

# The Origins of Writing: A Neurolinguistic Perspective on Written Communication

Elena del Pilar Jiménez-Pérez <sup>a</sup>, Pedro García Guirao <sup>b,\*</sup>

<sup>a</sup> University of Málaga, Spain, <sup>b</sup> University of Murcia, Spain

Received September 8, 2023; Revised December 1, 2023; Accepted December 3, 2023

**Abstract.** If homo sapiens, understood as the evolution of the current human being, was characterized by a cerebral advance and a much more evolved communicative capacity than its ancestors, then it is not conceivable that the origin of writing as the maximum exponent of homo sapiens' need for communication did not improve until many thousands of years later. The fact that the first linguistic system perfected and agreed upon by an entire society dates from 3,500 years ago does not prove that this is the origin of writing. Writing, as the origin of the word itself indicates (both in Spanish and English), implies an attempt to communicate in writing and does not require a sophisticated and mature language with a developed grammar, phonetics, or semantics. No matter how rough, clumsy, crude, sparse, scanty, and incomprehensible these early written manifestations may have been, they are samples of writing. Taking into account this starting point, which is not new, the present study suggests a new classification of the origin of writing up to the present day. As long as no more ancient writing endeavors appear, the first attempts at written communication date back to about 40,000 years ago. From then until now, three periods have developed from the linguistic point of view: proto-writing, emergent writing, and maturity. These periods match the cognitive development of human beings with respect to their historical achievements of globalization.

**Keywords:** *origin of writing, classification of writing stages, writing periods, globalization, psycholinguistics.*

**Хіменез-Перез, Елена дел Пілар, Гірао Педро Гарсія. Витоки письма: Нейролінгвістична перспектива писемної комунікації.**

**Анотація.** Якщо homo sapiens, що розуміють як еволюцію сучасної людини, характеризувався розвиненим мозком і набагато розвиненішою комунікативною здатністю, ніж його предки, то неможливо уявити, що походження писемності як максимального вираження потреби homo sapiens у спілкуванні відбулося лише за багато тисячоліть потому. Той факт, що перша мовна система, вдосконалена й узгоджена цілим суспільством, датується 3500 роками тому, не доводить, що це і є час походження письма. Письмо, як вказує саме походження слова (в іспанській і англійській мовах), передбачає спробу спілкування в письмовій формі і не вимагає складної і зрілої мови з розвинутою граматиною, фонетикою чи семантикою. Якими б грубими, незграбними, сирими, рідкісними, скупими і незрозумілими не були ці ранні письмові прояви, вони є зразками писемності. Беручи до уваги цю відправну точку, яка не є новою, це дослідження пропонує нову класифікацію походження писемності до сьогоднішнього дня.

\* Corresponding author. Pedro García Guirao,  <https://orcid.org/0000-0001-6641-508X>,  [pedro.gg@um.es](mailto:pedro.gg@um.es)

© Jiménez-Pérez, Elena del Pilar; Guirao, Pedro García, 2023. This is an Open Access article distributed under the terms and conditions of the Creative Commons Attribution 4.0 International Licence (<http://creativecommons.org/licenses/by/4.0>). East European Journal of Psycholinguistics, 10(2), 33–46. <https://doi.org/10.29038/eejpl.2023.10.2.jim>

Оскільки давніших писемних пам'яток не виявлено, перші спроби писемної комунікації датуються приблизно 40 тис. років тому. Відтоді виокремлюють, із лінгвістичного погляду, три періоди: протописемність, зародження писемності та зрілість. Ці періоди відповідають когнітивному розвитку людини та її історичним досягненням у глобальному вимірі.

*Ключові слова:* походження писемності, класифікація етапів писемності, періоди писемності, глобалізація, психолінгвістика.

## Introduction

From a linguistic point of view, based on archaeological evidence that supports the paleographic perspective of the idea, some experts place the origin of writing in the history of humanity as an event that occurred around 3,500 BC, specifically in Mesopotamia and Egypt (Kramer, 1956; Winter, 1985; Loprieno, 1995; Glassner, 2003; Campos, 2022; Masó, 2023). The origin of writing, however, arouses interests that are rooted in different disciplines. For example, the transition of human societies from purely oral communication to the use of graphic symbols to represent language is a central topic at the intersection of neurolinguistics, archaeology, and anthropology. According to paleoanthropological research, *Homo sapiens* emerged in Africa about 300,000 years ago. The ability to use complex language is thought to have been an important evolutionary milestone, although its exact origin is debated. According to Pinker (1994), universal grammar is “hard-wired” into the human brain, suggesting a neurological basis for our linguistic abilities. Broca’s and Wernicke’s areas of the brain, which are associated with language, show greater complexity in humans than in other primates, according to research by neuroscientists such as Damasio (1994). In this sense, language is an evolutionary adaptation rooted in the structure of our brains (Pinker, 1994). And it is this neurolinguistic adaptation that paved the way for the development of writing. As human communities became more complex –and especially larger– the need to record information arose, leading to primitive accounting systems, for example. Probably even earlier, primordial religious feelings, fears, and manifestations could be written down using symbolism or very basic systems more or less agreed upon by a very small group. In this way, there is the logical possibility, by common sense in the absence of evidence, that the power that some groups could exercise over others and their ability to phagocytize each other popularized these symbologies or basic systems, and that in the simplification of the linguistic economy, the quickest to perform and easiest to understand were kept by pure mnemonics and its consequent linguistic economy. Although writing is ubiquitous today, its invention was a gradual process that evolved from older systems of graphic representation. According to Gelb (1963), writing emerged as an evolution of earlier systems of representation that were primarily countable. These systems were primarily logographic, meaning that each character represented a whole word or idea. Gelb introduced the taxonomy of writing systems, which distinguishes between logograms, syllabograms, and alphabets. Sumerian cuneiform, one of the oldest systems, began primarily as a logographic system and later incorporated syllabic elements. However, before systems such as Sumerian cuneiform

and Egyptian hieroglyphs emerged as complete forms of writing, various forms of graphic symbolism were used.

Von Petzinger (2016) documents prehistoric symbols found in Paleolithic caves and argues that certain recurring signs may have had specific meanings some 40,000 years ago, something also advocated by Schmandt-Besserat (1995), although many linguists do not consider these and later finds to be writing. The relationship between these Paleolithic symbols and true writing has been widely debated, given the evidence that humans have been inclined to represent ideas through graphic symbols for millennia. However, from a strictly linguistic and purist perspective, there are several researchers who disagree, as pointed out in the volume edited by Peter T. Daniels and William Bright, *The World's Writing Systems* (1996), and others such as (Goody, 1987; Schmandt-Bessera, 1992; Houston, 2004; Woods, 2010). Daniels and Bright's volume argues that writing can be defined as a graphic system that allows the reader to retrieve exactly the writer's original message. However, they confuse writing with literacy. These statements imply that signs must represent sounds or words of language in a systematic way. By this definition, although ancient symbols may convey ideas or concepts, they are not "writing" in the linguistic sense until there is a systematic correspondence with spoken language. This development is evident in Maya writing, as Houston (2004) discusses in his research. Maya writing, although logographic at its core, also had syllabic signs and was capable of accurately representing spoken language. In this regard, DeFrancis (1989) argues against the idea of a hierarchy of writing systems. While some earlier conceptions viewed logographic systems as "primitive", DeFrancis argues that systems such as Chinese, which are based on logograms, are equally capable of representing language accurately and systematically, thus challenging the notion that there is an evolutionary "end point" in the development of writing.

While it is true that writing is the basis of written communication and that, in order to fulfill this function, it must be understood by others, it has not been taken into account that the fact that we are unable to decipher certain symbols today does not mean that they were readable at the time they were created. Some interpretations are made from the point of view of presentism, that is, they look with the eyes of the 21st century at the reality of thousands of years ago, specifically of the Paleolithic. Neither has it been considered that the fact that this understanding was only possible in small groups and cannot be considered today as a complex system, a language like the present one, does not detract one iota from its written entity. Thus, in certain current linguistic perspectives, the meaning of writing is confused with that of a complex linguistic system, eliminating the original meaning of the term and thus confusing related but not synonymous realities.

Perhaps it is because writing has developed so much in recent centuries and has become so much a part of human genetics, that the development of humanity cannot be understood without it. As early as the 18th century, Diderot spoke of the importance of writing in preserving human memory. In his concept of written memory, he argued that writing allowed societies to record their past and transmit knowledge to future

generations. An extension of man, according to McLuhan (1964); or the ability to domesticate the spoken word, according to Godoy (1977). It is no longer a simple practical communicative fact, but a form of cultural awareness that transcends the purely linguistic to penetrate the vast reality of the human being, from the scientific and psychological terrain to the more practical, such as the political, cultural, or economic.

## Method

In the present theoretical, comparative, and constructive study, an information search on the origins of writing was carried out in the main databases: *Clarivate* (JCR), *Elsevier* (Scopus), *ResearchGate*, *Google Scholar*, and *Dialnet*. Using key words such as “origin of writing” in both English and Spanish, the references returned by these search engines were thoroughly reviewed.

It is important to note that theories about the origins of writing are not recent; consequently, many of the references are not from the last five years, as is often recommended; this does not mean that the publications are out of date. A similar situation arises when citing the theories of Saussure or Chomsky, which are still relevant, or Gardner or Salovey and Meyer (from the nineties of the last century, but indispensable for the theories of intelligences and psycholinguistic sciences).

## Results and Discussion

In the present theoretical, comparative, and constructive study, an information search on the origins of writing was carried out in the main databases: *Clarivate* (JCR), *Elsevier* (Scopus), *ResearchGate*, *Google Scholar*, and *Dialnet*. Using key words such as “origin of writing” in both English and Spanish, the references returned by these search engines were thoroughly reviewed.

It is important to note that theories about the origins of writing are not recent; consequently, many of the references are not from the last five years, as is often recommended; this does not mean that the publications are out of date. A similar situation arises when citing the theories of Saussure or Chomsky, which are still relevant, or Gardner or Salovey and Meyer (from the nineties of the last century, but indispensable for the theories of intelligences and psycholinguistic sciences).

### **Other origins of writing: a brief pre-historical background to the Iberian Peninsula**

According to the current consensus, so-called prewriting, consisting of symbols and isolated marks, has its first manifestations in the archaeological record since at least 40,000 BC, in sites as diverse as the Blombos Cave in Africa and other European sites such as the Chauvet Cave in France. In this sense, prewriting is linked to prehistory, which would end with the discovery of what is now known as writing. Thus, prewriting

and protowriting converge in time with prehistory and protohistory as they have been conceived in recent decades.

Table 1  
*Major Discoveries about Writing, Arranged Chronologically*

Period	Description	Reference
c. 40,000–10,000 BC	Cave representations found in Europe show symbolic communication. The “Vogelherd Man” shows bone carvings with possible specific meanings	Von Petzinger (2016)
c. 8000–4000 BC	Clay tablets in the Middle East, known as “tokens”, which may represent an accounting system and a precursor to writing	Schmandt-Besserat (1992)
c. 6.600 BC	Clay labels at Jiahu, China, which may be evidence of emergent writing.	Li et al., (2003)
c. 5300 BC	Romanian Tărtăria tablets with scriptural looking	Makkay (1969)
c. 5300–4000 BC	Vinča markings on clay figurines from the Vinča culture of Eastern Europe	Gimbutas (1982)
c. 5000–4000 BC	Marks on ceramics of the Yangshao culture in China, possible early forms of symbolic communication	Liu & Chen (2012)
c. 3500–3200 BC	Sumerian inscriptions considered “proto-writing”, more advanced than simple symbols but not as developed as a full-fledged written language	Englund (2004)
c. 3200 BC	Sumerian cuneiform script, engraved with styli on clay tablets	Charpin (2010)
c. 3200 BC	Hieroglyphs in Egypt, another early writing system	Allen (2014)
c. 2600–1900 BC	Indus Valley script, not yet fully deciphered, shows the diversity and richness of early written traditions.	Parpola (1994)

*Source:* Own elaboration based on references

The study of the first manifestations of writing in the Iberian Peninsula is closely linked to the global evolution of graphic and symbolic communication. One of the most emblematic sites is the caves of Altamira, in Cantabria (Spain), where cave paintings dated to around 15,000 BC show impressive artistic representations of animals and abstract figures. Although these paintings are not “writing” per se, they reveal a

sophisticated level of abstraction and symbolic ability on the part of the prehistoric inhabitants (Pike et al., 2012).

Similarly, artistic representations from a similar period have been found in the Maltravieso cave in Cáceres (Spain), demonstrating the spread of these artistic and symbolic practices throughout the peninsula. However, as in Altamira, although they reveal a symbolic capacity, they are not considered a form of writing (Bahn, 1998).

With the advent of the Neolithic, around 5000 BC, societies became more sedentary and complex. This change in lifestyle was also reflected in their communication systems. In Almeria (Spain), the Los Millares culture was characterized by the production of objects engraved with geometric signs. Although the exact meaning of these signs is still debated, some researchers suggest that they may represent an early form of proto-writing (Harrison, 2004; Chapman, 1990). More recently, stelae have been found, such as the Montoro stela (García Sanjuán et al., 2017), which may date between the 6th and 5th centuries BC. This stela, together with those found in Almadén de la Plata and Mirasiviene (Seville), as well as the revised ones from Almargen (Málaga) and Setefilla (Seville), contain inscriptions that, although enigmatic and not completely deciphered, demonstrate the existence of advanced symbolic systems in present-day Andalusia.

The Iron Age in the peninsula brought with it clearer examples of proto-writing. Stelae found in several places, such as Almadén de la Plata and Setefilla (both in Seville), have inscriptions that, although not completely deciphered, indicate the development of more complex symbolic systems. These inscriptions, possibly related to culture and religion, give us an insight into the evolution of graphic communication in the peninsula (Ruiz & Molinos, 1993).

However, it was not until the arrival of the Phoenicians, a trading people from the eastern Mediterranean, around 800 BC that a more formalized writing system was introduced to the Iberian Peninsula. Although the Phoenicians had their own writing system, over time it was adapted and developed into local scripts such as the Iberian script (Aubet, 2001).

Finally, the historical journey culminates with the Roman conquest in the third century BC, which marked a milestone in the history of writing in the region. Latin, together with its alphabet, was established in a dominant way, laying the foundations for the later development of Romance languages in the peninsula (Keay, 1988), such as Castilian, Catalan or Galician. In this sense, some scholars argue that Andalusian – another unrecognized Romance language- derives directly from Latin and not from Castilian, and that in the area now known as Andalusia, Castilian was never spoken except by the Castilians who went there, so that Andalusian is not a variant of Castilian but a parallel language that has not yet established norms, so that it would be a variety of today's Spanish, but not of Castilian. Although historically there have been attempts to impose Castilian in this area, the imposition has never been effective (Gutier, 2000).

## What Writing Is: From Pre-Writing to Proto-Writing

There is no unanimous consensus in the scholarly community on the concepts of prewriting, protowriting, and writing, and it may vary from discipline to discipline. It can be summarized as follows:

- Pre-writing: It reflects the first manifestations of human graphic representations that have meaning but do not represent a structured language. Examples: Petroglyphs, cave paintings, and other signs carved in various media. Chronology: These manifestations have been found since the Upper Paleolithic, about 40,000 years ago (Clottes, Lewis-Williams, 1998).
- Proto-writing: It represents an intermediate stage between prewriting and writing. Although more structured than prewriting, protowriting does not fully capture a language. Symbols with specific meanings. Chronology: Appears during the Neolithic period, approximately between 8000 and 3000 B.C. (Overmann, 2023; MAN, 2023; Dematte, 2022; Schmandt-Besserat, 1992).
- Writing: It refers to structured graphic systems that can represent language in its entirety. For example, codified systems such as Sumerian cuneiform and Egyptian hieroglyphs. Chronology: They originated around 3200 BC (Robinson, 2007).

Although there are also authors, such as Gorrochategui (1984), who avoid strict definitions and emphasize the progressive, heterogeneous, and conventional nature of the historical development of ancient writing systems (Robinson, 2007).

In this sense, Denise Schmandt-Besserat (1978; 1992) argues that true writing requires a versatile system of abstract signs capable of expressing any idea in a complex way, as opposed to proto-writing composed of fixed pictographic symbols. In his view, the first writing appeared in Sumer around 3500–3000 BC. with the cuneiform script. Thus, Gilman (1991) emphasizes that the ability to record complete speech through linearity distinguishes true alphabetic writing, discarding earlier proto-writings and placing the origin only with the Greek and Phoenician alphabets in 800 BC.

Damerow (2006), for his part, distinguishes between writing systems that serve only to record data and writing itself, which can generate new knowledge through more advanced syntactic structures. According to him, writing also appears in Sumer, but at a later stage, around 3100–3000 BC, with more complex cuneiform texts. However, Woods (2010) avoids precise dates and proposes several categories such as semasiographic, logographic and glottographic scripts. He emphasizes the gradual nature of the development of the true glottographic script, which emerged long after several earlier stages. On the other hand, de Hoz (2011) introduces the concept of “partial writing” to refer to systems such as Luvite, with logographic and phonographic components, and considers them an intermediate stage before the Greek and Phoenician alphabets, which appeared around 1500 BC.

## Writing

In the obsession to atomize the concept of writing, to dissect it to delimit the reality it contains by means of its most sophisticated manifestation, the closest thing to what is

currently conceived as writing is sought. However, it forgets the origin of the word and its essential function, something that is crucial in order to define what it is and thus be able to determine which of the written expressions found so far are writing and which are not. It is not a question of defining writing from the current concept of evolved language, but of recognizing what writing is beyond cultural anchorages and transversal analyses.

The word writing comes from the Latin *scriptūrā* (-ri) – act of writing – which in turn comes from *scribere* –to write. According to the *Dictionary of the Spanish Language of the Royal Spanish Academy* (DRAE), to write, in its first meaning, means “to represent words or ideas with letters or other signs drawn on paper or other surfaces”. It also means “to communicate something to someone in writing” or “to trace the notes and other signs of music”. That is, it also includes ideas and signs that can be used without going into specifications of what kind: something; also writing music, but most importantly, it is the communicative intention. If we rely on English, “to write” comes from Old English *writan* “to mark, outline, draw the figure of”, then “to put in writing” (Class I strong verb; past tense *wrat*, past participle *written*), from Proto-Germanic *writan* “to tear, scratch” (Harper’s Online Etymology Dictionary), probably from the act of scratching a tree to leave a mark of communication, or carving a symbol on a tool to indicate ownership.

Writing, in this sense, as a direct result of writing, does not seek a well-defined semantics or a perfect grammar or a specific phonetics. Writing was, as it is today, the practical result of the desire to communicate beyond orality, either with oneself in order to remember something, or with the rest of the group in order to survive in the environment. This includes the possibility of expressing one’s individualism through emotions, even fears and desires in the face of spirituality. If the first homo (*homo habilis*, with the greatest encephalization to date) appeared on Earth between 2 and 3 million years ago (Leakey, 1979), and *Homo sapiens* – with the greatest brain development and the ability to articulate complex language-, considered the first human (Crespo, 2017), (“Jebel Irhoud” dated to the Paleolithic era, found in Morocco by Jean-Jacques Hublin’s team, is the earliest *Homo sapiens* ever recorded), it becomes very difficult to understand that none of them would have gotten it into their heads to write down what they were talking about until 3,500 years ago. Occam’s razor. Another question is that, from a linguistic point of view, we want to categorize the types of writing according to their complexity or development, as writing is currently conceived, but what we have to differentiate in reality in its origin is the simple drawing, as an artistic manifestation for pure pleasure, from the communicative intention, even if it was crudely ingenious and tremendously restrictive (for a small group, even very small), since globalization did not exist before. The fact of the intention to leave a written record of reality is already writing, and in this sense the symbols carved in the bones of the “Vogelherd Man” (Vogelherdhöhle, Germany) 40 thousand years ago are one of the first manifestations of written communication of which data are available. The fact that no other symbols with the same characteristics have been found, which would imply their consensual use, only means that they have not been found, not that they did not exist. In



fact, if the communicative intention existed (which has already been made clear in the same idiosyncrasy of *Homo sapiens*), there must logically have been more written texts with the same minimum consensus. But since its use was not widespread (let's remember that until the Mesolithic period – about 10 thousand years ago – humans gathered in very small groups and were nomadic), since each small group created its own (probably what worked best were idiolects, isolects and microlects), the possibilities of survival of those written microlects (the lexis of small nomadic groups), throughout the millennia, is practically nil. And the possibility of narrowing them down, comparing them and even translating them, until quantum computers and big data through AI work miracles, is even less likely.

As the origin of writing is conceived, it defines the human being in its origins, the *homo sapiens* (ABC, 2017), in a paradoxical way, to say the least. It argues that he is capable of communicating in a much more sophisticated way than the rest of the hominis with a defined spirituality and yet without knowing how to write. To understand that writing is not writing until it is sufficiently expanded, regulated, and agreed upon – almost exclusively in an official way– in a culture or geographical area, is to continue the beliefs of past centuries in which the end was defended, but not the way. Writing consists in writing intentionally, not in how that graphic/symbolic/conceptual inscription is done, nor in what degree of development/complexity/perfection it is. That is another question.

## Conclusion

Experts cannot be obsessed with finding the earliest example of modern humans and pretend that their cognitive development was so limited that the concept of writing would not have emerged as a simple parallel need in its own context. That evolutionary sophistication has shaped more consensual and widespread communication in the last 5,000 years does not detract from the specificity of written communication in its original DNA. It is the *sine qua non* of human evolution itself. That the development of writing, and therefore reading, as a means of advanced communication is one of the issues that best defines us as a species is undeniable (Jiménez Pérez, 2023). To break the link between *homo sapiens* and one of its main characteristics by means of *antonomasia* does not follow common sense. To argue that writing did not evolve in parallel with *Homo sapiens* is simply irrational. To think that writing is so only in its maturity is to think that childhood is worthless simply because of its lack of perfection. Obviously, from a linguistic point of view, the origin of writing is worthless because of its lack of complexity and its impossibility of analysis due to the immense scarcity of data. Probably never in the history of mankind has written communication been as individualized as in its genesis, which does not invalidate its unity, oscillating between idiolect and microlect. But just as a demographic study provides useful but superficial statistical information without too many whys and wherefores, a case analysis, on the other hand, provides in-depth data that can reveal other types of information of vital

importance (Piaget formulated his hypotheses of human development by observing his daughters, Howard Gardner his theory of MI by studying great figures such as Picasso). Thus, the study of these written manifestations may not reveal a new language, but it may, for example, shed light on the development of the ego from a linguistic perspective at that time.

In other words, one cannot speak of writing as a watertight compartment from a linguistic evolutionary perspective without taking into account the neuroevolution of human beings within their own evolutionary history. Just as one cannot educate human beings in the development of their communicative skills from a single linguistic perspective without considering their neurocognitive, emotional, and physical evolution. Disciplines that do not consider their environment and mediators, such as human historical knowledge, are biased. Paleography, as part of the linguistic knowledge of the origin of writing, must go hand in hand with anthropology and archaeology, among other sciences. Likewise, for a true knowledge of the didactics of writing and reading today, pedagogy, psychology, and medicine are very useful disciplines that complement each other.

From all the above, it is clear that the use of the term pre-writing refers to the beginning of the process of learning to write in a human being, not to a moment in history when the invention of writing as a system of signs is still incipient and immature. And proto-writing, in the aseptic sense of the term, is the first stage within writing (as its own name indicates –from the Greek “*πρωτο- prōto*”, first), not an earlier stage.

Thus, at present, the origin of **writing** could be considered to be about 40,000 years ago, with these bones carved with the symbols of the herdsman, and most likely, as more evidence is found, this date in the history of writing can be pushed back further. That would be the beginning of the **proto-writing** period, which would extend until the next differentiating find collected, the Jiahu clay tags in China, dated approximately 6,600 years ago, and would place a period of **emerging writing** and would include the Tărtăria tablets in Romania, with script-like markings, chronologically placed around 5300 BC. The Vinča marking system on clay figurines of the Vinča culture in Eastern Europe, dated to around 5300–4000 BC. The markings on pottery of the Yangshao culture in China, dated around 5000–4000 BC. And finally, the **mature period**, which would begin with what is now considered writing, from the Sumerian cuneiform script around 3500 BC. and which, in turn, would include the initial period of expansion, in which those who prosper in their culture, generally characterized by political-economic issues, would be maintained and would develop before the discovery of America, the first globalization, and the last, with the total globalization due to the Internet, which completely consolidates the beginning of globalization after the Second World War and the creation of international organizations.

Writing:

1. Proto-writing (about 40 thousand years ago)
2. Emergent writing (about 6.6 thousand years BC)
3. Maturation (about 3.5 thousand years BC)

- a. Initial Expansion (3,500 BC- 1492 AD)
- b. Globalizations:
  - 1. First: Historical Globalization (1492–1945)
  - 2. Second: Political Globalization (1945–1989)
  - 3. Third: Technological Globalization (1989-present)

The dates are taken with the historical references that mark the society from multiple perspectives, but especially to take into account the linguistic and cognitive.

The origin can fluctuate, since it will depend on the ability to continue discovering the history (or prehistory, according to the traditional consensus) of the first written manifestations, but the subsequent historical facts are fixed anchors for a reasoned contextualization of the terms. From the origin of these manifestations to the evidence of the first mature languages used by each specific society (or part of it, the literate one), in which each one develops and accepts its symbolism in an unequivocal and unambiguous way, is the period in which they emerge. They emerge as neurons in search of a synaptic pruning that immortalizes the most accepted ones and denies to oblivion those whose use does not extend to universalizing them in a geographical area or in a specific group, because use is life. Like a kind of linguistic Big Bang, in which each attempt at communication gains importance according to the inertia of its energy when used by homo sapiens. Already in this third phase of maturity, a more political and cultural expansion takes place. Thus, since the world becomes navigable with the discovery of America and the communication of the globe as the first globalization, which defines its specificity by its historical nuance, until after the Second World War, the world begins to unite with the emergence of the United Nations in 1945 and the speed of technology, so that the human being can move by land, sea, and air. Finally, the quantitative leap that has meant for the world not even having to move physically to communicate easily and cheaply with the birth of the www in 1989, the universalized inter-nautical communication, for all, as the third and last important globalization so far (with the permission of the COVID pandemic).

Each of today's languages, always understood as a means of communication rather than as a cultural manifestation, has had a linguistic evolution that has fluctuated according to its environment, but has developed with a certain stability and at a pace that has allowed linguistic evolution to take place in a natural way. However, in recent globalization, which began just before the 21st century with the consolidation of a single global communication through the Internet, where most of the countries of the world are interconnected in real time in one way or another, the communicative use of languages has changed. The communicative use of languages has already become so automated that it has become part of a social DNA that some want to defend at all costs, as if it were an endangered animal, while others use it as a cultural identification that transcends its communicative origin. In any case, the fact that it has moved to a higher level (even beyond the literary manifestations that have always accompanied it as a form of aesthetic communication) implies that the sophistication of writing, in parallel with human

cognitive development, is probably preparing for a new qualitative leap: will we abandon handwriting?

## Disclosure Statement

No potential conflict of interest was reported by the authors.

## References

- Allen, J. P. (2014). *Middle Egyptian: An Introduction to the Language and Culture of Hieroglyphs*. Cambridge University Press. <https://doi.org/10.1017/CBO9781107283930>
- Aubet, M. E. (2001). *The Phoenicians and the West: Politics, Colonies and Trade*. Cambridge University Press.
- Bahn, P. G. (1998). *The Cambridge illustrated history of prehistoric art*. Cambridge University Press.
- Chapman, R. (1990). *Emerging complexity: The later prehistory of south-east Spain, Iberia, and the west Mediterranean*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511735486>
- Charpin, D. (2010). *Reading and Writing in Babylon*. Harvard University Press.
- Clottes, J., & Lewis-Williams, D. (1998). *The Shamans of Prehistory: Trance and Magic in the Painted Caves*. Harry N. Abrams.
- Crespo, C. (2021). ¿Qué homínidos han poblado España a lo largo de la historia? *National Geographic*, <https://www.nationalgeographic.es/historia/que-hominidos-han-habitado-en-espana-a-lo-largo-de-la-historia>
- Damasio, A. R. (1994). *Descartes' Error: Emotion, Reason, and the Human Brain*. Putnam.
- Damerow, P. (2006). The origins of writing and arithmetic. In K. Chemla (Ed.), *History of science, history of text* (pp. 77–136). Springer. [https://doi.org/10.1007/1-4020-2321-9\\_3](https://doi.org/10.1007/1-4020-2321-9_3)
- Daniels, P. T., & Bright, W. (1996). *The world's writing systems*. Oxford University Press.
- DeFrancis, J. (1989). *Visible Speech: The Diverse Oneness of Writing Systems*. University of Hawaii Press.
- De Hoz, J. (2011). *Historia lingüística de la Península Ibérica en la Antigüedad. II. El mundo ibérico prerromano y la indoeuropeización*. Ediciones Universidad Salamanca.
- Dematte, P. (2022). *The origins of Chinese writing*. Oxford University Press.
- Englund, R. K. (2004). Proto-Cuneiform. In S. D. Houston (Ed.), *The First Writing: Script Invention as History and Process* (pp. 70-100). Cambridge University Press.
- García Sanjuán, L., Díaz-Guardamino, M., Wheatley, D. W., Vita Barra, J. P., Lozano Rodríguez, J. A., Rogerio Candellera, M. A., Erbez, Á. J., Barker, D. S., Strutt, K. D., & Casado Ariza, M. (2017). The epigraphic stela of Montoro (Córdoba): The earliest monumental script in Iberia? *Antiquity*, 91(358), 916-932. <https://doi.org/10.15184/aqy.2017.86>
- Gilman, A. (1991). *La escritura pre-alfabética en el Mediterráneo*. Gedisa.
- Gimbutas, M. (1982). Old Europe in the Fifth Millennium B.C.: The European Situation on the Arrival of Indo-Europeans. *UCLA Indo-European Studies*, 1, 1-60.
- Glassner, J.-J. (2003). *The Invention of Cuneiform: Writing in Sumer*. Johns Hopkins University Press.
- Goody, J. (1977). *The Domestication of the Savage Mind*. Cambridge University Press.
- Goody, J. (1987). *The Interface Between the Written and the Oral*. Cambridge University Press.
- Gorrochategui, J. (1984). *Estudio sobre los plomos ibéricos*. Ministerio de Cultura.

- Gutier, T. (2000). *En defensa de la lengua andaluza*. Almuzara.
- Harrison, R. (2004). *Symbols and warriors: Images of the European Bronze Age*. University of Bristol, Institute of Archaeology.
- Houston, S. D. (Ed.). (2004). *The first writing: Script invention as history and process*. Cambridge University Press.
- Jiménez Pérez, E. del P. (2023). Critical thinking VS critical competence: critical reading. *Investigaciones Sobre Lectura*, 18(1), 1-26. <https://doi.org/10.24310/isl.vi18.15839>
- Keay, S. (1988). *Roman Spain*. University of California Press.
- Kramer, S. N. (1956). *History Begins at Sumer*. University of Pennsylvania Press.
- Leakey, M. D. (1979). *Olduvai Gorge: My Search for Early Man*. Harper Collins.
- Leroi-Gourhan, A. (1967). *Las religiones de la prehistoria: Paleolítico*. Ediciones Akal.
- Li, X., Harbottle, G., Zhang, J., & Wang, C. (2003). The earliest writing? Sign use in the seventh millennium BC at Jiahu, Henan Province, China. *Antiquity*, 77(295), 31-44. <https://doi.org/10.1017/S0003598X00061329>
- Liu, L., & Chen, X. (2012). *The Archaeology of China: From the Late Paleolithic to the Early Bronze Age*. Cambridge University Press.
- Loprieno, A. (1995). *Ancient Egyptian: A Linguistic Introduction*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511611865>
- Makkay, J. (1969). *Early Stamp Seals in South-East Europe*. *Archaeologia Hungarica*, Series Minor 21. Akadémiai Kiadó.
- McLuhan, M. (1964). *Understanding Media: The Extensions of Man*. Routledge.
- Michalowski, P. (1994). The origin and development of the cuneiform system of writing. In S. D. Houston (Ed.), *The first writing: Script invention as history and process* (pp. 59-90). Cambridge University Press. <https://doi.org/10.1017/CBO9780511488401.004>
- Millard, A. R., Rollston, C. A., & Bordreuil, P. (2010). *Writing and ancient near eastern society: Papers in honour of Alan R. Millard*. Eisenbrauns.
- Ong, W. J. (1982). *Orality and Literacy: The Technologizing of the Word*. Routledge. <https://doi.org/10.4324/9780203328064>
- Parpola, A. (1994). *Deciphering the Indus Script*. Cambridge University Press.
- Pike, A. W. G., Hoffmann, D. L., García-Diez, M., Pettitt, P. B., Alcolea, J., De Balbín, R., ... & Zilhão, J. (2012). U-series dating of Paleolithic art in 11 caves in Spain. *Science*, 336(6087), 1409-1413. <https://doi.org/10.1126/science.1219957>
- Pinker, S. (1994). *The Language Instinct: How the Mind Creates Language*. Harper Perennial Modern Classics. <https://doi.org/10.1037/e412952005-009>
- Robinson, A. (2007). *The Story of Writing: Alphabets, Hieroglyphs & Pictograms*. Thames & Hudson
- Ruiz, A., & Molinos, M. (1993). *The archaeology of the Iberians*. Cambridge University Press.
- Salvador, A. N. (2023). De la letra en la tumba a la frase en el texto. La recepción en el mundo moderno del doble origen de la escritura en el antiguo Egipto. In *I Jornadas sobre usos y recepción de la historia antigua. El antiguo Egipto como fantasía moderna: a cien años del descubrimiento de la tumba de Tutankhamón*, 1-26.
- Schmandt-Besserat, D. (1978). The earliest precursor of writing. *Scientific American*, 238(6), 50-59. <https://doi.org/10.1038/scientificamerican0678-50>
- Schmandt-Besserat, D. (1992). *Before Writing: From Counting to Cuneiform*. University of Texas Press.
- Von Petzinger, G. (2016). *The first signs: Unlocking the mysteries of the world's oldest symbols*. Atria Books.
- Woods, C. (2010). *Visible language: Inventions of writing in the ancient Middle East and beyond*. Oriental Institute of the University of Chicago.

## Sources

- ABC (2017). La escritura más antigua de Iberia, ¿en la estela de Montoro? Retrieved from [https://www.abc.es/cultura/abci-escritura-mas-antigua-iberia-estela-montoro-201710231034\\_noticia.html](https://www.abc.es/cultura/abci-escritura-mas-antigua-iberia-estela-montoro-201710231034_noticia.html)
- Campos, S. (2022, 5<sup>th</sup> October). ¿Cómo evolucionó y se extendió la escritura? *La Razón*. Retrieved from <https://www.larazon.es/cultura/historia/20220901/lxj4snhp5cofoptycysvripi.html>
- Masó, F. (2023, 22<sup>nd</sup> December). Así se originó la escritura en la antigua Mesopotamia. *National Geographic*. Retrieved from [https://historia.nationalgeographic.com.es/a/asi-se-origino-escritura-antigua-mesopotamia\\_20605](https://historia.nationalgeographic.com.es/a/asi-se-origino-escritura-antigua-mesopotamia_20605)
- Museo Arqueológico Nacional -MAN- (2023). Un gran invento: la escritura. Retrieved from <https://www.man.es/man/exposicion/recorridos-tematicos/tocar-historia/escritura.html>
- Online Etymology Dictionary de Harper (2023). Write. Retrieved from <https://www.etymonline.com/search?q=write>
- Overmann, A. (2023, 21 June). Prehistoric Numbers: What, When, and Why. Talk presented to Sign and Symbol in Comparative Perspective. Retrieved from <https://youtu.be/6d7zlY38Pts>