

# Illiteracy and cognitive sciences: A psycholinguistic perspective

Tan Arda Gedik

---

*This text emphasises the importance of considering literacy and nonverbal IQ (NVIQ) in cognitive psychology research, highlighting their significant impact on language acquisition and cognitive abilities. Inclusion of diverse populations is crucial to avoid overgeneralizations and gain a comprehensive understanding of these influences.*

**Keywords:** Illiteracy, Cognitive sciences, Non-verbal IQ, Psycholinguistics.

**W**ITHIN the realm of cognitive psychology and related disciplines, it is essential to critically examine the biases inherent in our research samples, particularly the overrepresentation of participants from Western, Educated, Industrialised, Rich, and Democratic (WEIRD) societies in our studies and the overgeneralizations made based on this sample. However, an often-overlooked aspect of this discussion is the role literacy plays in our studies, even within WEIRD populations. Literacy changes the mind in very minute but important ways and has profound effects on our cognition (e.g. Huettig & Mishra, 2014). Even in WEIRD countries, non-WEIRD samples can be found in the form of illiterate individuals (see Dąbrowska et al., 2022 for a study with illiterate speakers in Spain). Literacy, and its concomitant effects (i.e. print exposure) are important for L1 development as continued literacy practices develop both cognitive abilities and linguistic abilities (e.g. Kolinsky & Morais, 2018; Stanovich & Cunningham, 1992). Although it is difficult to tell if schooling or reading contributes more to the development of cognitive abilities (i.e. nonverbal IQ), it would be safe to argue that both make important contributions as research shows their influence is difficult to detangle (Huettig & Mishra, 2014).

Scholars such as Kolinsky and Morais (2018) argue that our perspectives as researchers are influenced by our own

literacy, which is not evenly distributed among the population. This neglect of literacy in cognitive studies is significant, as the impact of literacy on cognition has been underestimated by many contemporary theorists (Morais, 2018). Consequently, it is imperative to re-evaluate the assumptions made in psycholinguistics and cognitive sciences in the absence of data from illiterate individuals.

Until very recently, the received conventional wisdom in linguistics was that first language acquisition was independent of speaker internal and external differences (see for example Bley-Vroman, 2009: 179; Chomsky, 1965, p. 11). However, emerging research shows that this is not the case (e.g. Dąbrowska, 2015; Kidd et al., 2018), and suggests that literacy and nonverbal IQ might be at play more than previously anticipated. The acquisition of literacy is one of the ways in which this belief is challenged. Print exposure as a result of sustained literacy practices can result in more diverse lexical and syntactic knowledge in L1 speakers (e.g. Dąbrowska, 2015). This is because written language contains more complex structures (Roland et al., 2007) and acts as training wheels for the entrenchment of complex structures (Dąbrowska, 2021). More importantly, nonverbal IQ (NVIQ) also seems to be at work in L1 acquisition.

NVIQ plays a significant role in the process of first language acquisition, and its influence can be observed in both literate

and illiterate populations. In literate populations, individuals with higher NVIQ tend to exhibit more efficient language learning abilities as their cognitive skills, such as pattern recognition, problem-solving, and abstract reasoning, contribute to enhanced language processing and comprehension, especially grammar (Dąbrowska, 2018). These individuals may demonstrate advanced lexicogrammatical knowledge, allowing them to acquire and utilise complex language structures more adeptly, even when they do not have as much print exposure (Dąbrowska, 2018). In other words, good NVIQ can compensate for a lack of education/print exposure. In contrast, in illiterate populations, where formal literacy skills are limited or absent, the role of NVIQ may become even more crucial in language acquisition. However, little is known about the role of NVIQ in illiterate populations. The absence of written language as “training wheels” (Dąbrowska, 2021) may necessitate greater reliance on nonverbal cognitive abilities for linguistic skills. Higher NVIQ in illiterate individuals can facilitate the development of compensatory strategies, enabling them to make use of alternative cues and context in deciphering and producing language (Dąbrowska et al., 2022). Such a scenario may prove important for Theory of Mind studies with a language component, where the complexity of the structures used in elicitation tasks are directly connected to print exposure (Boeg Thomsen et al., 2021), and above average NVIQ skills may help to interpret the scene given in an experiment more efficiently.

Dąbrowska et al. (2022) demonstrated that NVIQ is an important training crutch for heightened comprehension of complex structures (i.e subject and object relatives) in an illiterate population in Spain, such that illiterate participants with above average NVIQ but less literacy-learning experience performed better at matching complex sentences with the corresponding picture than speakers with average or below average NVIQ (and more literacy-learning experience). Similarly,

Gedik (in preparation) shows the importance of NVIQ for grammatical comprehension of various complex constructions in Turkish (i.e subject and object relatives, passives, and nominalization). His preliminary findings show that NVIQ correlates differently with each respective construction, and across groups (illiterates and literates). Quantifiers correlate the strongest, followed by passives, and the relative clauses in both groups. But interestingly, the strength of the correlation differed between the two groups, with higher correlations in the illiterate group.

This suggests that even in a simple task used in these studies (picture selection tasks), connecting the dots between the scene and the linguistic comprehension requires some NVIQ and some exposure. In the absence of prior frequent exposure to such complex structures, NVIQ compensates for a lack of linguistic experience. Thus, NVIQ acts as a cognitive facilitator in first language acquisition, shaping language learning outcomes in both literate and illiterate populations. This also warns us about how we should design our psychological studies that have a language component, because confounding variables such as NVIQ or various linguistic structures might be at play (see Blasi et al., 2022 for similar discussions).

Cognitive sciences is an interesting field, because humans have many (cognitive and physiological) individual differences (e.g. Gruszka et al., 2010). However, to move away from the deadly sin of overgeneralizing based on WEIRD samples, cognitive sciences needs to consider including participants from different backgrounds. This does not reinvent the wheel. These emerging studies showcase that we need to be careful with our theories, frameworks, and our assumptions about phenomena. Unless we test the long-standing conventional wisdom (as in the case of testing the role of NVIQ in L1 acquisition) with WEIRD and non-WEIRD populations, we cannot rule out the remaining confounding variables.

## The author

### Tan Arda Gedik

Chair of Language and Cognition;

FAU Erlangen-Nürnberg

Email: [tan.gedik@fau.de](mailto:tan.gedik@fau.de)

Web: [tangedik.owlstown.net](http://tangedik.owlstown.net)

X: @imtangedik

## References

- Blasi, D.E., Henrich, J., Adamou, E., Kemmerer, D. & Majid, A. (2022). Over-reliance on English hinders cognitive science. *Trends in Cognitive Sciences*, S1364661322002364. <https://doi.org/10.1016/j.tics.2022.09.015>
- Bley-Vroman, R. (2009). The Evolving Context of the Fundamental Difference Hypothesis. *Studies in Second Language Acquisition*, 31(2), 175–198. <https://doi.org/10.1017/S0272263109090275>
- Boeg Thomsen, D., Theakston, A., Kandemirci, B. & Brandt, S. (2021). Do complement clauses really support false-belief reasoning? A longitudinal study with English-speaking 2- to 3-year-olds. *Developmental Psychology*, 57(8), 1210–1227. <https://doi.org/10.1037/dev0001012>
- Chomsky, N. (1965). *Aspects of the Theory of Syntax*. MIT press.
- Dąbrowska, E. (2015). Individual differences in grammatical knowledge. In E. Dąbrowska & D. Divjak (Eds.), *Handbook of Cognitive Linguistics* (pp. 650–668). De Gruyter Mouton. <https://doi.org/10.1515/9783110292022-033>
- Dąbrowska, E. (2018). Experience, aptitude and individual differences in native language ultimate attainment. *Cognition*, 178, 222–235. <https://doi.org/10.1016/j.cognition.2018.05.018>
- Dąbrowska, E. (2021). How writing changes language. In A. Mauranen & S. Vetchinnikova (Eds.), *Language Change: The Impact of English as a Lingua Franca*. Cambridge University Press (pp.75–94). Cambridge University Press. <https://revistas.uclm.es/index.php/CJES/article/view/78219>
- Dąbrowska, E., Pascual, E. & Macías Gómez-Estern, B. (2022). Literacy improves the comprehension of object relatives. *Cognition*, 224, 104958. <https://doi.org/10.1016/j.cognition.2021.104958>
- Gedik, T.A. (in preparation). *The effects of illiteracy on Turkish Morphosyntax*.
- Huettig, F. & Mishra, R.K. (2014). How literacy acquisition affects the illiterate mind—a critical examination of theories and evidence. *Language and Linguistics Compass*, 8(10), 401–427.
- Kidd, E., Donnelly, S. & Christiansen, M.H. (2018). Individual Differences in Language Acquisition and Processing. *Trends in Cognitive Sciences*, 22(2), 154–169. <https://doi.org/10.1016/j.tics.2017.11.006>
- Morais, J. (2018). Literacy and Democracy. *Language, Cognition and Neuroscience*, 33(3), 351–372.
- Roland, D., Dick, F. & Elman, J.L. (2007). Frequency of basic English grammatical structures: A corpus analysis. *Journal of Memory and Language*, 57(3), 348–379. <https://doi.org/10.1016/j.jml.2007.03.002>
- Stanovich, K.E. & Cunningham, A.E. (1992). Studying the consequences of literacy within a literate society: The cognitive correlates of print exposure. *Memory & Cognition*, 20(1), 51–68. <https://doi.org/10.3758/BF03208254>