# Linguistic analysis of the scarcity mindset: A corpus-based LIWC study of the United Nations General Debate (1987-2020)

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It has been found that scarcity impedes cognitive function (Mani et al. 2013). Based on this finding that the lacking resources occupy the poorer people' cognitive capacity, it is hypothesized that the cognitive load due to lacking money may be linguistically manifested as the expressions related to money (such as business, pay, price, market) and lacking (such as hungry, don't have, didn't have) in the poorer people's language. This study tests the hypothesis with a corpus-based analysis of the United Nations General Debate (UNGD), and the hypothesis can be more specifically stated as follows: The lower-income countries (LIC) tend to present more "money" and "lack" categories at the United Nations General Debate than higher-income countries (HIC).

The analysis is based on the corpus of 6,096 speeches delivered from 1987 to 2020 at the UNGD (Jankin Mikhaylov, Baturo & Dasandi 2017), altogether 14,300,539 words. According to the income categorization by the World Bank, 2,733 speeches (6,313,579 words) are from HIC, and 3,362 speeches (7,986,960 words) are from LIC. The two groups of speeches are analyzed with Linguistic Inquiry and Word Count (LIWC), a psycholinguistic tool that connects psychological theories with linguistic expressions. In LIWC, the words that describe a particular domain are "categories". The normalized frequencies of the categories "money" and "lack" are computed for the two groups of speeches. The scores on the three categories are compared between LIC and HIC with Mann-Whitney U tests and visualized with ggplot2 in R.

The results suggest a significant difference between HIC (0.79 [0.51, 1.20]) and LIC (0.99 [0.67, 1.35]) on the use of "money" categories ($P<0.001$), and the difference between HIC (0.14 [0.07, 0.24]) and LIC (0.16 [0.08, 0.27]) on "lack" categories is significant as well ($P<0.001$). A circular heatmap with complete-linkage clustering is also generated for the 194 countries (Figure 1), and it is observed that the cluster showing more frequent use of "money" and "lack" categories is comprised of more LIC than HIC. The diachronic analysis for "money" categories (Figure 2) and "lack" categories (Figure 3) indicates that the difference between LIC and HIC is relatively stable from 1987 to 2020. The LIC shows the more frequent use of "money" categories than HIC on 28 years over the 34-year period (82.4% of the time) and of "lack" categories on 29 years out of the 34 years (85.3% of the time).

The results confirm the hypothesis of this study. It is argued that with the scarcity mindset at play, the LIC more often see the economic dimension (Shah et al. 2018) and thus use the "money" categories more often than HIC in their UNGD speeches. The cognitive load created by scarcity can be linguistically manifested as the "lack" categories with anxiety over lacking (Mani et al. 2013). This finding may shed light on how the scarcity mindset works in the correlation between wealth and language at UNGD.
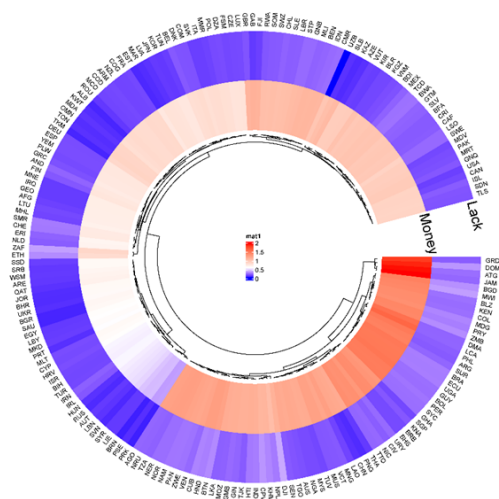


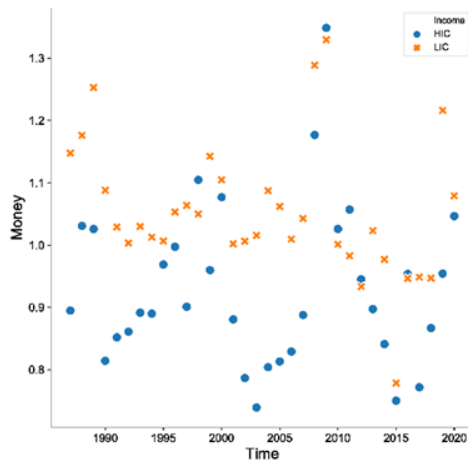*Fig. 1: A cluster heatmap of the 194 countries on the "money" and "lack" categories*

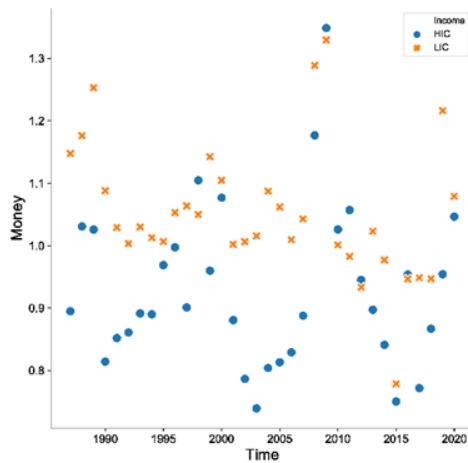*Fig. 2: A diachronic comparison of "money" categories between HIC and LIC*



*Fig. 3: A diachronic comparison of "lack" categories between HIC and LIC*

## References

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