

Mortuary Variability and Social Diversity in Ancient Greece

Studies on ancient Greek death and burial

edited by

Nikolas Dimakis and Tamara M. Dijkstra



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Οὐδὲν ἔφη τὸν θάνατον διαφέρειν τοῦ ζῆν.
Σὺ οὖν, ἔφη τις, διὰ τί οὐκ ἀποθνήσκεις;
Ὅτι, ἔφη, οὐδὲν διαφέρει.

(Diog. Laertius, I, 35)

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Contact Details of Contributors

ALEXANDRA ALEXANDRIDOU, University of Ioannina, aalexandr@uoi.gr
VASILIKI BROUMA, Greek Archaeological Committee U.K., vasiliki.brouma@yahoo.com
VASSILIKI CHRISTOPOULOU, Senior archaeologist, Ephorate of Antiquities of Dodecanese, vassochristo@gmail.com
TAMARA M. DIJKSTRA, University of Groningen, t.m.dijkstra@rug.nl
NIKOLAS DIMAKIS, University of Athens, nikdimakis@arch.uoa.gr
GEORGIOS DOULFIS, University of Athens, gdoulfis@yahoo.gr
PANAGIOTA GALIATSATOU, Ephorate of Underwater Antiquities, pgaliatsatou@culture.gr
GEORGIA IVOU, Directorate of Prehistoric and Classical Antiquities, givou@culture.gr
OLGA KAKLAMANI, University of Athens/KIKPE Numismatic Collection, olkakla@gmail.com
ANNA MOLES, University College London, anna.moles.14@ucl.ac.uk
ELENI PANAGIOTOPOULOU, University of Groningen, e.panagiotopoulou@rug.nl
CHRYSANTHI TSOULI, National Archaeological Museum of Athens, chtsouli@culture.gr
MARIA TSOULI, Ephorate of Antiquities of Laconia, mtsouli@culture.gr
VICKY VLACHOU, École Française d'Athènes, vasiliki.vlachou@efa.gr

Mortuary Variability and Social Diversity in Ancient Greece: A Prologue

Nikolas Dimakis and Tamara M. Dijkstra

This volume is born out of the international workshop for early career scholars entitled ‘Mortuary Variability and Social Diversity in Ancient Greece’ that was held at the Netherlands Institute at Athens, Greece on December 1-2, 2016. The idea for this workshop stemmed from our mutual interest in ancient Greek death practices, and in understanding how the political, economic, and social realities that characterized Greek history related to funerary ideology and informed the ways in which the Greeks dealt with their dead. Two main questions are central to this problem: 1) how were local social structure and social roles – for example those the elderly or children, men or women, locals or migrants, or the poor or the wealthy – reflected in and motivated the way people were treated in death, and 2) how did large-scale developments such as political change and processes of ‘globalization’ influence death practice on the level of the individual, the social group, the local community, and the region.

The mortuary record of Early Iron Age to Roman Greece, with its regional variability and differing historical trajectories, offers a particularly rich set of data on funerary customs that allows us to explore these questions from multiple and interdisciplinary angles. Much of the relevant archaeological data have been excavated by the Greek Archaeological Service. In order to stimulate the dialogue and the sharing of knowledge and insights between funerary archaeologists in the academic world and those working in the field, we specifically attempted to bring together early career scholars from these two complementary worlds. The workshop had three main aims. The first was to encourage the reappraisal of burial evidence through current theoretical, methodological and interdisciplinary approaches. The second was to discuss how the unique strengths of burial evidence can be employed in understanding social structure and organization. And the third aim was to highlight the multiple ways in which funerary archaeology can contribute to a nuanced understanding of past societies.

Ancient Greece, with its great regional and social diversity, provides a unique context for exploring how the expression of social, cultural, and political complexities were expressed or reflected in death. Archaeological remains of funerals from Early Iron Age to Roman Greece have received significant amounts

of scholarly attention, but most work has focused on the documentation and publication of specific sites,¹ tombs² or specific types of material, including tombs,³ tombstones,⁴ and certain categories of grave goods.⁵ Thorough analyses of funerary remains have also been employed in reconstructions of local burial customs and local social and cultural histories of specific sites,⁶ and in assessments of broader social issues.⁷ Thus far, only few extensive regional studies exist that attempt a synthetic interpretation of the evidence for mortuary ritual,⁸ and more such studies should be undertaken in the future. Despite the wide variety and dispersed nature of these studies, it is by now widely recognized that evidence from burials has enormous value in studies of collective and individual identities, social structure and organization, symbolism, as well as social and cultural practices.

Outline and Content of the Volume

The volume brings together case studies on Greek mortuary practices from the Early Iron Age to the Roman period, with a geographic spread that covers the southern Greek mainland, the Aegean islands, and Crete. We regret the absence of contributions on sites in the central and northern regions of Greece, even though important research in these regions is being done; a future workshop on mortuary variability and social diversity that includes or even focuses on these regions is highly desirable. As was the case during the workshop, the contributions in this volume are organized in a thematic manner in an attempt to transcend divides between traditional research traditions, be they temporal, regional, or methodological. A thematic approach, in our view, is a good way to better highlight how different sets of burial evidence can contribute to our knowledge about the relation between social diversity and the mortuary record.

¹ e.g. Blegen *et al.* 1964; Rife 2012; Warner Slane 2017.

² e.g. Kleiner 1983.

³ e.g. Flämig 2007.

⁴ e.g. Walters 1988; Papapostolou 1993.

⁵ e.g. Papapostolou 1990; Graf and Johnston 2007; Andrianou 2012.

⁶ e.g. Dimakis 2009; Petersen 2010; Dijkstra 2015; 2017; Christensen 2018; Dijkstra 2019.

⁷ e.g. De la Genière 1990; Morris 1992; Shepherd 2013.

⁸ e.g. Dimakis 2016.

Death Practices and Social Change

In the first paper Eleni Panagiotopoulou uses skeletal and mortuary evidence to examine how communities in Thessaly handled the changes that occurred during the Protogeometric period. She uses isotope analysis of bone collagen and tooth enamel from human remains to reconstruct dietary practices and population movements, and she contextualizes these data with a consideration of variations in mortuary practices. She shows that while there was intense diversity in burial practices, the variation in dietary practices was limited and indicates only slight changes in the use of resources. The evidence for population movements indicate that contacts and interaction occurred between regions within as well as outside Thessaly.

Vicky Vlachou also examines social change in the Early Iron Age, but takes a different approach. Taking northeastern Attica as her case study, she takes a holistic approach to burials in the Marathonian plain, in which she considers the placement of burials in the natural landscape and their relation to the main routes leading to Marathon, the spatial arrangement of the burials, their types, the funerary practices used, and the material assemblages recovered from the graves. Based on her analysis, she argues that the Marathonian plain was progressively occupied by certain *oikoi* that exploited the arable land, and that the social structure of the four *poleis* of the Marathonian *Tetrapolis* were founded on matters of wealth and kinship.

Alexandra Alexandridou attempts to come closer to understanding the reasons for choosing cremation as a burial rite. She focuses on the meaning and purpose of cremation in Late Geometric funerary plots of Attica, where the evidence points to burial inclusivity. This burial inclusivity is explained as a new strategy that was used by Attic kinship groups in order to strengthen their identity by means of a wider, more inclusive representation of their members in death.

Panagiota Galiatsatou studies mortuary practices in the ancient rural demes of southeastern Attica by analysing recent evidence from five adjacent cemeteries in Mesogaia. She identified demotic and family cemeteries, where she observes a common burial language. In striking contrast to the urban cemeteries, only minimal mortuary variation is noted.

Anna Moles examines evidence from Knossos in Crete dating to the Hellenistic, Roman and Late Antique periods. She investigates how the changing urban status of the site and the associated social and environmental factors impacted on age-at-death, skeletal and dental health, and human activity. She takes a diachronic approach, and studies differences within the population that are related to social

status, age and sex. Moles' contribution is useful in that it clearly demonstrates how fragmentary, poorly preserved skeletal assemblages that have come from rescue excavations can still be used to address a wide variety of research questions.

Social Identity and Treatment in Death

Georgia Ivou studies grave goods from Classical Argos and uses them to identify social status, age and gender of the deceased. She focuses on two specific types of offerings – terracotta figurines and a vase with plastic decoration – and argues that these can be associated with two distinct social groups of the Argive society. The selection of these particular types of offerings to accompany the dead is not only indicative of the deceased's social status, but also of the socio-political circumstances that characterized Argos in the mid-4th century BC.

Olga Kaklamani focuses on burials of infants. She investigates the way in which deceased infants were treated in the ancient city of Thera in the 8th-6th centuries BC. She takes a contextual approach, in which the spatial distribution of infant burials is studied in correlation with the grave types and the grave goods that were provided. In contrast to other Greek contexts, infants in Thera were included in the cemeteries of the city and formal funerary rituals were carried out. Infants were invariably interred inside a pot (*enchytrismos*) and they were buried either isolated or in groups. Exceptions to this general rule, it is argued, should probably be interpreted as a reflection of special circumstances of death or the status and perceptions of the family.

Nikolas Dimakis studies child death in Classical and Hellenistic Attica. He reconstructs the funeral ritual associated with child death, investigates the impact of child loss to Classical and Hellenistic society, examines the association between emotion and the child's identity and status, and explores how this association might have changed in time in Attica.

Monumental Commemoration and Identity

Vassiliki Brouma examines the monumental Hellenistic tomb at Agios Milianos in Lindos, Rhodes, and its connection to the surrounding landscape. She proposes an alternative function of the tomb as a cenotaph and its transformation into a deathscape, a place of memory and commemoration in the bay of Lindos.

Georgios Doulfis offers a survey of the Roman columbaria that have thus far been found in Laconia in the Peloponnese. He argues that the Laconian columbaria were situated in places of strong Roman interest, and shows that they varied in structure, forms

and features, and that they represent late examples of the type.

Maria Tsouli discusses the relation between mortuary practices and identity in Roman Sparta. She focuses primarily on a recently excavated set of burial monuments at the periphery of Sparta and shows that these structures give clear evidence for differentiation in terms of social, economic, and even political status.

Nikolas Dimakis and Vassiliki Christopoulou present the preliminary results of an interdisciplinary research project on a peculiar burial monument with multiple burials from Roman Kos. They tentatively identify the tomb as belonging to a local cultic community (*thiasos*), of which they explore the identity and characteristics.

Chrysanthi Tsouli, finally, offers a survey of the iconography, form and chronology of the rich group of Koan grave markers that date from the 3rd century BC to the 3rd century AD. She explores the contribution of the Koan workshop to funerary art and shows how this changed from the Hellenistic to the Roman period.

Despite the focus of classical archaeologists on particular aspects, funerary locales or preconceived ideas and stereotypes within and about Greek cemeteries, the current volume has sought to explicate the major dimensions of social diversity as this is represented through the mortuary record of ancient Greece from the Early Iron Age to the Roman period. The close engagement with burial evidence from these periods has contributed to our understanding of social structure, display and relative possession of wealth and land, and the degree of flexibility in the apportionment of power, providing us with a more intimate access to society of the periods under study.

In addition, spatial variations and temporal change in the material commemoration of death has also revealed differences in the relationship between the living and the dead, as well as among the living themselves. In the former instance 'the distance' between living and dead seems to have grown smaller from the Early Iron Age to the Roman period as death and the dead gradually became 'objects' of greater concern precisely because social variations were introduced leading to a growing social divide as time moved on. The passage from life into death and beyond was not regarded as an abrupt transition between two states, alive and dead. Death on the other hand was never seen as in direct opposition to life; instead it was considered as a stage of some sort of continuation of (social) existence. But, it appears that the more socially complex society had become the less likely it was for kinship to have been the only structural principle through which cohesion/distinction in death was achieved; e.g. dietary habits, religious affinities, sociopolitical endeavours, wealth display, show how

increasingly strongly personalised life had become and how personal relations really mattered over and above all constitutional structural considerations.

Thus, one may say that the general picture emerging out of the current volume is one of a progressive narrowing of the burial ritual from the 'communal' level to that of the 'individual'. In other words the tendency noted by the burial evidence of the periods under study seems to resemble, to a degree, that of everyday life where people had gradually moved on from the political, social, economic and religious life of the developing Early Iron Age communities, to their consolidation in the Classical *poleis*, and then to societies of increased mobility and growing diversity in the Hellenistic and Roman periods.

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The workshop 'Mortuary Variability and Social Diversity in Ancient Greece' provided specialists from the academic world and the Greek Archaeological Service, as well as a wider group of interested scholars and students the opportunity to come together and reflect on ancient Greek societies through systematic and interdisciplinary analyses and discussions about mortuary customs. We would like to thank all the speakers (including Melanie Spiegelhalter, Despoina Tsardaka, Michalis Anetakis and Eirene Poupaki who were unable to contribute to this volume) and all the participants for their contribution to the workshop. We express our sincere gratitude to Professor Panos Valavanis, who provided useful advice during the organization of the workshop and to Professor Sofia Voutsaki for giving the opening lecture and for offering constructive comments during the various discussions. We are very grateful to the Research Centre for the Humanities and the Netherlands Institute at Athens for funding the event, and to the National and Kapodistrian University of Athens and the Necropoleis Research Network for sponsoring us. Of course, our gratitude also goes to the staff of the Netherlands Institute at Athens for all their kind assistance before and during the workshop. Finally, as editors, we have been fortunate to benefit from the kind advice of a number of people: Foteini Balla, Merkouris Georgiadis, Eurydice Kefalidou, Georgia Kokkorou-Alevras, Konstantinos Kopanias, Evangelia Pappi, Gina Salapata, Despoina Valatsou.

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Death Practices and Social Change

Protogeometric Thessaly: An Integrated Study of Burial Practices and Isotope Analysis of Human Remains

Eleni Panagiotopoulou

Abstract: This study examines how communities handled the changes that occurred during the Protogeometric period (11th-9th centuries BC) by focusing on dietary practices and population movements. Focus is given to the region of Thessaly, because as the northern region of the Mycenaean civilization, it saw many changes taking place. Most evidence comes from burial grounds because of the well-preserved material they provide. The integration of the isotope analysis of bone collagen and tooth enamel from human remains with the contextual analysis of mortuary data, a method that is traditionally used to study mortuary assemblages, has enriched our knowledge on the period and helped to refine the conclusions. The analyses have shown that there was intense diversity in burial practices but limited variation in dietary practices which indicates slight changes in the use of resources. Furthermore, population movements indicate that contacts and interaction occurred between regions within as well as outside Thessaly.

Keywords: Early Iron Age, Thessaly, diet reconstruction, population mobility, isotope analysis, contextual analysis of mortuary practices

Introduction

The Early Iron Age (1100-900 BC), a period that followed the collapse of the Mycenaean palatial system (12th century BC)¹ was traditionally referred to as the Dark Ages because of the evident decline as well as insufficient archaeological evidence. During that period the stratified Mycenaean system disintegrated and communities had to adapt to new social and cultural conditions.² Material culture, technology, living conditions, and mortuary practices were all affected in this process of regression.³ At the same time population mobility occurred, perhaps as a result of these fluid and unstable conditions.⁴

The main aim of this paper is to examine social relations and make an effort to reconstruct social structure in Early Iron Age Greece through the study of burial practices, dietary variation, and population movements. This will be accomplished by integrating three different methods: a) carbon, nitrogen, and strontium isotope analysis of human skeletal material for the reconstruction of diet and population movements, b) the contextual analysis of mortuary practices, and c) osteological analysis of the skeletal assemblage.

This research constitutes a part of the author's PhD thesis.⁵ The data are extensively analysed and discussed in the publications Panagiotopoulou *et al.* 2018b (diet

and social reconstruction) and Panagiotopoulou *et al.* 2018a (population mobility).

The region of focus is Thessaly, which is situated in the central Greek mainland (Figure 1). Thessaly constituted the northern margin of the old Mycenaean world and was, therefore, affected by the decline and disintegration of the Mycenaean civilization.⁶ In particular, the cemeteries of Pharsala have been selected because they show high degree of diversity in the mortuary practices. Therefore, the site constitutes a suitable case study in order to examine and understand the process of social formation and social structure through an integrated approach. The detailed contextual analysis of mortuary variation provides the basis for an informed sampling strategy for the isotope analysis of the skeletal material. The results from the isotope analysis are compared with the results from the contextual analysis of mortuary practices and the osteological analysis of the skeletal assemblage for a better understanding of the social structure.

The questions examined in this paper are a) could dietary variation correlate with social divisions and enhance them, and b) were there any foreigners initiating the diversity by introducing their own burial customs?

Archaeological Data

Rescue excavations from 2004 to 2008 in the modern town and surrounding area of Pharsala revealed two

¹ Wright 2008: 248-9.

² Deger-Jalkotzy 2008: 287-415.

³ Dickinson 2006: 242-55.

⁴ Snodgrass 2000; Lemos 2002; Coldstream 2003; Morris 2007; Georganas 2009.

⁵ Panagiotopoulou 2018.

⁶ Papadimitriou 2008; Eder 2009; Crielaard 2011.



Figure 1. Map of Thessaly (created by R. Bronkhorst).

burial grounds with 6 km distance between them, dating to the Protogeometric period (1100-850 BC). From this point onwards, these two burial grounds will be referred to as Site 1 and Site 2. Site 1 is located at the western side of the modern town. It includes a tumulus, which will be called Site 1-tumulus and an open area to the east of this tumulus with 35 more graves, which will be called Site 1-cemetery. Site 2 is located to the north-east of Site 1 and includes only two tombs.⁷

Various tomb types have been discovered at Site 1-cemetery: 29 cists, five burial jars, one tholos and two burial enclosures. Site 1-tumulus contained one pit, five cists and two tholoi. At Site 2 only two tholoi were discovered. All grave types contained inhumations, except the vases, which contained cremations. The grave goods are pottery for drinking and pouring (oinochoai and cups), iron and bronze ornaments (fibulae, rings, bracelets), and iron tools and weapons (knives).⁸

⁷ Katakouta 2012.

⁸ Katakouta 2012.

Osteological Analysis

The osteological analysis showed that the Minimum Number of Individuals (MNI) in the cemeteries of Pharsala is 54,⁹ of whom eight are subadults and 46 are adults. Of the adults present in the sample 11 males or probable males, 10 females or probable females, and 24 indeterminate individuals were recorded. The age-at-death for the subadults ranges from neonate to 16+ years old and for the adults from 20 to 50 years old. Adults predominate in both burial grounds, while the subadults are underrepresented. The two sexes do not show significant representation differences, but the large number of indeterminate individuals prevents us from reaching certain conclusions.

Sampling Design

The careful sampling procedure conducted for this research, took into account a) the patterns and correlations detected by means of the contextual

⁹ Panagiotopoulou *et al.* 2018b.

analysis described above, b) the research questions arising from our contextual observations, and c) the preservation and sample quality of the osteological material.

The Contextual Analysis of Mortuary Practices

The contextual analysis of the mortuary practices of the cemeteries of Pharsala showed that Site 1-cemetery was the most diverse in terms of tomb types and body treatment. Cist graves dominate the funerary record (n=29), but one tholos, two burial enclosures, and five burial vases were also present. In this study tholoi and similar types are considered as traditional tomb types, while cists are considered as new burial forms for two main reasons: a) the construction of tholoi in the Protogeometric period followed the Mycenaean plan retaining the basic structure features – dromos, entrance, and tholos – though the size was much smaller, and b) the cist is a grave with a sudden widespread use during the Early Iron Age. The type, however, was already known from the Mycenaean period.¹⁰ Therefore, the diversity in grave types emphasizes the parallel use of simpler and more complex types, as well as of traditional and new types. Inhumation has been the main treatment of the body, but five cremations underlined the diversity. The Site 1-tumulus was less diverse because it covered fewer grave types – a pit, cists (n=5) and tholoi (n=2) – with inhumations. The most homogeneous burial ground is Site 2 with 2 tholoi with inhumations.¹¹

Age differentiation is attested as young subadults were excluded from certain burial forms.¹² Individuals under 10 years old were buried exclusively in cist graves at the Site 1-cemetery. Two subadults from the tumulus were older (11-16+ years old). Subadults were excluded from Site 2. The analysis showed that the group of young subadults was underrepresented considering the high infant mortality in pre-industrial societies,¹³ a practice that was also attested in the Mycenaean period.¹⁴

The grave goods in Pharsala included typical types and materials for the period – pottery, iron and bronze ornaments, and iron tools and weapons.¹⁵ Exceptional objects such as gold or imports were absent. The analysis of diversity and quality of the objects showed that significant differences did not occur between the graves.¹⁶ Therefore, wealth classification of the graves was based on differences in the number of grave goods: wealthy (three or more grave goods ascribed to each

individual), poor (two or less grave goods ascribed to each individual), and empty (no grave goods were found in the grave with the individual). The presence of wealthy, poor and empty graves did not vary significantly between the different burial grounds nor did it correlate with specific tomb type; wealth divisions (which may be seen as an indication of social status) were not rigid.

The comparison between grave goods from different age groups revealed that age differentiation occurred in grave goods provision as well. Adults were accompanied by a varied assemblage including pottery, iron and bronze ornaments, tools and weapons. Subadults (neonates to 16+), however, were only offered bronze ornaments and sometimes pottery, while iron objects, tools and weapons were absent. This shows the significant difference in grave goods between adults and subadults. Further differences were observed between males and females, but only between the individuals of whom the sex was determined. Females were only offered bronze ornaments, while male individuals were buried with pottery, iron ornaments, tools, and weapons. The commingled secondary depositions and double or multiple burials resulted in a large number of indeterminate individuals and therefore in underrepresented skeletal material in terms of anatomically diagnostic skeletal elements that are essential to sex estimation. Therefore sex differentiation should be treated with caution.

In the contextual analysis of the mortuary practices a great degree of diversity was observed. Age and – to a small degree – gender differentiation were observed in grave goods, while status and wealth differentiation, as detected through the grave goods, were not rigid but rather subtle divisions are seen.

Diet Reconstruction

Methodology

The stable carbon and nitrogen isotope analysis is an established method to reconstruct the diet of past societies. Human and animal bodies incorporate the elements of carbon and nitrogen through diet. During this process different proportions of the isotopes of these two elements are assimilated by the body and depend on the diet we follow and the foods we consume. Bone is the best-preserved tissue of a body. Therefore, the diet can be reconstructed by analysing bone collagen.

This method may identify groups of foods based on a) carbon assimilation and photosynthetic pathways and b) nitrogen assimilation and the trophic levels in the food web. There are three photosynthetic pathways to assimilate carbon: 1. C₃ pathway is used by plants such

¹⁰ Dickinson 2006.

¹¹ Panagiotopoulou *et al.* 2018b.

¹² Panagiotopoulou *et al.* 2018b.

¹³ Masset 1973; Bocquet-Appel and Masset 1977.

¹⁴ Lewartowski 2000; Papatthasiou *et al.* 2012.

¹⁵ Katakouta 2012.

¹⁶ Voutsaki 1995.

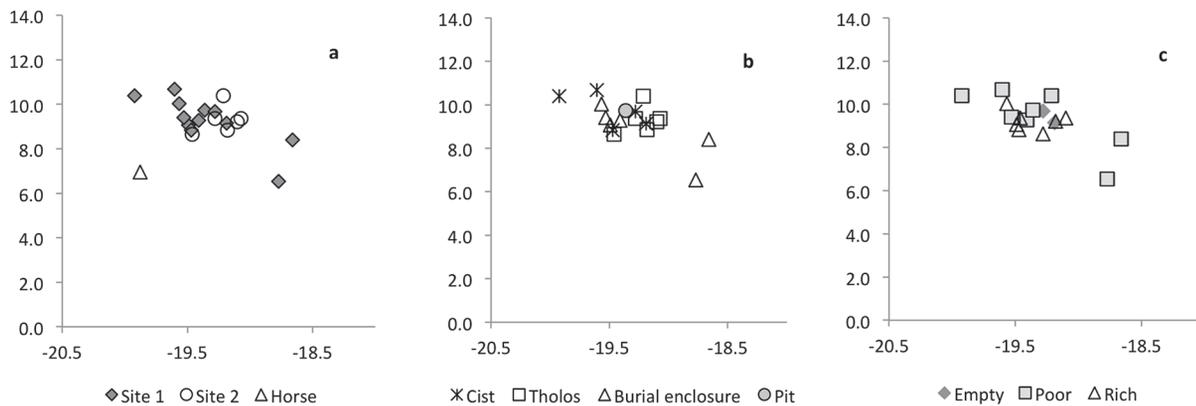


Figure 2. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotope values from Pharsala: a) comparison of the diet of individuals between different burial locations, b) comparison of the diet of individuals between different tomb types, c) comparison of the diet of individuals between different wealth categories (after Panagiotopoulou *et al.* 2018b).

as fruits, grains, and vegetables; 2. C_4 pathway is used by plants such as millet and maize; 3. CAM (Crassulacean acid metabolism) is the photosynthetic pathway used by mainly cacti and similar plants. Nitrogen isotopes may identify the different trophic levels of the food web. Between the levels (plants / herbivores / omnivores / carnivores) there is a difference of approximately 3‰ enrichment of nitrogen isotopes. Therefore, plant protein intake (when a diet is based purely on plant consumption) may be distinguished from animal protein intake (when a diet is based on both plant and animal protein consumption or purely on animal protein consumption). In a similar way, consumption of legumes can be distinguished from non-leguminous plants. Last but not least, terrestrial versus aquatic (either marine or freshwater) diet may be detected by the combination of carbon and nitrogen isotopes.

Results

Collagen extraction was conducted on 43 human and one animal bone samples. Based on the collagen quality criteria (C/N ratio, carbon content (%) and/or nitrogen content (%)), 18 human out of 43 and one animal samples were accepted for the paleodietary study.¹⁷ The stable carbon and nitrogen isotope analysis showed that the diet of this group largely comprised C_3 plant and animal protein, i.e. vegetables, fruits and a significant amount of meat and/or dairy products. Pulses were attested in minor proportions and seafood seems to have no contribution. The diet of two individuals that cluster separately from the majority of the individuals seems to have relied more on fruits and vegetables and less on animal protein; millet in this case seems to have some contribution (Figure 2a). These two individuals,

a male and a female, might have been related in some way. They were buried in the same burial enclosure with poor grave goods. Despite the fact that more individuals were buried in this burial enclosure, only the two aforementioned individuals are likely to have consumed a plant – millet – that might not have been grown locally during that period.¹⁸

The comparison between the diet of individuals from different burial locations and different grave types showed that there is great overlap with high animal protein (Figure 2a,b). The diet seems homogeneous, and there is no significant variation either between burial locations or between grave types. There is some variation between wealthy, poor and empty graves but no significant clustering is observed. The four samples with the higher nitrogen values, more than 10‰, are those with the largest consumption of animal protein. It has been suggested that high animal protein consumption in the Mycenaean period was associated with individuals of higher status. The examination of the archaeological data of the aforementioned four samples indicates that they did not share common mortuary practices (buried in cists or *tholoi*, both rich and poor grave goods were found, and both males and females were buried at the same premises), suggesting that they did not belong to the same social group.¹⁹

The comparison between males and females indicated a greater range of animal protein in males than females (Figure 2c); females do not show extreme values of very high or very low animal protein intake, but lie between the male values.

¹⁷ De Niro 1985.

¹⁸ Valamoti 2013.

¹⁹ Panagiotopoulou *et al.* 2018b.

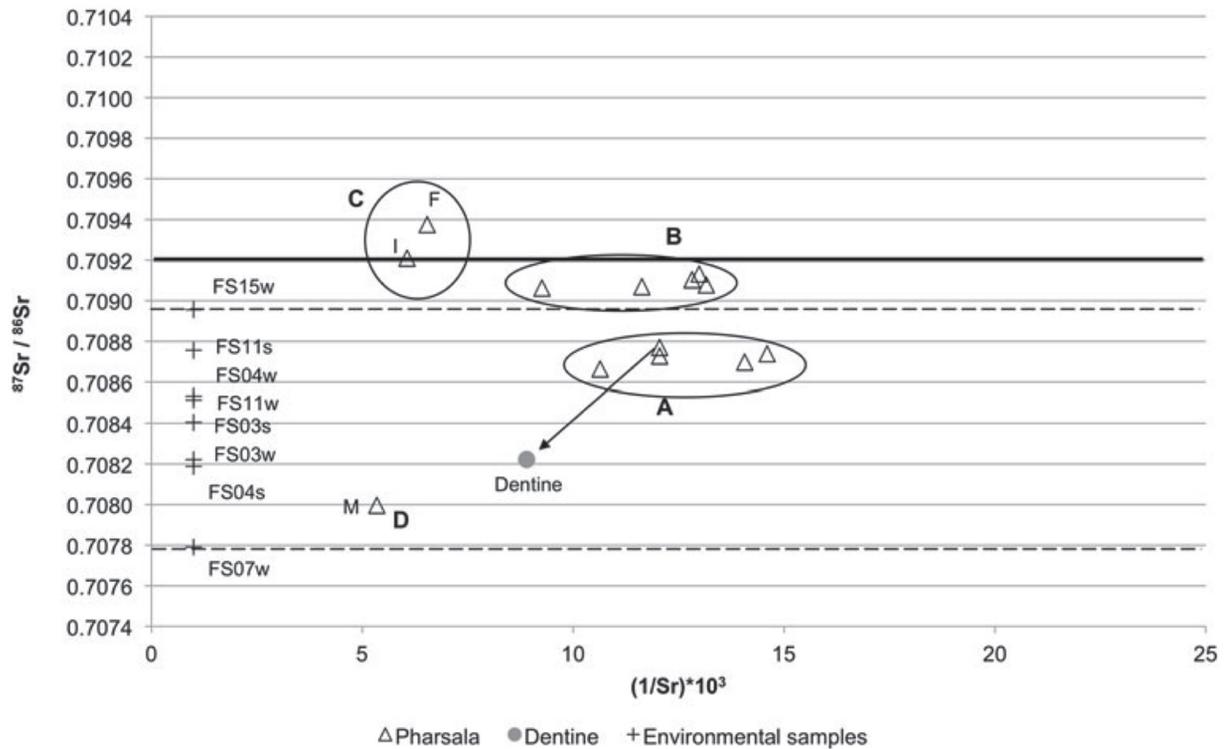


Figure 3. $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of human enamel and environmental samples from Pharsala plotted against the Sr concentration of the samples. The black thick line indicates the seawater $^{87}\text{Sr}/^{86}\text{Sr}$ value. The local $^{87}\text{Sr}/^{86}\text{Sr}$ ratios are indicated by the environmental end-members (dashed black line). The black arrow shows the enamel and the dentine of the same sample. The letters F, M, and I indicate the sex of the individuals from which these samples were taken (F: female, M: male, and I: indeterminate sex). The codes beside the environmental samples are the sample names. The error for Sr isotopes at 2sd is within the symbol (after Panagiotopoulou *et al.* 2018).

Local v. Non-Local Individuals

Methodology

Strontium isotope analysis is a method used to identify non-local individuals buried in a cemetery. The element of strontium is associated with the environment that the food grew in. During childhood, when teeth are formed, the element of strontium is captured into the enamel through our diet. Therefore, if someone dies at a place different from the one s/he was born and raised in, then this method can show that s/he is not local, and can potentially indicate the place where s/he came from. That is because the environment of one region can be very different from another, therefore the strontium values recorded in human teeth representing the birthplace might be distinguishable from the environmental values of the place of death.²⁰

Thirteen human tooth enamel and environmental samples (snail shells and water samples) were collected and analysed. The teeth were preferably loose, but associated with specific individuals and had no

pathologies. The environmental samples represent the geological formations that could have contributed to the strontium intake by humans and animals through plant farming and animal breeding, as well as water sources. This sampling provided information on the range of bioavailable strontium that characterizes the local soil and water end-members (and for regions of comparable geology).

Results

Four groups have different strontium isotope ratios (Figure 3). Group A is considered to consist of local individuals because all values fall within the local environmental range (between dashed lines). All three other groups consist of possible non-local individuals. Group A and Group B are also distinguished by burial location: group A was buried at Site 1 and group B was buried in the distant tholoi (Site 2). However, other aspects of burial treatment (grave types and grave goods) are similar for both burial groups, suggesting that although Group B consisted of non-locals, they came possibly from a region culturally comparable.²¹

²⁰ Price *et al.* 2002; Montgomery 2010; Stallo *et al.* 2010.

²¹ Panagiotopoulou *et al.* 2018a.

Groups C and D consist of two females and an indeterminate individual. They were buried among the local individuals at Site 1 and could provide evidence for exogamy.²² The female discussed earlier²³ that might have consumed millet is represented by the higher sample of group C. Combining these data we may hypothesize that millet could be a plant known to her from her birthplace, but unknown to the local group of Pharsala.

Conclusions

The integration of the contextual analysis with the bioarchaeological study of human remains showed that the group from Early Iron Age Pharsala exhibited possible emerging social differentiation at a very initial stage. Foreigners were living with the locals, either fully integrated or coming from a culturally similar community, as is suggested by the material culture found in the graves. It is significant that the foreigners practiced traditional Mycenaean burial customs (the tholoi) while the locals preferred simpler forms, which are considered new in this period.

Finally, the integration of these methods uncovered potential evidence for the practice of intermarriage between communities during the Early Iron Age. A female that has been identified as a non-local, was using a food plant possibly unknown to the local group. This could suggest that she might have been familiar with the plant from her birthplace.

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²² Exogamy is the practice of marriage between two individuals from different groups/communities. Here, this practice can be suggested when two geological locations (place of birth and place of death) are different based on strontium isotope analysis.

²³ In the first paragraph of 'Results' of Diet Reconstruction.

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