

# LINKING - Neuroscience and Education Perspectives on Language Ability and Critical Thinking: An Interdisciplinary Approach

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*Abstract:*

This proposal aims to develop an interdisciplinary research on education and neuroscience to study the role of language skills on critical thinking high school

students. Critical Thinking (CT) has been widely recognised as an essential skill for personal development and for societies. We propose to bridge education and neuroscience, in a mixed-methods cross-disciplinary approach combining empirical data from social contexts, learning behaviors, and experimental neuroimaging, to answer the following specific research questions: i) How do students perform in cognitive tasks involving CT? ii) How do language writing skills influence the rate of growth in CT? iii) What are the neural responses from neuroimage and electrophysiology underlying language comprehension that contribute to CT? A sample of 75 high school students from public schools in Lisbon will be collected. Written language and CT will be assessed using established tests. Brain activity will be measured according to functional neuroimaging and electroencephalography.

Statistical procedures will consist in structural equation modeling (SEM), including a latent growth modeling to examine how writing language skills influence the rate of growth in CT. Knowledge obtained will support a large competition proposal submission and hopefully inform educational strategies and policies at different levels, possibly resulting in a guide on how to improve CT teaching through mother tongue classes.

Partners:



Alignment with SDGs:

The project is strongly aligned with SDG 4 – Quality Education, particularly through its focus on understanding how language skills contribute to the development of

critical thinking among high school students. By combining educational research, cognitive assessment, and neuroscience methods, the project aims to generate evidence on how writing, language comprehension, and neural processes support critical thinking, which is explicitly recognised in the proposal as an essential skill for personal development and for society. Its expected contribution to educational strategies, policy development, and the production of guidance for improving critical thinking through mother-tongue classes reinforces its relevance to inclusive and quality education. The project may also indirectly contribute to SDG 10 – Reduced Inequalities, insofar as it focuses on students from public schools in Lisbon and seeks to inform practices that can strengthen learning opportunities across educational contexts.

Image of the project:

