Anatolian Interactions

Criss-Cross Contacts and Cultural Dynamics
in the First Millennium BCE

edited by Emanuele Pulvirenti

1st millennium Anatolia stores an array of material remains, in the form of artefacts, landmarks, structures and their imageries, standing as evidence of decades of cultural interactions between local peoples and the great powers contending the region. How, when and where were such interactions taking place? These questions have traditionally been answered with the cultural and political *impact* of a major historical actor on the locals. Is it possible, though, to deconstruct the ethnic pre-eminence of some groups over others, and empower Anatolian identity through an understanding of its active reception and appropriation of external stimuli?

This volume tries to investigate this subject, without aiming at an exhaustive treatment. The studies here featured explore a variety of intercultural dynamics across diverse Anatolian historical contexts and communities, by combining different methodological approaches on the ancient evidence: physical monuments, as well as textual monuments and written records, are discussed to determine whether the role played by local kingdoms, single actors, minor groups or imperial dominators can be seen as concurrent in articulating cultural developments in Anatolia.

The result invites to further investigate cultural phenomena of Achaemenid Anatolia, to recover Anatolian agency and to advance the project of writing properly Anatolian history.

Quaderni

18

Anatolian Interactions

Criss-Cross Contacts
and Cultural Dynamics
in the First Millennium BCE

edited by Emanuele Pulvirenti

UNIVERSITÀ
DI TRENTO

TABLE OF CONTENTS

EMANUELE PULVIRENTI

ACKNOWLEDGMENTS

whose unvaried support and unshakable confidence into my ability of fulfilling this project have been inspiring.

All these people who where connected in a virtual context, beyond any precise geographical location, during the workshop, felt as though they could even have been in Anatolia, and surely they moved around Anatolian space and time those two days… On a more intimate note, I would then say that the greatest *Anatolian Interaction* has been the one that brought them together and eventually resulted in publishing this humble, but hopefully very telling, book.

ANATOLIAN INTERACTIONS

Eleonora Selvi

Graeco-Anatolian Pamphylia.
A Social Network Analysis
of Funerary Epigraphy*

1. *Introduction*

1.1. Possibilities for a Computational Approach to Contact
between Ancient Cultures

The purpose of this study is to investigate the application of computer-based Social Network Analysis (SNA) to funerary inscriptions from Hellenistic Aspendos in Pamphylia. In multicultural contexts such as Late Classic and Hellenistic Anatolia, network and relational approaches to linguistic and archaeological materials offer insights into understanding the influence of connectivity and social networks on the socio-cultural development of the region.[1] SNA gives the opportunity to incorporate simultaneously various characteristics of complex artifacts such as funerary inscriptions, ranging from decorative patterns to linguistic features, and to trace patterns of diffusion and contact within the

    [1] Cf. Malkin 2011.

community. By employing such analysis, we can gain a better understanding of how these artifacts were shaped by different traditions and how they reflected the role of the deceased and their families in society.

The application of multi-faceted formal analyses can also help unveil long-standing biases in studies on the ancient world. Despite the recent interest in ethnicity studies among ancient world scholars, our understanding of ethnicities in the ancient – especially Classical – world still heavily relies on language as the primary determinant. However, as suggested by Hall,[2] language was just one of several indicators of ethnicity in the ancient Mediterranean. Moreover, our linguistic categories may not accurately reflect ancient perceptions. Although morphologically Greek, Pamphylian Greek exhibits pronounced phonetic and syntactic features influenced by Anatolian languages,[3] making it challenging for other Hellenophones to recognize it as a Greek dialect.[4] This highlights the limitations of relying mainly on linguistic material to assume the 'Greekness' of the Pamphylian people in the Hellenistic era.[5] To gain a more comprehensive understanding of how the Pamphylian-speaking community represented itself within the Greek Hellenistic world and how individuals negotiated their position within that community through funerary epigraphy, it is essential to bring together the linguistic features of the inscriptions and the characteristics of the script, monument type, dimensions, decorations, and formulae. Formal statistical analyses, such as SNA, serve as a valuable tool to simultaneously analyze and interrelate these diverse data points, enabling the visualization of the resulting network of connections within the community and revealing significant patterns and similarities.

---

[2] Hall 1995.

[3] Dardano 2006, Skelton 2017.

[4] Selvi *forthcoming*.

[5] E.g., Keen 2002, Grainger 2009.

1.2. The Dataset: Pamphylian Hellenistic Funerary Inscriptions

Pamphylia offers a unique context for exploring interactions between different cultures and people, as its own culture and language emerged from the integration of various Greek groups into the native Anatolian society. When discussing 'Pamphylian' funerary inscriptions, we primarily refer to approximately three hundred inscribed funerary stelae from the villages of Çamilköy and Belkis, which were built upon the Hellenistic necropolises of the nearby Pamphylian city of Aspendos.[6] These inscriptions, paleographically dated from the 3rd to the 1st century BCE (as per *DGP*), exhibit a remarkable overall continuity in terms of their general appearance and layout, indicating the existence of a distinct epigraphic culture. However, they also display various combinations of different features, which will be discussed in sections §2.1-6.

1.3. Social Network Analysis (SNA): Possibilities and Drawbacks

Social Network Analysis (SNA) focuses on understanding the relationships between individuals or entities within a social system and how those relationships influence the system's behavior and outcomes. This analytical method, along with network modeling for historical studies, has been successfully introduced in archaeology over the past decade, as demonstrated by studies conducted by Brughmans and Knappett,[7] among others.[8] In our case, SNA traces patterns of interaction and reciprocal influence among archaeological, linguistic, epigraphic, and paleographical features (see *Tab. 1*). The resulting SNA graph consists of 'nodes' (in our case, inscriptions) connected by 'edges' (relational ties). It

---

[6] Tekoğlu - Köse 2017.
[7] Brughmans 2010, 2013; Knappett 2013.
[8] See Mills 2017.

describes the communication structure, the position of individuals, and how each individual contributes to the overall structure. No single feature is sufficient to determine the position of individuals within the graph; rather, their placement results from the combination of all features considered and the interactions among also the *other* nodes. Carrying out SNA on ancient artifacts can be challenging, as our databases often lack important information. We do not have complete databases of the objects under investigation. Many of them are fragmentary, deteriorated, or found outside their original context. This leads to a significant amount of missing information, which can impact on the final representation of the graph. Therefore, we must always consider a margin of error. One way to reduce this margin of error is to work with a dataset composed of items selected based on their completeness. This approach may exclude a considerable number of available documents, thereby increasing the margin of error in the validity of the statistical results for the entire dataset. Nevertheless, by drawing our dataset from objects that exhibit a high degree of overall homogeneity, we can minimize the risks associated with extending the statistical results to draw general conclusions. As mentioned earlier (§1.2), Pamphylian funerary inscriptions generally display a significant degree of overall homogeneity, which justifies the adoption of this approach. The inscriptions featured in the graph are selected from *DGP* 48-103, epitaphs from Aspendos. However, it is important to interpret this work as a preliminary model given the limited sample size.

In this study, the weight of the edges was determined as follows: each inscription was assigned as a row-input in a table, with the column-input containing all the features discussed in section 1.4. If a feature between two nodes (i.e., inscriptions) matches, the weight of the corresponding edge is increased by 1. For example, if two inscriptions have the same dimensions and display identical pediment decorations, without sharing any other features, the resulting edge will have a weight of 2. Since we cannot establish a priori the direct influence of one inscription

on another, all the edges are undirected, meaning that the ties be-tween the nodes do not presuppose an exchange of features with a determined direction.

2. *Inscriptions' Features in the Table*

Tab. 1 - Features considered in the graph.

ONOMASTIC max total score: 4 points.	Name. Variants of the same name in different dialects match each other. e.g., Φορδίσις / Ἀφορδισίυ	Members of compounds. e.g., Ἀριστο-πολίς / Κυδρο-πόλις	PN typology according to the referent. Theophoric names, names referring to physical features, names referring to animals, etc.	Linguistic Root. Greek, Anatolian, mixed, Egyptian, Persian, etc.
LINGUISTIC FEATURES max total score: 3 points.	Epichoric dialectal features e.g., Pamph. gen. -αυ	Generic non-Attic/Ionic dialectal features e.g., /a/ for koine /ē/		Koine features e.g., -ου gen. instead of Pamph. -αυ
ALPHABET max total score: 3 points.	Epichoric letters/ writing conventions e.g., И, Т, -II-, etc.	Non-Ionic/Milesian general features e.g., <o> for /ō/		Ionic-Milesian features e.g., ω, η, ου for /ū/, etc.
FORMULAE AND ATTRIBUTES max total score: 3 points.	Presence of *formulae* and attributes	Type of *formulae* e.g., attributes referring to familiar ties ('wife of'), attributes to roles in society ('priest of Zeus'), etc.		Specific words e.g., γυνὰ, Ἰαρεῖϝους, etc.
FUNERARY MONUMENT (STELE) max total score: 3 points.	Type Simple, with simple mouldings, with pediment and acroteria, etc.	Dimensions Height, width, thickness		Words layout and dimensions Height of letters and their placement onto the epigraphic surface
DECORATIONS max total score: 3 points.	Presence of decoration	Decoration type entire scenes, rosettes and acroteria, simple mouldings, etc.		Decoration placement on the pediment, on the base, in the middle, etc.

2.1. Onomastics

Pamphylian onomastics, as noted by Brixhe and Dardano,[9] exhibits a combination of Greek and Anatolian roots, along with a small number of names with other linguistic origins, such as Egyptian or Persian. Interestingly, even within the same family, funerary monuments can display personal names (henceforth PNs) of different linguistic origins. Based on linguistic features, most PNs found in Hellenistic inscriptions from Pamphylia can be categorized into three main groups (cf. *Tab. 2*). The first two groups consist of PNs built from Anatolian and Greek roots, respectively. The third group, according to Dardano (2012), includes PNs that combine both Greek and Anatolian roots, as well as those considered 'double-entry', which can be interpreted as either Greek or Anatolian depending on the linguistic and social context. Additionally, PNs can be considered 'mixed' if the etymology of each component can be traced back to a different language or, even if their linguistic origin is singular, if there is a high likelihood that they were reanalyzed as mixed. For instance, the name Κυδρόπολις (*DGP* 144, 218, etc.) is likely a variant of Κυδρομολις (*DGP* 31). According to Brixhe (*DGP* p. 214), the latter is a compound of Luwian *kudra-* (also found in Lician as *χudre*) and Luwian *muμa-*, both commonly used in Anatolian onomastics. The form Κυδρόπολις represents a reanalysis of the compound, where the Greek word πόλις, widely used as the second element in compounded PNs among Greek speakers, was recognized and easily adopted and spread.[10] Moreover, whenever the linguistic origin is uncertain beyond reasonable speculation, it will be labeled as 'mixed', as we lack information to determine how it would have been perceived by Pamphylian speakers. The speakers' perception is indeed a very important factor to be

---

[9] Brixhe 1999; Dardano 2012.

[10] The LPGN database counts 76 PNs with -πολις as second member, for a total of 118 attestations. Other Pamphylian examples of -πόλις PNs are Ἀριστοπόλις (*DGP* 103), Θεόπολις (*DGP* 110), Νεόπολις (*DGP* 101), etc.

taken into consideration, as, unlike in most alive European lan-
guages, in the onomastic culture of ancient Greece PNs had to
retain a clear meaning, which was often reconstructed or re-given
whenever the original one had been lost.[11]A fourth group could be
added, considering both cultural aspects and linguistic features.
Theophoric PNs were popular in Pamphylia, as in the broader
Greek-speaking region.[12] However, in multicultural contexts like
Pamphylia, theophoric PNs can reveal even more intriguing phe-
nomena. Syncretic cults that combine elements from both origi-
nating cultures often emerged, representing unique cults specific
to the area and embodying the regional culture. One notable
example is the Pamphylian cult of Artemis Pergaia/*Wanassa
Preiia*, which originated as a syncretic cult and later became a
symbol of Pamphylian culture and its most prominent city in the
Hellenistic period, Perge. This illustrates how cultural syncretism
played a significant role in shaping the religious landscape and
identity of Pamphylia. The epichoric Anatolian goddess of the
city was associated with the Greek goddess Artemis. Similar pro-
cesses were at the base of the cults of Aphrodite Kastnienidis
and Sidetan Athena.[13] It would be wrong, therefore, to consider
theophoric PNs as perfectly matching in meaning their linguistic
origins: a Αθανάδωρος in Pamphylia would point to different
cultural meanings in respect to an Αθηναδωρος in contemporary
Athens. For such reasons, theophoric PNs can be classified as a
class on their own. The edge weight between each inscription
in the onomastic section will be calculated by considering the
specific characteristics of the names. In many cases, the PNs will
only share a few of these characteristics. For instance, the score
between Ἀφορδίσιυς and Πελάδορυς would be 2, as they have
the same linguistic origin (Greek) and refer both to theonyms.

---

[11] Cf. Morpurgo Davies 2000, 15-39.

[12] On theophoric PNs in Greek onomastics, see Parker 2000.

[13] On Artemis Pergaia and more Pamphylian cults, see Dağlı Dinçer 2020.

Tab. 2 - Pamphylian personal names.

ANATOLIAN	Attested in other Anatolian languages. Ex. Λυρμαπίας (*DGP* 206) < theonym + *pija* (prob. part. Hitt. *pai-* /CLuv. *pi(j)a*, Hluw. *pa(i)-*, 'to give'; Πυναμουας (*DGP* 66) < cfr. Hitt. *Pu-na-mu-ụa-ti*, NH Hr. 1050; Τροκονδας (*DGP* 259) < Hitt./Luv. Storm-god Tarḫunz.
	Attested only in Pamphylian onomastics. E.g., Μουριζος (*DGP* 73); ΜαγασιΤϝαυ (*DGP* 65).
GREEK	Koine phonetics and lexicon. E.g., Ἔυτυχος (*DGP* 112); Τέχνω (*DGP* 235); Ἀσπάσεις (*DGP* 267).
	Dialectal phonetics and lexicon. E.g., Ἀπελάυρυνις (*DGP* 56); Φόρδισιυ (*DGP* 123); Πελδᾶς (*DGP* 140).
MIXED AND DOUBLE-ENTRY	Mixed (or probably reanalyzed as mixed): Κυδρόπολις (*DGP* 144, 218, etc.) Luv. *kudra-*, Lic. *χudre-* + gr. πολις; Οροφατιρας (*DGP* 21) Hitt./Luv. *ura-* 'big' and Greek patronymic –ιδας in its Pamphylian form, –ιρας; Ἐπιμούνας (*DGP* 271) Gr. ἐπὶ + Hitt./Luv. *muụa*.
	Double-entry. Ορουμνεύς (n. 116, 90 etc.) / Ερυμνεύς (273, etc.). Name of the Pisidian city Ορυμνα + suffix gr. –εύς. Felt close to ἐρυμνός, -ή, -όν 'strong, defended, stable'; Μαλης (n. 119) Hitt. *Malli* NH Nr. 726, etc. / gr. Μαλός, -ή, -όν 'white'.
THEOPHORIC PNs	Ἀφορδίσιυς, Φορδίσιυς, etc. < Aphroditis Kastnienidis, Greek-Anatolian goddess; Πελάδορυς, Ἀπελάδορυς, etc. < Apollo, Artemis brother and popular deity in Pamphylia, also present in Sidetic inscriptions; Ἔρμα/ο-names Ἑρμογένης, Ἑρμόδαμος, Ἑρμόδορος, etc. Ερμαπίας, Ερμενεννης, Ερμαπις, etc. (cf. Hitt./Luv. *Arma*, *Armamalli*, *Armadatta*, *Armanani*, *Armaziti*, etc.) Greek names from Ἑρμες ≈ Anatolian names from *Arma*, 'moon' et 'Moon-god'; Ϝαναξ- names Ϝαναξίϝω, Ϝαναξάδρου, ιαναξιμοῦτους, etc. Connected with the name of the Pamphylian goddess ΙανάΤας Πρειας (Lady of Perge): Greek Radical ϝαϝακ- in the fem. form (cf. Myc. Dat. Pl. *Wa-na-so-i*) ≈ Luv. *ụanatt-*, 'Lady'. Syncrethism of the name and of the goddess (= Artemis).
OTHER LINGUISTIC ORIGINS	E.g., Σεραπίϝω (Egyptian, *DGP* 74).

2.2. LINGUISTIC FEATURES

Even in short texts like Pamphylian funerary inscriptions, there is a notable range of combinations between dialectal features and koine elements. Some PNs exhibit distinct local dialectal features that are easily recognizable (e.g., the Pamphylian mascu-

line genitive singular -αυ or -ιυ).[14] In other cases, the prominent local traits are omitted, while features commonly found in other dialects, particularly Doric, are retained (e.g., Δαμάτριος instead of the koine form Δημήτριος). Lastly, certain PNs appear to completely conform to koine, diverging noticeably from the corresponding local name (e.g., Θαναδόρυ and Ἀθηναδώρου) or are otherwise unattested. In these instances, the contribution of linguistic features to the overall weight of the edge will be calculated based on binary possibilities, as demonstrated in the example in *Tab. 3*.[15]

Tab. 3 - Edge's weight calculation.

EXAMPLE	SHOWS EPICHORIC DIALECTAL TRAITS	SHOWS GENERAL NON-KOINE TRAITS	SHOWS SPECIFIC KOINE TRAITS
DGP 22, Δαμάτριυς Ἀρτιμιδόρ[υ]	Yes (e.g., -ιυς ending, Ἀρτιμιδ- instead of koine Ἀρτεμιδ-)	Yes (e.g., Δαμάτ- instead of Δημήτ-)	No
DGP 213, Δαμάτρεις Δαματρίου.	No	Yes (e.g., Δαμάτ- instead of Δημήτ-)	Yes (e.g., -ου ms. gen.)
	0	1	0
	Total weight of the linguistic part of the edge = 1.		

2.3. ALPHABET TYPE

Although Pamphylian funerary monuments are all dated to the Hellenistic period, they show quite a noticeable number of fluctuations among the employed alphabet and writing conventions.

---

[14] For the epichoric dialectal traits of Pamphylian Greek, the reference text is *DGP* pp. 12-146. See also Panayotou 2007.

[15] Koineization is indeed a much more complex and less linear phenomenon, as argued, among others, by Colvin 2014, Striano 2018, Bubenik 2018 etc. However, for the sake of providing binary correspondences in the graph, linguistic features which are not expected in Pamphylian (according mainly to *DGP*) and are present in the koine will be counted as 'koine features'.

The epichoric Pamphylian Greek alphabet had started to undergo a standardization process with the beginning of the Hellenistic period due to the homogenizing pressure of the Ionic-Milesian alphabet, however, such 'koineization' spread unevenly.[16] Private inscriptions retained some features of the epichoric alphabet in different degrees, as well as dialectal features. Once again, the alphabetic features can be divided into three classes: 1) features shown exclusively by the Pamphylian alphabet, such as the two digammas (<И>, <F>), the so-called 'Pamphylian sampi' (here represented with <T>) and some writing habits, e.g., <υ> in hiatus; 2) common non-Ionic Milesian features, e.g., <o> for /ō/ etc.; 3) markers of the Ionic-Milesian alphabet, such as <ω> for /ō/, <ου> for ū etc., although obviously the presence of such possibilities is determined by the phonetic reality of the PNs. The weight for the alphabetic part of the edge will be calculated matching yes/no answers to these three possibilities, as in case 2.2.

2.4. FORMULAE AND ATTRIBUTES

Some inscriptions are characterized by the presence of formulae and attributes. Most of them refer to familiar ties or roles in the society, such as γυνὰ, 'wife (of)', Ἰαρεῖϝους, 'priest', etc. In this case, a point will be attributed to the weight of the edge if the two inscriptions match in 1) displaying a formula or attribute, 2) having either a familiar attribute or a professional role, 3) using the same formula or attribute.

2.5. MONUMENT

Although all Pamphylian funerary monuments consist of stone *stelai*, they exhibit notable variations in dimensions. To construct a comprehensive graph, four potential ranges have been established for each dimension, namely: height (>55 cm, 45-55 cm, 35-45 cm, <35 cm), width (>30 cm, 25-30 cm, 20-25 cm, <20 cm),

---

[16] Selvi 2023.

and thickness (>15 cm, 10-15 cm, 5-10 cm, <5 cm). Moreover, these stelae appear in various shapes, predominantly as simple parallelepipeds or parallelepipeds adorned with a triangular pediment, or slightly tapered towards the top. The dimensions of the inscribed letters also exhibit variation, spanning from a minimum of 0.8 cm to 3 cm. A point will be assigned if the two examined inscriptions align in terms of: 1) dimensions, 2) stelae type, and 3) letter dimensions.

2.6. DECORATIONS

While some epitaphs are inscribed on a simple stone *stele*, some others display various decorations, mostly ranging from simple mouldings on the base, top and middle of the inscribed stele, sometimes with a ribbon in the middle (e.g., *DGP* 60), to a triangular pediment, often enriched with rosettes and acroteria (e.g., *DGP* 91), to, in some cases, the depiction of entire funerary scenes in *bas-relief* (e.g., *DGP* 243). A point will be assigned whenever the two considered inscriptions match in 1) having some kind of decoration; 2) the decoration type (mouldings, rosettes, scenes, ribbons); 3) placement of the decoration.

3. *The Graph*

3.1. OVERALL CHARACTERISTICS

The graph (*Fig. 1*) is obtained by combining the weights of the edges between each object through the program *Gephi*. The graph is non-oriented, as the edges are undirected. It is spatialized through the layout *Force Atlas 2* with *LinLog* mode.[17] In the

---

[17] LinLog mode is a layout algorithm used for spatializing or arranging nodes in a network visualization. The LinLog mode balances attractive forces (Lin) and repulsive forces (Log) to achieve an optimal arrangement of nodes. Such a layout was implemented to emphasize the differences among the different communities of nodes.

Fig. 1 - The graph.

graph, 53 nodes are featured, for a total of 1377 edges. The high number of edges indicates a dense and interconnected network. The 'compactness' of the graph is indeed expressed by the metric *Average degree*, which measures 51,962, indicating a near-complete connectivity where most nodes are directly linked.[18] On average, each node is connected to approximately 52 other nodes, that is to say, all the other ones, while on average each node has connections with a total weight of approximately 493.434. Such metrics are confirmed by the value 0.99 of *graph density*. Some of the features are widely shared among the inscriptions. Almost all inscriptions contain at least one Greek name, and there is quite a consistency across the dataset in material parameters such as

---

[18] The average degree of an undirected graph is the sum of the degrees of all its nodes divided by the number of nodes in the graph. A higher average degree is also a good predictor of the robustness of the graph, i.e., its reliability (see Martin - Niemeyer 2021).

decorations and dimensions. The periphery of the graph is made up of slightly less connected nodes, distributed quite evenly around a highly interconnected center. Even at a first glance, it is apparent that there is a specific set of widely shared characteristics which individuate a core of features specific to Pamphylian funerary epigraphy. The closeness and the continuity of the community is therefore statistically proved, even though the inscriptions in the graph span more than two centuries.

3.2. Graph Analysis: Linguistic Origins of PNs

This graph (*Fig. 2*) depicts the inscriptions according to the different linguistic roots of personal names. The graph shows that groups with distinct combinations of linguistic roots tend to
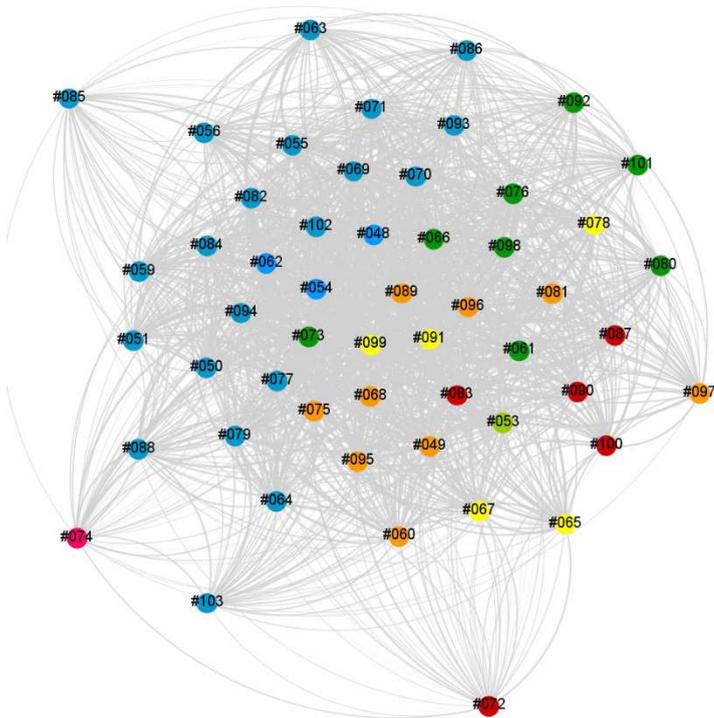

Fig. 2 - Inscriptions according to the linguistic origins of the PNs.

cluster together, suggesting that this characteristic is important in predicting the position of each inscription. The inscriptions are categorized based on the presence of Greek PNs (light blue), linguistically mixed families (yellow, dark and light green, and orange), and completely Anatolian families (red). Greek-only families are located towards the left side of the graph, while linguistically mixed and Anatolian families tend to occupy the right side. The graph is therefore clearly divided on a vertical axis. The center of the graph, representing the most prototypical objects, is shared by linguistically mixed and Greek families. No linguistically mixed inscription is found at the far edges of the graph. These spots are occupied by exclusively Greek, Egyptian, and Anatolian families. The linguistically mixed families in the graph are loosely arranged based on the relationship between individuals with Greek and Anatolian names. This observation is interesting because it suggests that this arrangement depends on other parameters, not explicitly provided in this section of the spreadsheet. The same goes for inscriptions with Anatolian or epichoric only families, pushed onto the right edge of the graph (e.g., *DGP* 72, Νης Βᾶτος; *DGP* 100, Κεδας Συκαρυ).[19] Specifically, inscriptions in dark green feature deceased individuals with Anatolian or mixed/double entry names and their fathers with linguistically Greek names. For example, *DGP* 98, which reads Μάνις Δ[ι]ϝονυσίιυ, shows a father bearing a theophoric Greek name (from Dionysus) and his son with a typical Anatolian/Pamphylian name.[20] The distinctive regional characteristics of such inscription are readily identifiable through both alphabetic

---

[19] In *DGP* 72, both PNs are Anatolian Lall names, while *DGP* 100's Κεδας is a specific Pamphylian/Anatolian name (found only four times in Aspendos), for which Brixhe (*DGP* p. 256) reconstructs a radical *kend-/kand-*, also to be found in *DGP* 68 (etc.) Κεδαιϝιου, and in Lycian Κενδηϐης, Κενθηϐης, Κενδαιϐης and Cilician Κενδεϐης (Brixhe 1966, 658).

[20] According to the *LPGN* database, Μάνις occurs exclusively in this region of Anatolia: twelve times in Aspendos, eight on amphora stamps from broader Pamphylia and three in Cilicia.

and linguistic features, as it exhibits the usage of digamma in the father's name and the Pamphylian genitive ending -ίυ. In contrast, the orange-colored inscriptions present an inverse scenario, exemplified by *DGP* 68, Ἀρτιμιδώρας Κεδαιϝιου, where a father with an Anatolian name bestows a clearly Greek name upon his daughter.[21] Furthermore, these inscriptions also display the presence of the koine genitive ending -ου and markers of the Ionic-Milesian alphabet <Ω>. However, theophoric names associated with Artemis may hold a deeper regional significance for the community, as the cult of Artemis Pergaia likely involved a syncretic fusion with the local goddesses of the Pamphylian cities. Lastly, yellow inscriptions represent unions of mixed couples or other relationships. For instance, *DGP* 65 features a husband with a Greek-sounding name, Θάσους son of Στρατοκλῖτους (in the genitive case), and his wife, who bears a typical Anatolian Lall name, Να daughter of ΜαγασιϜαυ (in the Pamphylian genitive -αυ), clearly indicating Anatolian linguistic origins. Although some overlap exists, the orange and dark green groups exhibit the most distinct features, while the yellow group tends to share more similarities with the orange group.

By examining the distribution of theophoric personal names (PNs) and mixed PNs, as depicted in *Fig. 3* (represented by blue and enlarged dots respectively, with potential combinations between the two), the significance of these PN categories within Pamphylian onomastic culture becomes visually evident. Theophoric PNs are present in 54.72% of the inscriptions analyzed, while mixed PNs account for 30.2%, collectively making up 84.92% of the total count. To facilitate the interpretation of the graph, the remaining inscriptions are displayed in grey. As anticipated, mixed families exhibit the highest percentage of mixed or dual-entry names. However, it is noteworthy that a significant number of linguistically exclusively Greek families also bear theophoric PNs. Depending on the associated deity, these names

---

[21] See note 19.

Fig. 3 - Inscriptions featuring theophoric and mixed PNs.

Fig. 4 - Distribution of theophoric PNs:
Aphrodite (pink), Apollo (yellow), Artemis (green), Athena (gray),
Demeter (red), Dionysus (purple), Hermes (light blue),
Paiawan? (light yellow), *Wanassa* (dark blue).

may not be perceived as distinctly 'Greek' in comparison to other types of personal names, such as typical Macedonian ones (e.g., genitive Ἀλεξαδρου in *DGP* 74, albeit in its 'Pamphylianized' version without the nasal sound before the dental, or genitive Λιμνα[ίου] in *DGP* 78), functioning instead as a potential onomastic 'middle ground'. In *Fig. 4*, we observe the distribution of inscriptions based on the deities to whom the PNs are dedicated. The majority of PNs are devoted to Artemis (green) and her brother Apollo (yellow), who are the principal deities of Pamphylia. PNs associated with Apollo primarily belong to the 'Greek' side of the graph, whereas PNs linked to Artemis are positioned in the central region and can be found in both linguistically Greek families and mixed families. This pattern becomes even more pronounced when considering PNs constructed with the stem *wanak-*, which are connected to the local name of the goddess of Perge, Ιανάῖας Πρειιας, or that of Aspendos, Ιανάῖας ἄκρου.[22] Artemis-inspired PNs are also frequently encountered in families that include other theophoric PNs, such as *DGP* 73 (featuring a *wanak-* name, Ϝαναξάδρου), 69 (Δαμάτρι[υς]), 62 (Ἑ]ρμόπολις), and so on, further supporting the notion of a significant and specific cultural significance associated with certain theophoric PNs.
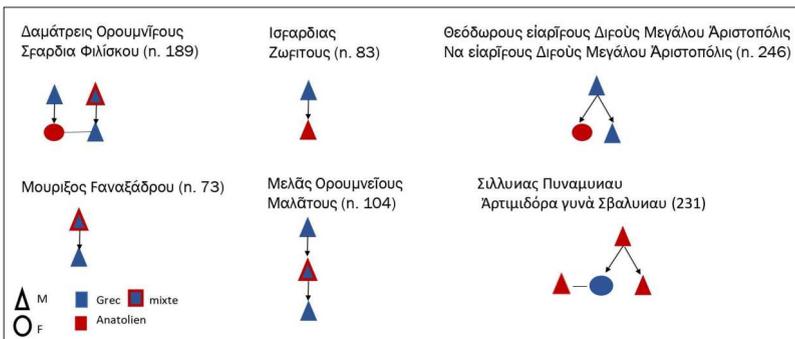
Scholars such as Skelton[23] have interpreted the compresence of Anatolian and Greek PNs among members of the same families as a proof of intercultural marriages between the Greek-speaking community – making no distinctions, as many do, between the Pamphylian Greek-speaking community and the koine Greek-speaking

---

[22] Conversely, Apollo-inspired names appear in the area of 'mixed families' only in conjunction with other theophoric PNs, as seen in examples such as *DGP* 99 (Ἀρτεμω Μάνειτους. Ἀρτιμεισία Πελωνίου. Μάνις Φιράραυ. Ἀρτεμεί[ς]) or, possibly, under the epithet Παιάϝας (*DGP* 66, 91), which is also found at Xanthos on the Lycian sarcophagus of Paiawas (TL 40a, 4th cent. BCE). However, the interpretation as a divine epithet of Παιάϝας and Παίονος is debated, cf. *DGP* pp. 235, 251. In the first case, it could be an epichoric name (as suggested also by the Lycian attestation), in the second, an ethnic.

[23] Skelton 2017.

one – and the few Anatolian families which had been able to inte-
grate themselves in the Greek *poleis*. Although such a case is well
documented, for example in Greek-Carian communities,[24] such an
argument, based only on the PNs linguistic origins, must be care-
fully analyzed. The composition of many families, in fact, seems
to point to a more complex interaction between the linguistic ori-
gins of PNs and ethnicity claims (cf. *Fig. 5*).

Fig. 5 - Greek and Anatolian personal names
in some Pamphylian families.

3.3. Graph Analysis: Linguistic Features

Fig. 5 presents the distribution of linguistic features in Pam-
phylian inscriptions. Dark blue inscriptions display a notable
presence of dialectal linguistic features, showing minimal or no
influence from koine, as seen in *DGP* 70 (Δϝιγένεις Δαματρίιυ).
Inscriptions in azure color represent a combination of dialec-
tal and koine features, as exemplified by *DGP* 96 (Κορϝαλείνα
Κουναυ Αἐκαλείτου. Κορϝαλίς, Ορομνεὺς Ϝαναξάδρου). On the
other hand, inscriptions marked in lighter sky-blue predominant-
ly exhibit koine linguistic traits, such as *DGP* 79 (Ἀρτεμίδωρος
Σόφωνος. Φιλᾶς Ἀρτιμιδώρου). Upon observing the graph, it be-
comes evident that the distribution of linguistic features does not
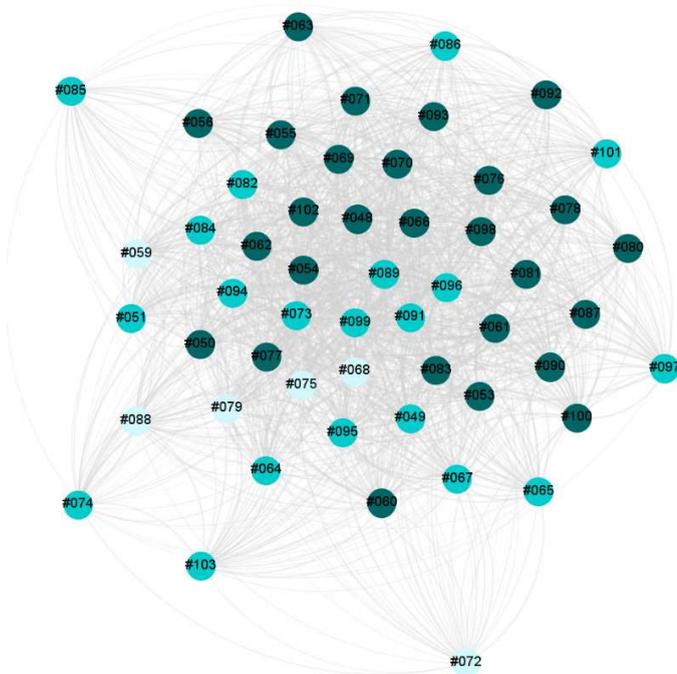
---

[24] See De Luca 2022, 192-208.

Fig. 6 - Inscriptions according to the
prevalence of koine and dialectal features.

align with the linguistic origin of the personal names. In other
words, inscriptions with mixed or Anatolian personal names do
not necessarily have a noticeably higher likelihood of being more
dialectal compared to families with solely Greek personal names.
There is a clustering effect of linguistic features independent of
the linguistic origin of the PNs. While a combination of dialectal
and koine traits allows inscriptions to occupy the central region
of the graph, a stronger influence of koine pushes inscriptions
towards the southwestern edge.

The trend observed in the distribution of inscriptions based on
linguistic features could help explain the distribution of 'mixed'
families observed in §3.2. It suggests that families where a fa-
ther with an epichoric personal name gives a Greek-sounding

name to his son or daughter are more likely to exhibit linguistic influence from koine. For instance, in *DGP* 49, we can identify a probable couple. The man, Ὀψαγένεις, and his father, Θαναδώρου (koine genitive -ου), have compound names that are clearly Greek-sounding and easily understood. The wife bears a transparent personal name derived from the Greek word μύρμηξ, meaning 'ant', which was commonly used as a personal name during the Classical and Hellenistic periods across the Greek world, particularly in Athens, and in Anatolia, in cities like Miletus and Smyrna. On the other hand, her father, Ζώϝειτους (genitive), carries a 'mixed' personal name exhibiting distinct dialectal features, possibly associated with both the Greek adjective ζοϝός and the Anatolian lexeme *zuṃa*, found in other personal names such as Ζοϝαμυς (*DGP* 31). Hence, a significant transformation in the Hellenization of personal names has occurred from the father to the daughter, accompanied by the spread of koine linguistic features and alphabetic Ionic-Milesian traits.

3.4. Graph Analysis: Alphabetic Features

Fig. 7 illustrates the distribution of various alphabetic features found in Pamphylian inscriptions. Dark purple dots represent epichoric alphabetic features, including the use of epichoric Pamphylian letters (<И>, <Т>) and specific writing conventions (e.g., the double -υ-). Light violet dots indicate inscriptions that lack these epichoric features but still demonstrate the use of non-Ionic Milesian letters (such as the standard digamma <F>) or non-Ionic Milesian writing habits (e.g., <o> for /ō/). Inscriptions without both these characteristics are shown in sky blue. The dots representing traits influenced by contact with the standard Ionic-Milesian alphabet are enlarged for emphasis. While the distribution of alphabetic features may appear to follow a similar pattern to the linguistic features graph, a closer examination reveals that they are not perfectly aligned. Many inscriptions exhibit a combination of non-koine and koine traits, with the latter not limited
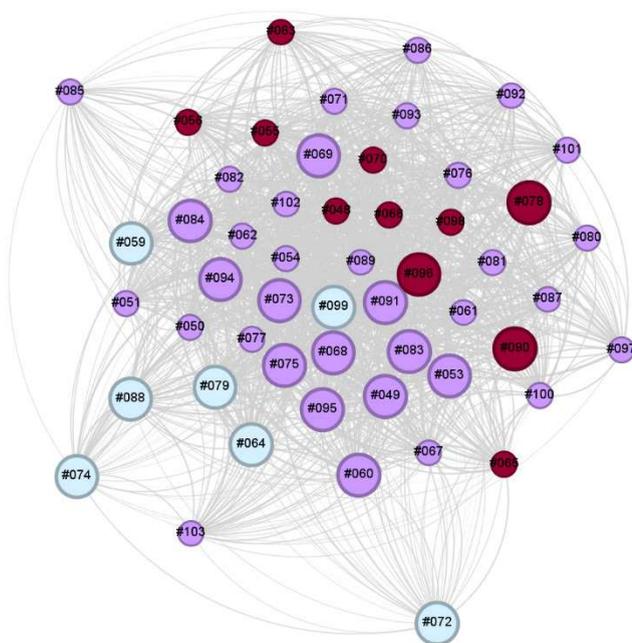
Fig. 7 - Alphabetic features.

to inscriptions showing koine linguistic features. For instance, in
DGP 69 (Δαμάτρι[υς] Α[ρτ]ιμαυ), we observe the dialectal gen-
itive in -αυ, but the epichoric letter <И>, typically used to write
this genitive in other inscriptions (cf. *DGP* 66 below), has been
replaced by a standard upsilon. This suggests that koineization
did not necessarily eliminate Pamphylian epichoric traits when
they came into contact. Indeed, when comparing this graph with
Fig. 2, it becomes clear that alphabetic features cannot be predict-
ed solely based on the linguistic origins of the personal names.
Pamphylian epichoric letters appear in both all-Greek families
(e.g., *DGP* 55, Ἀπελάιϝρυνις Μειακλεῦτυς) and mixed families
(e.g., *DGP* 66, Παιάϝας Πυναμυϝαυ. Πυναμυας Παιάναυ), as
well as in all-Anatolian families (e.g., *DGP* 90, Ορυμνεὺς [Κ]
εδαιϝιυ). They are distributed evenly along a north-west/south-
east axis on the upper side of the graph. This observation, sup-

ported by statistically significant data, suggests that epichoric Pamphylian letters and writing conventions were not primarily used, and likely not introduced, to represent Anatolian phonemes, *pace DGP* pp. 5-9.

3.5. Graph Analysis: Monument

Fig. 8 displays the distribution of funerary inscriptions of various heights (represented from biggest to smallest by blue, light blue, pastel green, and pastel yellow) in conjunction with different types of *stelai*. Smaller dots represent inscriptions on simple parallelepiped-shaped *stelai*, while larger dots indicate inscriptions on *stelai* with a triangular pediment. *Fig. 9* illustrates the distribution of decorations. Inscriptions with elaborate adornments, such as rosettes, ribbons, and acroteria, are represented by red dots, while inscriptions with simpler decorative elements, such as mouldings, are depicted by dark yellow dots. Inscriptions without any decoration are represented by black dots. The distribution of inscriptions based on alphabetic features reveals interesting patterns. The center of the graph is primarily occupied by light blue inscriptions, indicating their prototypical nature (e.g., *DGP* 89, Ἀρτιμίδορυς Κραιτυς). Pastel green inscriptions, with some exceptions, tend to align with the linguistic Greekness area observed in *Fig. 2*. These exceptions include cases of mixed families where younger generations have Greek names, while older mixed or Anatolian (e.g., *DGP* 96 Κορϝαλείνα Κουναυ Αἐκαλείτου. Κορϝαλίς Ορομνεὺς Ϝαναξάδρου), as well as Anatolian inscriptions with strong koine influences (*DGP* 72). The smallest category, pastel yellow inscriptions, predominantly associates with mixed and Anatolian families. Inscriptions featuring a triangular pediment exhibit a disposition along a north-east to south-west axis, situated below it. This distribution corresponds to the inscriptions with elaborate decorations, as depicted in *Fig. 9*, and both categories tend to avoid the region characterized by a more prominent presence of Pamphylian dialect alphabetic features (*Fig. 7*).
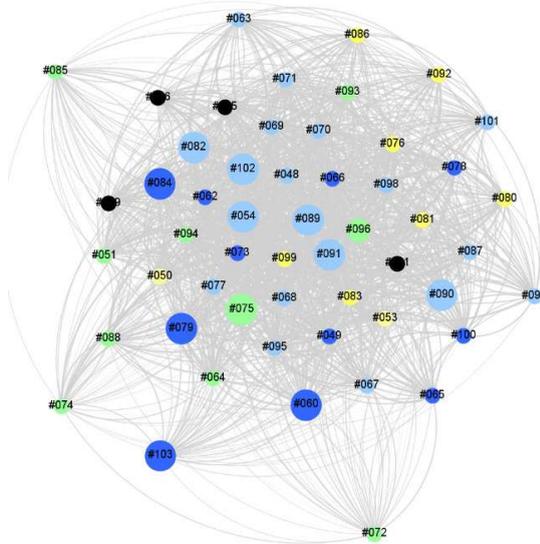
Fig. 8 - Stelai by height. From biggest to smallest by blue,
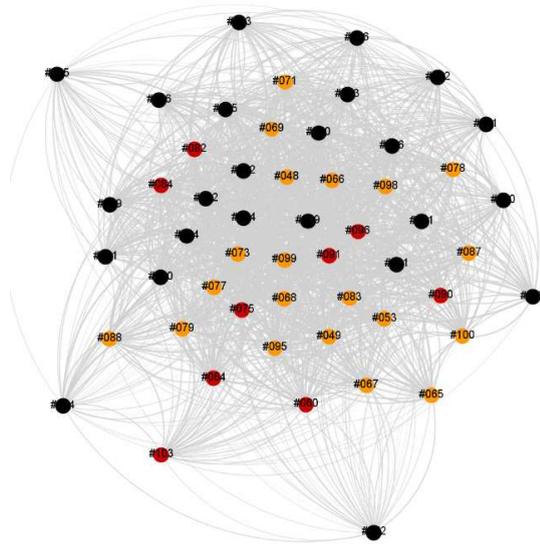light blue, pastel green, pastel yellow.

Fig. 9 - Distribution of decorations. Red: elaborate decorations,
dark yellows: simple decorations, black: no decorations.

4. *Conclusions*

The graph's characteristics reveal a densely interconnected network, indicating a strong and cohesive community that spans more than two centuries. The key findings that can be inferred from the graphs are:

– The clustering of inscriptions based on linguistic roots suggests that distinct combinations of linguistic origins are a predictive factor for an individual's position within the community. Linguistically mixed families in the graph are loosely arranged according to the relationships between individuals with Greek and Anatolian PNs, with their behavior varying depending on the familial role of those bearing Greek or Anatolian PNs. Theophoric PNs, though common throughout the dataset, are typically associated with specific linguistic origins. PNs derived from Apollo are more likely to appear in inscriptions of exclusively Greek families, while those based on Artemis (and her Pamphylian counterpart, the Lady of Perge) are characteristic of mixed families, serving as an onomastic 'middle ground'.

– The presence of Pamphylian epichoric letters alongside koine traits in various inscriptions demonstrates that the process of koineization did not entirely eradicate local alphabetic features. Instead, koine traits spread more readily in families where a father with an epichoric personal name – often displaying distinctive alphabetic traits – gives his children Greek-sounding names, which are more likely to exhibit linguistic influence from koine. Pamphylian alphabetic features can be found associated with all kinds of PNs, suggesting that they were not felt or needed specifically for Anatolian PNs, as previously argued.

– The characteristics of the monuments exhibit patterns similar to the linguistic ones. While all-Greek inscriptions are associated with a specific type of *stele* – medium-sized

stelai with simple mouldings or mouldings featuring a simple rosette – this type is also often found in mixed families where younger generations bear Greek names, while older members have mixed or Anatolian names. Similarly, Anatolian inscriptions with strong koine influences follow this pattern, a phenomenon that might be generalized as a 'Hellenization trend'. In contrast, families adhering to entirely Anatolian onomastics tend to be associated with smaller *stelai*. More elaborate monuments, such as those with triangular pediments and complex decorations, tend to avoid inscriptions with marked Pamphylian alphabetic features but not those with non-koine linguistic traits, suggesting that only the former were recognized as a strictly 'local' or 'archaic' mark.

Thus, the graph analysis provides compelling evidence for the existence of a tightly-knit community with shared cultural and linguistic characteristics, while also highlighting the complexity and diversity within the Pamphylian funerary epigraphy. The analysis of the graph also presents possibilities for future research and applications of SNA to ancient epigraphy. Future studies could investigate the relationship between linguistic origins and social networks, shedding light on the interplay between language, identity, and social connections. Additionally, SNA could be employed to analyze the evolution of personal names and their associations with specific deities, offering insights into religious practices and belief systems of ancient cultures. Furthermore, the application of SNA to larger corpora of inscriptions from different regions and time periods has the potential to uncover patterns of migration, cultural diffusion, and the spread of specific cultural practices or languages.

Abbreviations

DGP = C. Brixhe, *Le Dialecte Grec de Pamphylie. Documents et grammaire (Inscriptions 1-178)*, Bibliothèque de l'Institut Français d'archéologie d'Istanbul, Paris 1976.

LGPN V.B. = J.S. Balzat - R.W.V. Catling - E. Chiricat, *A Lexicon of Greek Personal Names: Volume V.B.: Coastal Asia Minor, Caria to Cilicia*, Oxford University Press, Oxford 2014.

References

Brixhe 1976
C. Brixhe, *Corpus des inscriptions dialectales de Pamphylie. Supplément I (Inscriptions 179-192)*, «Études d'Archéologie Classique», 5 (1976), pp. 9-16.

Brixhe 1988
C. Brixhe, *Corpus des inscriptions dialectales de Pamphylie. Supplément II (Inscriptions 193-225)*, «Études d'Archéologie Classique», 6 (1988), pp. 165-254.

Brixhe 1991
C. Brixhe, *Corpus des inscriptions dialectales de Pamphylie. Supplément III (Inscriptions 226-242)*, «Études d'Archéologie Classique», 7 (1991), pp. 15-27.

Brixhe 1996
C. Brixhe, *Corpus des inscriptions dialectales de Pamphylie. Supplément IV (Inscriptions 243-257)*, «Kadmos», 35 (1996), pp. 72-86.

Brixhe 1999
C. Brixhe, *Réflexion sur l'onomastique personnelle d'une vieille terre coloniale: la Pamphylie*, in Dobias-Lalou 1999, pp. 33-45.

Brixhe - Tekoğlu 2000
C. Brixhe - R. Tekoğlu, *Corpus des inscriptions dialectales de Pamphylie. Supplément V (Inscriptions 258-276)*, «Kadmos», 39 (2000), pp. 1-56.

Brixhe *et al.* 2007
C. Brixhe - R. Tekoğlu - G. Vottéro, *Corpus des inscriptions dialectales de Pamphylie. Supplément VI (Inscriptions 277-291)*, «Kadmos», 46 (2007), pp. 39-52.

Brughmans 2010

   T. Brughmans, *Connecting the Dots: Towards Archaeological Net-work Analysis*, «Oxford Journal of Archaeology», 29.3 (2010), pp. 277-303.

Brughmans 2013

   T. Brughmans, *Thinking Through Networks: A Review of Formal Network Methods in Archaeology*, «Journal of Archaeological Method and Theory», 20 (2013), pp. 623-662.

Bubenik 2018

   V. Bubenik, *North-West Doric Koina and the Issue of 'Koinei-zation': Sociolinguistic Concerns*, in Giannakis - Filos 2018, pp. 149-168.

Christidis 2007

   A.-P. Christidis (ed.), *A History of Ancient Greek. From the Begin-nings to Late Antiquity*, Cambridge University Press, Cambridge 2007.

Colvin 2014

   S. Colvin, *Perceptions synchroniques des dialectes et de la* koinè, in Minon 2014, pp. 19-28.

Dağlı Dinçer 2020

   İ. Dağlı Dinçer, *Cults and Religious Life of Pamphylia from the Ar-chaic to the Late Antique Period / Arkaik Dönem'den Geç Antik Dönem'e kadar Pamphylia bölgesi kültleri ve dinsel yaşamı*, Un-published PhD Dissertation, Koç Üniversitesi - Sosyal Bilimler En-stitüsü - Arkeoloji ve Sanat Tarihi Ana Bilim Dalı, Antalya 2020.

Dardano 2012

   P. Dardano, *Continuità e discontinuità nell'onomastica panfila: il caso degli antroponimi*, in Mancini - Lorenzetti 2012, pp. 49-83.

De Luca 2022

   G. De Luca, I matrimoni misti (*epigamiai*) nell'Oriente greco, tesi di dottorato, Napoli L'Orientale - EHESS, Paris 2022.

Dobias-Lalou 1999

   C. Dobias-Lalou (éd.), *Des dialectes grecs aux Lois de Gortyne*, De Boccard, Nancy 1999.

Giannakis - Filos 2018

   G.K. Giannakis - E.C.P. Filos (eds.), *Studies in Ancient Greek Dialects From Central Greece to the Black Sea*, De Gruyter, Ber-lin - Boston 2018.

Grainger 2009
  J. Grainger, *The Cities of Pamphylia*, Oxbow, Oxford 2009.
Hall 1995
  J.M. Hall, *The Role of Language in Greek Ethnicities*, «Proceedings of the Cambridge Philological Society», 41 (1995), pp. 83-100.
Hornblower *et al.* 2000
  S. Hornblower - E. Matthews - P.M. Fraser - M. Peter (eds.), *Greek Personal Names: Their Value as Evidence*, Oxford University Press, Oxford 2000.
Keen 2002
  A.G. Keen, *The Poleis of the Southern Anatolian Coast (Lycia, Pamphylia, Pisidia) and Their Civic Identity*, in Tsetskhladze - Snodgrass 2002, pp. 27-40.
Knappett 2013
  C. Knappett (ed.), *Network Analysis in Archaeology: New Approaches to Regional Interaction*, Oxford University Press, Oxford 2013.
Liverani *et al.* 2022
  P. Liverani - M. Foschi - A. Casadei (a cura di), *ILLA. Espressioni e poetiche dell'identità*, Pisa University Press, Pisa 2022.
Malkin 2011
  I. Malkin, *A Small Greek World: Networks in the Ancient Mediterranean. Greeks Overseas*, Oxford University Press, Oxford - New York 2011.
Mancini - Lorenzetti 2012
  M. Mancini - L. Lorenzetti (a cura di), *Atti del convegno 'Discontinuità e creolizzazione nell'Europa linguistica' - Viterbo, settembre 2006*, Il Calamo, Roma 2012.
Martin - Niemeyer 2021
  C. Martin - P. Niemeyer, *On the Impact of Network Size and Average Degree on the Robustness of Centrality Measures*, «Network Science», 9.1 (2021), pp. 61-82.
Mills 2017
  B.J. Mills, *Social Network Analysis in Archaeology*, «Annual Review of Anthropology», 46.1 (2017), pp. 379-397.
Minon 2014
  S. Minon (éd.), *Diffusion de l'attique et expansion des* koinai *dans le Péloponnèse et en Grèce centrale. Actes de la journée internationale de dialectologie grecque du 18 mars 2011, Université Paris-Ouest Nanterre*, Droz, Genève 2014.

Mora-Marin - Cahill 2023

D. Mora-Marin - L. Cahill (eds.), *On the Systematic Nature of Writing Systems*, «Written Language and Literacy», Special Issue 26 (2023).

Morpurgo Davies 2000

A. Morpurgo Davies, *Greek Personal Names and Linguistic Continuity*, in Hornblower *et al.* 2000, pp. 15-39.

Panayotou 2007

A. Panayotou, *Pamphylian*, in Christidis 2007, pp. 427-431, 506-507.

Parker 2000

R. Parker, *Theophoric Names and the History of Greek Religion*, in Hornblower *et al.* 2000, pp. 53-79.

Santamaria 2023

A. Santamaria, *From Images to Signs. Cretan Hieroglyphs and Linear A in context*, PhD Thesis, University of Bologna, Bologna 2023.

Selvi 2022

E. Selvi, *I graffiti dell'Acropoli di Perge. Una testimonianza di scrittura alfabetica in Panfilia nel VI sec. a.C.*, in Liverani *et al.* 2022, pp. 393-408.

Selvi 2023

E. Selvi, *Koineization and the Pamphylian Alphabet*, in Mora-Marin - Cahill 2023, pp. 76-95.

Selvi *forthcoming*

E. Selvi, *Hellenophones or Barbarophones? Assessing Pamphylian Intelligibility with the Levenshtein Algorithm*, «Digital Humanities», forthcoming.

Skelton 2017

C. Skelton, *Greek-Anatolian Language Contact and the Settlement of Pamphylia*, «Classical Antiquity», 36.1 (2017), pp. 104-129.

Striano 2018

A. Striano, *Koiné, Koiná, Koinaí: Are we Talking About the Same Thing?*, in Giannakis - Filos 2018, pp. 131-148.

Tekoğlu - Köse 2022

R. Tekoğlu - V. Köse, *Le dialecte grec de Pamphylie. Supplément VII*, «Kadmos», 61.1/2 (2022), pp. 183-198.

Tsetskhladze - Snodgrass 2002

G.R. Tsetskhladze - A.M. Snodgrass (eds.), *Greek Settlements in the Eastern Mediterranean and the Black Sea*, Archaeopress, Oxford 2002.