism and Executive Control

- Result of managing two languages in the mind through executive control.

  (e.g. Bialystok et al., 2009; Costa & Sebastián-Gallés, 2014)
Bilingualism and Executive Control

- Literature on bilingualism and executive control: extensive but also messy (many recent studies failed to find a bilingual cognitive advantage)

  (e.g. Bialystok, 2017; Paap et al., 2015)
Gricean pragmatics

- Efficient communication is based on the appreciation of the Cooperative principle which can be expressed as four maxims:
  - quality
  - quantity
  - relation
  - manner

- Based on these maxims listeners can infer information that is not part of what a speaker explicitly said.

- Conversational implicatures:
  1. John: Did all of his students passed the exam?  
     Mary: Some of his students passed the exam.

  2. Some but not all of his students passed the exam.

(Grice, 1989)
Bilingual children of preschool age: precocious development in their pragmatic abilities.

- more advanced in computing scalar implicatures.
- better in detecting violations of Gricean maxims.

(Siegal et al., 2007; 2009; 2010)
Bilingualism and Pragmatics

- They compensate for their lower linguistic knowledge by paying more attention to contextual information.

- Better pragmatic abilities due to their enhanced executive control skills.

(Siegal et al., 2007; 2009; 2010)
But...multilingual and bi-dialectal children of early school age do not differ from monolinguals in understanding various types of implicatures:

- novel metaphors
- scalar implicatures
- manner implicatures

Antoniou & Katsos (2017)
What is the effect of bilingualism and bi-dialectalism on children’s implicature interpretation and executive control skills?
Novel elements

- New groups of Dutch-speaking bilingual and bi-dialectal children growing up in a different sociolinguistic context (Belgium).

- The effect of bilingualism and bi-dialectalism on new types of implicature:
  - Contrastive implicatures
  - Irony

- The effect of bilingualism and bi-dialectalism on the processing of implicatures.
Participants (10-12 years of age):

- 48 bilingual children from Belgium (in Dutch and French; 121-144 months old).
- 46 bi-dialectal children from Belgium (in Dutch and West Flemish; 121-155 months old).
- 44 Dutch-speaking monolingual children from the Netherlands (ages 121-145 months)
Tasks

- Participants were administered the following battery of tasks:
  - **Pragmatics:**
    - Relevance, manner, scalar, contrastive implicatures, metaphor, and irony. All participants were tested in Dutch.
  - **Vocabulary:**
    - The Word Definitions Test (Semel et al., 2008) for expressive vocabulary,
    - The Peabody Picture Vocabulary test (Dunn et al., 2005) for receptive vocabulary
  - **Executive control:**
    - Attentional Networks task (Rueda et al., 2004) for inhibition.
    - The Color-Shape task (Ellefson et al., 2006) for cognitive flexibility/task-switching.
    - The Number Repetition task as a measure of verbal working memory (from the CELF-4-NL; Kort et al., 2008)
    - The Corsi blocks Task (Mueller & Piper, 2014) for visuo-spatial working memory.
  - An extensive language background and socioeconomic status (SES) questionnaire.
The Attentional Networks Task: Inhibition
Welcome to the Fish Task!

In this task you will see a fish swimming either to the left or to the right.
Sometimes the fish will swim with other fish: two on its left and two on its right.

You will have to feed the center fish.

Press the left arrow key when the center fish swims to the left. Press the right arrow key when the center fish swims to the right.

You have to respond as fast as possible but without making any errors!

Press the space bar to begin...
The Pragmatics Test
The pragmatics test

- Six different sub-tests:
  - Relevance implicatures
  - Scalar implicatures
  - Novel metaphors
  - Contrastive implicatures
  - Manner implicatures
  - Irony

- Each sub-test included two critical implicature items and control filler items.

- Both reaction times and accuracy were recorded.

- Picture-selection format: participants had to choose between three pictures.
Irony

- Participants heard short conversations between a boy character and a speaker.
- The speaker would ask a question and the character would reply with an ironic statement.
- Participants had to give the character the item they believed he wanted.
- Based on a previous study by Kowatch et al. (2014).
Wouter, I know that blue is your favourite colour for clothes and that you definitely don't like red clothes. But a red jacket would be nice to wear.
Here is a green jacket
Here is a blue jacket
And here is a red jacket
Would you like to wear the red jacket, now?

Yes, you know how much I like red clothes!
Results
Preliminary analyses

- Composite scores
  - Language proficiency
  - Socioeconomic status (SES)
  - Inhibition
  - Verbal working memory
  - Visuo-spatial working memory
Bilinguals versus bi-dialectals versus monolinguals

- Background measures:

  - The three groups differed in age, SES, and Vocabulary proficiency.

  - Age, SES, and Vocabulary proficiency were entered as covariates in all between-group analyses on pragmatics and executive control.
Executive Control:

A between-group analysis on the three EC measures (Inhibition, Verbal working memory, Visuo-spatial working memory) with Age, SES, and Language Proficiency as covariates was conducted.

No significant differences between the three groups
Pragmatics overall accuracy

- Sufficient variability in most sub-tests, besides relevance implicatures
Bilinguals versus bi-dialectals versus monolinguals

- Pragmatics (accuracy):

Between-group analyses on Pragmatics (Irony vs. Metaphors vs. Contrastive vs. Scalars vs. Manner) with Age, Vocabulary proficiency, and SES as covariates indicated no significant differences between the three groups.

Similar results were obtained when Vocabulary proficiency was not covaried.
**Bilinguals versus bi-dialectals versus monolinguals**

- **Pragmatics (reaction times in critical implicature items):**

  - Analyses on reaction times in each implicature sub-test with Group, Condition (Implicature, Literal-1, Literal-2) and their interaction, Age, SES, and Vocabulary as covariates indicated, overall, no significant Group by Type interactions (even though bi-dialectals were overall faster (in all conditions) than monolinguals in Relevance and Scalars, and faster than bilinguals in critical ironic items).

  - Similar results were obtained when Vocabulary proficiency was not covaried.
Summary

- Largely, no differences between bilingual, bi-dialectal, and monolingual children in understanding and processing implicatures.

- No differences between bilingual, bi-dialectal, and monolingual children in executive control skills even when controlling for bilinguals’/bi-dialectals’ lower language proficiency.
Bilingual and bi-dialectal children maintain comparable to monolinguals implicature understanding skills

- This is true in terms of both comprehension (accuracy) and processing of implicatures
- This holds for various types of implicatures, including more difficult, late-developing implicatures, such as irony
- Despite bilinguals’/bi-dialectals’ lower vocabulary proficiency.
- This holds across bilingual/bi-dialectal samples

Summary and Conclusion
Summary and Conclusion

- No differences between bilingual, bi-dialectal, and monolingual children in executive control skills

  ✓ Educational background was not controlled
  ✓ Bi-dialectal children in this study had a lower socioeconomic status than the other two groups
  ✓ For bi-dialectals, it is possible that the socio-linguistic context of dialect use makes a difference
  ✓ Monolingual children in this study were of high socio-economic status (at least based on the Family Affluence Scale)
  ✓ Bilingual children in this study were not very balanced in their two languages (mean balanced bilingualism= .42)
References


References


References


References


