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Linguistic typology and the cognitive science of non-WEIRD societies: The role of memory types

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Abstract

Linguistic typology has identified properties shared by the world's languages, as well as features with respect to which languages diverge, including infrequent or rare phenomena. Cognitive biases are one important source of language universals, through their indirect effect on language change via their impact on language learning and language use. At the same time, typologically rare phenomena can exist only if the human brain is able to accommodate them. Nonetheless, our knowledge of how we process language mostly derives from the analysis of a limited set of languages associated with WEIRD (Western Educated Industrialized Rich Democratic) societies. Including non-WEIRD languages in our psycholinguistic experiments stands to benefit the cognitive science of language and, in addition, linguistic typology, given that languages do best what speakers do most, which in turn depends on what our brains do most. In this paper, the benefits of a less biased approach to the cognitive science of language diversity are illustrated through the consideration of a research project aimed at determining the impact of the typological diversity of human languages on different memory types, specifically, procedural vs. declarative memory, with the latter encompassing two subtypes of relevance to linguistic structure, semantic and episodic. Our focus is on typological features that have been shown, in the past, to correlate with sociolinguistic factors. Overall, we aim at delving into an array of multi-directional feedback relationships among memory types, sociolinguistic properties, and typological features.

Keywords: cognitive biases; typological diversity; non-WEIRD languages; non-LOL languages; language complexity; memory types.

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1. Introduction: giving a voice to non-WEIRD societies and their languages

Building on a long tradition of psychological and neurological studies of language, in recent years a cognitive science of language has emerged as a lively field of research, whose aim is to integrate diverse neuroscience approaches to language acquisition, processing, and even evolution. Not only is this approach expected to significantly improve our understanding of the nature of language, but in addition it stands to contribute significantly to our comprehension of human perception and cognition, and more generally, the human phenotype. For typological studies, the cognitive science of language will likely improve our understanding of the typological diversity of the world's languages, since cognitive biases contribute to determining what is frequent and what is rare among the world's languages. Nonetheless, research in the cognitive science of language still suffers from a dramatic sampling bias. Our manifesto article is intended to stress the benefits of including in our psycholinguistic and neurolinguistic research a larger number of languages, specifically those associated with non-WEIRD (i.e. Western, Educated, Industrialized, Rich, Democratic; Heinrich et al. 2010) societies, henceforth referred to simply as "non-WEIRD languages" – a kindred notion being that of "non-LOL languages" (where LOL stands for Literate, Official and with Lots of users; Dahl 2015). As an example of this less typologically-biased approach to language diversity, we present our ongoing research project, situated at the crossroads between typology, sociolinguistics, and psycholinguistics. The project is aimed at determining the potential impact on our cognition of aspects of the structural diversity of the world languages resulting in part from sociopolitical factors (although the opposite effect could be also expected, with changes in memory types also impacting on language structure). Specifically, we aim to test whether speakers of languages spoken in close-knit societies store linguistic information in the procedural and declarative memory systems in ways that differ from speakers of languages used by larger and more interconnected human groups.

The project thus aims to enrich extant hypotheses about the impact of language diversity on human cognition (via social environment-language-cognition co-evolution). As noted, for linguistic typology, knowing more about the cognitive differences shown by speakers of typologically diverse languages should improve our understanding of the nature of language universals and language rara.

Variation certainly pervades language. Language fulfils many functions, we speak thousands of languages that are structurally diverse, and different varieties of each individual language can be found in different social groups, geographical areas, age groups, genders, contexts, and so on. Describing all this diversity has been a concern for many linguistic disciplines, ranging from dialectology through sociolinguistics to typology. While this is already a formidable task, it is even more challenging to provide an explanation for all this diversity. For a long time, typology has attempted to account for the diversity found among present-day languages in diachronic terms, pertaining to how language changed in the past. However, as noted by many other typologists, language change is also dependent on patterns on language acquisition and use, which are subject to diverse constraints many of which are of a cognitive nature. As noted by e.g. Culbertson (Culbertson 2012; Culbertson et al. 2013) these are typically biases favoring salience, harmony, or systematicity in language structure, which are frequent phenomena in the world's languages. Nonetheless, the world's languages also exhibit infrequent or even rare phenomena, which, as stressed by Cysouw and Wohlgemuth (2010), can tell us as much about the capacities and limits of human languages as do universals. For example, it might be suggested that typological rara are less learnable or more demanding in terms of cognitive resources. Knowing more about how our brain deals with the reduced cognitive demands of typological frequent phenomena or with the increased cognitive loads and demands of typological rara can help understand the typological diversity of human languages. That said, this cognitive approach to linguistic typology, even if sounded is not uncontroversial, and it certainly needs more evidence to be fully supported. Importantly too, non-cognitive factors are still much needed to explain typological patterns of interest. As noted by e.g. Harris (2010) regarding typological rara, they might exist despite their extra cognitive burden because of historical reasons, if they result from a large amount of otherwise common diachronic changes each demanding no extra cognitive effort.

For typologists, the structural diversity of human languages is certainly a gift. Diversity enables us to test assumptions about what is universal in languages, and what is specific to certain languages, language families, or linguistic areas. Nonetheless, as far as the cognitive underpinnings of all this diversity are concerned, we still suffer from a dramatic sampling bias, which resembles the sampling bias suffered by early linguistics. Specifically, psycholinguistic and neurolinguistic research still mostly focuses on a small set of languages, typically WEIRD languages, like English and other widespread Indo-European languages (see Blasi et al. 2022 and Benítez-Burraco 2025 for discussion), or what has been more recently called LOL languages. Just as we already have detailed accounts of the typological diversity of human languages (like WALS, Dryer & Haspelmath 2013 or Grambank, Skirgård et al. 2023), so we also need richer accounts of how the human brain processes other types of languages. Fortunately, non-WEIRD/non-LOL languages are being increasingly examined by the neuroscience of language, as in the recent study by Malik-Moraleda and colleagues (2022) of syntax processing by speakers of 45 languages from 12 different language families. Ideophones are another notable example, as they are typically found in non-WEIRD languages. Research suggests that their cross-linguistic similarities might be due to their closer relationship (compared to non-ideophonic words) to motor and sensory components of our cognition, which are rather invariant among humans (De Varda & Strapparava 2022), with ideophones activating sensory areas in a greater degree and in a way that can be regarded as (quasi-)synesthetic (Osaka et al. 2004; Osaka 2009).

Both conceptually and methodologically, this research is expected to be challenging. Typological research of minority languages is difficult per se (see Gorter 1997; Nagy 2009; Marten et al. 2012, for interesting discussions). Conducting neurolinguistic and psycholinguistic research with speakers of these languages can be even more challenging. Technical facilities can be difficult to transport to and use in the testing places, tests need to be adapted, the necessary number of subjects for achieving statistically significant results might be not easily reached, and so on. In the next section, we provide a detailed description of our ongoing project examining some cognitive correlates of certain basic aspects of the typological diversity of languages. As part of our research, we are examining non-WEIRD languages, and we will also comment on potential ways of dealing with the methodological problems and limitations inherent to this type of research.

2. Cognitive biases, language diversity, and sociopolitical factors: a research project

2.1. Rationale and background

As discussed in the previous section, humans exhibit cognitive biases that favor specific ways of processing and storing linguistic information, and that are expected to contribute in some way to the existence of universal properties of languages, as found by typological research. If we further assume that human cognition (including our faculty of language) is similar in all human beings (Moro 2008; Bolhius et al. 2014), one can certainly wonder why cross-linguistic differences do exist. One possible answer is, as noted above, historical change. Another possibility is that languages diversify due to their being host to different forces pulling in different directions, e.g. the need for expressive power as opposed to the drive for simplification. Finally, it has been suggested that cross-linguistic differences can also result from languages adapting to a changing environment. For instance, sound inventories might be, at least in part, a response to different physical environments, in view of the correlations found with vegetation coverage (Maddieson & Coupé 2015), humidity (Everett et al. 2015), or temperature (Wang et al. 2023). Likewise, the social environment might also exert some impact on language structure, this including the number of speakers, the degree of bilingualism, the tightness or looseness of the social networks, aspects of sociopolitical organization, or the number of adult learners of the language (Sinnemäki 2009; Lupyan & Dale 2010, 2016; Trudgill 2011; Nettle 2012; Atkinson et al. 2019; Gil 2021, among many others).

More specifically, it has been claimed that societies featuring large and complex social networks, involving greater rates of inter-group contacts and cultural exchanges (which are overwhelmingly WEIRD or LOL societies), might favor languages with larger lexicons, more complex phonologies, increased compositionality and enhanced semantic transparency, as well as more complex and more layered syntaxes, with more specialized and obligatory grammaticalized distinctions. Allegedly, these languages also tend to exhibit decreased complexity in some domains, particularly, their morphologies. Following an original proposal by Wray and Grace (2007), these languages have been called Type X languages, because of the eXoteric (i.e. outwards) nature of the societies speaking them (see Chen et al. 2024 for details). By contrast, the languages spoken by small and isolated human societies (which are overwhelmingly non-WEIRD/non-LOL societies), featuring tight networks and high proportions of native speakers tend to show larger sound inventories and more complex phonotactics, as well as opaquer morphologies, but reduced semantic transparency and compositionality (with an abundance of idioms and formulaic language), as well as simpler and less layered syntaxes. These languages have been called Type S languages, because of the eSoteric (i.e. inwards) nature of the societies speaking them (see Chen et al. 2024 for details).

The distinction between Type X and Type S languages is not uncontroversial. On the one hand, some authors have failed to find robust evidence of exoteric societies speaking languages that differ in some of the aspects mentioned above from the languages spoken by esoteric societies (e.g. Shcherbakova et al. 2023 on morphology), hence more research is needed to properly support such a distinction. On the other hand, the distinction itself is quite crude. First, these two language types are merely ideal types (or poles) of a continuum of diversity, so that most if not all languages can be expected to show a complex admixture of type X and type S features (this is clearly observed in the statistical study by Chen et al. 2024). Second, the societal distinction supporting these two types of languages, namely, esoteric vs exoteric societal types, is itself a gross simplification. In actual fact, many or most small communities are not really "isolated", at the very minimum they may be multilingual, so even if outsiders do not typically learn their language, insiders do know the language(s) of other human groups. This is expected to impact on the features of the local (allegedly, Type S) language. Importantly, this circumstance may have a potentially significant impact on our project, which we consider in detail in section 2.3. below.

As discussed by several authors (e.g. Bolender 2007, Wray & Grace 2007, Trudgill 2011), the structural differences between Type X and Type S languages might result, to some extent, from their differential context-dependency. The reason is that speakers of the latter type constitute dense social networks and share substantial common ground, whereas users of Type X languages do not know each other to a similar extent and constitute looser social networks. Now, there is also increasing evidence that the languages we speak impact, even if subtly, on our cognition, this including our perceptive, processing, and storing abilities. For instance, speakers of languages with a S(ubject) V(erb) O(bject) basic order outscore speakers of languages with a SOV order at recalling final stimuli from a set or a list (and vice versa) (Amici et al. 2019). Likewise, it is well-known that languages differ in the degree to which their word-order patterns "harmonize". For example, while in Indonesian all noun modifiers follow the head noun, in English some noun modifiers, e.g. relative clauses, follow the head noun while others, e.g. adjectives, precede it. It has been observed that speakers of languages with less harmonic structures show a reduced tendency to regularity when dealing with structural rules, which is an important cognitive bias accounting for several typological findings (Culbertson 2012). Still, this does not mean that harmony or even regularity, as found in the world languages, are solely the outcome of our cognitive biases. Indeed, harmony might be favoured by some functional reasons. Nonetheless, research using computational simulations suggests that this is a more unlikely possibility than the cognitive reason (Chater et al. 2009).

It may be expected that given sufficient time, language-specific structural constraints of this type result in a differential involvement of specific cognitive abilities in language processing. In our project, we focus on two basic types of memories which play a central role in language processing: procedural and declarative. Procedural memory supports the acquisition and processing of compositional, rule-governed aspects of language; by contrast, declarative memory is typically involved in learning and storing words and irregular phenomena across domains, including suppletive forms, irregularities, and formulae (see Ullma 2004, 2015 for details). Typically, declarative memory encompasses two subtypes of memory: semantic and episodic (Tulving 1972). Whereas semantic memory is important for word components storage, episodic memory enables us to mentally move backwards and forwards in time, that is, remembering or foreseeing events. Intriguingly, episodic memory has been related to recursion, which is a typical feature of complex syntax (see Corballis 2019 for details). Because of the opposite features purportedly exhibited by Type X and Type S languages in the domain of grammar, we predict a greater involvement of procedural memory in the acquisition and processing of Type X languages, and, conversely, of declarative memory in the acquisition and processing of Type S languages. This is the main hypothesis we wish to test in the project (sketched in Chen et al. 2023), which is derived from the more general view that languages react adaptively to the sociopolitical environment in which they are spoken and that these changes are later cognitively accommodated by speakers via the potentiation of cognitive resources otherwise not specific to language that are needed for their acquisition and use, particularly, different types of memory. In truth, this suggested connection between memory types, specific domains of language, and different social contexts is not new. Among others, it has been proposed by Ullman himself, although in relation to second language learning (e.g. Ullman 2020). As noted by one anonymous reviewer, some experimental and typological work also builds on this idea (e.g., Clahsen et al. 2010; Sinnemäki & Di Garbo 2018).

In order to achieve our goals, we plan to test groups of 20-40 native speakers of strongly Type X and strongly Type S languages for procedural and declarative memory abilities. With regards to the latter, Type S languages, this means that we will be examining distinctively non-WEIRD/non-LOL languages. In this way, we expect to contribute to the improvement of a non-WEIRD cognitive science of language, as proposed in the first section of the paper.

That said, a non-trivial concern is the distinction between the two subcomponents of the declarative memory (episodic and semantic) which, as noted, can be expected to contribute differently to different aspects of language. One problem is that there is an ongoing, lively discussion about the ultimate nature of these two subtypes of memory, particularly, of semantic memory. Accordingly, for some researchers, semantic memory is the component of the declarative memory system (located in the hippocampal/medial temporal lobe) which facilitates the learning of "facts" about the world (in contrast to episodic memory, which supports the learning of the world's "events"). Others, however, might use the term "semantic memory" to refer to the memory system that stores our knowledge about the world over the long term. Notice that this type of knowledge is sensitive to the properties of specific cultures. Because of this, most tests used to evaluate semantic memory tend to be culturally biased, which is an important concern for the type of cross-linguistic research we will be pursuing. These tests include the well-known Pyramids and Palm Trees test (PPTT) (Howard & Patterson 1992), but also the Camel and Cactus test (CCT) (Bozeat et al. 2000), which is a less categorically stringent version of the former. In the PPTT, participants are typically shown a target picture together with two other pictures: one semantically related to the target and another semantically unrelated. This procedure allows to evaluate semantic knowledge via non-verbal responses. The CCT is similarly designed and used, although participants are typically offered 4 possible images, with only one being semantically related to the target image. Nonetheless, even the modified version of the CCT test recently developed by Moore and colleagues (2022), which is claimed by its authors to be language-independent, exhibits some cultural biases.

A second important problem is that these two subcomponents of the declarative memory may exhibit some partial overlap and functional interconnection (see De Brigard et al. 2022 for a recent discussion). Learning and remembering new semantic knowledge is potentially inseparable from the specific event in which this knowledge was first presented, with events accordingly being dependent on episodic memory abilities. This seemingly explains why performance on the CCT test correlates well with brain regions associated with episodic memory (hippocampus) (Jana Reifegerste, personal communication).

The problems and limitations discussed above can be extended, in truth, to the two main memory types considered in our project, declarative and procedural. First, their neurobiological and cognitive status is still object of discussion (see e.g. Michaelian

2015 on declarative memory). More importantly, both memory systems show partly overlapping/redundant functions with regard to (specific components of) language.

Despite all these circumstances and potential limitations, we still believe that the distinctions above can be helpful in interpreting the typological results pertaining to language diversity, as well as the sociolinguistic findings about societal types (see Benítez-Burraco et al. 2022 for some reasons), among which are the purported trade-offs in complexity among different linguistic domains (of the sort discussed in e.g. the contributions in Sampson et al. 2009).

2.2. Methods

In order to remedy, or at least minimize all these caveats and limitations, we have decided to test our participants, specifically, for their ability to learn new items (as a proxy of their ability to learn words and the arbitrary, non-compositional aspects of language) or to learn new rules (as a proxy of their ability to learn the systematic aspects of language). In other words, we will be trying to distinguish, as much as possible, between their ability to learn new information and their ability to store such information at the long term, which is what most if not all available tests for semantic memory typically do. Of course, these two abilities can be expected to correlate: if you are good at learning new words, you will probably show a good long-term semantic memory; conversely, if you have managed to store a lot of semantic knowledge, this is probably because you first successfully learned it).

For testing procedural memory abilities, we will rely on an optimized version of the Serial Reaction Time (SRT) task (Nissen & Bullemer 1987), whereas for evaluating declarative memory abilities, we will use an optimized (and slightly adapted) version of the DecLearn task (Hedenius et al. 2013). Optimization here means, in essence, that we have developed improved versions of these tasks that can be taken online using a laptop or a mobile phone, but particularly, that we have carefully selected the stimuli to avoid any potentially confounding cultural effects, which, as noted, can be a limitation of most of the tests aimed to evaluate memory, particularly, semantic memory[1].

In the procedural memory task, a target stimulus (here: a green plus sign) appears in one of four horizontally aligned locations on the screen, which map onto four keys on the keyboard (S, F, J, L) (Figure 1). Participants are asked to press (using

[1] Development of these improved versions was conducted in collaboration with Jana Reifegerste.

their left and right middle and index fingers) the corresponding key as soon as the target stimulus appears on the screen. The task encompasses 6 blocks each of 60 trials each. In each trial, items remain on the screen until a correct response is registered, followed by a 100-ms inter-stimulus-interval, after which the next stimulus appears. Unbeknownst to the participant, the location of the target stimulus follows a 10-location sequence in some blocks (blocks 2-5), while it is random in other blocks (blocks 1 and 6). Previous research has shown that response times decrease during the sequence blocks, indicating that participants implicitly learn the sequence of locations. Participants will be encouraged to perform the task as quickly as possible. Responses by participants will be coded for both reaction time and accuracy. The dependent variable (participants' 'procedural memory score') is the procedural learning effect, which will be computed by first dividing the median reaction time of each block by the median reaction time of block 1, and then subtracting the resulting proportion in the last sequence block (i.e., block 5) from the proportion in the last random block (i.e., block 6) (see Juhasz et al. 2019 for details). Only correct responses will be considered.

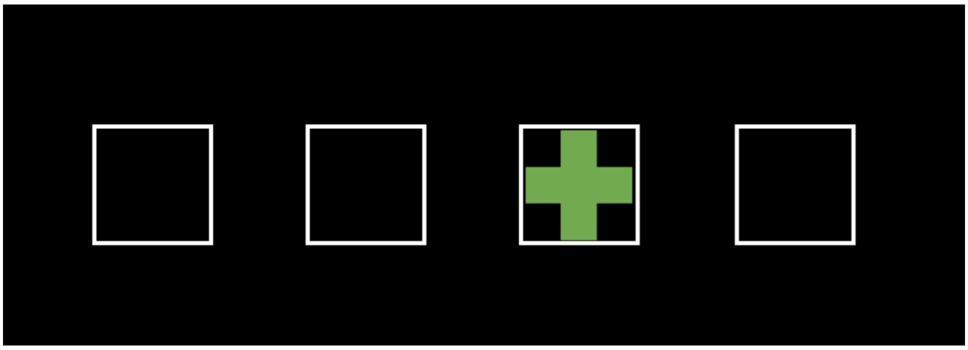

Figure 1. One of the stimuli used in the procedural memory task.

The declarative memory task encompasses two distinct phases, encoding and recognition. The first of these is a "dummy" phase, whose purpose is to expose participants to images that they will later be called upon to remember, but without clueing them in to the fact that their recollection of these images will be tested in the second, recognition phase. In order to avoid cross-cultural biases, the images are all abstract and non-representational, in order to ensure that participants have no prior familiarity with them. In the first, encoding phase, participants are presented with 60 triad tasks, each of which consists of a 'target' image in the top centre of the screen and two horizontally arranged 'foil' images below. Participants are then asked to indicate (via key press on a computer keyboard; keys E and P) which of the two foil images more closely resembles the target. Each foil differs from the target in one out of 5 features: background, colour, number, orientation, or shape (e.g., target: three red circles inside a larger grey circle; foil A: three yellow circles inside a larger grey circle [colour condition]); foil B: one red circle inside a larger grey circle [number condition] (Figure 2A). Each trial consists of a fixation cross (1000 ms), item presentation (timeout: 8000 ms), and a blank screen (1000 ms). The five conditions are counterbalanced with regard to their location on the screen (left vs. right). The encoding phase comprises 50 experimental trials. As there is no objectively correct (vs. incorrect) response, an additional 10 "catch trials," in which one of the two foils is very different from the target, serve to identify participants who do not follow the task instructions (e.g., by always pressing the same key). During the recognition phase, participants are presented with 120 images – half of which were presented as targets during the encoding phase, more specifically the larger images that appeared at the top of the screen (Figure 2B), while the other half were not presented (Figure 2C) –, and are asked to indicate via key press on a keyboard which images they recognize as having seen during the encoding phase. The dependent variable (participants' 'declarative memory score') is their d-prime (d') score in the recognition phase, which will be computed as the z-score of the hit rate (previously presented items correctly identified as having-been-seen) minus the z-score of the false alarm rate (items that were not presented incorrectly judged as having-been-seen).

Participants will be never informed that they are being tested on their memory for triads of objects, with the aim of minimizing the involvement of working memory (see Logan et al. 2002; Takashima et al. 2006, or Craik & Rose 2012 for discussion).

Notice that our declarative memory test is also a nonverbal task. This has some advantages on its own. First, it facilitates more direct and reliable comparisons across speakers of different languages, since words are more culturally dependent, as noted. Second, the control for psycholinguistic properties of the stimuli becomes simplified, since one does not need to consider aspects like frequency or length, as in the case of using words. At the same time, the non-verbal nature of the DecLearn task also entails that what it truly evaluates is episodic memory abilities, since it assesses whether participants can remember if they have encountered a given image during a previous phase of the task. However, for the reasons discussed above, we expect the results in this test to be a reliable proxy for their semantic memory abilities too, even if this ability is understood as the ability to store words in the long term. In fact, there is evidence that the results in the DecLearn task significantly correlate with the results obtained in the CCT test (Jana Reifegerste, personal communication).

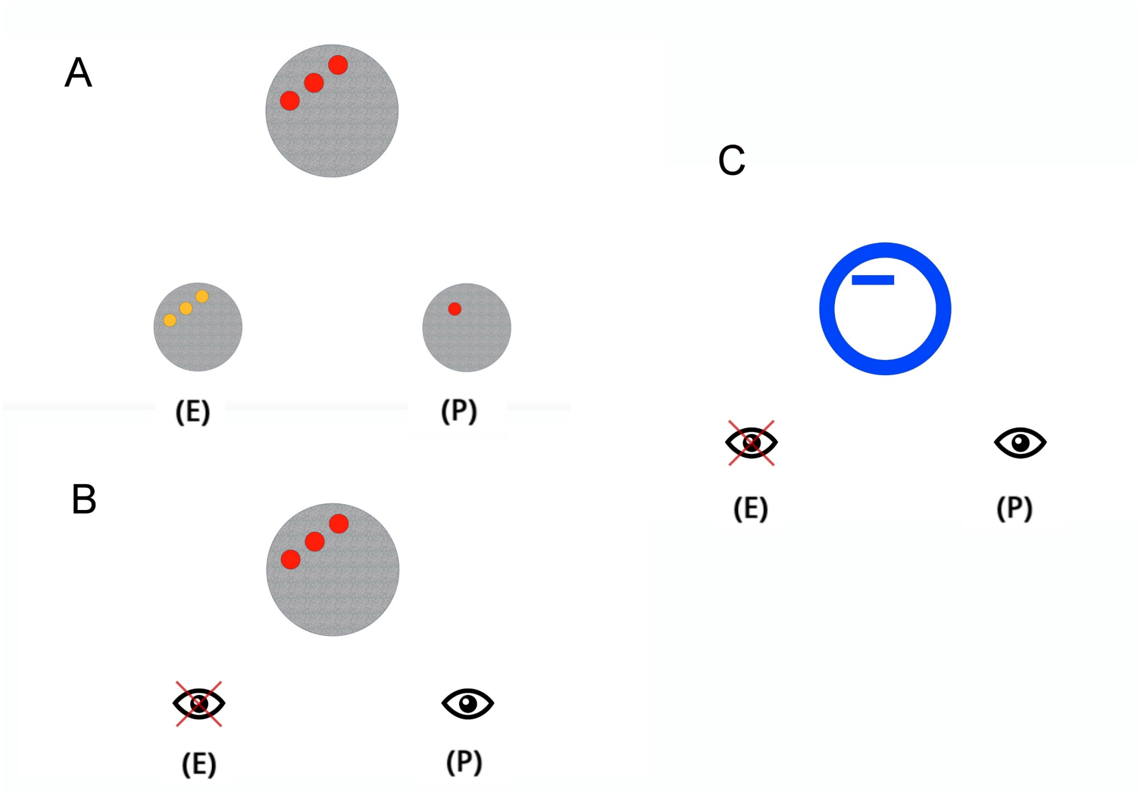

Figure 2. Examples of the stimuli used in the declarative memory task. A) One of the triads encompassing the encoding phase of the task. B) One of the triads in the recognition phase which include items that were seen during the encoding phase. C) One of the triads in the recognition phase which do not include items previously seen during the encoding phase. In all cases, (E) and (P) stand for the keys E and P in the keyboard of the device used for passing the task.

As noted, the distinction between Type X languages and Type S languages, although gross and pending of further confirmation, is expected to have some sort of sociopolitical motivation; moreover, it involves diverse language domains (phonology, morphology, syntax, and the lexicon). In our project we will be focusing on morphology and syntax only. That said, linking Type S languages (and particularly, a rich morphology) to an enhanced declarative memory (or more specifically, to an enhanced semantic memory), and Type X to an enhanced procedural memory (and perhaps to an enhanced episodic memory) might also be a crude simplification. One basic reason is that all these types of memories are needed for processing any aspect of language. For instance, morphology is also rule-dependent, which means that procedural memory is involved in word formation too. Moreover, morphology can also, albeit in rare cases, exhibit recursion, which means that episodic memory is necessary for morphology too. Likewise, recursion involves rules, and rules are stored in the procedural memory. For these reasons, we have also planned to perform a second round of psycholinguistic analyses, aimed to test these memory abilities on groups of 20-40 native speakers of languages with complex morphology + complex syntax vs languages with simple morphology + simple syntax.

Additionally, it is important to bear in mind that these types of memory are “domain-general” in the sense that they underlie multiple cognitive domains. For instance, working on an assembly line typically entails mastering procedural abilities that are expected to be supported by a potentiated procedural memory. Still, this circumstance does not preclude sub-specialization of these memory types for language, as established with evidence from other domains. It is just that other factors external to language need to be properly controlled for matching subject groups in order to obtain conclusions that are informative about language specifically. Incidentally, one could hypothesize that changes in these types of memories in response to factors external to language might favor (or disfavor) Type X or Type S features in the languages spoken by various human groups. Accordingly, if people routinely engage in activities potentiating procedural memory abilities, they could find Type X languages more learnable, thus favoring their distinctive features over Type S features. And vice versa. Finally, we have planned to test speakers of the lowest socioeconomic status, in order to minimize the impact of literacy (and accordingly, the effect of the more exoteric varieties of their native languages), as well as the exposure to widespread Type X languages, like English.

2.3. Contingencies

The potential difficulties and limitations of our planned research do not differ substantially from those experienced by most field studies of minority languages and more specifically, by psycholinguistic research on such languages (see Adamou 2023 for a recent review). One critical point will be testing a suitable number of native speakers of Type S languages, which are spoken in remote places that are often difficult to access.

Also, the necessary facilities for testing speakers might be absent or difficult to provide (laptops, power supply, internet connection, and the like). Additionally, speakers are likely not to be particularly skilled in using most of these facilities, particularly, laptops and online resources, often requiring someone with the needed expertise to supervise the procedure on site. For all these reasons, the experiments will be always run in collaboration with field researchers who are familiar with the local languages. In addition, however, we will also develop online versions of the memory tests to be used for evaluating speakers via massive online calls or through platforms like Amazon Mechanical Turk (MTurk) or Prolific. Even if online tests may prima facie be regarded as more appropriate for speakers of WEIRD languages, currently, speakers of non-WEIRD languages can be found in many big cities in the countries where the languages are spoken. For instance, many speakers of minority Siberian languages (one of the groups we aim to test) live in Novosibirsk. Many of them still retain a good command of their mother tongues and have a reduced knowledge of Russian. Because of sociological and historical reasons, many of them can be (semi)illiterate. With the aid of speakers of their languages who are familiar with modern technologies, like smartphones or laptops (typically, younger people), such speakers can be properly tested using online tasks. Admittedly, this option is worse than testing speakers on site, but it can be good enough in cases where the access to local communities is particularly difficult.

A second critical point concerns the design of the tests. Most psycholinguistic tests are designed for being used with representatives of WEIRD societies, but the involved stimuli and procedures can be strange (or plainly incomprehensible) for speakers of minority, non-WEIRD languages. Cultural effects can be very subtle. The original version of the DecLearn and SRT memory tasks we will be employing made use of images depicting real and imaginary objects that different cultures might be familiar with to different degrees, thereby rendering the results incommensurable. In order to address this particular problem, we will adapt, as noted, both tests by replacing the original images with ones of an abstract, non-representational nature. At first, we decided to adapt the stimuli to the cultural context, but we experienced many problems for properly achieving this (mostly, because any stimuli that came to our minds could be argued to suffer from some kind of cultural bias); since we plan to use our tests with many different cultural groups, we finally decided to keep the stimuli as abstract as possible.

A third, major challenge faced by our research program stems from the fact that a large majority of the world's population today is multilingual and/or multiglossic. Thus, the results that we obtain from the experiment concerning the procedural and declarative memory capabilities of particular participants cannot be linked in straightforward one-to-one fashion to particular languages and their associated grammatical characteristics; instead, it is necessary to take into account the entire linguistic ecology associated with individual participants. This problem is particularly acute in the case of the non-WEIRD Type X languages that are of greatest interest to this project. To cite just one example, hunter-gatherers from the island of Mentawai, off the west coast of Sumatra, in Indonesia, will typically enjoy varying degrees of mastery of — in order of increasing exotericity — the indigenous Mentawai language, the regional lingua franca Minangkabau, the local colloquial koiné variety of Indonesian, and the national language Standard Indonesian. Thus, in order to make sense of our results, we intend to develop a method that will take such linguistic ecologies into account, by assigning appropriate weightings to each constituent language, in order to assign individual participant an overall grammatical and social profile.

Finally, an important limitation of our project is that it largely depends on distinctions (Type X language vs Type S language, exoteric societies vs esoteric societies) that, as discussed in detail in sections 2.1 and 2.2 above, are in need of further confirmation and refinement, as well as on a neurobiological/cognitive hypotheses about language processing that also needs to be fully established. This is why we consider our research as a pilot project, a preliminary exploration of the complex interfaces of linguistic typology, cognitive science, and sociolinguistics.

3. Conclusions

Overall, our project aims to shed light on the typological features, cognitive underpinnings, and sociocultural environments of non-WEIRD languages. More generally, we expect to contribute to current typological studies at the crossroads of classical typology, psycholinguistics, and sociolinguistics. In particular, we expect the project to contribute to ongoing discussions of the effects of the socio-cultural environment on language diversity, the nature of human communicative interactions (with a focus on the impact of the context on verbal structure), the role of different memory types (procedural and declarative) in language processing, and ultimately, the foundations of the typological differences between WEIRD and non-WEIRD languages.

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