PROGETTO DI RICERCA

Differential roles of socio-linguistic status and foundational cognitive-linguistic skills on literacy acquisition

Theoretical background

Language Minority Bilingual Children (LMBC) grow up speaking a heritage language at home and the societal language (L2) at school. They might lag behind their monolingual peers in literacy achievements in the language of schooling either because of lesser and later exposure to L2, but also because they often live in families with low socio-economic status (SES). It is well known that low SES might negatively affect cognitive, language, and literacy acquisition (Hoff, 2013), with independent effects of SES and bilingualism on linguistic and cognitive skills (Calvo & Bialystok, 2014). However, limited evidence aimed at disentangling the role of SES and bilingualism in literacy skills. Bonifacci et al. (2022) found that SES, rather than bilingualism was the discriminating factor of reading comprehension skills at the end of primary school. In addition, increasing evidence suggests a significant role of cognitive functions in L2 acquisition (Bouffier et al., 2020) and literacy skills (Pan & Lin, 2023), particularly, reading comprehension. The Simple View of Reading (SVR) predicts that Reading Comprehension is the product of decoding and listening comprehension skills (Gough & Tunmer, 1986). Further developments suggested that SVR's explanatory power can be strengthened when it is integrated with nonverbal IQ and foundational cognitive–linguistic skills (Pan & Lin, 2023). To sum up, when studying literacy acquisition in bilinguals, it is important to develop models that include both cognitive and environmental factors within the framework of theoretical models developed on monolinguals. In light of this awareness, the present study intends to deepen the role of decoding, listening comprehension, SES, and children's cognitive skills on literacy profiles in a sample of LMBC attending primary school.

Aims and Hypotheses

The present study aims to test which variables predict reading comprehension by comparing LMBC and monolingual children. In particular, the SVR will be proposed as a starting point to test the role of decoding skills and listening comprehension; expecting a major role of listening comprehension over decoding skills (Bonifacci & Tobia, 2017). Secondly, the study aims to evaluate the role of cognitive skills as represented by non-verbal IQ and working memory skills, hypothesizing a strengthened explanatory power of the model. Finally, the study aims to evaluate the role of SES, expecting an additional portion of variance explained by this factor.

Methods

Participants: Initially, a sample of around 200 participants will be involved, attending the third to fifth grade of mainstream primary schools with a high percentage of non-Italian citizenships. Parents will be asked to compile a sociolinguistic questionnaire proposed in paper format. Exclusion criteria are: having a diagnosis of neurodevelopmental disorder; being exposed to Italian for less than two years.

Sample size and justification of the sample size: A preliminary analysis of the responses will be run to divide the whole sample into two categories of bilingual and monolingual children, selected for the second step of the study. The final sample will include 146 participants (73 bilinguals and 73 monolinguals). The minimum sample size required was estimated through G∗Power (Faul, et al., 2007) using as effect size $f^2 = .15$, $\alpha = .05$, $1\text{-}\beta = .95$. As output parameters, $F(6, 139) = 2.164$ and an actual power of = .951. Five predictors have been included as input. The effect size estimation was performed following Khang (2021) concerning the category of *F* tests, which have been chosen as appropriate analysis for the aims and characteristics of the project.

Tools: A battery of literacy and cognitive tests will be administered

Socio-Economic Status: The Hollingshead Four Factor Index of Social Status (Hollingshead, 1975). A compound SES score for children will be derived from the mean of fathers' and mothers' scores.
Non verbal IQ: Kaufman Brief Intelligence Test-2, K-BIT2 (Bonifacci & Nori, 2016). The child is asked to choose a picture, among six proposals, that best corresponds to the matrix presented. A total of 46 matrices composed the test.
Decoding skills: ALCE battery (Bonifacci et al., 2014). The word (20 items) and nonword reading tasks (15 items) will be adopted. For both tasks, the reading speed and accuracy are recorded.
Listening Comprehension: ALCE (Bonifacci et al., 2014). Participants listen to a narrative passage read aloud by the examiner, and then they are asked to answer 10 comprehension questions without looking back at the text. One narrative passage for each grade was provided.
Working memory: Wechsler Intelligence Scale for Children-IV (WISC-IV, Orsini et al. 2012). The task is composed of two subtests: the digit span, in which the child is asked to listen and repeat 3–9 digits forwards and 2–9 digits backward and the Letter-Number Sequencing, WHICH requires examinees to recall numbers in ascending order and letters in alphabetical order.
Reading Comprehension: ALCE (Bonifacci et al., 2014). Children are asked to read a narrative text and respond a set of 10 comprehension questions. Texts remained available for consultation.

Procedure: The recruitment of participants will take place through contacts with primary schools in Bologna (Italy). Parents will have to read and sign the informed consent. The tasks will be administered both individually and collectively, during school hours.

Statistical analyses: After descriptive analyses and correlation analyses to test for collinearity, the main analysis will be a stepwise regression (the R studio packages *leaps*, *tidyverse,* and *caret* are the ones required for this purpose) with reading comprehension as the dependent variable. In step 1 the SVR will be tested, by considering decoding skills in interaction with listening comprehension skills as main factors, plus the group (monolingual, LMBC) considered as a dichotomous variable; In step 2 cognitive skills (non-verbal IQ and working memory skills) will be included; In step 3, SES will be considered as a further predictor. Reciprocal interaction will be tested.

The project will be submitted for ethical approval by the Bioethics Committee of the University of Bologna.

Expected results:
1) to confirm the stronger role of listening comprehension in reading comprehension;
2) to obtain increased strength of the SVR when taking into account cognitive skills
3) to add a significant contribution to previous literature in determining the additional effect of SES into an expanded SVR model of reading comprehension in bilingual and monolingual population

Implications:
1) Research: to add knowledge on the role of SES in interaction with cognitive and linguistic skills
2) Educational setting: to give information to teachers on the best strategies to improve reading comprehension.

Characters: 6992/7000

Riferimenti bibliografici e piano delle attività formative

References:

Bonifacci, P., & Nori, R. (2016). KBIT-2. Kaufman brief intelligence test. Contributo alla taratura italiana. Giunti-OS.

Bonifacci, P., & Tobia, V. (2017). The simple view of reading in bilingual language-minority children acquiring a highly transparent second language. *Scientific Studies of Reading*, *21*(2), 109-119.

Bonifacci, P., Ferrara, I.C., Pedrinazzi, J., Terracina, F., & Palladino, P. (2022). Literacy Acquisition Trajectories in Bilingual Language Minority Children and Monolingual Peers with Similar or Different SES: A Three-Year Longitudinal Study. *Brain Science, 12*(5):563.

Bonifacci, P., Tobia, V., Lami, L., & Snowling, M. (2014). *ALCE. Assessment di lettura e comprensione per l'età evolutiva*. Hogrefe.

Bouffier, M., Barbu, C., & Majerus, S. (2020). Verbal Working Memory but Not Attention Is Related to Language Proficiency: Evidence from Multilingual Speakers. *Psychologica Belgica, 60*(1), 270.

Calvo, A., Bialystok, E. (2014). Independent effects of bilingualism and socio-economic status on language ability and executive functioning. *Cognition, 130*(3), 278–288.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior research methods*, *39*(2), 175-191.

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and special education*, *7*(1), 6-10.

Hoff, E. (2013). Interpreting the early language trajectories of children from low-SES and language minority homes: implications for closing achievement gaps. *Developmental psychology, 49*(1), 4-14.

Hollingshead, A. A. (1975). Four-factor index of social status. Unpublished manuscript, Yale University, New Haven, CT.

Kang, H. (2021). Sample size determination and power analysis using the G*Power software. *Journal of Educational Evaluation for Health Professions, 18*, 17. https://doi.org/10.3352/jeehp.2021.18.17

Pan, D. J., & Lin, D. (2023). Cognitive–linguistic skills explain Chinese Reading comprehension within and beyond the simple view of Reading in Hong Kong kindergarteners. *Language Learning*, *73*(1), 126-160.

Plan of activity: a) a review of the international literature on the topics of the research project; b) training on the administration of the experimental battery; c) collecting data in schools; d) writing reports for parents and teachers; e) Analysis of results through appropriate statistical analyses, f) Dissemination through participation in conferences and writing of scientific reports. The study will be conducted in primary schools of the Municipality of Bologna or in the Emilia-Romagna region, and at the Department of Psychology, University of Bologna.

Timing of activity: Months 1-3: Submission of the proposal to the Bioethics Committee, Review and update of the literature, contacts with schools in the Bologna city area; Month 4: Collection of informed consent and SES questionnaire from parents, definition of the two experimental groups based on inclusion and exclusion criteria; Months 5-8: Training and administration of the battery to the children in schools; Months 9-12: Data analysis and dissemination.

Feasibility:

The feasibility of the project is supported by the collaboration of the LADA lab with many schools in the Bologna area which can favor participants' recruitment; previous research conducted in the research field by the supervisor allows an established knowledge of instruments and procedures.

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