

January 12, 2024

Review of the **Doctoral thesis “Flexibility of social categorization in bilinguals: The role of executive control and motivation,”** by *Sofía González Castro (Jagiellonian University)*

Prepared by:

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Dear colleagues,

I have reviewed this outstanding dissertation, which in my opinion meets and exceeds the requirements imposed by Article 190 (3) of the Act of 20 July 2018 The Law on Higher Education and Science. This is because the dissertation clearly “*demonstrates the candidate’s general theoretical knowledge in the discipline or disciplines and the ability to conduct research or artistic work independently, and whether the subject matter of the doctoral dissertation is an original solution to a scientific problem, an original solution in the application of results of own scientific research in the economic or social sphere, or an original artistic achievement.*”

In what follows, I offer justification for my assessment based on the elements outlined in your instruction letter.

Assessment along with justification, whether the doctoral dissertation demonstrates the general theoretical knowledge of the candidate for the doctorate degree in psychology:

The dissertation is comprised of 5 separate studies, some of which are thematically grouped, but all of which address wide-ranging questions of great importance to the intersecting fields of multilingualism and cognition. Collectively, this substantial body of work demonstrates a superior level of theoretical knowledge of the candidate for the doctoral degree in psychology.

The first study addresses the important and overlooked question of whether classing people as “monolingual” is empirically justifiable given the many ways that such people in fact have important multilingual experiences. This study is important because many studies in the literature rely upon whole group monolingual vs. bilingual comparisons to draw conclusions about the relationships between language and thought. In recent years, this approach has been seen as highly problematic for bilingual individuals given the many ways that that bilingual experience manifests globally. However, very little work has gone to the same lengths to investigate this for presumed monolingual groups. Clarifying this in the literature is crucial, and the findings of the dissertation in this regard are highly convincing many “monolinguals” should

not be presumed to fit this category, and in fact, one's personal endorsement of whether they are monolingual or not could relate to a host of other factors that are relevant to the investigation of language and cognition. The candidate's mastery of the literature in Study 1 was outstanding and comprehensive – this reviewer learned a lot from reviewing the work.

Studies 2 to 4 departed (but profited) from this Study 1 by investigating the degree to which bilingualism and bilingual experience impacts people's social biases and social categorizations (e.g., gender bias or out-group bias). These studies are highly innovative and theoretically sound. I was especially impressed by how the candidate integrated the multilingualism literature with that of the social cognition literature. Their sophisticated understanding of both led them to produce a body of empirical work that goes far beyond the routine "How does bilingualism impact this-or-that function" found in the literature. Again, this reviewer was impressed and learned a great deal theoretically and empirically from these studies.

Finally, Study 5 departed (but profited from Studies 1 to 4 by investigating the general notion of cognitive flexibility, which was indicated as an explanatory mechanism of how multilingual experience modulates the expression of social biases in Studies 2 to 4. Here, the candidate demonstrated theoretical mastery of yet another literature area, that which is specific to the impact of bilingual experience on cognitive control. Here, this reviewer found the speed/accuracy instructional manipulation to be especially insightful and interesting – as were the findings that people seem to always prioritize accuracy but vary due to instructions with respect to speed.

In sum, my assessment is that this dissertation demonstrates superior theoretical mastery, precisely because the candidate is not just reviewing one global research area – rather, they have demonstrated theoretical mastery of several interdependent theoretical areas. In this way, their performance clearly meets and exceeds that which is typically expected for a Ph.D. in psychology.

Assessment along with justification, whether the doctoral dissertation demonstrates the ability of the doctorate degree candidate to conduct research independently:

As with the first point, the wide-ranging nature of the work presented in this dissertation demonstrates to this reviewer a superior ability of this candidate to conduct research independently, across a variety of approaches.

My assessment on this point derives from several observations about the dissertation.

- The planning, presentation, and description of the research methods and statistical approaches used is of superior quality. All methodological steps and decisions were clearly presented and justified, the data and scripts are open access for others to verify and explore, and the interpretations of the data were sound and appropriately nuanced, with limitations clearly indicated and logical. As well, given the inherent complexity of

multilingualism research of this kind, the candidate is to be applauded for their systematic use of data reduction methods to make the data more understandable/interpretable.

- The mediation/moderation approach to data analysis is particularly innovative in the psycholinguistic field, and the candidate has applied this approach in a careful and considered way with respect to sample size and all else.
- Given the many different empirical elements comprising the dissertation, the candidate has demonstrated mastery of not just one kind of approach but many – these include questionnaires, remote cognitive studies, real-time processing tasks, a variety of innovative statistical techniques, etc.
- I was especially impressed by the candidate's statistical reporting habits, which were clear, comprehensive, and would make it possible to replicate exactly what was done. The use of LME was expert and well considered. The use of pre-registration for some of the studies was exemplary.

Assessment along with justification, whether the doctoral dissertation is an original solution to a scientific problem, an original solution in the application of results of own scientific research in the economic or social sphere.

As previously mentioned, this doctoral thesis represents a collection of original solutions to several scientific problems of interest to the field of multilingualism and cognition, in a manner that builds upon what is learned in an ongoing manner.

The dissertation addresses open, important questions regarding the following:

- The degree to which people's self-categorizations about their language status are valid reflections of the concepts they are presumed to reflect (e.g., monolingualism).
- The degree to which cognitive flexibility relates to social cognitive processes such as social biases and categorization.
- The degree to which cognitive flexibility is modulated by tasks goals in a more general sense.

This reviewer anticipates that the individual papers to be published from this work will be highly impactful in several adjacent literature areas pertaining to bilingualism and cognition.

Importantly, the work sparks a variety of new questions, which I will be delighted to pose at the defense to learn more about the candidate's expert views.

These include but are not limited to:

- The ways in which bilingual experience can be completely disconnected from cultural experience or use of specific languages, especially in samples such as the ones used in this dissertation, that contain people with such heterogeneous language backgrounds. This leads to questions about the pros and cons of studies that are highly inclusive vs. ones that are specific to locations and language configurations.
- The pros and cons of naturalistic studies which leverage the individual differences that people bring to the lab or experimental situation vs ones that explicitly teach people things and then measure the impact of that experimental manipulation on performance.
- The pros and cons of questionnaire based individual difference assessments (e.g., of executive control) vs. real time measures? Similar issues pertaining to generalized executive control assessments vs. ones that are specific to domains (e.g., social evaluations).
- The pros and cons of LME models that have many fixed effects terms, acknowledging that there is both merit and challenges to addressing at once as so many factors.

In sum, the candidate, their supervisor, and their advisors are to be congratulated for the extraordinary body of work presented in this dissertation. I look forward to the defense!