Tracing maritime connectivity in the Greek Early Iron Age through the funerary culture at Lefkandi on Euboea

By

Prue Newton

Thesis submitted to
Flinders University
for the degree of

Masters in Maritime Archaeology

College of Humanities, Arts and Social Sciences

February 2022

CONTENTS PAGE

TABLE OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

BA	Bronze Age
EBA	Early Bronze Age
EIA	Early Iron Age
EPG	Early Protogeometric
G	Geometric
LBA	Late Bronze Age
LH	Late Helladic
LPG	Late Protogeometric
MPG	Middle Protogeometric
P	Palia Perivolia Cemetery
PG	Protogeometric
S	Skoubris Cemetery
SM	Sub-Mycenaean
SPG	Sub-Protogeometric
SPSS	IBM SPSS Statistics Software
T	Toumba Cemetery
TB	Toumba Building

ABSTRACT

The multi-scalar character of the Early Iron Age (c. 1070–700 BCE) Aegean and Mediterranean trade networks makes the region an optimal setting for studying the interaction of societies through the lens of maritime connectivity. A major centre for trade, at the forefront of these interactions, was the ancient Greek settlement of Xeropolis at Lefkandi, on the island of Euboea, established in the Early Bronze Age (c. 2100 BCE) and abandoned towards the end of the Early Iron Age in c. 700 BCE. The Skoubris, Palia Perivolia and Toumba cemeteries at Lefkandi offer the largest assemblage of burial objects and imports for the Early Iron Age in Greece. However, little is understood about how maritime trade and exchange played a role in shaping the funerary culture at Lefkandi, thus, lacking a wider contextual understanding of what enterprises are driving and influencing networks in the Early Iron Age. This thesis demonstrates how the chronologically significant patterns of diversity in burial assemblages and distribution of foreign imports, found in the cemeteries of Lefkandi, provide evidence for complex maritime connectivity within the Early Iron Age Aegean and Mediterranean. Through the use of statistical analyses applied to Lefkandi cemeteries, both individually and collectively, this study aims to detect maritime trade networks and trade routes operating in association with Lefkandi and to determine what part maritime trade played in shaping the funerary culture at the site.

This thesis presents new findings for Lefkandi that show significant correlations in the composition of the burial assemblage suggesting an intentionally compiled ‘funerary package’. In this way, the provenance of metal objects is used to better understand the foreign imports that form a crucial part of these funerary packages. As such, it is clear that the settlement of Xeropolis had widespread maritime contacts that stretch from the Eastern Mediterranean to the Northern Aegean; also showing that their interaction occurred more frequently than previously expected.

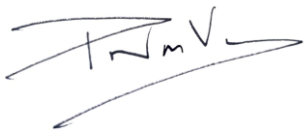
This thesis further argues that the ‘funerary packages’, observed at Lefkandi demonstrate a certain requirement, which creates a demand for particular

material objects that have, in turn, influenced the trade links and contacts maintained by the site's inhabitants. The role of *exotica* and the common practice of using funerary packages to honour the dead, infers that the purpose of exchanging resources was possibly driven by the aristocratic elites who capitalised on revolutionising a mortuary market in the Early Iron Age. The continuity of this practice coincides with the frequent interactions with well-established maritime trade networks throughout this period. This study proposes that agents and carriers of exchange attained the knowledge of the type of materials that were in demand at Lefkandi based on the needs of the funerary culture. The products were acquired at different parts of the Mediterranean and supplied via direct and indirect maritime trade routes influencing the funerary economy of Lefkandi during the Early Iron Age. This thesis demonstrates that statistical analyses of mortuary data can play a significant role in the interpretation of maritime connectivity and trade in pre-monetary societies.

DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed



Prue Newton

Date: 22/02/2022

ACKNOWLEDGEMENTS

I would like to thank my supervisors Dr Ania Kotarba and Associate Professor Wendy Van Duivenvoorde, whose assistance, guidance and timely advice made the completion of this thesis possible. I would like to express my sincere thanks to Louis Andrews for his patience in guiding me through the world of statistics and his extensive knowledge in this field, which has significantly improved this study. Dr Ivana Vetta for her extensive knowledge and willingness to review this study several times. Without her persistent help and support academically, professionally and personally, this thesis would not have been possible. Associate Professor Lesley Beaumont of the University of Sydney, whose continued support and former supervision of my Honours thesis (2016) laid the foundation for this research.

I owe a deep sense of gratitude to Professor Irene Lemos, University of Oxford and director of the excavations at Lefkandi, Euboea. Foremost for her contribution to the excavations and publications of the discoveries at Lefkandi and the archaeology of Early Greece. Irene's kindness, timely scholarly advice and insightful comments encouraged me to pursue and expand on this research. A very heartfelt thanks to Steven Vasilakis for his inspirement and countless hours spent sharing his extensive and practical knowledge of maritime archaeology. A special thank you to Dr Katarina Jerbic for providing valuable feedback on my earlier drafts when she was also inundated with academic commitments.

To my colleagues, both former and present, at Archaeological Management and Consulting Group, in particular Ivana, Martin, Jaki, Kelly, Emma, Paulo and Steve, for their constant support and allowing me the time and flexibility to undergo this research. I am truly grateful to be part of such a supportive group of talented and inspiring individuals. I would like to thank my family and friends for their continual support and convincing interest in this thesis which carried me through to the end. To my people, Suellen, Chelsea, Michael, Simon, Jane, Brody and Pippa, whose unwavering belief in me has always provided me the encouragement and support to overcome obstacles and pursue my dreams.

CHAPTER 1. INTRODUCTION

The ocean has always been an avenue for mobility and a medium for trans-Aegean and Mediterranean relations. The Bronze Age (BA) (c. 3000–1200 BCE) saw the earliest expansion of trade networks in the Aegean and wider Mediterranean Sea. This period saw Mycenaean Greece form social, political and economic connections between states of the Eastern Mediterranean (Eder and Lemos 2020:190). The collapse of the Mycenaean palatial states at the end of the 11th century BCE, led to a scholarly tradition of referring to the succeeding Early Iron Age (EIA) as a 'Dark Age', with a paucity of archaeological data from settlements, cemeteries and shipwrecks feeding into this rhetoric (Biers 1996; Desborough 1972; Langdon 2008; Snodgrass 1971). Extensive excavations of the EIA cemeteries at Lefkandi and burials located at Knossos and Athens since the 1960s have called to question whether this 'Dark Age' was dark at all (Smithson 1968:77–116; Popham and Sackett 1968). The archaeology of funerary practices in EIA Greece and the Aegean has been at the forefront of scholarly discussion, especially for this period where there is little written text (Chapman et al.1981; Lemos and Kotsonas 2020; Tarlow and Nilsson Stutz 2013). Mortuary data has been pivotal in reconstructing chronologies for ancient Greece and enabled analysis of the distribution of objects throughout the maritime trade networks in the Aegean (Dickinson 2006:172). However, there is a gap in knowledge regarding if the demand for funerary objects influenced the nature of exchange with trade contacts and if maritime connectivity enabled a mortuary economy. Lefkandi provides the largest assemblage of burial objects and exotic imports for the EIA in Greece and offers a rare opportunity for this kind of study.

The island of Euboea is the second largest in the Aegean and Lefkandi, situated on the west coast, consisted of five separate burials grounds. They are all associated with the EBA to EIA settlement of Xeropolis which was a major centre of trade (Lemos 2020:873). Three of the cemeteries, known as the Skoubris, Palia Perivolia and Toumba, date to the period between 1050–825

BCE and contain notably wealthy[1] tombs (Popham et al. 1980). The large number of imported objects deposited in these tombs, suggests a community that; i) had access to disposable wealth, ii) valued its presence in burials, and iii) played a significant role in extended maritime trade networks (Lemos 2001:215–225). The discovery of these burial grounds challenged traditional notions that only low-level complex societies existed in this period and foreign relations had ceased between Greece and the Near East (Arrington 2015:1–30; Foxhall 1998:297). For this reason, Lefkandi became one of the most significant archaeological sites for this period providing the only three extensively excavated cemetery sites from the EIA in Greece. The unique assemblage of burial objects displayed in the Skoubris, Palia Perivolia and Toumba cemeteries form the focal point of this study. The artefacts catalogued in the Lefkandi volumes and excavation reports (Catling and Lemos 1991; Lemos 2002–2009; Popham et al 1980; 1988; 1992(a); 1993; 1996) offer a rare opportunity to analyse the circulation of objects found in the tombs, for the purpose of detecting trade networks in the Aegean and Mediterranean Sea in the EIA. This data can be used to identify whether these funerary practices at Lefkandi influenced foreign trade and exchange in the EIA.

This study will take advantage of the mortuary dataset that has been previously produced by the author in her Honours thesis (Newton 2016).[2] The preceding thesis re-evaluated the mortuary data as it was originally published and provided a quantitative comparative analysis of the Skoubris, Palia Perivolia and Toumba cemeteries. This consisted of burial contents and tomb construction, as well as cross examination of social stratification and consideration of gender distinction through burial goods for the Lefkandi cemeteries (Popham et al. 1980:203–207). The study demonstrated that significant correlations could be seen between specific burial objects, especially

[1] Popham (1995:32) identifies wealthy burials in the 11th century BCE as those that contain a large number of Greek coarse and fine wares, metal offerings and in addition contain exotic imported goods.

[2] Disclaimer: Unpublished Honours thesis submitted to the University of Sydney for the degree of Bachelor of Arts (Honours), Major in Archaeology.

exotic imports, and tomb construction variables that have the potential to identify social factors including gender and status. This posed the possibility that maritime trade networks and foreign relations were fundamental catalysts in funerary culture at Lefkandi and recommended that a wider contextual understanding of the distribution of objects was required. For this reason, through statistical analyses, this thesis aims to expand on this research to determine if there are significant trends in the distribution of specific grave objects and to identify if they were being compiled together in the Lefkandi tombs. These patterns include the frequencies of objects in the tombs, and most importantly, where they originated from to expose a wider scope of foreign trade and exchange contacts in the EIA. Thus, a focus will be on – but not restricted to – exotic imports and identifying potential provenances of metal objects found in the tombs, which can be traced chronologically and geographically through maritime connectivity in the EIA Aegean and Eastern Mediterranean.

Lefkandi is a microcosm of maritime connectivity in this pre-monetary society. Yet, from the archaeological record we can see the inhabitants of Xeropolis could clearly identify the value in the goods that were being imported from overseas and were actively responsible for creating that value. These goods were worthy of not just adorning but honouring the dead and showing their prestige within a funerary context. The demand for *exotica*[3], visible through the lens of burial artefacts, suggests a complex society strongly driven by conspicuous consumption of wealth and facilitated by maritime trade and foreign contacts (Lemos 2002:217–219). Therefore, this thesis aims to determine what part maritime trade played in the funerary culture of Lefkandi in the EIA and highlight the significant research potential of tracing and observing maritime connectivity using mortuary data.

[3] The term *exotica* is commonly used by scholars for describing exotic imported goods in studies relating to pre-Archaic Greece (see Chapter 2.4).

1.1 Background: Early Iron Age Chronology and Geographical Area of Study

1.1.1 Chronology of Early Iron Age Greece

The Mycenaean palatial collapse marked the end of the Late Bronze Age (LBA) c. 1200 BCE (Eder and Lemos 2020:190). In Greece, the post-palatial transition is defined by the evidence of the Late Helladic (LH) period IIIC which is organised in chronological sub-periods from 1200–1070 BCE (Eder and Lemos 2020:190). The end of the 11th century BCE saw the formation of the EIA communities. The era began with the Sub- Mycenaean (SM) and Protogeometric (PG) periods (c. 1070–900 BCE), which were characterised by the continuity of deep-rooted cultural traditions and contrasted against explicit regional diversity (Lemos 2002; Morgan 2009). The emergence of a distinct pottery style named the following years as the Geometric period (c. 900–700 BCE) (Eder and Lemos 2020:190; Popham et al. 1980, 1993; Popham and Lemos 1996). The 8th century BCE is considered a historical epoch for Greek history marked by the recovery of literacy (Morris 1997; Kotsonas 2016). The development of economic, political and social organisation in this period saw the dawn of the Greek *polis* and formed the foundation for the later Archaic and Classical Greece (Morris 2009).

Reports on recent excavations (2003–2016) and the complete publication of the Toumba cemetery is currently underway (see Chapter 2.1). It should be noted that the chronology of the site at Lefkandi is currently being reconsidered by the excavators (Eder and Lemos 2020:190). For this reason, the chronology adopted for this study is based on the *Lefkandi* volumes which were published prior to more elaborate dating systems and is presented below (see Chapter 3.2.2). In the future it may be possible to re-evaluate the chronology of the cemetery material once the new data becomes available.

SM Sub-Mycenaean: c. 1100–1050 BCE

PG Protogeometric: c. 1050–900 BCE

- **EPG** Early Protogeometric c. 1050–1000 BCE
- **MPG** Middle Protogeometric C. 1000–950 BCE
- **LPG** Late Protogeometric c. 950–900 BCE

SPG Sub-Protogeometric c. 900–750 BCE

- **I** c. 900–875 BCE (Attic Early Geometric I)
- **II** c. 875–850 BCE (Attic Early Geometric II)
- **III** c. 850–750 BCE (Attic Early Geometric III)

1.1.2 Maritime Landscape of Early Iron Age Greece

The Mediterranean Sea is an intercontinental sea connected to the Atlantic Ocean via the straights of Gibraltar. Scholars have typically divided the sea into the eastern, central and western Mediterranean regions (Aubet 2001). The Eastern Mediterranean region, which is a key focus of this thesis, comprises of Egypt, Mesopotamia, the Levant, Cyprus, Anatolian coast, Aegean islands and the Greek mainland (Aubet 2001:257).

The Aegean Sea, with a total area of approximately 215,000 km^2, is a part of the Eastern Mediterranean Basin, located between the Greek peninsula on the west and Anatolia on the east (Figure 0.1). The Aegean is connected to the Marmara Sea and the Black Sea by the straits of the Dardanelles and Bosporus in the north, while the Island of Crete and Rhodes marks its' southern boundary. The Aegean Islands are made up of several groups of islands that include the Cyclades, Dodecanese, Sporades, the North Aegean Islands and the Saronic Islands.

Lefkandi is a coastal town on the island of Euboea, which is parallel to the coastline of Attica, Boeotia and East Locris with Cyclades to the south and the Gulf of Pegassi to the north. Lefkandi's location is advantageous for controlling the entrance to the Euripus straits with its strong tides and reversing currents challenging the inexperienced sailor. The site was a hub for important and long-

standing seafaring routes crossing the Euboean Gulf in the western Aegean, linking the east coast of Attica and the northwest Aegean (Sherratt 2020:263).

The landscape of Euboea is mountainous with limestone ranges covering the majority of the island. There is limited access to the eastern coastline compared to the west coast, whereby ancient sites including Lefkandi were located, and communities could benefit from the lagoon-like seascape (Lemos 2020:873). Euboea is characterised by fertile plains and geomorphological diversity that is typical of Aegean and Mediterranean landscapes, in that, it displays a variety of micro-regions with different climates and topographies (Horden and Purcell 2000). The mountainous terrains of Euboea and the Greek mainland made maritime trade more profitable in respect to time, costs and energy output due to the widespread disbursement of the settlements
(Sherratt 2020:263). This applies not only in ancient Greece but right up to the early 20th century and the invention of the motor vehicle.

Figure removed due to copyright restriction.

Figure 0.1 Map of the EIA Aegean and Mediterranean Sea showing Lefkandi on the island of Euboea, Greece circled in red.
Lemos 2020: Map 1.

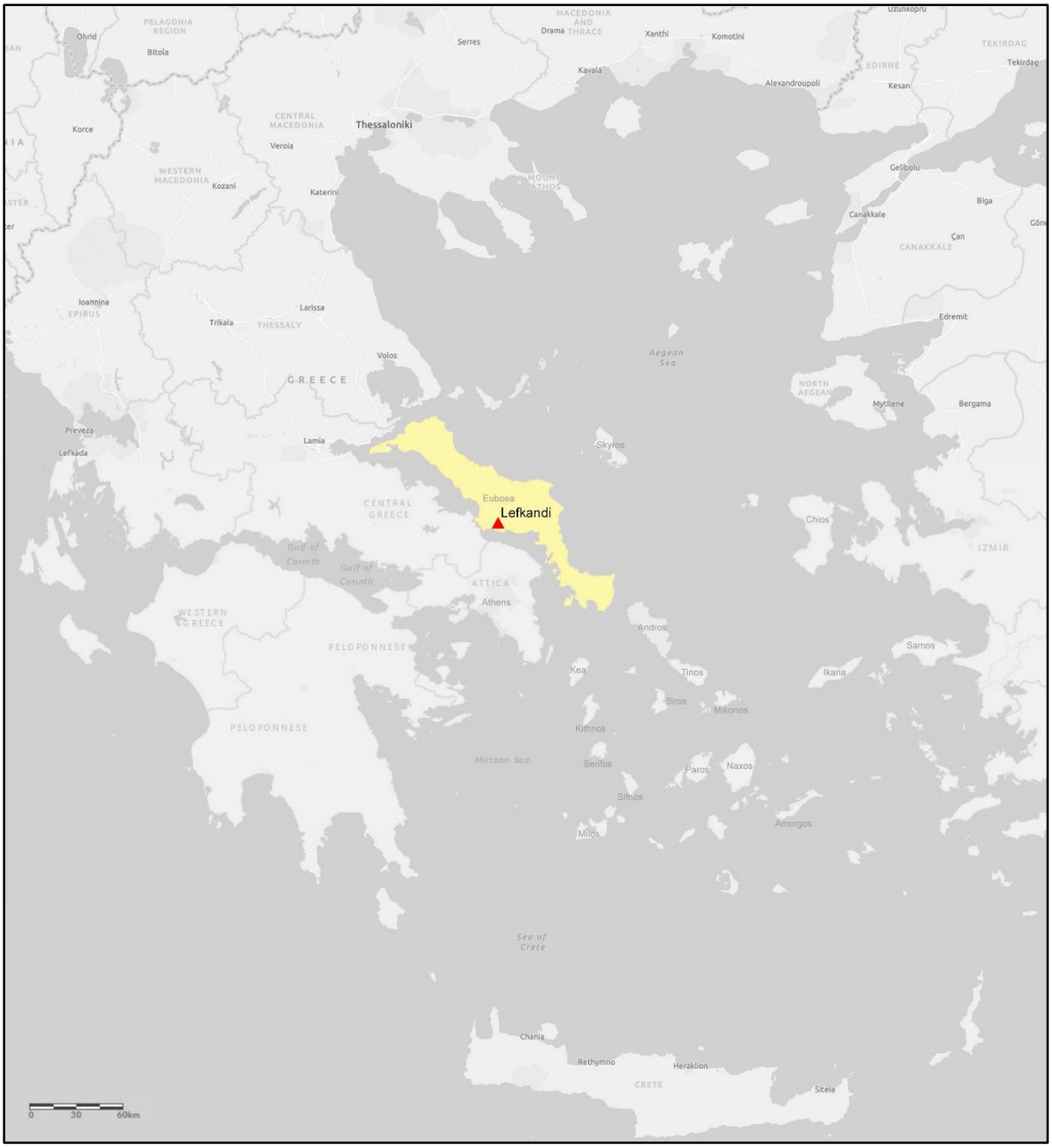


Figure 0.2 **Map of the Aegean Sea and Lefkandi on the island of Euboea, Greece.**

Lefkandi indicated in red and Euboea shaded yellow.

ArcGIS Esri “Light Grey Canvas Map” [Basemap], accessed 2021.

Figure removed due to copyright restriction

Figure 0.3 Map of Euboea and Lefkandi (circled in red) in the EIA Aegean.

Lemos 2020: Map 5.

1.1.3 Area of Study: Skoubris, Palia Perivolia and Toumba Cemeteries

The modern city of Lefkandi has largely developed above and around the archaeological site identified as the ancient settlement Xeropolis, and five associated burial grounds (Figure 0.4–Figure 0.5). Xeropolis is situated close to the coastline and was established in the EBA and developed into a major centre during the MBA and LBA (Davidson et al. 2010). It is considered one of the largest sites in the Aegean, covering an area of approximately 10 ha and lies between two major harbours, Eretria and Chalcis (Evely 2006). The five burial grounds are located on a hillock 600 metres from the ancient settlement and north of the modern-day harbour (Figure 0.5). Of the five EIA burial grounds, the Skoubris, Palia Perivolia and Toumba cemeteries contain the most undisturbed and wealthy burials (Figure 0.6). The East and South burial grounds and the two tombs found in the area of the Khaliotis will be excluded from this study because reports of their systematic excavation have not yet been published.

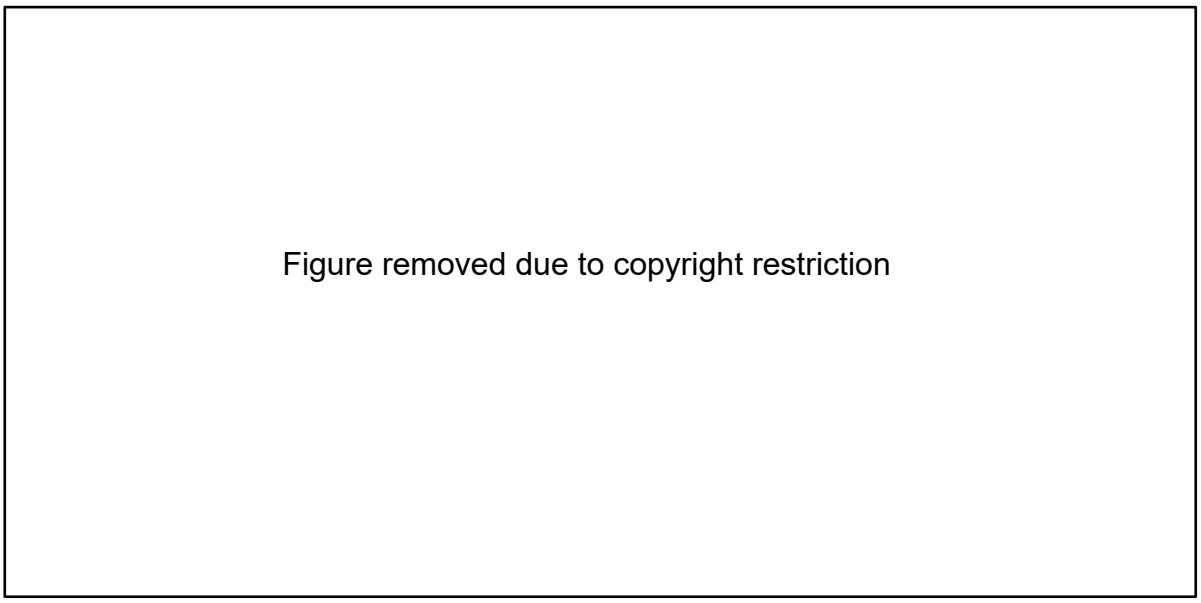


Figure 0.4 **Aerial view of the archaeological site at Xeropolis, Lefkandi.**
Lemos (2016), Figure 1.

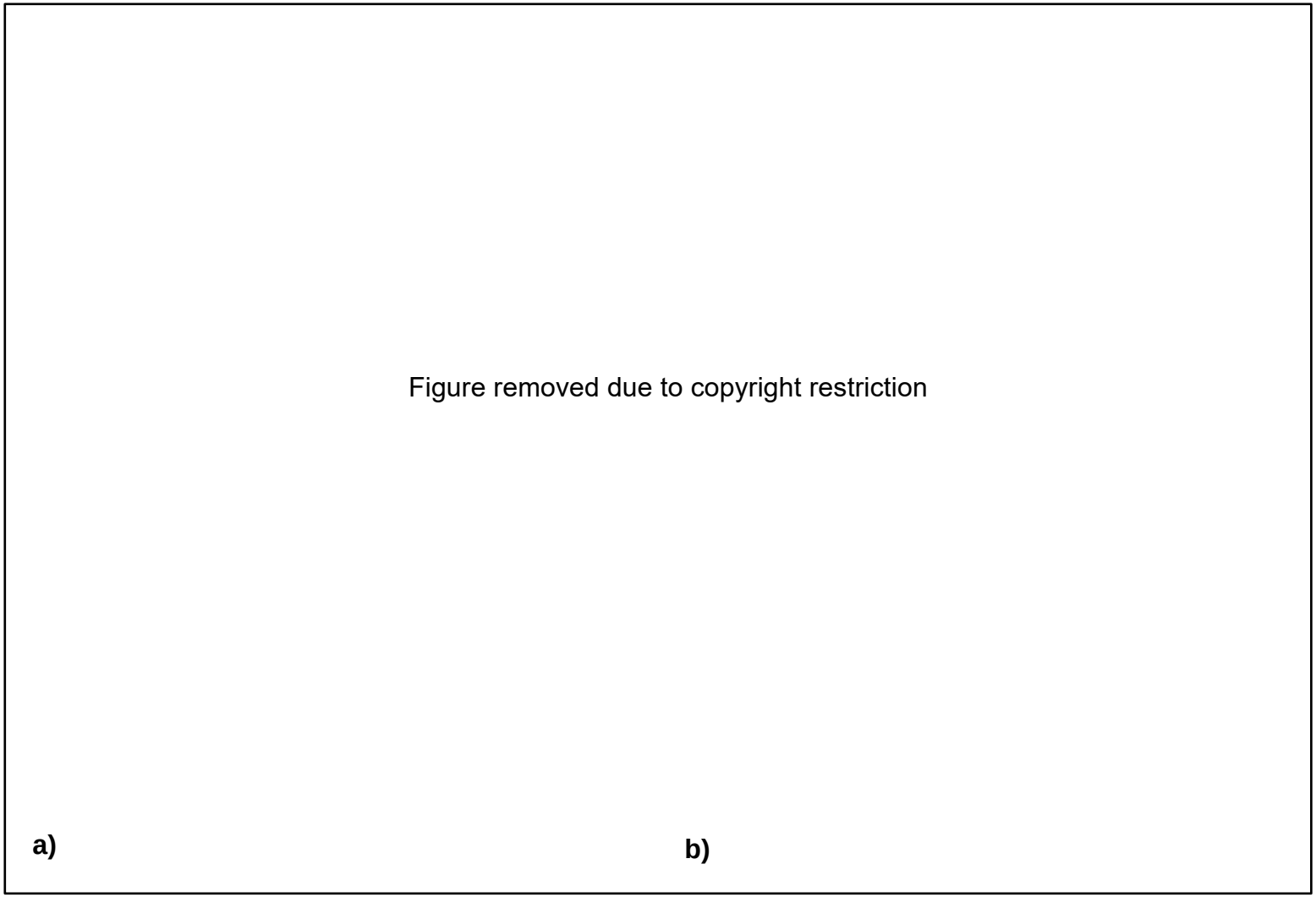


Figure 0.5 **a) Lefkandi Cemetery Plan; b) Pre-1993 aerial photograph showing the location of the Skoubris, Palia Perivolia and Toumba cemeteries outlined in red and the Toumba building indicated in white.**

a) Popham and Lemos 1996: pl. 2; b) Popham et al. 1993: pl. 2(b).

The settlement at Xeropolis was abandoned in c. 700 BCE, an event that may be associated with the Levantine war (Lemos 2020:879). The known cemeteries at Lefkandi end prior to the end of the settlement's use at around 825 BCE. A Bronze Age (BA) cemetery is yet to be found. The location and chronological phasing of the three cemeteries are as follows:

The Skoubris cemetery contains the earliest burials out of the three cemeteries and has the longest occupation phase dating from the Sub-Mycenaean (SM) period up until 825 BCE (Figure 0.6c). The Skoubris cemetery is located approximately 600 metres northwest of Xeropolis (Figure 0.5). The boundaries of the cemetery have not yet been identified, thus there is potential for more tombs to be attributed to the burial ground that have not yet been located (Popham et al. 1980).

The Palia Perivolia cemetery was established in the Middle Protogeometric (MPG) period, and its use ended in the Sub-Protogeometric (SPG) II phase. The burial ground is located approximately 500 metres northwest of Xeropolis and 100 metres southwest of the Skoubris cemetery (Figure 0.5–Figure 0.6a). Of the three Lefkandi cemeteries, the Palia Perivolia is the only one that has its boundaries exposed and well defined (Popham et al. 1980).

The Toumba cemetery is unique in that it was formed immediately after the destruction of the Toumba apsidal building that was intentionally concealed in the MPG period (Figure 0.5). This was following the burial of two elite individuals who were housed in the building (Figure 0.6b, d). The Toumba cemetery is located approximately 50 metres west of the Palia Perivolia cemetery and directly in front of the Toumba building. The burial ground dates from the MPG period to 825 BCE and has been largely excavated (Popham et al. 1980; Popham et al. 1993; Popham and Lemos 1996). There is a significant increase in the quantity and variety of grave goods there and especially foreign imports, compared to the Palia Perivolia and Skoubris cemeteries, as well as any known burial grounds in EIA Greece.

Figure removed due to copyright restriction

Figure 0.6 **a) Shaft graves of Palia Perivolia cemetery; b) female inhumation burial with gold disks in the Toumba building; c) cist graves of Skoubris cemetery; d) cremation burial in bronze amphora in the Toumba building.**
Popham et al. 1980, a) pl. 197(a), c) pl. 193(d); Popham et al. 1993: b) pl. 15(a), d) pl. 16(b).

1.2 Research Questions and Aims

1.2.1 Research Question

The primary research question of this thesis is:

How can maritime connectivity in the Early Iron Age Aegean and Eastern Mediterranean be traced through patterns in the funerary assemblage, and the distribution of foreign imports in the Skoubris, Palia Perivolia and Toumba cemeteries at Lefkandi?

1.2.2 Aims

To answer the primary question, this thesis will address the following aims:

1. Identify statistically significant trends in the distribution of grave objects in the Skoubris, Palia Perivolia and Toumba cemeteries, both individually and collectively.
2. Determine if the distribution of certain assemblages of grave objects and foreign imports required for funerary practices, can reveal maritime trade networks and trade routes operating in association with Lefkandi.
3. Identify potential provenances of metal goods found in the Lefkandi tombs that could reveal a wider scope of foreign trade and exchange contacts.
4. Identify if the demand for certain grave object assemblages which included foreign imports at Lefkandi influenced the nature of exchange with trade contacts.
5. Determine if the maritime connectivity enabled a mortuary economy in the EIA Aegean and Eastern Mediterranean.
6. Determine what part maritime trade played in the funerary culture at Lefkandi.

CHAPTER 2. LITERATURE REVIEW

2.1 History of Lefkandi Field Research and the Production of Mortuary Data

The site of Lefkandi was first excavated in 1964 by the British School at Athens, under the direction of Mervyn Popham and Hugh Sackett. The preliminary reports were published in 1967, providing concise information on the excavation of the settlement, LH pottery and significant finds including *exotica* (Desborough et al. 1970:21–30; Popham and Milburn 1971:333–352; Popham and Sackett 1968; Sackett and Popham 1972:8–19; Sackett et al. 1967:33–112). It should be noted, that the term *exotica* is commonly used by scholars for describing exotic imported goods in studies relating to pre-Archaic Greece and will be further discussed in Chapter 2.4.

In 1968 burial plots were located on a hillock north of the modern harbour and 600 metres from the ancient settlement. An excavation permit was granted by the Greek Archaeological Service and by 1970 five cemeteries were located. A considerable number of the burials contained very rich exotic goods that, prior to the excavation of Lefkandi, were not found on that scale in any other region in EIA Greece. In 1979 and 1980 the results of the archaeological excavation of the cemeteries and the analysis of the pottery from Xeropolis was collated and published in *Lefkandi I* (Popham et al. 1980). These volumes presented a detailed catalogue of all the tombs and their associated finds in the Skoubris, Palia Perivolia, East and Toumba cemeteries, up until the 1970 season. The volumes showcased the importance of the site to the academic community and forced scholars to revisit preconceived ideas of what they referred to at the time as a Dark Age period (Coldstream 1968; Desborough 1972; Langdon 2008; Morris 1998; Snodgrass 1971).

The publication contains some inconsistencies in the identification of objects, burial practices and gender and is likely a consequence of the variability in interpretation by the individual excavators over time. An attempt to rectify these inconsistencies was undertaken by the author in her Honours research (Newton 2016) specifically addressing certain gender criteria and cross-examining burial methods, in order to

objectively analyse the mortuary data. The re-evaluated dataset from 2016 has been used in this current thesis and the assumptions remain current.

In 1981 Popham located the large apsidal Toumba building that revolutionised understanding of early Greek history and attracted a great deal of scholarly attention (Catling and Lemos 1991; Lemos 2001:215–225, 2003:7–8, 2004a:27–33, 2004b:39–40, 2005a:30–34, 2005b:50–52, 2006a:34–38, 2006b:62–63, 2009:51–54; Morris 1998; Popham 1994; Popham and Lemos 1996; Popham et al. 1979, 1993). It is to date, the largest PG structure that has been found in Greece and housed two extremely wealthy burials which has been called by some, a *Heroon* or locus of a 'hero cult', in response to the cemetery that formed directly after its destruction in the MGP period (Lemos 2001:216). The cemetery was linked to the Toumba building, as a burial ground for the ruling class (Morris 1998). It was suggested by Lemos (2002:218) that burials were situated in the Toumba cemetery to associate with the group of high ranked elites or alternatively pay homage to, and claim kinship with, the two *Homeric* style warrior burials housed in the Toumba building. In 1991 and 1993 the results from the excavation of the building and burials were recorded in *Lefkandi II* (Catling and Lemos 1991; Popham et al. 1993).

Figure removed due to copyright restriction

Figure 1.1 **Schematic plan of the Protogeometric building known as the Toumba building.** Popham et al. 1993: pl. 5.

Figure removed due to copyright restriction

Figure 1.2 **Plan of the two elite warrior burials (TB 1 and TB2) in the Toumba building.** Popham et al. 1993: pl. 13.

Popham and Lemos edited and published *Lefkandi III* in 1996 detailing the Toumba cemetery plan and associated findings. The same recording system was followed that was implemented in the *Lefkandi I* volumes and the same inconsistencies in the detailing of these burials were continued. Fortunately, in all of the *Lefkandi* volumes the thoroughness of the descriptions of the tomb contents and well documented plates allow for adequate revision of the mortuary data. In 2002 Lemos published an

up-to-date survey and collation of studies of Aegean archaeology for the late 11th and 10th centuries BCE. Identification of Near Eastern imports in the Aegean that had been published at that point, were catalogued as an appendix (Lemos 2002:226). The Toumba cemetery remains a focus for scholars and as a result has produced a large corpus of additional publications (Arrington 2015:1–30; Boardman and Kurtz 1971; Driessen and Crielaard 1994:251–270; Evely et al. 1996; Karageorghis 2001; Harrell 2014:99–104; Lemos 2001:215–225, 2002; 2003:7–8, 2004a:27–33, 2004b:39–40, 2005a:30–34, 2005b:50–52, 2006a:34–38, 2006b:62–63, 2006c:505–530; 2009:51–54; Lemos and Kotsonas 2020; Popham et al. 1982b:169–74; Popham 1995:103–107; Toffolo et al. 2013).

Since 2003 field excavation and research has been under the direction of Professor Irene Lemos of the University of Oxford. A grant from Packard Humanities Institute made it possible to purchase the land of the site for excavation (Lemos 2009:51–54). Excavation seasons occurred from 2003–2016, followed by extended study seasons. According to Lemos (pers. comm. 2021), reports of the most recent excavations including the complete publication of the Toumba cemetery is currently underway and highly anticipated. The recent publication by Lemos and Kotsonas (2020) has been monumental for collating the up-to-date study of the material culture and society of early Greece and the Mediterranean, from the 14th to early 7th centuries BCE. Though it does not present direct field research of Lefkandi, it discusses Lefkandi in context and in light of the most recent archaeological findings. Thus, it is an essential resource for any analysis or discussion of Lefkandi and its role in the EIA Aegean. *Lefkandi I* (Popham et al. 1980), *Lefkandi III* (Popham and Lemos 1996), Lemos (2002) and preliminary excavation reports (Popham, et al. 1982a; 1982b) were the sources that presented the artefact assemblage from the tombs and contributed to the compilation of data that were analysed for this study.

2.2 Aegean Early Iron Age – Trade Routes and Key Players

The Eastern Mediterranean was systematically linked to the Aegean and further west to the Tyrrhenian Sea, by the end of the LBA largely as a result of the rise of the Mycenaean palaces (Sherratt 2020: 251). The collapse of the palatial centralised

control around 1200 BCE saw the economic and political connections that linked Mycenaean Greece to the states of the Eastern Mediterranean, Egypt and the Near East break down (Deger-Jalkotzy 2008:387–392). This in turn provided new opportunity for leaders of hierarchical regional groups outside of the palatial system to gain more control of newly available maritime networks and coincided with an increase in regional mobility of disintegrated Mycenaean governing and military groups (Lemos 2020:192). This manifested in the 12th and 11th centuries BCE where peripheral regions to the palaces showed economic and cultural revival. The Ionian Islands, northwestern Peloponnese, central Greece, the Euboean Gulf, Aegean Islands, Dodecanese and the Cyclades had now increased their surplus production and were in possession of their raw materials and items manufactured for export that were previously taxed by the palatial centres (Lemos 2020:193; Sherratt and Sherratt 1993). This development went from palatial centres receiving imported goods via interregional exchange, to organized small scale societies of the 12th and 11th centuries BCE becoming linked by partially interacting networks (Liverani 1990; Sherratt and Sherratt 1993; Crielaard 2006; Eder and Pruzsinszky 2015). A population decline appears to have occurred in regions that were once under palatial control. However, areas located along important seafaring routes such as Euboea appear to rise (Lemos 2020:192).

At Lefkandi there is a substantial scholarly debate concerning maritime networks and trade centres around 1) identifying the main agents and carriers of exchange and trade; and 2) who controlled maritime trade and under what socio-political and economic structure during the BA and EIA (Crielaard 2006; Dickinson 2007:255; Sherratt and Sherratt 1993; Lemos 2020:204). The principal agents of connectivity favored in these studies are identified as chiefs, merchants, pirates and members of the local elites who seized the opportunity to establish long distance contacts (Lemos 2020:204). Euboeans, Cypriots or Phoenician are at the forefront of this hypothesis and evidence of their activity in the Aegean has been expanded to make a strong case for them being the main carriers of goods (Dickinson 2007:206; Morris 1997; Papadopoulos 1997). Crielaard (2006:271–297) proposes that a shift occurred following the fall of the Mycenaean palatial centre from centralised power to local authorities holding power, what he termed the "*wanax* to *basileus* model". A rise of the local elite prompted a regional phenomenon seeking to preserve social inequality,

power structures and maintaining external contacts while emerging into the EIA (Crielaard 2006:291–292). The theory is a plausible way to explain the continuity of socio-political hierarchal systems and maritime trade relations represented by the elite burials and *exotica* found in the cemeteries at Lefkandi.

The relationship between the Near East and Greece was important to the early trade networks, however there is some debate about how this relationship was manifested. Coldstream (1998:356) suggested that Phoenicians and Euboeans worked closely together through personal and cultural connections and not just for the sake of trade. Boardman (1999:271) provides evidence that Euboean pottery is found more than any other western Aegean pottery type in the Near East prior to the 8th century indicating demand for these goods. It is evident that identifying a main trader or carrier of exchange is difficult when addressing such a dynamic and complex operation. This highlights the significance of this study in that the nature of exchange needs to be further explored in order to understand what the contributing factors are for forming and maintaining certain relations with Lefkandi. Lemos (2020:193) suggests that if the main agents of connectivity and trade networks remain chiefs, merchants and pirates, then they may have all been engaged at different localities and levels. This is conceivable throughout the EIA and is certainly moving in the direction of a more multidimensional explanation.

The study of circulation of pottery, metal objects and *exotica* assist in tracing the contacts and cross-Mediterranean connections in the EIA (Eder and Jung 2005; Jung and Mehofer 2013). The presence of Cypriot vessels and Egyptian scarabs and faience beads in LH IIIC tombs in Rhodes and Attica attest to the continued connections that operated between the Eastern Mediterranean via the Aegean Islands (Voutsaki 2001:209–211; Zervaki 2011). Crete has always been a key player in Mediterranean maritime routes and at the beginning of the 11th century, the Greek mainland, Cyprus and the Dodecanese appear to be receiving exported pottery from the island (Lemos 2020:195). Cyprus also played a major role for both their intermediary position in the Mediterranean and the abundance of copper resources and continuity of copper and bronze objects traced between Cyprus and Greece (Jung and Mehofer 2013:182). New supplies of copper were discovered in the 11th century in the Aegean which Kiderlen (et al. 2016) argues may have resulted in the

withdrawal of existing contacts or the nature of contact itself changed. This is an interesting notion and demonstrates that the distribution of these materials is what we base our understanding of trade on, and further study of their circulation is required to explore and detect trade networks.

By the end of the 11th century, regional networks were becoming more obvious with distinct regional styles of pottery production (Deger-Jalkotzy 2006:174). The 10th and 9th centuries trade networks began increasing in magnitude both on the Greek mainland, the Islands and throughout the Aegean and Mediterranean. This can be seen in the distribution of a type of amphorae found in the Central and Northern Aegean (Gimatzidis 2010: 258–269; Kotsonas 2012:154–162; Lemos 2012), as well as an increase in eastern Mediterranean and Egyptian imports in the form of bronze and gold objects, faience and glass ornaments, found in elite burials at Lefkandi, Knossos and later in Athens (Lemos 2002:226–227; Dickinson 2006:206–218; Karageorghis et al. 2014). According to Lemos (2002:204) the eastern Mediterranean was receiving Greek and Euboean exports, but they were mainly found on settlement sites and limited largely to open ceramic vases, whereas Cyprus was placing Greek goods in tombs found in Salamis and Amathous demonstrating a wider variety of object types. Lemos further argues that it is difficult to identify exactly what else was being exchanged and the nature of this interaction considering there is substantial variability of objects within multiple contexts. This highlights the need to better understand the dynamic nature of maritime trade in the EIA.

Intermediary regions such as Euboea, Cyprus, the Aegean and Ionian Islands had clearly taken advantage of their long-standing position as trade powerhouses in this period. Although the size of the communities of both carriers and agents are argued to be too small to control trade networks, they clearly played a principal role in their operation in the Mediterranean and Aegean EIA (Horden and Purcell 2000:375–388; Murray 2017). Lefkandi is important because it could be considered an exception to this idea. Its conspicuous consumption of objects and access to *exotica* from the Eastern Mediterranean from the BA settlement occupation to EIA could support the idea that it was in partial control of Aegean exchange networks, certainly for anyone travelling to the Euripus straits or possibly to the Greek mainland (Lemos 2020:875). Therefore, what is paramount, is that continuity of contacts and information on

organising seafaring and trade routes appears to have survived through generations from the LBA with Lefkandi being a prime example (Horden and Purcell 2000:376).

The 9th century appears to have been a period of relative stability and growth in this region (Dickinson 2017:255). While some LBA practices continued, it is evident that Greece has always demonstrated regional variability even in their response to Near Eastern influence. The agents and communities of the 12th to 9th centuries that largely contributed to shaping and maintaining widespread connectivity, arguably characterised the formation of the Greek *polis* in the 8th century (Lemos 2020:204). Thus, this study places emphasis on detecting maritime trade networks and trade routes operating in association with Lefkandi to understand maritime connectivity in the EIA Aegean and Eastern Mediterranean.

2.3 Maritime Connectivity and Trade from the Bronze Age into the Early Iron Age

Connectivity within the Aegean and the wider Mediterranean is commonly understood as the mobility of people and objects, mode of communication and travel, and any affiliated social exchanges (Knapp and Demesticha 2017:53). The study of maritime mobility and interaction between coastal communities and islanders in the Aegean and Mediterranean has demonstrated that seafaring in this region occurred as early as in the Neolithic (Broodbank 2006, 2013; Knapp 2010; Leppard 2014; Polzer 2011). A substantial amount of material evidence dating to the EBA attested to seafaring or as Broodbank (2010:250) refers to, *voyaging* for the purpose of trade of exotic goods or securing foreign relations. This has resulted in the idea that seafaring only developed contiguously with dynamic cultural and social systems in the Aegean and Mediterranean during the EBA (Horden and Purcell 2000:9; Knapp and Demesticha 2017:53; Knappett et al. 2008:1010; Green 2018). In Lefkandi, foreign trade was clearly operating with evidence of *exotica* and other non-Greek objects found in both the settlement and cemetery contexts dating from the BA to the end of the EIA (Evely 2006; Popham et al. 1980; Popham and Lemos 1996).

Coastal communities relied on their geographical position and natural or artificial ports and harbours—the hubs of trade and exchange—to establish their connecting

role in the wider maritime trade system that strongly relied on maritime contacts (Horden and Purcell 2000; Leidwanger and Knappett 2018:11). Lefkandi was one of the largest sites in the central Aegean and was located between two small harbours (Evely 2006). It has been argued that Eretria, located southeast of Lefkandi, could have been the original port used by the people of Lefkandi (Davidson et al. 2010). Following the abandonment of Lefkandi in c. 700 BCE, nearby Eretria began to flourish. Lemos (2020:880) suggests that Lefkandi could not accommodate the new socio-political developments that are linked to geomorphologically flat sites which emerged at the end of the 8th century BCE. She argues that as a result many of the members of the local elite could have relocated to Eretria and played a crucial role for the site's advancements. Thus, it is a plausible idea that Eretria was associated to Lefkandi in the EIA.

EIA iconography, documentary evidence and imported objects from funerary and settlement sites such as Lefkandi, are used in conjunction with comparative analysis of these contiguous periods, in order to develop interpretative models for analysing trade and contacts within the maritime cultural landscape (Dickinson 2020:94; Oka and Kusimba 2008; Westerdahl 1992). Constantatakopoulou (2007), Malkin (2011) and Tartaron (2013:185–203) are among a number of authors who have expanded on Horden and Purcell's (2000:365) earlier work and developed an alternative framework for analysing maritime cultural landscapes. The framework was constructed to show Mycenaean maritime connectivity and the balance of interaction from a local level to international level using geographical, temporal and material scales (Tartaron 2013:185). This model was based on the LBA and the idea that the whole Aegean was a regional sphere consisting of multiple small worlds which remains the current school of thought (Knapp and Demesticha 2017:53; Tartaron 2013:185). This model has the ability to be applied to other areas and periods such as this study of Lefkandi in the EIA. Based on this framework Lefkandi could potentially be analysed within all four spheres of interaction described as 1) coast-scape, 2) maritime small world, 3) regional/intracultural and 4) interregional/intercultural (Tartaron 2013:185). This highlights the importance of Lefkandi in that it possibly had a multifaceted approach to operating and interacting with exchange networks both locally and internationally.

Approaches to analysing maritime connectivity and trade have evolved over time. In the 1970s under the processual archaeology approach, attempts were made to establish a relationship between the distribution and circulation of material and their underlying social mechanisms (Renfrew 1975:3–59). While there is still uncertainty as to whether any of these models can be considered to be directly predictive, the idea has promoted scholars to rethink approaches to maritime connectivity (Knappett et al. 2008:1020). In this way, Broodbank (2000) as well as Leidwanger and Knappett (2018:2) advocate adopting a network approach and using methodologies that analyse the behaviours, experiences and motives of maritime movement and exchange by testing certain network modelling of the Mediterranean historical and archaeological record (Leidwanger et al. 2014). Examining the predominant model of maritime connectivity is relevant to the study of Lefkandi, as it will shed light on the continuity or discontinuity of maritime trade networks across regions and periods (Leidwanger and Knappett 2018:9–10).

The application of diverse network thinking poses questions to all studies under this model. One that is considered relevant for this study is: whether networks were continually reinventing themselves according to evolving socially formed variables from technologies to produce and markets (Leidwanger and Knappett 2018:10)? This concern brings to the fore the notion of institutional or communicative memory in Aegean and Mediterranean maritime networks. EIA maritime networks, sea routes and cultural traditions have been evaluated as possibly being inherited or shaped by the LBA experience rather than being reinvented (Eder and Lemos 2020:190; Leidwanger and Knappett 2018:10–11). This question promotes a discussion on network thinking for maritime connectivity in the Aegean and Mediterranean and has the potential to shape the way we look at the funerary data from Lefkandi (Batty 2005; Broodbank 2000; De Nooy et al. 2018; Eder and Lemos 2020; Knappett et al. 2008; Nuñez 2020).

2.4 Importation of Exotica and Identifying Social Identities with Grave Goods in Early Iron Age Greece

The interpretation of imported *exotica* in the archaeological record ranges considerably depending on the focus of study. Murray (2018:221) defines it as "finished goods found in regions outside their "cultural unit" of manufacture"; in relation to depositional contexts in the Late Bronze to EIA Aegean. Whereas Vianello (2011:vii) argues that *exotica* are "symbolic tools of distinction primarily used in contexts of competition", in order to better understand intercultural, social and economic contacts in the BA Mediterranean.

Exotica found in EIA burials and settlements have sparked much scholarly interest with the majority of such objects found in the Lefkandi cemeteries (Lemos 2002). Their presence provides evidence that, even during the EIA, there were still areas of the Greek world that remained part of a long-distance trade network (Arrington 2015:1–30; Boardman 1998; Catling and Lemos 1991; Lemos 2002; Morris 1998; Popham 1994; Popham and Lemos 1996). Since the 1970s, Snodgrass (1971), Desborough (1972) and Coldstream (1977) have realised that local exportation was still active on the mainland and the demand for *exotica* remained an important aspect of funerary practice as evidenced at Lefkandi. Lemos (2002:212, 1998:45–58) argues that sites such as Lefkandi have a higher quantity of *exotica* in burials because they were part of the Euboean *koine* (Figure 1.3). That is, that widespread trade networks were produced by a dynamic process and Lefkandi's strategic position in the Aegean allowed for control over trade.

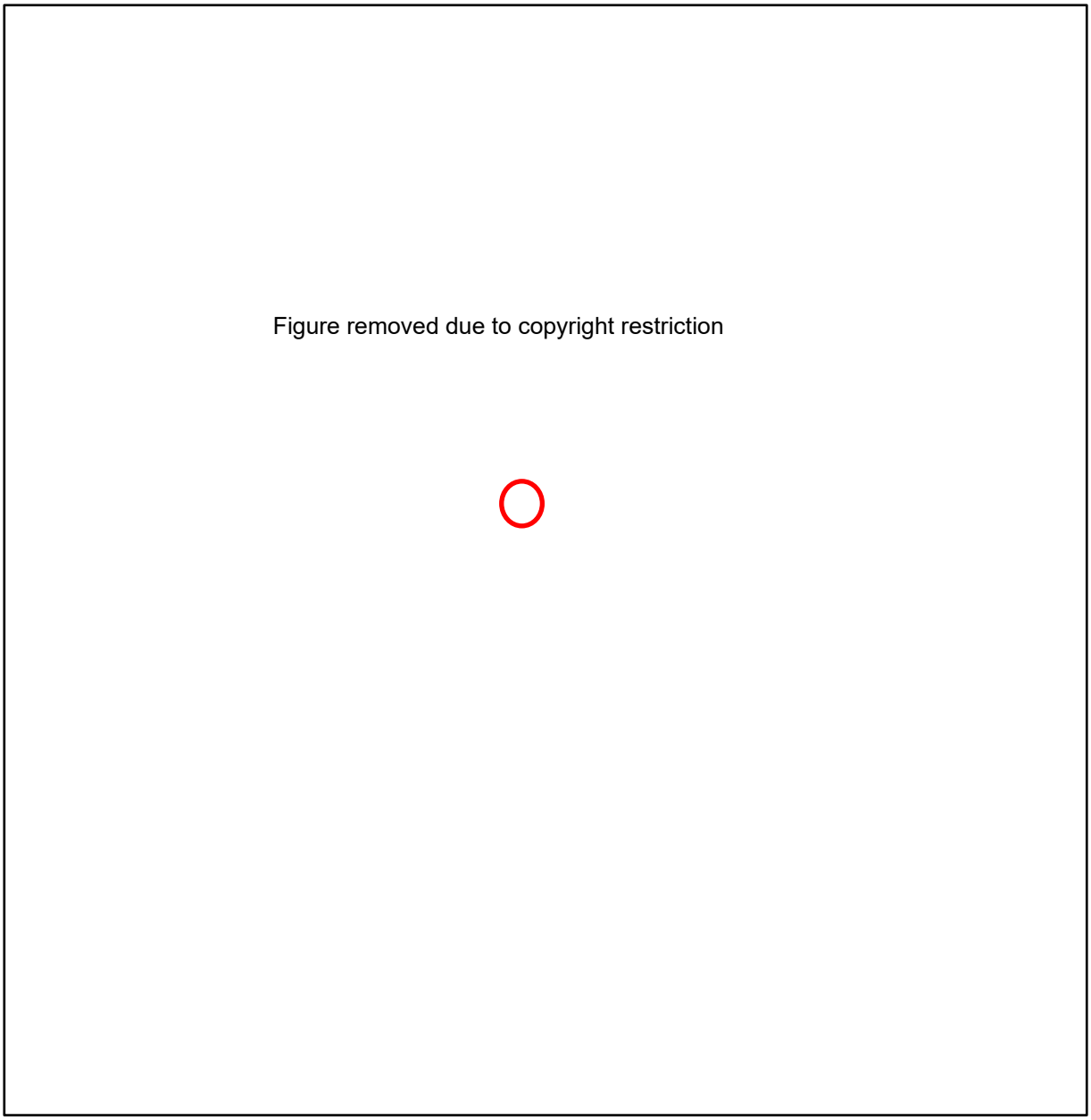


Figure 1.3 **Map of the Euboean koine within the Aegean.**
Approximate location of Lefkandi circled in red.
Lemos 2002: Map 7.

Research into social organisation prompted archaeologists to question the demand for *exotica* and, in turn, what it represented in EIA societies (Arrington 2015:1–30; Coldstream 1977; Desborough 1972; Lemos 2001:215–25; Lemos 2002; Popham and Lemos 1995:151–157; Snodgrass 1971). According to Lemos (2002:215), trade has been the main catalyst for interaction between Aegean communities since the Neolithic period. The diversity of grave goods in the tombs at Lefkandi makes it apparent that the demand for precious objects increased and coincided with its

involvement in securing connections with the Eastern Mediterranean and wider Aegean regions (Lemos 2002:216). This is attested by the evidence of eastern imports found at Lefkandi at the same time Euboean pottery was found distributed in Crete, Cyprus, Tyre, Tel Dor and Bassit on the Levantine coast (Lemos 2002:216). Euboeans, and more specifically those at Lefkandi, appear to have possessed an eagerness to forge links and maintain these connections. This shows that exchange was occurring and highlights the type of commodities that were being traded. The nature of exchange, however, needs to be further explored in order to understand what the contributing factors are for forging and sustaining trade relations.

Lemos (2002:16) suggests that the requirement for *exotica* at Lefkandi was due to the demand of the local aristocracy and their Aegean and Eastern Mediterranean allies. This idea is plausible under the suggested socio-political paradigms for Lefkandi. That is interpreted as, the involvement of interactive networks within and outside the Aegean that incited the development of complex stratified societies from less organised communities (Childe 1957:3; Lemos 2002:216; Service 1975:5). The limitation of socio-political model's has been observed by Arrington (2015:12–15), who suggests that frequent interaction and exchange between Cyprus and the Near East were stimulated by talismanic practice and fostered in the mortuary landscape at Lefkandi. Continuity of funerary practices and foreign trade relations at Lefkandi shows that mortuary belief systems were operating and played an important role in funerary contexts and trade relations (Blegen 1952:279–294; Boardman and Kurtz 1971; Dunbabin 1957; Anderson 1973; Karo 1943; Papadopoulos and Schilling 2003:1–370; Smithson 1968:77–116, 1974:325–390).

Scholars have questioned the purpose of the explicit use of *exotica* in mortuary contexts (Ames 2008:487–514; Arrington 2015:12–15; Bernbeck 2008:543; Lemos 2002:217–219 Whitley 2020). In the case of the Toumba Cemetery, Popham's (1995:32) statement that the inclusion of *exotica* and conspicuous consumption of grave goods was to symbolise wealth and to elevate status, appears to be the most plausible and accepted explanation. However, in the Skoubris and Palia Perivolia cemeteries, the tombs that contained *exotica* were in no way more prestigious than tombs without foreign imports (Newton 2016:126). Thus, it could be proposed that the function of imports and *exotica* could possibly be a memento that signifies a

member of a merchant family (Newton 2016:126). This idea is shared and expanded on by Murray (2018:228) who argues that the function of 13th to 10th century *exotica* is not associated with just the elite and could also be related to common individuals or in affiliation with superstitious beliefs within a larger ritual context.

Processual archaeology approached socio-political models by advocating for more interdisciplinary and scientific analysis (Beck 1981; Parker Pearson 1999; Tarlow and Nilsson Stutz 2013). Studies have extended beyond the function of *exotica* and focused on defining social identities such as gender or status, on the basis of distinctive funerary objects being placed in the tombs (Brown 1981; Chapman et al. 1981; Ivou 2020: 75–87). In the case of Lefkandi, Sackett's criteria were based on certain pottery groups, dress pins and jewellery as indicators of a female burial and weapons and tools for male graves (Popham et al. 1980:206). This idea is provable in the case that osteological remains are also present in the tombs and tests can determine the sex conclusively. However, issues have arisen with burials that undermine this criterion, such as the female grave in the Toumba building and the rich Athenian lady buried in the Areopagus, that contain both jewellery and weapons (Popham et al. 1993; Smithson 1968).

Lefkandi is unique in that there is no evidence of skeletal remains or carbonised remains in approximately 80% of the tombs. Thus, it is not possible to cross examine the majority of tombs at Lefkandi with osteological analyses. There is speculation that the corrosive effect of the soil could have contributed to the decay of an increasing number of skeletons in the Toumba burial, however, the chemical analysis of the soil determined it could not be attributed to the total decay of such a high number of bones (Lemos 2012:161–162). These types of burials have also been hypothesised as being token burials or honorific memorials (Newton 2016:66; Popham et al. 1980:212–216). In this way, the grave objects are not only offerings to the dead but are possibly used as a symbol in place of the body itself. This study seeks to expand upon what we understand about the significance of these objects through considering the role of maritime trade in the funerary culture at Lefkandi.

CHAPTER 3. METHODOLOGY

3.1 Assemblage

The assemblage consists of a total number of 1835 grave objects deposited across 189 tombs in the Skoubris, Palia Perivolia and Toumba cemeteries. The Toumba cemetery contains 1228 objects in 84 tombs which is a significantly higher quantity then the 313 objects in 65 tombs deposited in the Skoubris cemetery and 294 objects in 40 tombs placed in the Palia Perivolia cemetery. A list of all grave objects deposited in the tombs for each individual cemetery is provided as Appendices A, B and C in this thesis. This assemblage of grave objects is what has been collated and catalogued to form the dataset that this study will use to analyse.

As previously stated in Chapter 1, the data has been re-evaluated for the purpose of analysing the objects under the current classifications provided by the most recent publications (Lemos 2002; Popham et al. 1980, 1993; Popham and Lemos 1996). This study applies relational and statistical analyses which requires the data to be uniformly recorded to avoid skewing the results. Advancements in statistical software has allowed for more systematic analyses of this mortuary data which was not available in the past. Thus, the features of the assemblage will be described simultaneously with the points at which the data were re-evaluated and will be explained in the subsequent sections, as part of their individual application into categorical data in Chapter 3.2.2.

3.2 Databases, Catalogue and Recording Methods

3.2.1 Database (Microsoft Access)

The basis for this study is the published material available for the Skoubris, Palia Perivolia and Toumba cemeteries at Lefkandi (see Section 2.1). This data has been compiled into a database using Microsoft Access software, which is a relational computer database that has been used to record and analyse the imported objects found in each individual tomb. This program was chosen for its ability to catalogue a large dataset and to create ‘queries’, which are criteria-based searches of the data and allow for statistical analyses. The database was set up to record specific

categorial variables created using forms. The description of the assemblage (burial objects) will be discussed in association with their recorded category.

3.2.2 Categorical Data

The categorical data is defined as a collection of the variables used in the statistical analysis and divided into groups. These following groups are listed and discussed in way of their methodological application.

Tombs

The distinction between the words ‘tomb’ and ‘burial’ is important for understanding the data discussed in this study. According to Darvill (2008:463:63) the definition of a ‘tomb’ is the architectural structure of a grave to enclose human remains; and the meaning of a ‘burial’ is the practice or action of burying human remains. Lefkandi also exhibits a substantial number of cremation pyres nearby to the cemeteries which contain grave objects suggesting they may have also functioned as a grave. Unlike the tombs, the pyres are not sealed contexts and have been largely disturbed by the elements and modern ploughing. This has resulted in a scatter of unstratified damaged objects across the site which makes it impossible to associate to a specific pyre. For this reason, the objects found in the pyres have limited research potential and are not included in this study.

The cremation pyres have largely contributed to scholars identifying cremation as the most common burial practice at Lefkandi and EIA Greece (Boardman 1971:67; Popham et al. 1980:210). However, the data demonstrates that 80% of the tombs do not contain any skeletal or carbonised remains. The most likely hypothesis for this practice is that they were token burials; whereby the body was probably cremated and to a large extent destroyed in the process or the individual died too far a distance from the settlement to be brought back for burial (Boardman 1971:52; Popham et al. 1980:212). This is important to note because the use of token burial suggests an additional burial practice at Lefkandi other than cremation and inhumation. If this is the preferred mortuary practice, it would change the implications of burial practices at Lefkandi for the EIA.

In the case of the categorical data, in the *Lefkandi* volumes the tombs in all three cemeteries have been allocated a tomb catalogue number. In the case of having two burials in one tomb complex, they have provided an additional suffix (for example A or B). This occurred in only the Skoubris (S5, S5A, S25A and S25B) and Toumba cemeteries (T12A, T12B, T23, T23A, T62A and T62B). However, not all tomb complexes with multiple burials were treated by this approach and there is no reason stated in the *Lefkandi* volumes for why this decision was made. Thus, where it was possible to make a distinction between two individual burials, either by chronological means or physical, such as a dividing wall, isolated chamber or shaft in the tomb, they were recorded as separate burials.

In the case of where multiple burials or deposits that are confined to one tomb are present: this could be seen in the form of individuals being buried deliberately together at the same time and burials that cannot be dated and have remained recorded under a single burial tomb number. Of the burials that have been separated, they have attained their original catalogue number published in *Lefkandi I* (Popham et al. 1980) and *Lefkandi III* (Popham and Lemos 1996) with an additional prefix, so as to keep citation consistent. As a result, this methodology proposes a new tomb count for the Skoubris and Toumba cemetery whereas the Palia Perivolia cemetery remains at 40 tombs. The Skoubris cemetery originally recorded in *Lefkandi I* (Popham et al. 1980) as having 64 tombs, will adopt a total of 65 tombs. The Toumba cemetery according to *Lefkandi III* (Popham and Lemos 1996) has a total of 83 tombs whereby the new count proposes 85 tombs. Therefore, this thesis proposes an overall tomb count of 189, opposed to the 187 tombs recorded in *Lefkandi I* and *Lefkandi III*.

In order to analyse the data from the Skoubris, Palia Perivolia and Toumba cemeteries individually and collectively, a catalogue prefix was allocated to each tomb number. This was to group and specify the tombs using the letter ‘S’ for Skoubris, ‘P’ for Palia Perivolia and ‘T’ for Toumba. The nature of the Toumba cemetery is different to the Skoubris and Palia Perivolia cemeteries, in way of its association with the Toumba building burials. The two burials contain a substantial amount of rich imported goods and their exclusion would only skew the analyses. For this reason, the analytical approach was to include the two burials in the Toumba

building as part of the Toumba cemetery dataset but assign the prefix ‘TB’ and the recorded male cremation burial as TB1 and TB2 for the female inhumation burial.

Grave Objects

The objects in the form of grave goods are fundamental to this study. Although this study is largely focused on the trends of eastern *exotica* and foreign imports, it is important to understand the distribution and circulation of all the objects in order to provide the context. For this reason, this study analyses the trends of all the grave/burial objects. This allows for a broader understanding of the trends occurring in the cemeteries, as well as an opportunity to see how foreign imports, local (Euboean) and other non-local Greek objects interact within the archaeological context.

Object Material

An object group was created in the database as a sub-form that was linked to the tomb group. Each object that was found in the tombs were allocated a catalogue number. Two additional material fields were recorded, the first being object material such as metal or pottery, and the second field being a more specific classification of the material which was recorded as ‘sub-material’ and included material types such as gold or iron.

Object Type/Shape

A similar method was adopted in relation to object type and/or shape. The main form allows for a description such as jug and the sub-type/shape form complement the field with a detailed specification such as ‘miniature’ jug. Classification of certain shapes and objects did prompt some issues with inconsistencies in identifying some object sub-types but not others, even when they are visually the same, which is somewhat expected with multiple authors and recording over a long period of time.

Object Manufacturer/Origin

One of the most important categories recorded for this study was the objects manufacturing location and a sub-form specifying the place of origin. Out of 1835 objects, only 64 were found to be foreign imports, distributed between the three

cemeteries at Lefkandi. Defining imports here as foreign is a deliberate choice and it is important to understand the inferred meaning. In the *Lefkandi* volumes, the specification for an import includes both foreign origins such as Egypt and Greek areas outside of Euboea such as Attica. This caused issues in attempting to separate imported goods and local goods in the data and literature. For this reason, four possible classifications for manufacturing location were created that moved away from the *Lefkandi* volumes: local (Euboean), other non-local Greek, foreign import and unknown. This allows for a clearer understanding of the data and the objects circulation.

An additional sub-form was created to further specify the objects place of origin which included regions such as, Near East, Phoenicia, Egypt, Cyprus, Euboea and Attica. Lemos (2002:226–227) and her team analysed and recorded the imported objects following the *Lefkandi* volumes which she also contributed towards. For this reason, this thesis adopts the updated classifications and terminology of these objects provided by Lemos (2002).

Chronological Period

A date field was recorded for both objects and the burials. As mentioned in Chapter 1.2.1, dating for the objects and tombs was assigned by Popham and his team which formed the chronology provided in the *Lefkandi* volumes (Popham et al. 1980, 1993; Popham and Lemos 1996). It was based on the tomb types, relative chronology of pottery, and/or tangible stratigraphic evidence. Popham and Lemos (1996) provided an appendix of updated dates for all three cemeteries which was used in this dataset. It uses a more elaborated dating system than previous volumes by expanding on the SPG III phase with additional III(a) and III(b) phases. These additional phases however were applied to only 35 burials in the Toumba cemetery at this time (Popham and Lemos 1996). For this reason, this study adopts the original phase III system which can be applied to all of the burials in the three cemeteries in order to keep citation relevant, data variables consistent and avoid skewing the analysis. Thus, all SPG III(a) and III(b) phases assigned to a tomb will be accounted for under SPG III phase at the time. This category should be re-evaluated when publication becomes available and the new dating system can be applied to all burials.

3.3 Statistical Analyses

The dataset offers a number of object variable combinations which required more sophisticated computational methods in order to test significant results. For this reason, the statistical software SPSS was used to test the significance of patterns or trends in the accumulated data. These patterns include the frequencies of objects in the tombs, where they originated from and the categorical variables discussed previously in Chapter 3.2.2. Collective analyses are also administered to test if patterns only occurred in a particular Lefkandi cemetery or as a whole site. Object correlations and categorical analyses were conducted which will be discussed below. Appendices D and E have been provided to give a detailed explanation of the tests, equations (Equations 1.1–1.8) and contingency tables used in this statistical analysis.

All burial object frequencies were tested for a relationship in the Skoubris, Palia Perivolia and Toumba cemeteries, individually and collectively. That is, whether the frequency of one object increased when the frequency of another increased, and vice versa. Examination of the frequency distributions of variables determined that they are not normally distributed, thus nonparametric tests were executed. The correlation coefficients that were used included Spearman's Rho (Equation 1.1) and Kendall's Tau (Equation 1.2). For object variables that were found to be significantly correlated, linear regression analysis (Equation 1.3) was performed. For each model that is presented, the slope of the regression line demonstrates the average ratio of the arbitrary predictor variable to the dependent variable in the Lefkandi tombs. As such, the standardised residuals plot was used to determine if the assumptions made when linearity and homoscedasticity occurred were valid.

Categorical analyses were also administered to examine trends between the occurrence of objects against tombs, chronological period and manufacturing location. That is, whether there was a relationship between the frequency of objects and the various categories in which they were contained. These tests were produced using variations of the chi square test (Equation 1.4–1.7) detailed in Appendix D. The strength of the significance was calculated using Cramer's V (Equation 1.8) and interpreted using the values table in Appendix E.

CHAPTER 4. SKOUBRIS CEMETERY RESULTS

4.1 Introduction

The Skoubris cemetery is the earliest known burial ground established at Lefkandi. Chronologically arranged Figure 3.1 below demonstrates that the cemetery contains 65 tombs with a date range from the SM period to 825 BCE. Out of those, a total of 19 tombs were undatable based on inconclusive and unstratified evidence. Figure 3.2 below shows the chronological scope of the datable tombs and the cemetery was predominately used in the SM period and declines rapidly following the Early Protogeometric (EPG) period.

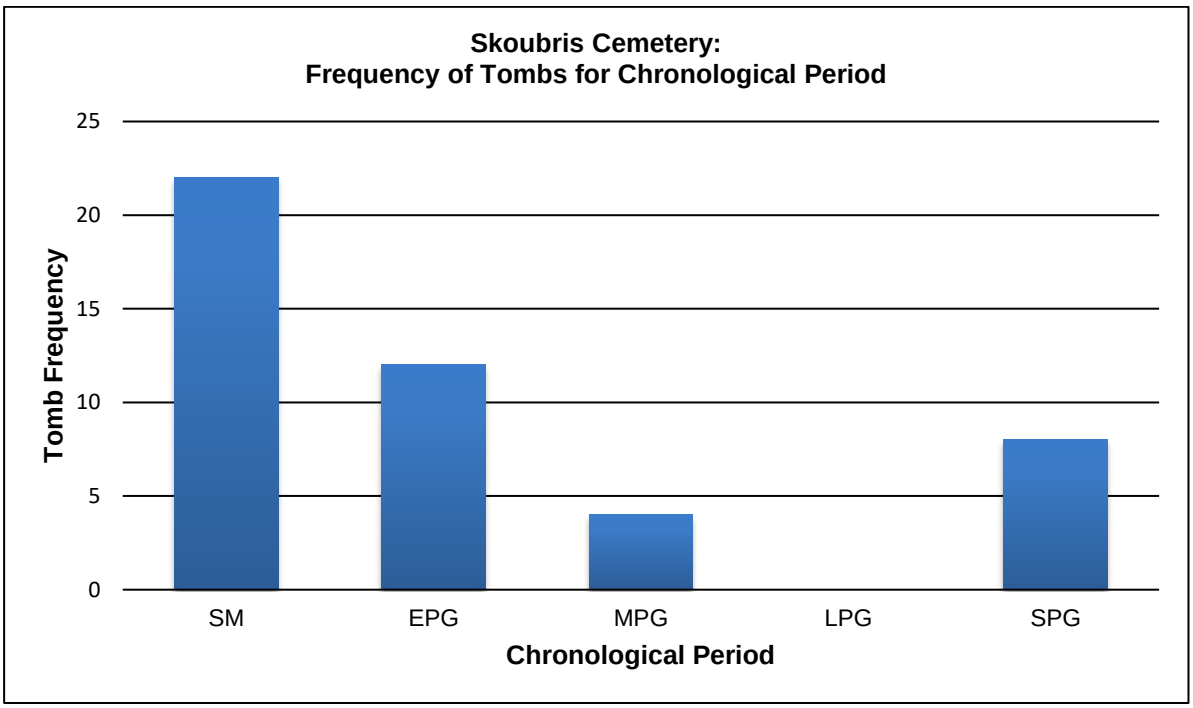


Figure 3.1 Skoubris cemetery – frequency of tombs for chronological period.

Figure removed due to copyright restriction.

Figure 3.2 Skoubris cemetery plan showing tombs according to chronological period.
Popham et al. 1980: pl. 75), modified by Newton to include a colour key.

4.2 Grave Objects/Goods

The Skoubris cemetery yielded a total number of 313 grave objects distributed across 47 of the 65 tombs. There were 18 tombs that were without contents and ten of these tombs were identified as robbed or disturbed which may have been the cause of the absence of objects (Popham et al. 1980:106). Shown in Figure 3.3, the total number of grave goods located in the burials ranged from 1–59 objects per tomb and averaged around six objects per tomb.

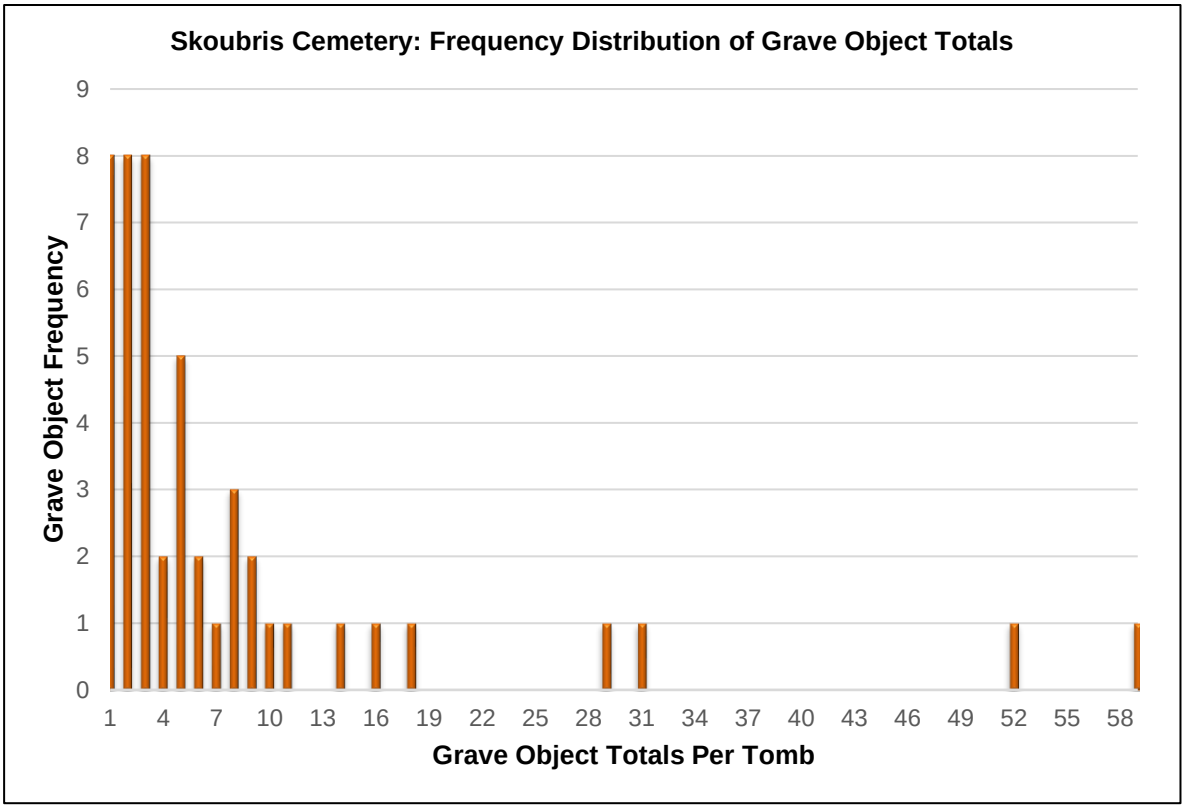


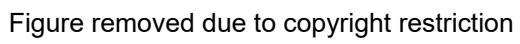
Figure 3.3 Skoubris cemetery – frequency distribution of grave objects per tomb.

The full range of materials and objects that were deposited in the tombs in the Skoubris cemetery are represented in Table 3.1 and Appendix A. This demonstrates that materials presented in the form of grave goods varied in type and distribution across the tombs. Based on these counts, the total number of metal and pottery objects were significantly higher than artefacts of textile, ivory, faience and shell. It is apparent from the metal group that bronze was the most dominant of all the metals, with 95 objects represented as grave goods in the tombs. This compares to lead (1), iron (16) and gold (17) of a significantly lower count.

Table 3.1 Skoubris Cemetery – list of object material and frequency in tomb.

Material	Sub- material	Total No. of Objects	No. of Tombs Containing Objects
	Bronze	95	24
	Gold	17	6
	Iron	16	9
	Lead	1	1
	Bronze & Iron	1	1
	Gold & Iron	2	2
	Unknown metal	1	1
Pottery		171	44
Faience		2	2
Ivory		1	1
Shell		2	2
Textile		4	6
Total		313	

The most frequently deposited object types in the tombs were cups from the pottery group, which were identified in 22 tombs and bronze fibulae (Figure 3.4) found in 16 tombs. When analysed against chronological period, a significant 80% of tombs in the Skoubris cemetery containing bronze fibulae, date between the SM and EPG periods. This trend can also be seen in 68% of tombs containing cups. The chronological period in which these types of objects occur more frequently corresponds with the Skoubris cemeteries primary periods of use.



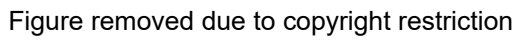


Figure 3.4 **SPG III bronze fibulae found in tomb S59 in the Skoubris cemetery.**
Popham et al. 1980: pl. 240a-e.

4.3 Grave Object Correlation

Correlation analyses was conducted on all combinations of object material and object types, to observe if there were any significant patterns between the frequencies of various grave goods in relation to each other, in the Skoubris cemetery tombs. This was done to identify if specific objects were placed in the tombs independently or deposited deliberately together. In addition, categorical analyses were done to examine if significant patterns were present between the tombs with correlated grave objects and the categorical variables. These two analyses both had significant results for metal against pottery and gold against bronze objects, in relation to chronological period. The following results that will be presented are limited to correlations that were found to be significant in the Skoubris cemetery.

4.3.1 Metal Against Pottery Objects

The frequency distribution of both metal and pottery objects found in the tombs of the Skoubris cemetery demonstrated in Figure 3.5, show that they are the most dominant and reoccurring material types. The total number of metal artefacts present in the tombs was 133 objects. Metal ranged from 1–25 objects per tomb and had an average of approximately five metal objects per tomb. Objects from the pottery group totalled 171 artefacts, ranging from 1–25 objects per tomb and averaged approximately four pottery objects per tomb.

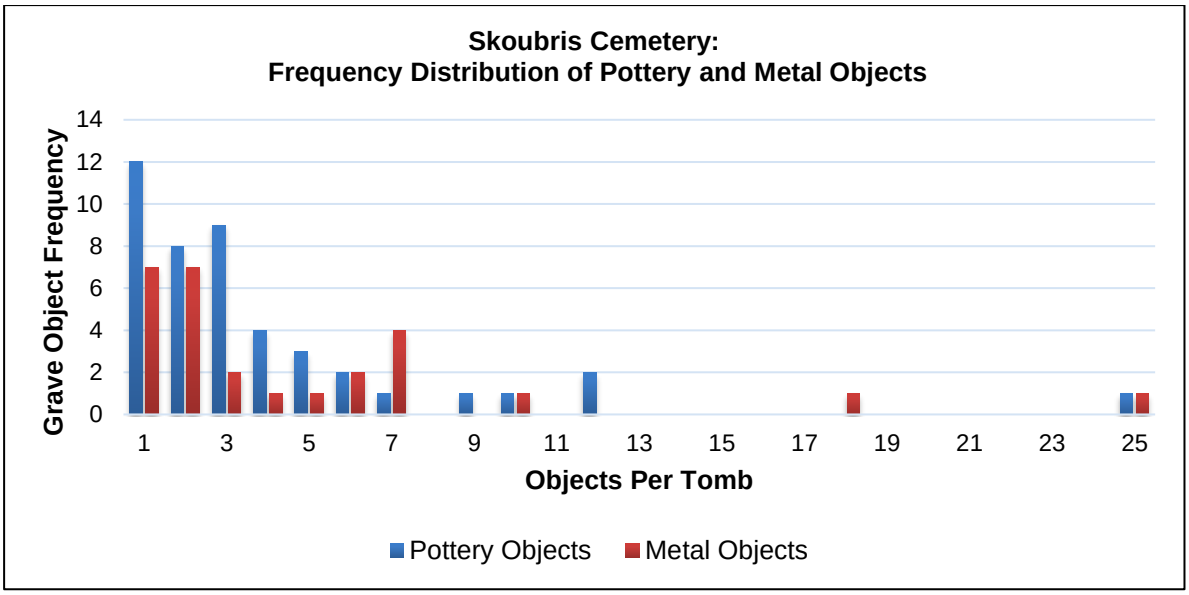


Figure 3.5 **Skoubris cemetery – frequency distribution of metal and pottery objects per tomb.**

The six total material variables in the database were tested (metal, pottery, textile, faience, shell and ivory). From this test only metal against pottery showed a significant correlation (see Appendix D: Equation 1.2). The results demonstrate that the frequency of pottery objects in the tombs was significantly correlated with the frequency of metal objects in the tomb, $\tau = .32, p < .001$. The linear regression model shown in Figure 3.6, reveals that the relationship is a good fit, as indicated by the results, $F = 32.174, p < .001$. (Appendix D: Equation 1.3). It is evident from these results that metal and pottery objects were deliberately placed in relative quantities to one another and deposited in the tombs as a compiled assemblage.

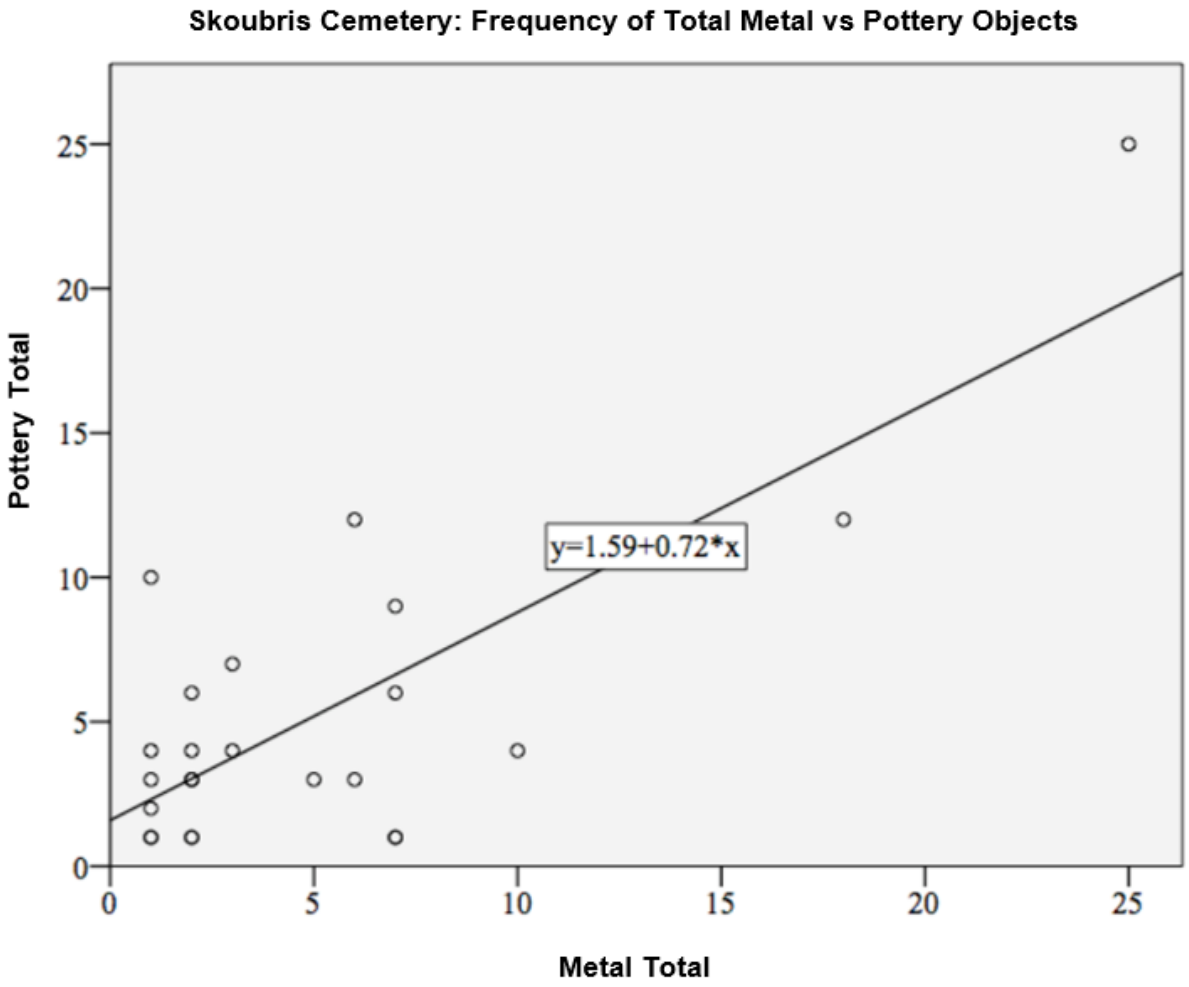


Figure 3.6 **Skoubris Cemetery - linear regression model showing the frequency of total metal against pottery objects in the tombs.**

4.3.2 Metal and Pottery Object Frequency for Chronological Period

The categorical analyses (Appendix D: Equation 1.4–1.5) performed revealed that there was a significant and moderately strong relationship between the frequencies of metal and pottery in relation to their chronological period, $x^2(3) = 14.974, p < .005$, Cramer's V= .224 (Appendix D: Equation 1.8).

Figure 3.7 shows that the relative amount of metal deposited in the tombs decreased from the SM period moving into the SPG period, whereas the relative amount of pottery increased. This result is suggestive of pottery gaining preference over time in the Skoubris cemetery or that it was potentially more accessible than objects made of metal.

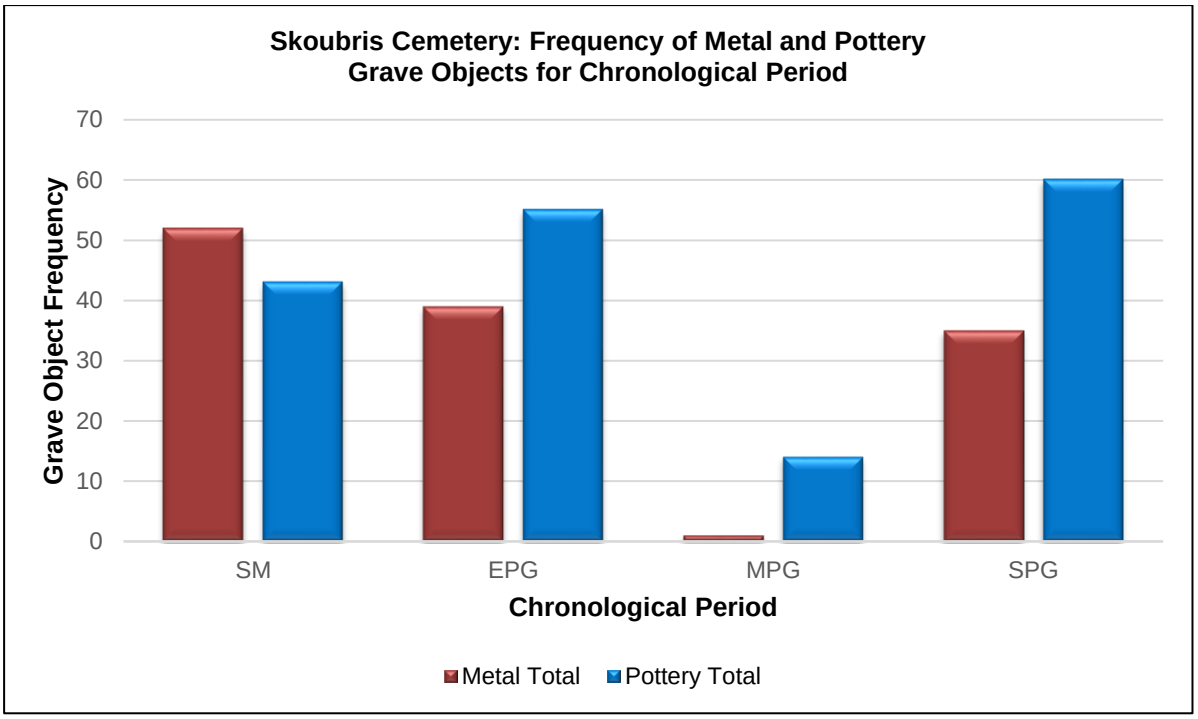


Figure 3.7 **Skoubris cemetery – frequency of metal and pottery grave object totals for chronological period.**

4.3.3 Gold Against Bronze Objects

Examining the metal group alone, the total number of gold and bronze objects are significantly higher than any other metals in this category. The frequency distribution of both gold and bronze objects found in the tombs of the Skoubris cemetery demonstrated in Figure 3.8, show that gold artefacts range from 1–10 objects per tomb and bronze artefacts range from 1–17 objects per tomb. The total quantity of gold present in the tombs was 17 objects and had an average of approximately three gold objects per tomb. Bronze totalled 95 objects and averaged approximately four bronze objects per tomb.

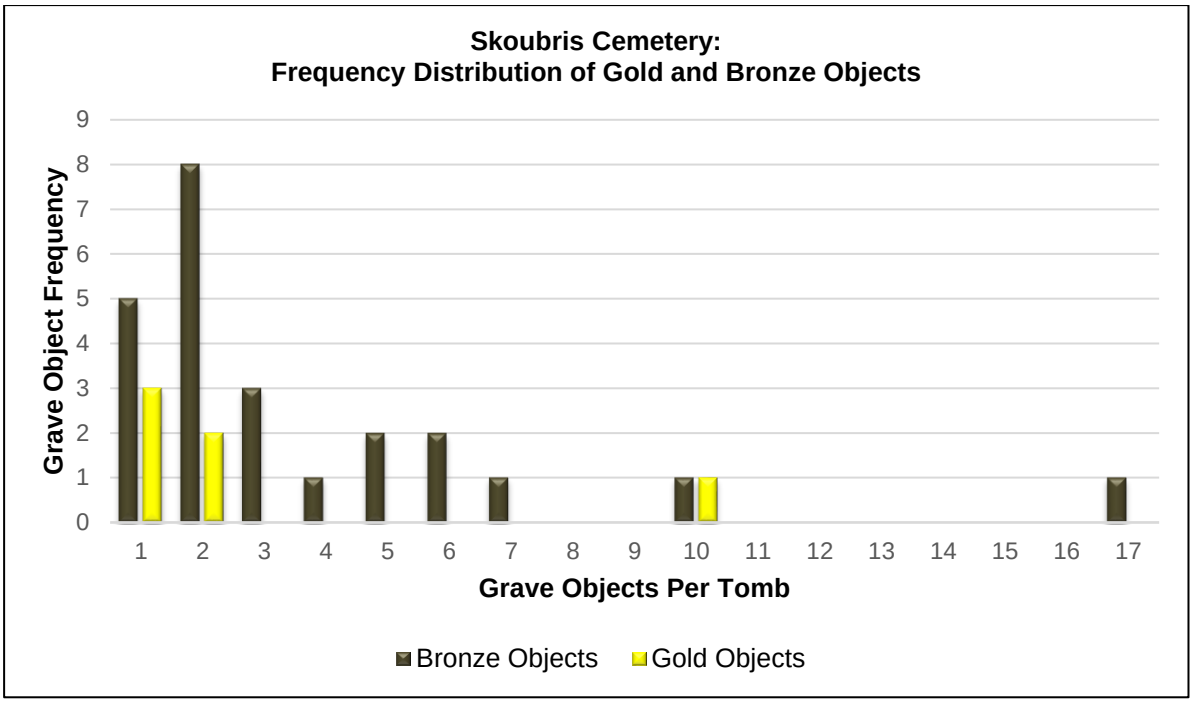


Figure 3.8 **Skoubris cemetery – frequency distribution of gold and bronze objects per tomb.**

The five total metal group variables in the database were tested (gold, bronze, lead, iron, and combined metals). From this test only gold against bronze objects were found to be significantly correlated (Appendix D: Equation 1.2). The results demonstrate that the frequency of bronze objects placed in the tombs was significantly related to the frequency of gold objects in the tombs, $\tau = .94, p < .001$. The linear regression model shown in Figure 3.9, reveals that the relationship is a strong fit, as demonstrated by the results, $F = 29.011, p < .013$. (Appendix D: Equation 1.3). The test shows that the ratio of bronze to gold objects is approximately 0.76. This indicates that from the metal group, gold and bronze were the preferred material and they were placed in relative quantities to one another in the tombs, though bronze being evidently more popular.

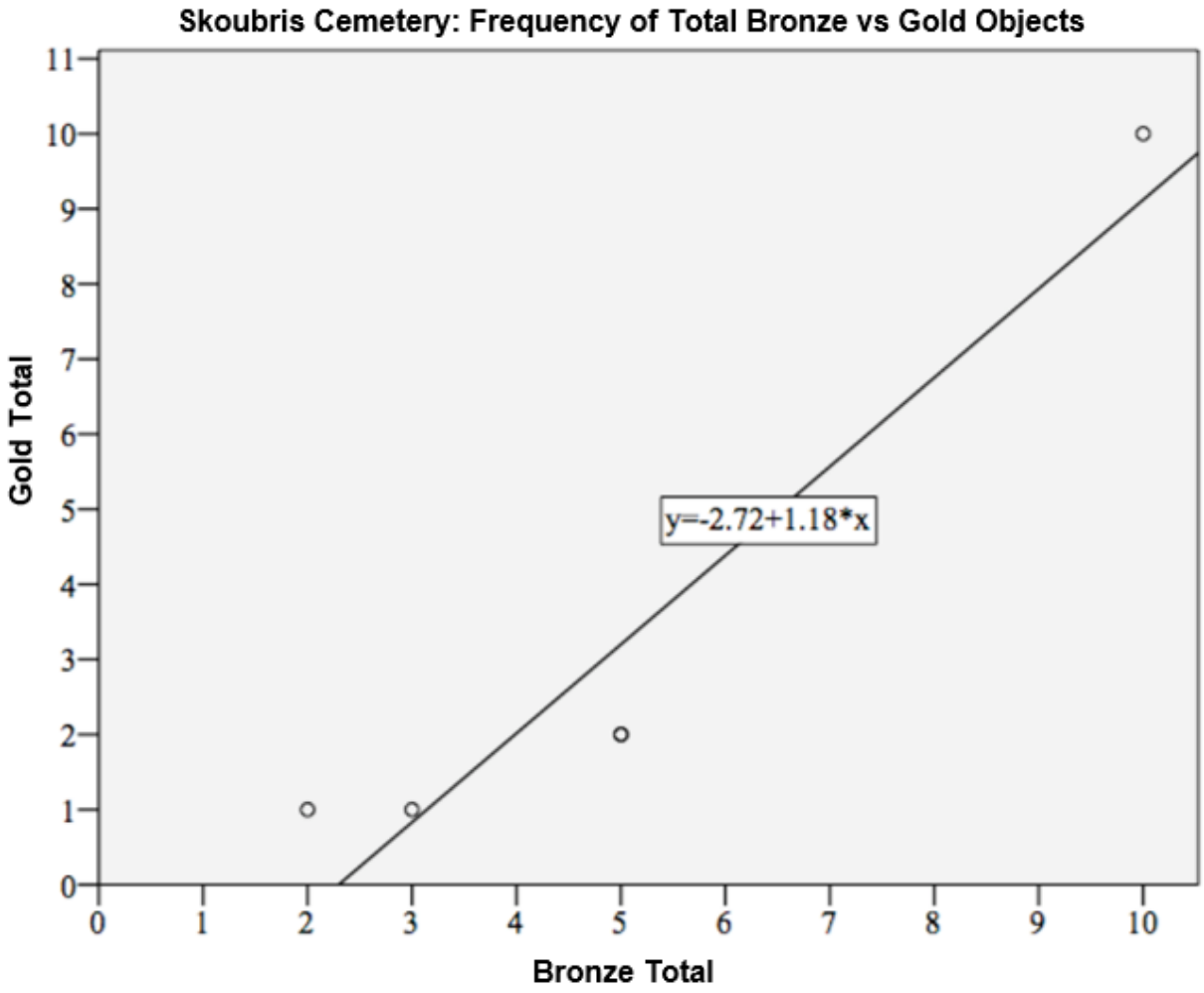


Figure 3.9 **Skoubris Cemetery - linear regression model showing the frequency of total bronze against gold objects in the tombs.**

4.3.4 Gold and Bronze Object Frequency for Chronological Period

In the metal group, a similar relationship can be seen between the frequencies of gold and bronze. Testing (Appendix D: Equation 1.4–1.5) demonstrated that there was a significant and extremely strong relationship between the frequencies of gold and bronze objects in relation to the chronological period in which they were deposited, $x^2(2) = 23.227, p < .005$, Cramer's V= .470 (Appendix D: Equation 1.8).

Figure 3.10 shows that the proportion of gold to bronze objects increased from the SM period onwards. This result suggests gold was more favoured in its inclusion in the tombs than bronze over time. This is interesting, as the previous results showed that bronze was preferred in relation to depositing higher quantities of that material in the tombs. Further testing of the constituent variables (object type/shape) of both gold and bronze objects did not yield a significant result. This suggests that the material of the object, in this case bronze or gold, was of value and not the object type/shape in the Skoubris cemetery.

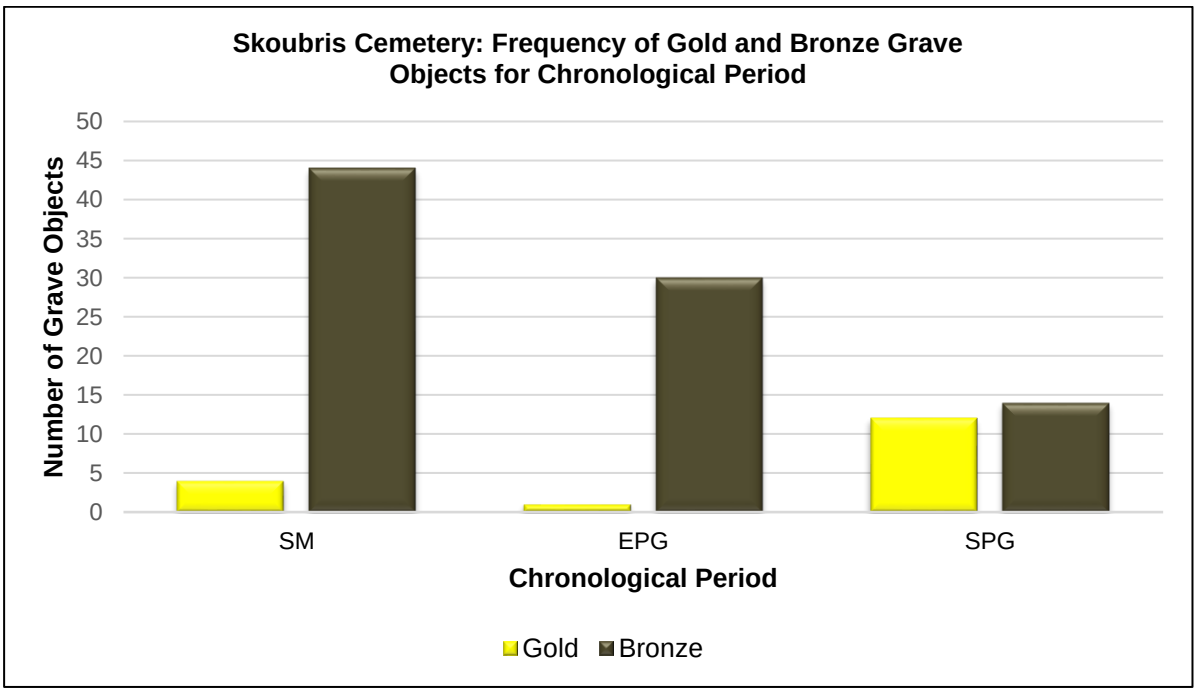


Figure 3.10 **Skoubris cemetery – frequency of gold and bronze grave objects for chronological period.**

4.4 Grave Object Manufacture

The manufacture and origin of the grave goods found in the Skoubris cemetery are displayed in Table 3.2 and illustrated in Figure 3.11. This shows that the manufacture and origin of a total number of 181 out of 313 artefacts could be identified in the tombs. The most dominant grave goods were manufactured locally in Euboea and their frequency was significantly higher than other Greek regions and foreign imports. Objects attributed to local Euboean origin was a total number of 174 artefacts. They were identified in 40 out of the 65 tombs and averaged approximately four objects per tomb in the Skoubris cemetery.

Table 3.2 **Skoubris cemetery – list of object total and their frequency in the tombs in relation to their manufacture and origin.**

Manufacture	Origin	Object Total	No. of Tombs Containing Objects
Local	Euboean	174	40
Other Greek	Attic	1	1
	Attico-Boeotian	3	1
Foreign Import	Cypriot	1	1
	Near Eastern	1	1
	Unknown	1	1
Unknown	Unknown	132	30
Total		313	

Comparatively the manufacture of grave objects from other Greek regions were significantly less in the Skoubris cemetery. A single object deriving from Attica was found in one tomb (S59) and three objects from Attica-Boeotia were also restricted to one tomb (S59A). The number of foreign imports was even more limited with a total number of three imported grave goods distributed across three tombs. These included: one Near Eastern juglet (S46) (Figure 3.12a), one Cypriot bird vase (S16) (Figure 3.12b) and a flask from an unknown origin (S33) (Lemos 2002:226–227). The foreign objects originating from Cyprus and the Near East were dated to EPG period and unknown origin SPG II phase.

Figure 3.11 **Map of the Aegean and Mediterranean Sea showing the provenance of grave goods found in the Skoubris cemetery.**

ArcGIS Esri "Light Grey Canvas Map" [Basemap], accessed 2021.

Figure removed due to copyright restriction

Figure 3.12 a) EPG Near Eastern juglet from S46; b) EPG Cypriot bird vase from tomb S16 in the Skoubris cemetery.
a) Popham et al. 1980: pl. 270(b); b) Popham et al. 1980: pl. 206b.

4.5 Summary of Correlation Results

The results of the statistical analyses for the Skoubris cemetery showed a significant correlation between the frequency of metal and pottery objects which were placed in relative quantities to each other in the tombs. The increase in pottery to metal ratio revealed that in later periods pottery became more dominant. This relationship was also demonstrated between gold and bronze objects which increased significantly in later periods. Interestingly, while bronze was preferred to be deposited in higher quantities then gold, over time, the inclusion of gold became more favourable. It must be noted that majority of the metal objects have not been scientifically tested and their provenance is not known, however, their potential provenances will be discussed in Chapter 8.1.

Therefore, the results suggest that specific object materials in the form of grave offerings were being placed in the tombs intentionally together as a package. In addition, we can infer that in the tombs in the Skoubris cemetery, it was material itself, and not the object type that was of symbolic value in respect to its inclusion. This presents a new finding at Lefkandi and the implications of these results will be discussed in Chapter 8.2.

CHAPTER 5. PALIA PERIVOLIA CEMETERY RESULTS

5.1 Introduction

The Palia Perivolia cemetery accommodates 40 excavated tombs dating from the MPG period to SPG II that is displayed in Figure 4.1. A total of eight tombs were undatable based on inconclusive and unstratified evidence. The burial ground contains the most limited occupation period of the three Lefkandi cemeteries and discontinued its use prior to the abandonment of Xeropolis in 825 BCE. Figure 4.2 below shows the chronological scope of the datable tombs and the use of the cemetery continuously increased from the MPG to SPG period.

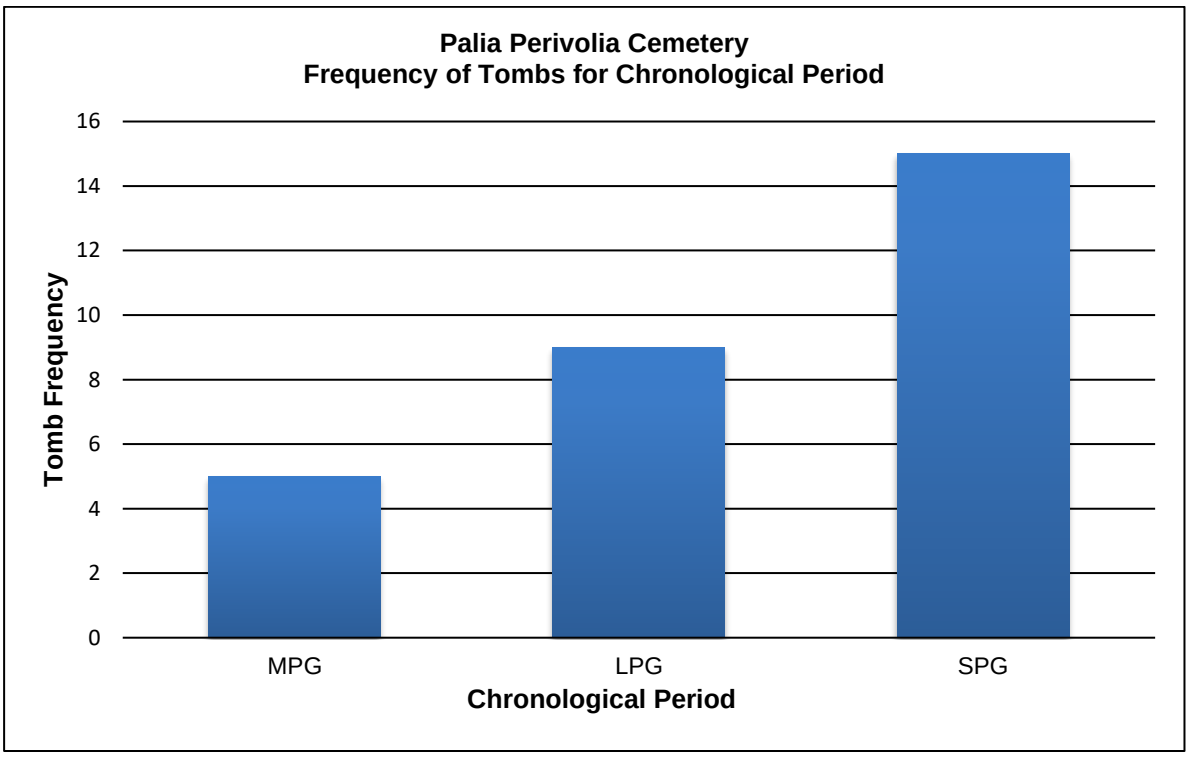


Figure 4.1 Palia Perivolia cemetery – frequency of tombs for chronological period.

Figure removed due to copyright restriction.

Figure 4.2 Palia Perivolia cemetery plan showing tombs according to chronological period.
Popham et al. 1980: pl. 77. Modified by Newton to include a colour key.

5.2 Grave Objects/Goods

The Palia Perivolia cemetery contains a total number of 294 grave objects distributed across 35 of the 40 tombs. The five tombs that did not present contents were identified as disturbed or robbed which was the likely cause for the absence of objects (Popham et al. 1980:106–107). Demonstrated in Figure 4.3, the total number of grave goods located in the burials ranged from 1–36 objects per tomb and averaged around seven objects per tomb.

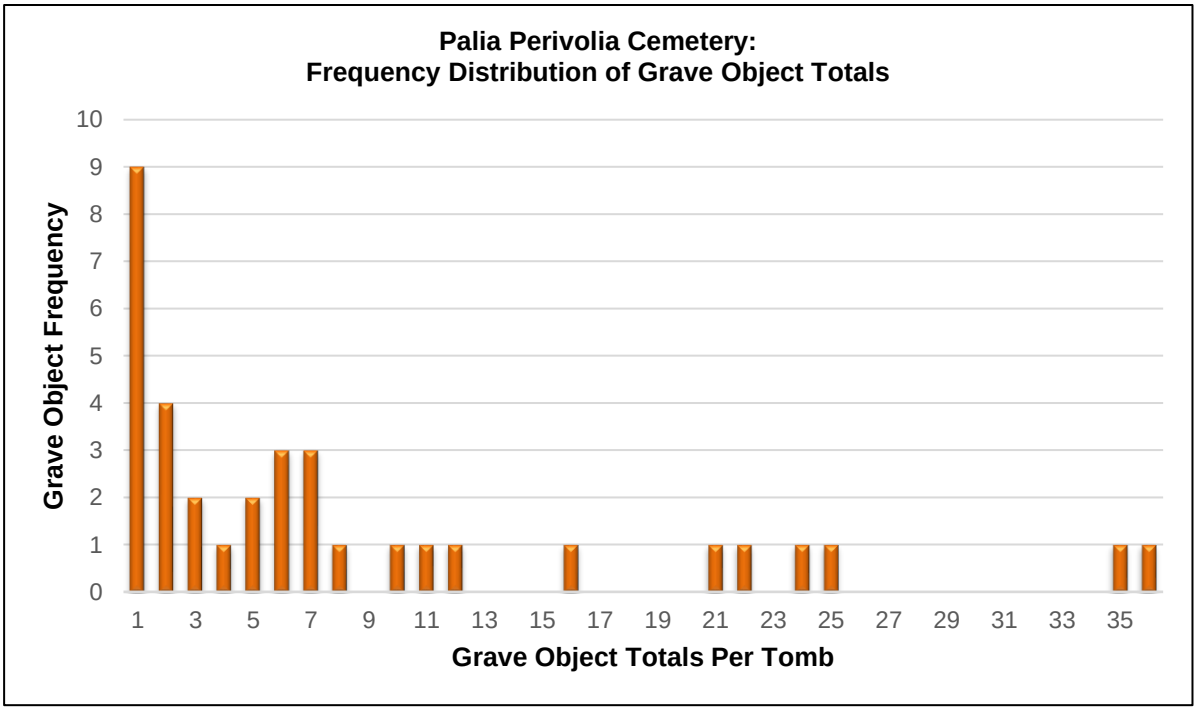


Figure 4.3 **Palia Perivolia cemetery – frequency distribution of grave objects per tomb.**

The full range of materials and objects that were deposited in the tombs in the Palia Perivolia cemetery are represented in Table 4.1 and Appendix B. This demonstrates that the type and distribution of materials presented in the form of grave goods varied across the tombs. Based on these counts, the total number of metal and pottery objects (Figure 4.4) were significantly higher than materials consisting of textile, terracotta, ivory, faience, glass and stone. Iron is clearly the most dominant material from the metal group with sixteen identified objects compared to lower counts of bronze (8), gold (2), gilt lead (2) and lead (1). Grave offerings of iron ranged from 1–3 objects per tomb and averaged approximately two iron objects per tomb. 45% of tombs dating to the Late Protogeometric (LPG) period contained iron and 27% of

tombs dated to the SPG I period. The frequency of iron compared to metal goods demonstrated that metal was distributed consistently among tombs dated in the LPG period and SPG I phase. In the subsequent periods the use of iron appears to cease completely in the Palia Perivolia cemetery and metal totals decrease. Though distributed at a lower frequency, bronze remained evenly distributed in tombs between the MPG period and SPG II phase.

Table 4.1 Palia Perivolia Cemetery – list of object material and frequency in tombs.

Material	Sub- Material	Total No. of Objects	No. of Tombs Containing Objects
	Bronze	8	6
	Bronze & Iron	2	2
	Gilt Lead	2	1
	Gold	2	1
	Iron	16	11
	Lead	1	1
Pottery		242	27
Clay		6	2
Faience		3	3
Glass		1	1
Ivory		1	1
Stone		2	2
Textile		8	7
Total		294	

The most frequently distributed object types in the tombs were jugs/juglets (21 tombs), *kalathoi* (13 tombs), and *oenochoae* (12 tombs). Higher numbers of *amphoriskoi* (24), *pyxides* (23), and *lekythoi* (19) were found compared to *oenochoae* but were not as frequently distributed across the tombs. Dated between the LPG period and SPG I phase, jugs/juglets were found in 60% of tombs, *kalathoi* in 76% of tombs and 75% of tombs contained *oenochoae*. The frequency of these objects decreases rapidly following the SPG I period. This may have been a result of the Toumba cemetery also operating in these periods and could have influenced the inclusion of certain grave object trends in the tomb. This will be further discussed in the later chapters.

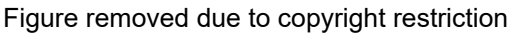


Figure 4.4 **LPG pottery found in tomb P22 in the Palia Perivolia cemetery.**
Popham et al. 1980: pl.212.

5.3 Grave Object Correlation

The same correlation and categorical analyses that were previously conducted on the Skoubris cemetery has been performed on the Palia Perivolia cemetery (see Chapter 4.3). This was in order to identify if objects were placed in the tombs independently or deposited deliberately together. Unlike the Skoubris cemetery, the only significant correlation found after all object variables were tested against each other was metal against pottery objects. Tests were restricted in the Palia Perivolia cemetery due to low counts of variables in the mortuary data. Consequently, further categorical analyses were performed and no significant results yielded for chronological period which were revealed in the Skoubris cemetery. For this reason, the following results of the significant correlations are restricted to metal against pottery objects in the tombs of the Palia Perivolia cemetery.

5.3.1 Metal Against Pottery Objects

In the Palia Perivolia cemetery, the frequency distribution of both metal and pottery objects demonstrated in Figure 4.5, shows that they are the most preferred material

types in the tombs. The total number of pottery artefacts present in the tombs was 242 objects. Pottery ranged from 1–30 objects per tomb and had an average of approximately eight pottery objects per tomb. The total number of metal objects were significantly lower consisting of 31 artefacts. Metal objects ranged from 1–5 objects per tomb and averaged approximately two metal objects per tomb.

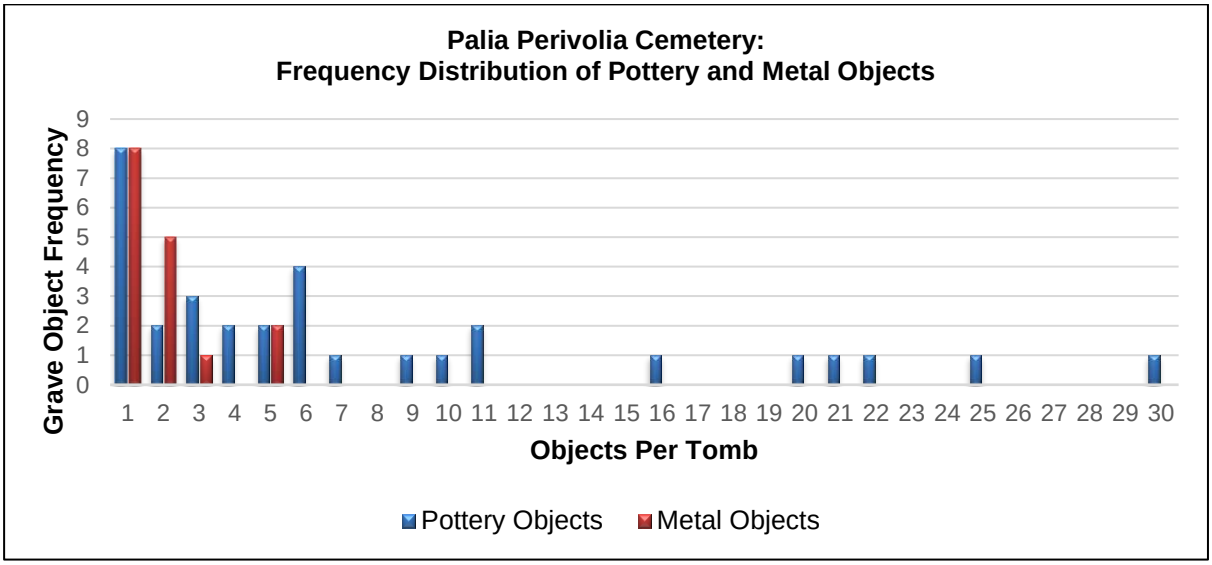


Figure 4.5 **Palia Perivolia cemetery – frequency distribution of metal and pottery objects per tomb.**

The eight total material variables in the database were tested (metal, pottery, textile, terracotta, faience, stone, glass and ivory). From this test only metal against pottery showed a significant correlation (Appendix D: Equation 1.2). The results demonstrate that the frequency of metal objects in the tombs was significantly correlated with the frequency of pottery objects in the tomb, $\tau = .57, p < .006$. The linear regression model shown in Figure 4.6 reveals that the relationship is a good fit, as indicated by the results, $F = 13.423, p < .004$. (Appendix D: Equation 1.3). The test shows that the ratio of pottery to metal objects is approximately 4.53. This is substantially higher than the Skoubris cemetery which presented a ratio of approximately 0.72. These results suggest that in the Skoubris and Palia Perivolia cemeteries, a similar practice is occurring in respect to placing specific grave objects in the tomb together. The higher ratio in the Palia Perivolia, however, shows that the inclusion rate of pottery compared to metal was significantly higher than in the Skoubris cemetery.

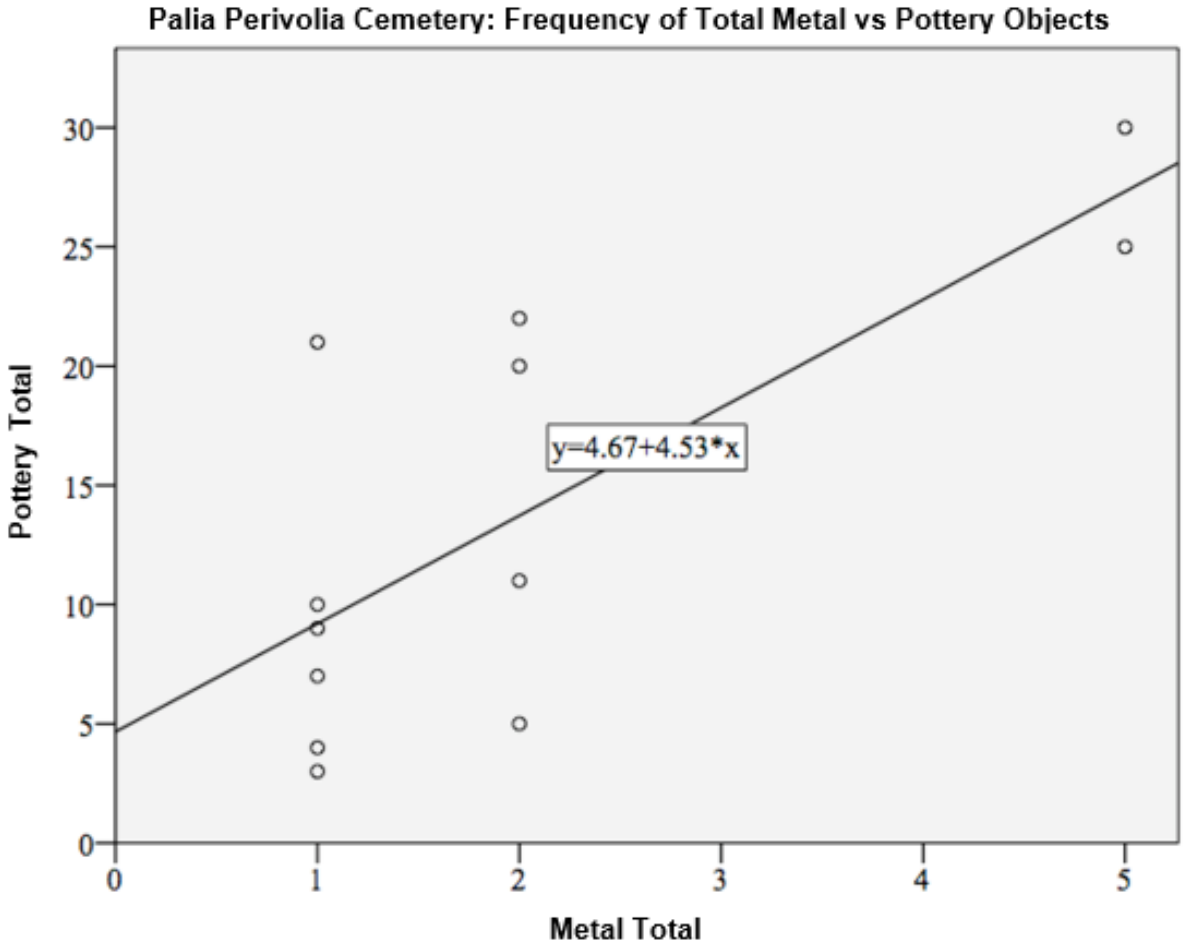


Figure 4.6 **Palia Perivolia cemetery - linear regression model showing the frequency of total metal against pottery objects in the tombs.**

5.4 Grave Object Manufacture

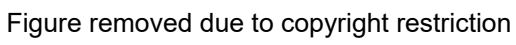
The manufacture and origin of the grave goods found in the Palia Perivolia cemetery are presented in the Table 4.2 and illustrated in Figure 4.7. This demonstrates that the manufacture and origin of 225 out of 294 artefacts could be identified in the tombs. In the tombs there were higher totals of grave goods manufactured locally in Euboea than other Greek and foreign imported objects. A total number of 202 objects were attributed to local Euboean origin and were found in 30 tombs. They averaged approximately seven objects per tomb in the Palia Perivolia cemetery.

Table 4.2 **Palia Perivolia Cemetery – list of object total and their frequency in the tombs in relation to their manufacture and origin.**

Manufacture	Origin	Object Total	No. of Tombs Containing Objects
Local	Euboean	202	30
Other Greek	Attic	13	2
	Unknown	4	3
Foreign Import	Cypriot	1	1
	Near Eastern	3	2
	Unknown	2	1
Unknown	Unknown	69	23
		294	

The manufacture of objects from other Greek regions was significantly less with a total amount of 17 grave goods and consisted of two origin categories, Attic and unknown. The frequency of these objects was notably low considering only two tombs (P21 and P22) contained Attic objects (Figure 4.8) and three tombs (P28, 39 & B, 39A) had unknown Greek objects. Furthermore, the number of foreign imported objects present in the tombs was significantly less in the Palia Perivolia cemetery. The total number of six imported grave goods was distributed among three tombs. These included: one Cypriot flask and two bird vases from an unknown origin (P22), (Figure 4.9b) one Near Eastern faience necklace/ bracelet (P24), and two Near Eastern objects: glass beads and faience necklace (P25) (Figure 4.9a) (Lemos 2002:226–227). The objects were found in tombs dating the LPG period, except for the objects in P25 that were dated to MPG.

Figure 4.7 **Map of the Aegean and Mediterranean Sea showing the provenance of grave goods found in the Palia Perivolia cemetery.**
ArcGIS Esri "Light Grey Canvas Map" [Basemap], accessed 2021.



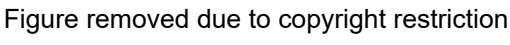
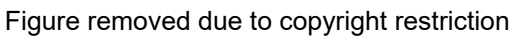
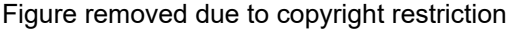


Figure 4.8 **Attic pottery from tomb P22.**
Popham et al. 1980: pl. 271a-b.





a) **b)**

Figure 4.9 **a) North Eastern glass beads and faience necklace in tomb P25; b) foreign imported bird vase in tomb P22.**
Popham et al. 1980: (a) pl. 233(a); (b) pl. 254(d).

5.5 Summary of Correlation Results

The statistical analyses of the Palia Perivolia cemetery demonstrated that there was a significant correlation between the frequency of metal and pottery objects which were placed in relative quantities to each other in the tombs. This however was the only significant correlation found in the Palia Perivolia cemetery. The tests were restricted in the Palia Perivolia cemetery due to low counts of variables in the mortuary data. Compared to metal, the rate that pottery was being deposited in the tombs was much higher than what was observed in the Skoubris cemetery. The lower counts of metal to pottery found in the tombs could potentially be an indicator that the Palia Perivolia cemetery was used by a lower demographic group. As previously mentioned in Chapter 4.5, majority of the metal objects have not been scientifically tested and their provenance is not known, however, their potential provenances will be discussed in Chapter 8.1.

Thus, the results suggest that like the Skoubris cemetery, specific object materials in the form of grave offerings were deliberately being placed in the tombs together as a package. Once again, the lack of correlations between certain types of objects being placed together in the tombs, suggest the material itself and not the object type was of symbolic value. These results uphold the previous claim of a new finding at Lefkandi (see Chapter 4.5) and their implications will be discussed in Chapter 8.2.

CHAPTER 6. TOUMBA CEMETERY RESULTS

6.1 Introduction

The Toumba cemetery was established in the MPG period following the deliberate demolition of the Toumba building that housed two very high-status burials and ceased in 825 BCE. The site is believed to have been largely excavated and a total of 84 tombs have been uncovered. Figure 5.1 below shows that of the 84 tombs, a total of 24 tombs were undatable as a result of inconclusive and unstratified evidence or they are part of the tomb group (T38–T83) that has not yet been fully published. Figure 5.2 below demonstrates the chronological scope of the datable tombs and the use of the Toumba cemetery continuously increased from the LPG period and moving into subsequent SPG phases.

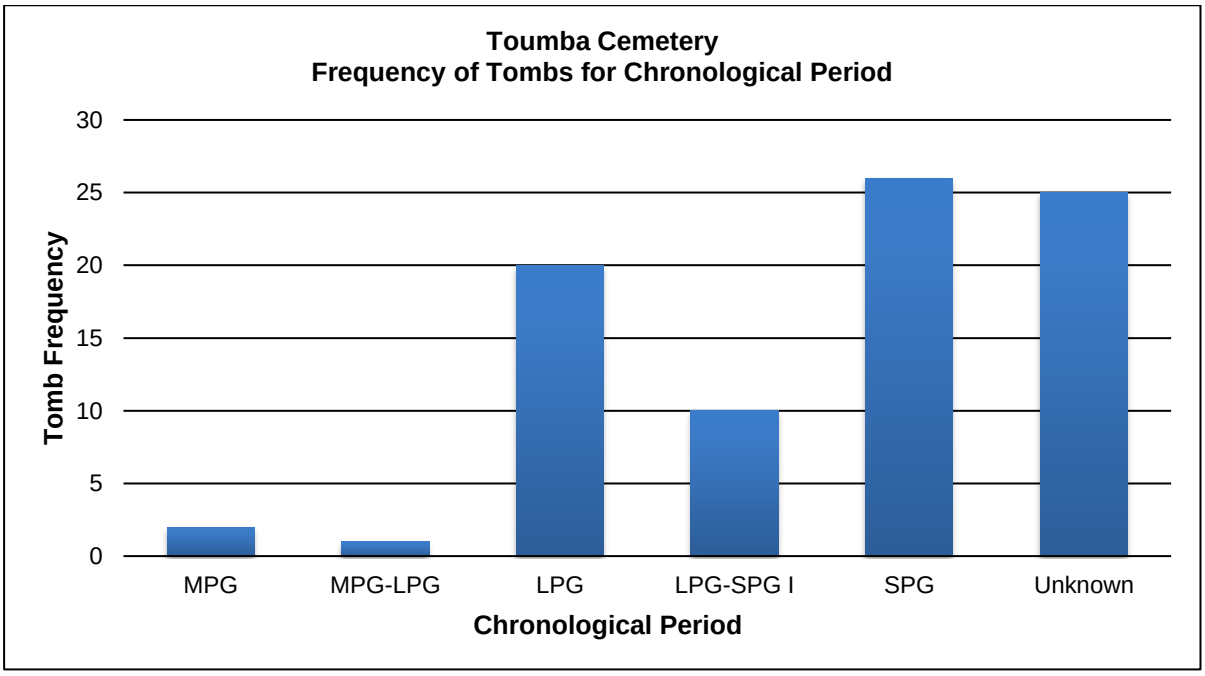


Figure 5.1 Toumba cemetery – frequency of tombs for chronological period.

Figure removed due to copyright restriction.

Figure 5.2 **Toumba cemetery plan showing tombs according to chronological period.**
Popham and Lemos 1996: pl. 3. Modified by Newton to include a colour key.

6.2 Grave Objects/Goods

The Toumba cemetery exhibits a substantial total number of 1228 grave objects distributed among 66 of the 84 tombs. The 18 tombs that did not have contents, only four tombs were identified as disturbed which was the likely reason for the omission of grave objects (Popham et al. 1980:108). The remaining 14 tombs with no contents, have not been fully published and this restricted further examination of these tombs. Demonstrated in Figure 5.3, the total number of grave goods found in the burials range from 1–106 objects per tomb and average approximately 15 objects per tomb.

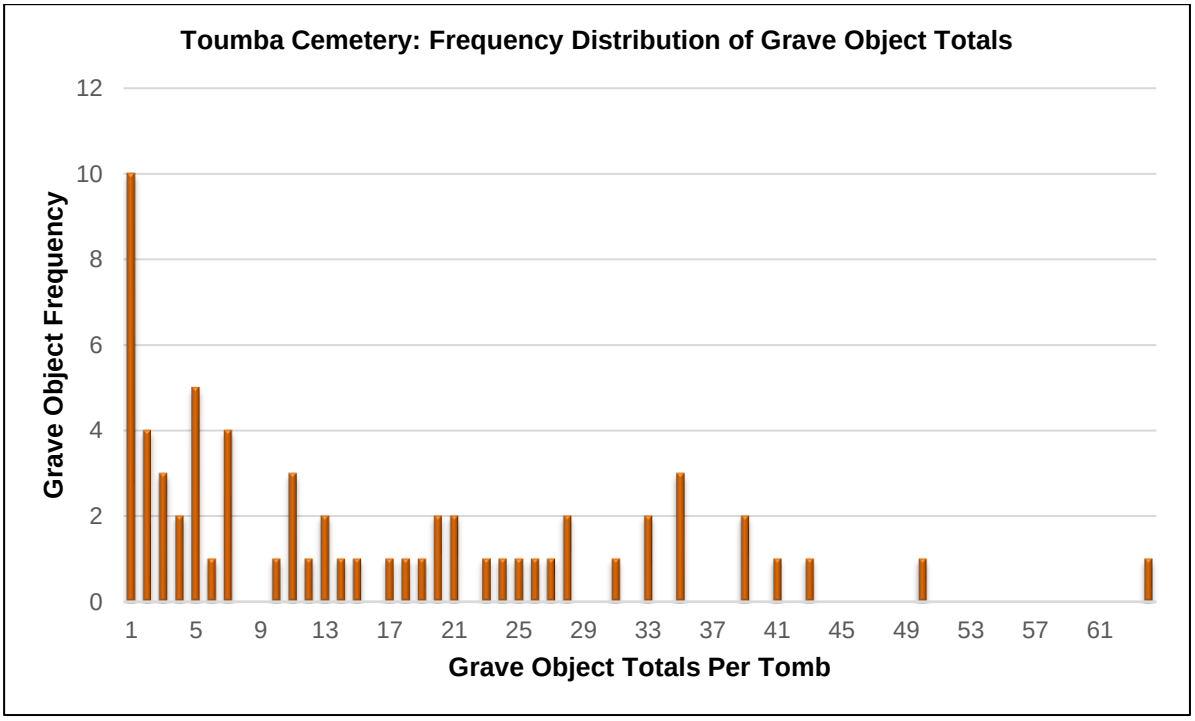


Figure 5.3 Toumba cemetery – frequency distribution of grave objects per tomb.

The full extent of materials and objects that were found in the Toumba cemetery tombs are shown in Table 5.1 and Appendix C. The material presented in the form of grave goods varied in type and distribution among the tombs. Results show that the total number of pottery and metal objects were significantly higher than artefacts of amber, faience, glass, ivory, crystal, steatite, stone, textile and terracotta. From the metal group, gold (259), bronze (136) and iron (116) were the preferred metals deposited in the tombs. Gold objects were found in 33 tombs and ranged from 1–37 objects per tomb and averaged approximately eight objects per tomb. Bronze objects were present in 35 tombs and ranged between 1–16 objects per tomb and averaged

approximately four objects per tomb. The range of iron grave goods that were found in 36 tombs ranged from 1–32 objects per tomb and averaged approximately four objects per tomb in the Toumba cemetery.

Table 5.1 Toumba Cemetery – list of object material and frequency in tomb.

Material	Sub-material	Total No. of Objects	No. of Tombs with Object
Metal	Bronze	136	35
	Bronze & Iron	2	2
	Gilt	28	11
	Gold	259	33
	Gold & Bronze	4	2
	Gold & Crystal	3	3
	Gold & Faience	1	1
	Gold/Iron/Amber	2	1
	Iron	116	26
	Iron/Bronze/Ivory	1	1
	Lead	3	2
Pottery		507	58
Amber		15	6
Bone		1	1
Terracotta		53	17
Crystal		6	4
Faience		55	26
Glass		21	12
Ivory		2	1
Shell		7	7
Stone		21	6
Textile		3	3
		1228	

In the Toumba cemetery tombs, the most frequently deposited object types from the metal group were: gold rings (89), bronze fibulae (88), iron arrowheads (42) and gold beads (42). The arrowheads are notably found in only two tombs dated to the LPG period and SPG II phase and are not as widely distributed as the other recorded objects. Gold rings were found in a significant 72% of tombs dated to the SPG period as well as 67% of tombs containing gold beads. Bronze fibulae were distributed relatively evenly between the LPG to SPG periods.

In the pottery group (Figure 5.4), the object types that appeared more frequently in the Toumba tombs were: *kalathoi* (100), cups (59), jug/juglets (51), *pyxides* (53) and *oenochoae* (43). *Kalathoi* were found in a significant 56% of tombs dating to the SPG period and 50% of tombs included *pyxides*. Cups, jug/juglets and *oenochoae* were relatively evenly distributed among the tombs dated to the LPG and SPG periods. It is notable that majority of the preferred pottery types appear to be vessels associated to drinking.

Figure removed due to copyright restriction

Figure 5.4 **LPG pottery found in tomb T26 in the Toumba cemetery.**
Popham et al. 1980: pl. 211a.

6.3 Grave Object Correlation

Correlation and categorical analyses that were conducted on the Skoubris and Palia Perivolia cemeteries has been performed on the Toumba cemetery. This was in order to identify if objects were placed in the tombs independently or deposited deliberately with others. The results that were found to be significant included: metal against pottery, gold against bronze, gold objects against bronze fibula, and bronze objects against gold ring. In addition, categorical analyses were conducted on correlated objects and the categorical variables which yielded a significant result between metal against pottery in relation to chronological period. The following results that will be presented are limited to correlations that were found to be significant in the Toumba cemetery.

6.3.1 Metal Against Pottery Objects

The frequency distribution of both metal and pottery objects demonstrated in Figure 5.5 shows that these material types are clearly the most dominant in the Toumba cemetery. The total number of metal artefacts present in the tombs was 537 objects. Metal ranged from 1–49 objects per tomb and had an average of approximately eleven metal objects per tomb. Objects from the pottery group totalled 507 artefacts, ranging from 1–49 objects per tomb and averaged approximately nine pottery objects per tomb.

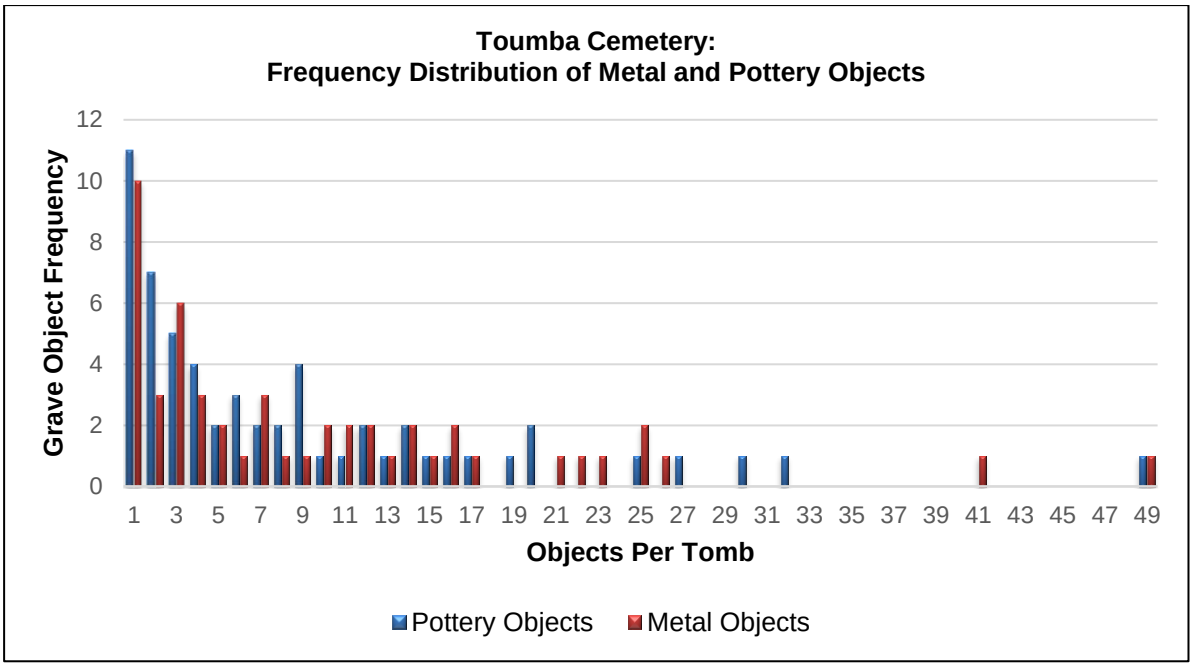


Figure 5.5 **Toumba cemetery – frequency distribution of metal and pottery objects per tomb.**

The eleven total material variables in the database were tested (metal, pottery, textile, amber, faience, crystal, glass, terracotta, stone, shell and ivory). From this test only metal against pottery showed a significant correlation (Appendix D: Equation 1.1). The results show that the frequency of pottery and metal objects in the tombs was significantly correlated, $r_s = .422$, $p < .002$. Though the strength of this correlation is weak, $R^2 = .178$, $p < .003$. The linear regression model shown in Figure 5.6 demonstrates that in the Toumba cemetery the ratio of pottery objects to metal objects is 0.42. This shows that in the tombs for an increase in approximately five metal objects, there was an increase of approximately two pottery grave objects. Compared to the Palia Perivolia cemetery where the ratio of pottery to metal objects was 4.53, this result demonstrates a completely different pattern in the Toumba cemetery.

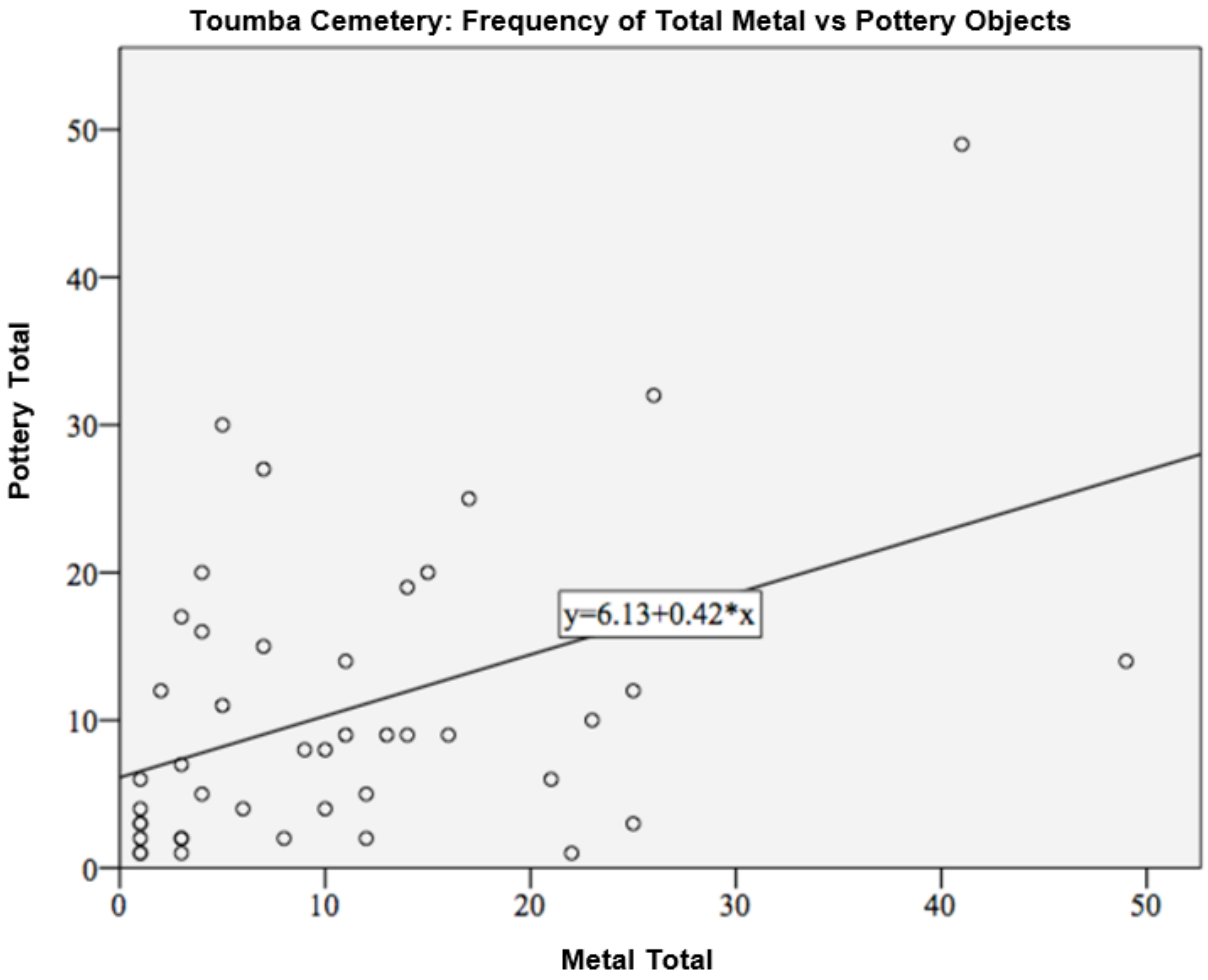


Figure 5.6 **Toumba cemetery - linear regression model showing the frequency of total metal against pottery objects in the tombs.**

6.3.2 Metal and Pottery Object Frequency for Chronological Period

The categorical analyses (Appendix D: Equation 1.4–1.5) performed revealed that there was a significant and strong relationship between the frequencies of metal and pottery objects and the chronological period in which they were deposited, $x^2(4) = 58.375, p < .001$, Cramer's V= .300 (Appendix D: Equation 1.8). The results show that metal grave objects compared to objects from the pottery group increased throughout the SPG period. This suggests that metal objects became increasingly more prevalent over time than pottery in the Toumba cemetery.

Additional examination of the standardized residuals plots demonstrated in Figure 5.7 shows that there is an obvious breach in the assumptions of the model. This is in

respect to the three distinct strands of residual points, which suggests that the relationship between the frequencies of metal and pottery has three trajectories. These three trajectories are also evident when viewing the frequencies scatterplot. In order to identify possible reasons for the three trajectories, the frequencies of metal and pottery objects were categorized in accordance to all variables and new regression calculations were executed on the subsets.

The results showed that by categorising the metal and pottery grave object frequencies by the chronological period of the tomb in which they were located, there is a degree of resolution for the manifestation of three trajectories. Figure 5.7 shows that when the grave objects are designated to three subcategories identified as: MPG and LPG periods, LPG-SPG transition period, and SPG period, distinct grouping of scatter points appear. The LPG-SPG transition predictor, however, is very weakly significant, $\mathrm{tb}=2.571, \mathrm{p}<.062$. In this regard, the other categories were found to be insignificant. The possibility of outliers may be a contributing factor for the slope of these models. More specifically, the two tombs (T63 and T70) in the MPG and LPG periods that each contained 25 metal objects. There are however, not enough tombs in this category to justify the exclusion of these points from the test.

These results suggest that throughout the chronological periods, burial practices were evolving and potentially influenced the ratio of metal to pottery objects in the tombs, however there are clearly other factors causing the three trajectories. Further examination of these factors is unfortunately limited by the current data available and as a result, it is difficult to present a conclusion with confidence. The only assessment that can be insisted upon from the results is that it was metal and pottery were deliberately placed in relative quantities to one another in the tombs with metal being the preferred material type.

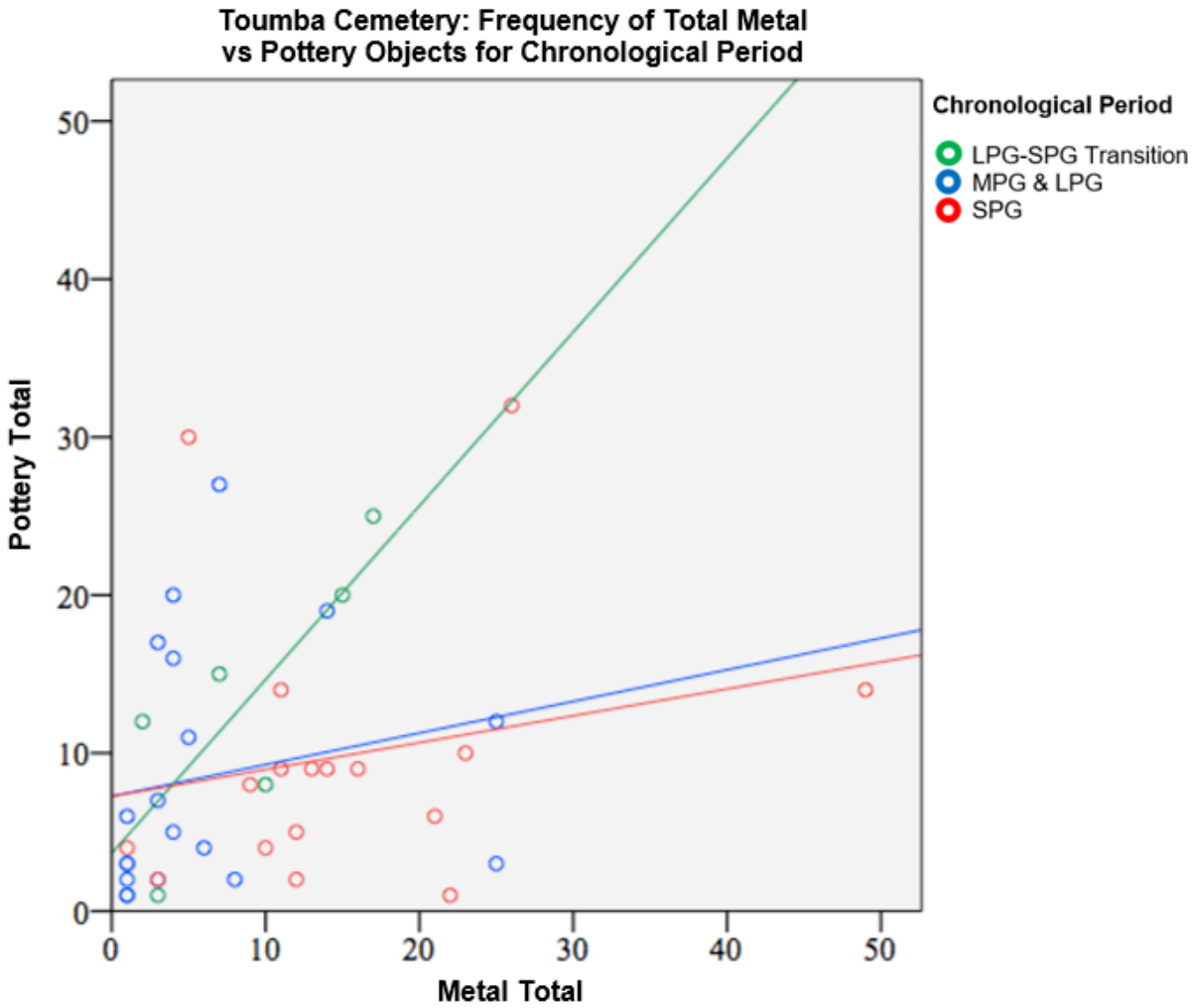


Figure 5.7 **Toumba cemetery - linear regression model showing the frequency of total metal against pottery objects in the tombs in relation to chronological period.**

6.3.3 Gold Against Bronze Objects

Examining the metal group itself, the total number of gold and bronze objects are significantly higher than any other metals in this category. Although, there was a high count of 116 iron objects distributed among the tombs, no significant correlations yielded. The frequency distribution of both gold and bronze objects found in the tombs of the Toumba cemetery are demonstrated in Figure 5.8. This shows that gold artefacts range from 1–37 objects per tomb and bronze artefacts range from 1–16 objects per tomb. The total quantity of gold present in the 33 tombs was 259 objects and had an average of approximately eight gold objects per tomb. Bronze totalled 136 objects found in 35 tombs and averaged approximately four bronze objects per tomb.

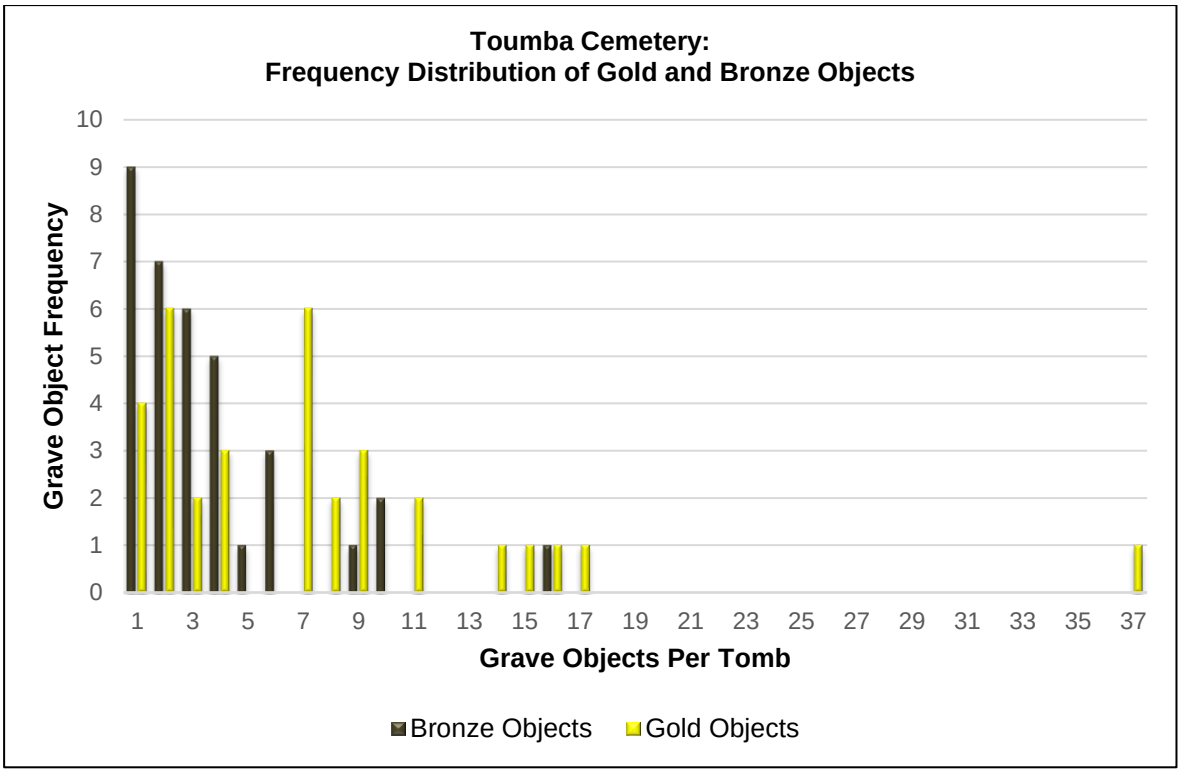


Figure 5.8 Toumba cemetery – frequency distribution of gold and bronze objects per tomb.

The six total metal group variables in the database were tested (gold, bronze, lead, iron, and combined metals). From this test only gold against bronze objects were found to be significantly correlated (Appendix D: Equation 1.2). The results demonstrate that the frequency of bronze and gold objects placed in the tombs was significantly related, $\tau = .389, p < .006$. However, initial calculations of the linear regression model and inspection of the standardized residuals plot displayed one outlier of gold that was four standard deviations from the mean. The regression linear model was adjusted to exclude the outlier based on its affect to the accuracy of the model and is presented in Figure 5.9 below.

Based on this model, the approximate ration of bronze to gold objects in the tombs of the Toumba cemetery is 0.88. This result is similar to the ratio (0.77) received in the Skoubris cemetery, though the quantity of gold is proportionally higher in the Toumba cemetery. The similarities are noteworthy because one would expect that the ratio of gold to elevate comparatively in the Toumba cemetery considering the tombs are substantially wealthier than those found in the Skoubris cemetery. The Skoubris cemetery showed that over time the amount of gold to bronze increased however this was not indicated in the Toumba cemetery and showed that the ratio was not

affected by the chronological period it was found in. The bronze and gold correlation does suggest that they were placed in the tombs together in the form of a package.

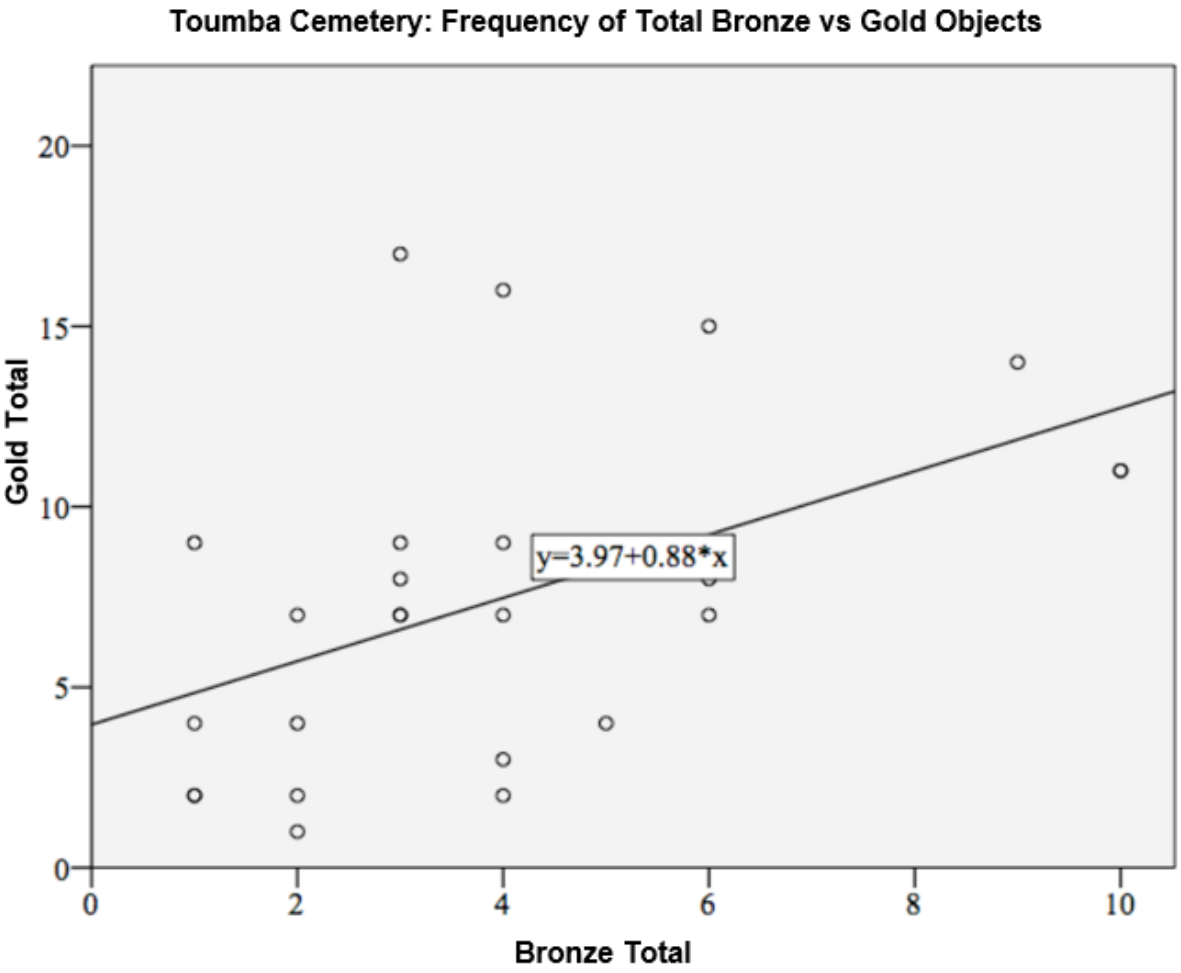


Figure 5.9 **Toumba cemetery - linear regression model showing the frequency of total bronze against gold objects in the tombs.**

6.3.4 Gold Objects Against Bronze Fibulae

The variables from the object group itself were tested and in this case the gold objects against constituents of the bronze object group which showed a correlation between gold objects and bronze fibulae (Appendix D: Equation 1.2). Gold artefacts range from 1–37 objects per tomb and bronze fibulae range from 1–9 per tomb. The total quantity of gold objects present in the tombs was 259 objects and had an average of approximately eight gold objects per tomb. Whereas bronze fibulae totalled 88 artefacts and averaged approximately three bronze fibulae per tomb.

The linear regression model presented as Figure 5.10 demonstrates that the frequency of gold objects in the tombs was significantly correlated with the frequency of bronze fibulae in the tomb, $\tau = .381, p < .013$. The N=21 data points further demonstrates that bronze fibulae were responsible for majority of the bronze against gold correlation. This suggests that in association with the inclusion of bronze fibulae, the material value of the gold objects was worth more than the object type itself. Further demonstrating specific objects and patterns were being deposited deliberately together in the form of a package in the tombs.

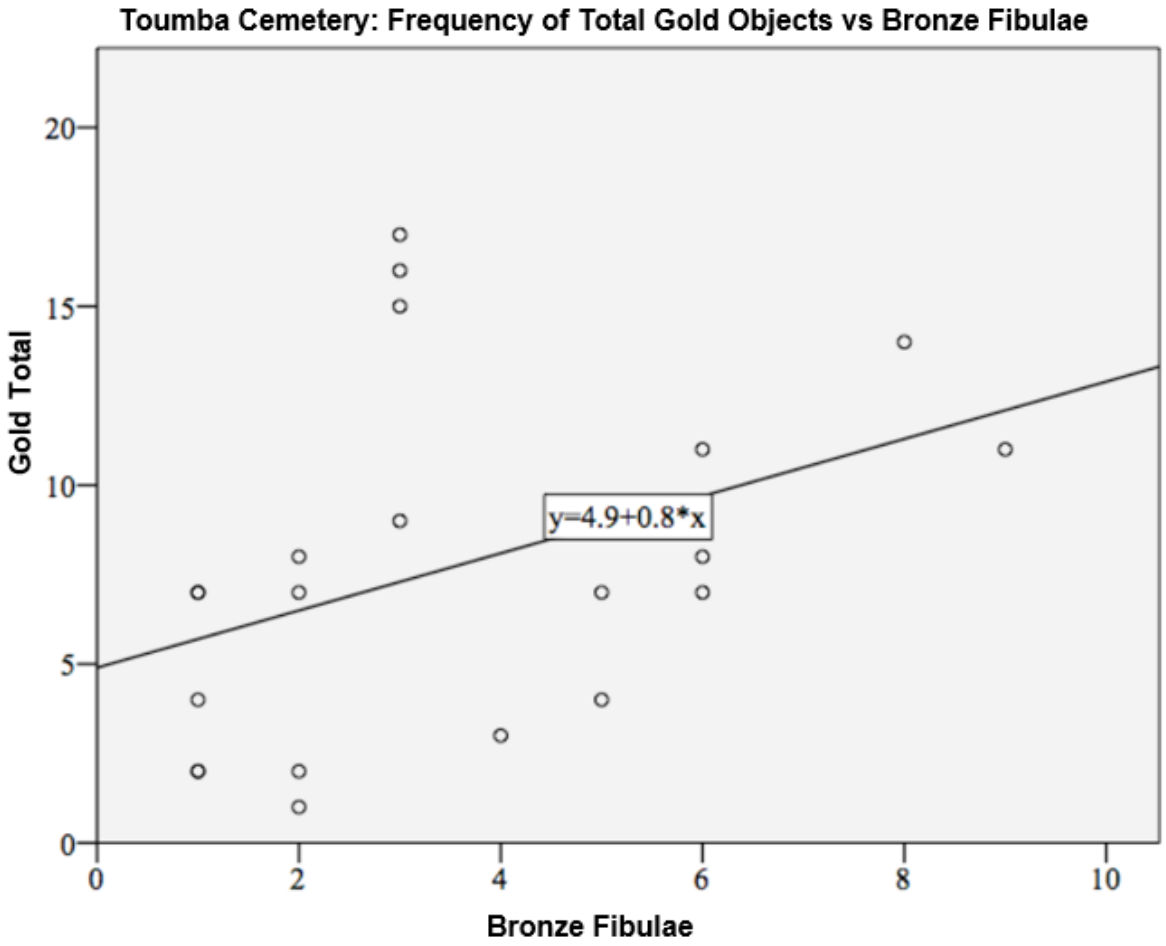


Figure 5.10 **Toumba cemetery - linear regression model showing the frequency of total gold against bronze fibulae in the tombs.**

6.3.5 Bronze Objects Against Gold Rings

Further testing of the constituents of the object group variables, showed a correlation between bronze objects and gold rings. (Appendix D: Equation 1.2). Bronze artefacts range from 1–16 objects per tomb and gold rings range from 2–13 per tomb. The

total number of bronze objects found in the tombs was 136 artefacts among 35 tombs and had an average of approximately four bronze objects per tomb. Whereas a total number of 89 gold rings were present in 19 tombs and averaged approximately five gold rings per tomb.

The linear regression model (Figure 5.11) shows that the frequency of bronze objects in the tombs was significantly correlated with the frequency of gold rings in the tomb, $\tau = .368, p < .03$. The calculations demonstrate that one gold ring for every two bronze objects was frequently placed in the tombs deliberately. This suggests that while the material of gold is evidently of value, the object type in the form of a ring is of equal importance. This result is noteworthy considering the previous correlation between gold objects and bronze fibulae showed that the material value of the gold objects was worth more than the object type itself. There were also no correlations between gold rings and bronze fibulae which could suggest that they were not deposited together because of their specific object type. This poses that the material and type of an object could potentially have different meanings for their placement in the tombs, which suggests other social factors may have contributed.

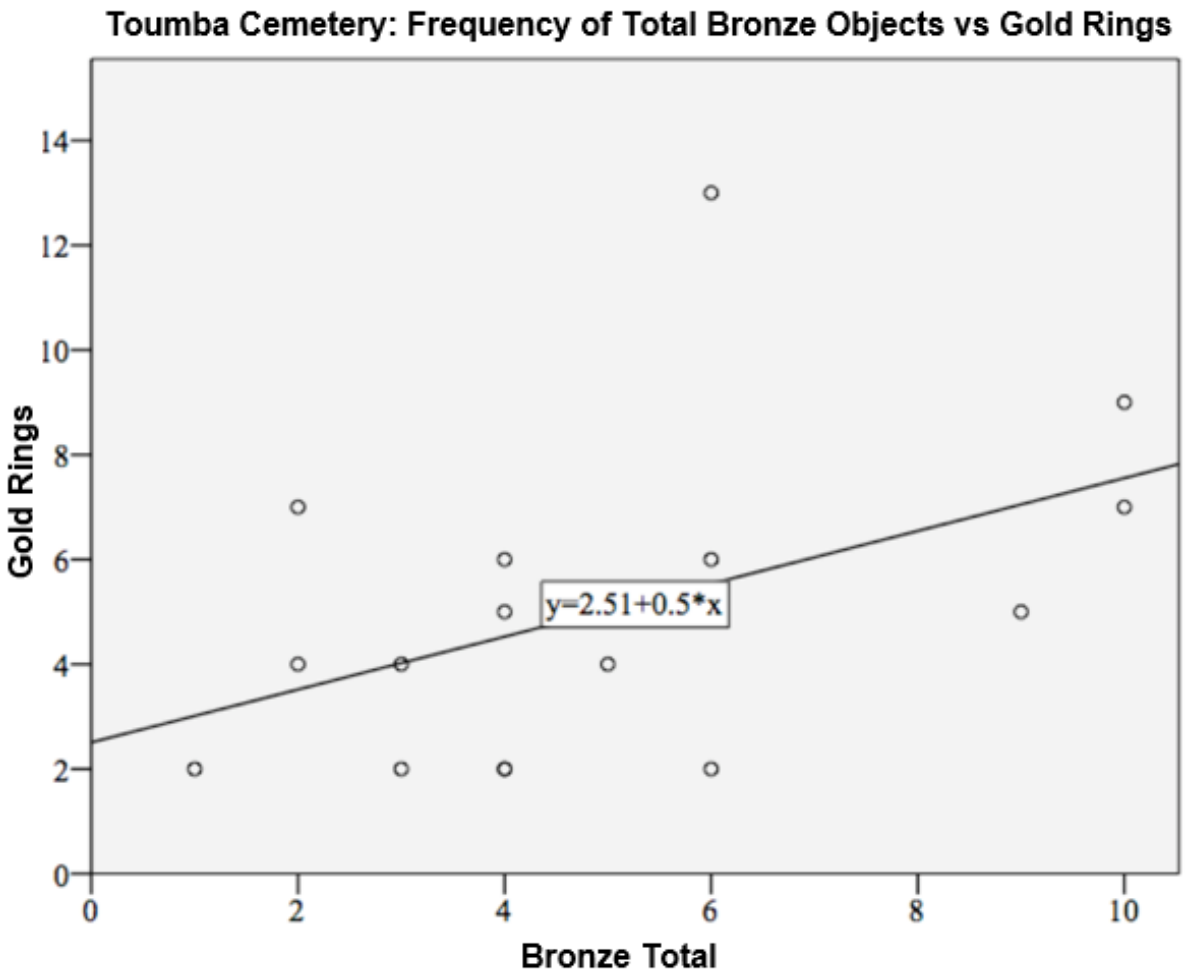


Figure 5.11 **Toumba cemetery - linear regression model showing the frequency of total bronze against gold rings in the tombs.**

6.4 Grave Object Manufacture

The manufacture and origin of the grave goods found in the Toumba cemetery are displayed in Table 5.2 below and illustrated in Figure 5.13. This demonstrates that the manufacture and origin of a total number of 572 out of 1228 artefacts could be identified in the tombs. The most dominant grave goods were manufactured locally in Euboea and their frequency was significantly higher than objects from other Greek regions and foreign imports.

Table 5.2 **Toumba Cemetery – list of object total and their frequency in the tombs in relation to their manufacture and origin.**

Manufacture	Origin	Object Total	No. of Tombs Containing Objects
Local	Euboean	414	57
Other Greek	Attic	35	16
	Macedonian	1	1
	Northern Greece	1	1
	Unknown	6	4
Foreign Import	Babylonian	1	1
	Cypriot	3	1
	Egyptian	2	2
	Near Eastern	42	14
	North Syrian	2	2
	Phoenician	6	4
Unknown	Unknown	716	54
		1228	

A total number of 414 artefacts can be attributed to local Euboean origin. They were identified in 57 out of the 84 tombs in the Toumba cemetery and averaged approximately seven objects per tomb. Grave goods from other Greek regions consisted of a total number of 43 objects. They could be attributed among four specific origin categories including 35 objects from Attica (Figure 5.12), one object from both Macedonia and Northern Greece and six unknown objects. It is clear, that majority of the objects deriving from other Greek regions were of Attic origin. Attic grave goods range from 1–6 objects per tomb and had an average of approximately two artefacts per tomb. There is a total of 55 foreign imported objects found in the tombs which compared to local Euboean objects is substantially lower. In respect to other burial grounds however, which presented a total number of three foreign imports in the Skoubris cemetery and six in the Palia Perivolia cemetery, it would appear significantly higher. Foreign imports and their inclusion in the tombs will be examined in depth below.

Figure removed due to copyright restriction

Figure 5.12 Attic MPG pottery from tomb T31.
Popham et al. 1980: pl. 272b-c

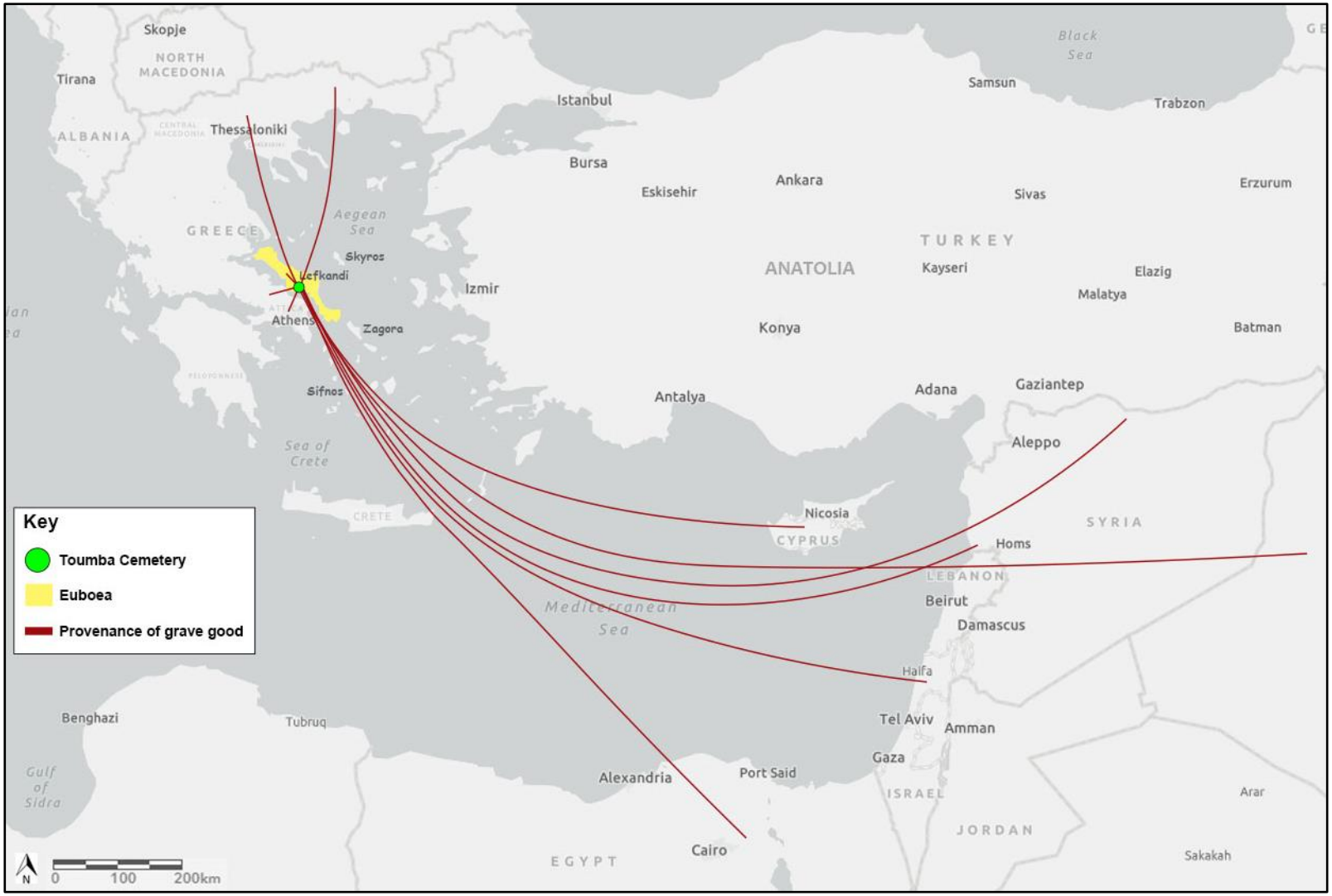


Figure 5.13 **Map of the Aegean and Mediterranean Sea showing the provenance of grave goods found in the Toumba cemetery.**

ArcGIS Esri "Light Grey Canvas Map" [Basemap], accessed 2021

Foreign Imports

The full range of foreign imported object types and their origin is displayed in Table 5.3 and illustrated in Figure 5.13. There is a total of twenty tombs that contain foreign imported objects that are distributed relatively evenly across the LPG to SPG periods. At this point in time, there are five specific origin categories that can be attributed to the foreign imported grave goods including Cypriot (3), Egyptian (2), Near Eastern (42) North Syrian (2) and Phoenician (6). It is evident that objects deriving from the Near East, such as jewellery (Figure 5.14) and vessels (Figure 5.15) where the more prevalent foreign imports, as they were distributed at a higher rate and found in 14 tombs. This could suggest that interaction with the Near East occurred more frequently than with other regions. Especially when considering that the Babylonia gold pendant located in the Toumba building tomb (TB2) was the only object found in the Lefkandi cemeteries originating from this provenance and dated to 2200 BCE (Lemos 2002:226). This is also the case for the bronze Cypriot Amphora (Figure 5.15b) found in TB1 which predates the tomb by 200 years and is considered an heirloom (Popham et al. 1993:81).

In the Toumba cemetery, the 55 recorded foreign imported objects range from 1–10 artefacts per tomb and average approximately three objects per tomb. When all manufacturing categories are combined in the 20 tombs containing foreign imports, the average is approximately 28 objects per tomb. This comparison suggests that tombs found with foreign imports were more likely to contain higher quantities of grave goods then tombs without foreign goods. There still remains a relatively large number of tombs in the Toumba cemetery that display a high number of grave offerings that do not contain foreign imports. This observation would suggest that foreign imports are of rare value and their placement in the tomb could have been symbolic of status or wealth.

Table 5.3 **Toumba cemetery – list of object types and total number in relation to their origin and allocated tomb number.**

Origin	Object Type	No of Objects	Tombs Containing Object
Cypriot	Jug	3	T79A & B
	Bronze Amphora	1	TB1
Babylonian	Gold Pendant	1	TB2
Egyptian	Faience Necklace	1	T22
	Faience Ring	1	T39
Near Eastern	Askos (bird)	1	T39
	Glass Beads	7	T1, 40, 42, 46, 59, 70.
	Gold Necklace	1	TB2
	Faience Beads	12	T12A, 15, 39, 40, 41, 42, 44, 46, 59, 63, 70.
	Bronze Bowl	3	T55, 70.
	Faience Bowl	1	T59
	Figurine (lion)	1	T39
	Faience Flask	6	T39, 42, 59.
	Bronze Jug	3	T39, 47, 70.
	Faience Necklace	1	T1
	Faience Pendant	1	T62A
	Faience Ring	2	T59, 70.
	Faience Seal	1	T46
	Bronze Situla	2	T42, 70.
	Bronze Wheel	1	T39
North Syrian	Bronze Bowl	1	T55
	Terracotta Seal	1	T79A & B
Phoenician	Faience Amulet	1	T32
	Stone Amulet	1	T36
	Jug	2	T79A & B
	Gold & Faience Seal	1	T36
	Stone Seal	1	T27

Figure removed due to copyright restriction

Figure removed due to copyright restriction

a) **b)**

Figure 5.14 **a) Gold and gilded jewellery and a gold and iron pin with glass bead from the Toumba cemetery; b) Egyptian faience necklace from T22 in the Toumba cemetery c. 900–875 BCE. It contains 53 beads representing the Egyptian goddess Sekhmet and the central pendant is Isis holding Horus.**

a) Photograph: Ian Cartwright. Copyright Irene Lemos. Lemos 2020: Fig. 4.7.2; b) Copyright Irene Lemos. Manolova 2020: Fig. 5.5.3.

Figure removed due to copyright restriction

Figure 5.15 **a) Near Eastern bronze jug from T39 in the Toumba cemetery; b) The decorated rim and handle of a Cypriot bronze amphora from TB1 in the Toumba building.**

a) Lemos 2002: pl. 106.5; b) Popham et al. 1993: pl. 20.

6.6 Summary of Correlation Results

Overall, the results of the statistical analyses for the Toumba cemetery showed multiple significant correlations between the frequency of metal and pottery, gold and bronze, gold objects and bronze fibulae, and bronze objects and gold rings. Further investigation also showed that metal objects became increasingly more prevalent over time than pottery in the Toumba cemetery. The ratio of bronze to gold objects in the tombs was interesting because it was similar to the ratio presented in the Skoubris cemetery. As previously noted in Chapter 6.3.3, one would expect that the ratio of gold to be higher in the Toumba cemetery considering it displays a higher level of wealth than what is found in the Skoubris cemetery. As previously discussed in Chapter 5.5, a large portion of metal grave goods have not been provenance tested and their potential provenance locations will be further discussed in Chapter 8.1.

The Toumba cemetery results strengthen the validity of the previous claim of a new finding at Lefkandi (see Chapters 4.5 and 5.5) showing that specific object materials in the form of grave offerings were being placed in the tombs intentionally together as a package. The implications of these results will be discussed in Chapter 8.2.

CHAPTER 7. COLLECTIVE CEMETERY DATA RESULTS

7.1 Introduction

This chapter is dedicated to the categorical analyses of the collective data from the Skoubris, Palia Perivolia and Toumba cemeteries. This is in order to observe distribution patterns of object material and their manufacture chronologically. For this reason, the tests conducted are focused on frequency of data rather than correlations found in the individual cemeteries. Thus, the following results are limited to significant relationships between the period in which object materials were distributed in the tombs and the manufacture of objects. A focus will be on foreign imports in order to trace them chronologically through maritime connectivity in the EIA.

The Skoubris cemetery was at its highest capacity in the SM and EPG periods and lowest moving into the MPG period and SPG phases. This decline coincides with the beginning of the use of the Palia Perivolia and Toumba cemeteries which both continued to increase until the Palia Perivolia ceased to be used in SPG II phase and Toumba in 825 BCE. The Toumba cemetery accommodated nearly 70% of the total number of grave objects and contains the majority of foreign imports of the three cemeteries.

7.2 Grave Objects/Goods

The statistical analyses of objects placed in the tombs demonstrate that in all three cemeteries, the most highly distributed and significantly correlated grave offerings were pottery and metal. From the metal group, bronze was distributed at the highest rate in the Skoubris tombs and conversely iron in the Palia Perivolia, and gold especially in the form of rings, in the Toumba cemetery. However, bronze and iron were found in a similar number of tombs to gold in the Toumba cemetery. The most frequently distributed object types in all three cemeteries were jugs/juglets and cups. *Kalathoi* was dominant in the Palia Perivolia and Toumba cemeteries, whereas bronze fibulae were preferred in the Skoubris and Toumba tombs.

7.3 Grave Object Frequencies for Chronological Period

7.3.1 Metal and Pottery Objects

The frequency distribution of both metal and pottery objects found in the tombs of the three cemeteries shown in Figure 6.1, demonstrates that these material types were the most frequently distributed grave goods. This suggests that these material types were the most popular for grave offerings and relatively accessible throughout the SM period to SPG phases. The categorical analyses (Appendix D: Equation 1.4–1.5) performed revealed that there was a highly significant and moderately strong relationship between the frequencies of metal and pottery in relation to their chronological period, $x^2(4) = 40.00, p < .001$. The relationship between these variables is of a moderate strength shown by the result of Cramer's V= .174 (Appendix D: Equation 1.8).

Figure 6.1 further reveals that in the earlier SM and EPG periods, the quantity of metal and pottery objects were relatively similar in the tombs. This changed progressing into the MPG periods, with pottery totals exceeding the metal object totals and then a rise in metal objects occurred during the SPG phases.

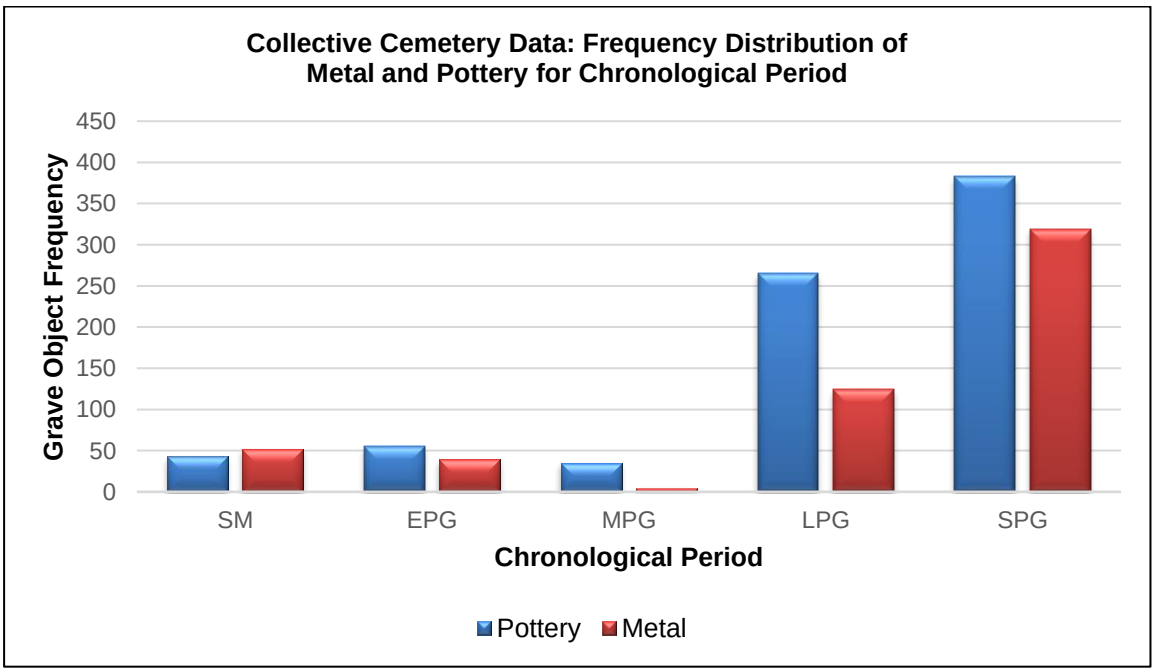


Figure 6.1 **Collective cemetery data – frequency distribution of metal and pottery for chronological period.**

7.3.2 Iron Objects

Grave objects made from iron were distributed in the Skoubris, Palia Perivolia and Toumba cemeteries. The highest rate of iron distribution was evidently in the Toumba cemetery with 116 iron objects; however, no significant correlations were found between iron and other material types. When testing all three cemeteries (Appendix D: Equation 1.4–1.5) the results demonstrated that there was a significant and moderately strong relationship between the frequencies of iron objects in relation to their chronological period of the tomb they were deposited in, $x^2(4) = 6.55, p < .003$, Cramer's V= .249 (Appendix D: Equation 1.8). Figure 6.2 demonstrates that during the LPG period, the frequency distribution of iron increased in the tombs and then multiplied moving into the SPG phases.

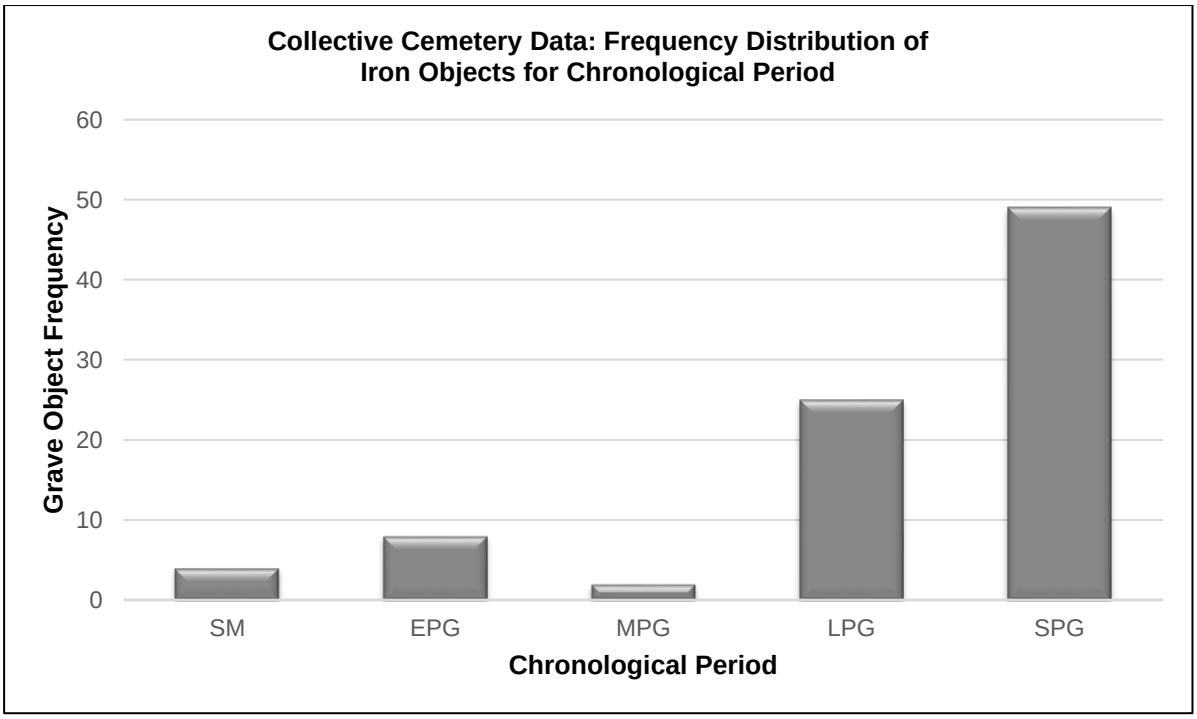


Figure 6.2 **Collective cemetery data – frequency distribution of iron objects for chronological period.**

7.3.3 Gold and Bronze Objects

Gold and bronze were found in all three cemeteries and were the most dominant of the metal group in the Skoubris and Toumba cemeteries. When testing all three cemeteries (Appendix D: Equation 1.4–1.5) the results show that there was a significant and extremely strong relationship between the frequencies of gold and

bronze objects in relation to their chronological period of the tombs in which they were placed, $x^2(4) = 73.62,\ p < .003$, Cramer's V= .431 (Appendix D: Equation 1.8).

Figure 6.3 demonstrates frequency distribution of bronze was more dominant than gold across all three cemeteries in the earlier periods and from the LPG period onwards gold objects were found in much higher frequencies than bronze objects. As previously discussed in Chapters 4.3 and 6.3, correlation analyses showed that in the Toumba and Skoubris cemeteries, gold was found to be of substantial value, although the quantity was significantly lower in the Skoubris. The approximate ratio of gold to bronze grave objects was also similar in the two cemeteries calculated at 0.77 and 0.88. This shows that in the Skoubris cemetery, the quantity of gold to bronze increased over time. This pattern was not observed in the Toumba cemetery which showed that the ratio was not affected by diachronic change.

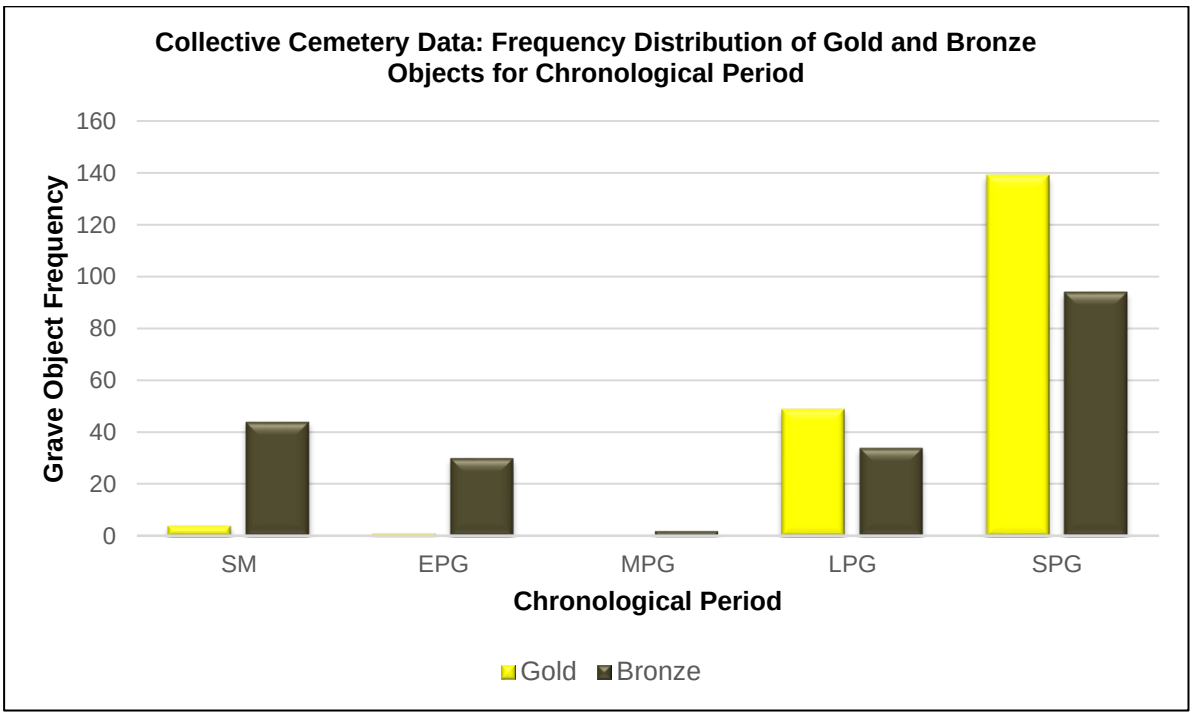


Figure 6.3 **Collective cemetery data – frequency of gold and bronze objects for chronological period.**

7.4 Grave Object Manufacture

The Skoubris, Palia Perivolia and Toumba cemeteries all displayed grave objects deriving from Euboea, other Greek regions and imports from the Near East. As expected, locally acquired Euboean objects were found to be distributed more frequently in the tombs and grave objects deriving from other Greek regions and the Near East were found in lower frequencies. In addition to these regions, the diversity of grave objects from other provenances found in the cemeteries include Attic, Egyptian, Macedonian, North Syrian, Northern Greek and Phoenician, however these are found at much lower counts and majority are found in the Toumba cemetery (see Chapter 6.5).

When testing all three cemeteries (Appendix D: Equation 1.7) the results show that there is a highly significant and moderately strong relationship between the chronological period of the grave objects and their manufacture location, Fisher's $p < .001$, Cramer's V = 0.261. Figure 6.4 below shows that imported objects were significantly higher than expected in the LPG period, but lower in the SPG phases. Grave objects deemed to be manufactured in other Greek regions were lower than expected in the EPG and MPG periods, but higher in the LPG period and SPG periods. Whereas Euboean objects were always prevalent but increased rapidly from the LPG onwards. This pattern corresponds with the Toumba cemetery which saw an increase in grave objects and diversity of object manufactures at this time. Observation of the manufacture of all grave objects that were found in the Lefkandi cemeteries in relation to chronological period is illustrated in Figure 6.6

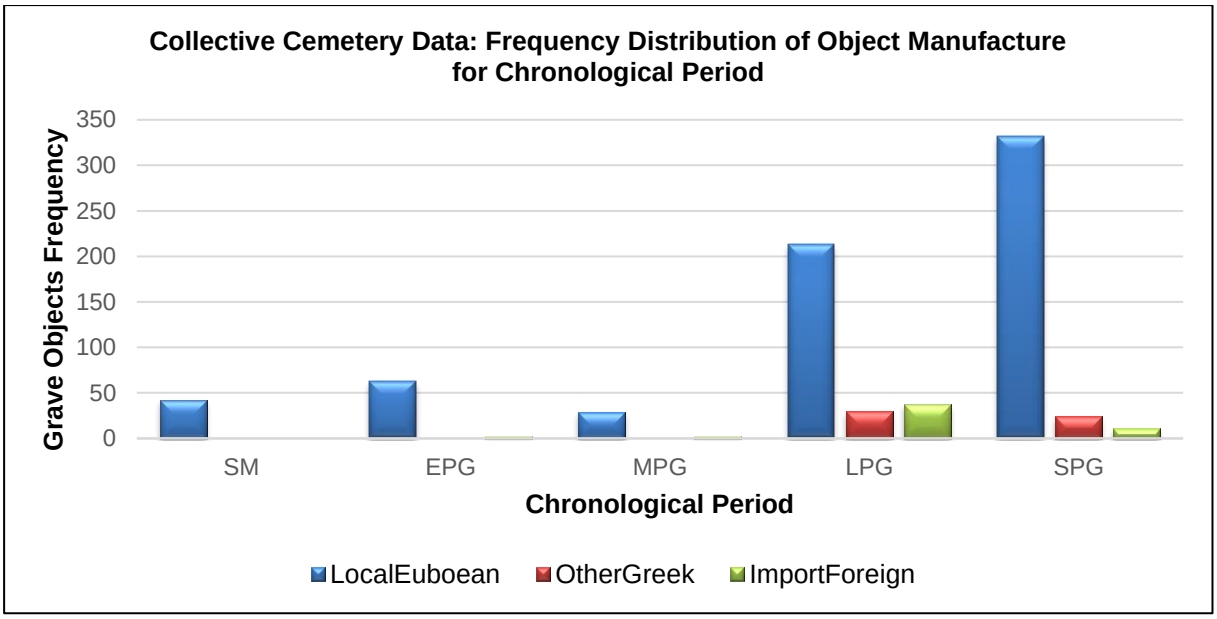


Figure 6.4 **Collective cemetery data – frequency distribution of grave objects in relation to manufacture location for chronological period.**

Foreign Imports

Further inspection was performed on the origin of foreign imports in the tombs and their distribution in relation to chronological period. Figure 6.5 below demonstrates Near Eastern imports were the most frequently distributed and increased from the EPG onwards and declined from the LPG onwards. Objects from Cyprus although only six in total were imported from the SM period onwards and increased in the SPG period. Egyptian and North Syrian goods were found in low quantities in the LPG period and SPG phases. Interestingly, Phoenician imports were only found in the SPG phases. The LPG onwards appears to become much more diverse in the origin of the imported goods. This demonstrates widespread maritime connections in the Aegean and Mediterranean Sea which is illustrated in Figure 6.6. showing the location of foreign imports deposited in the Lefkandi cemeteries.

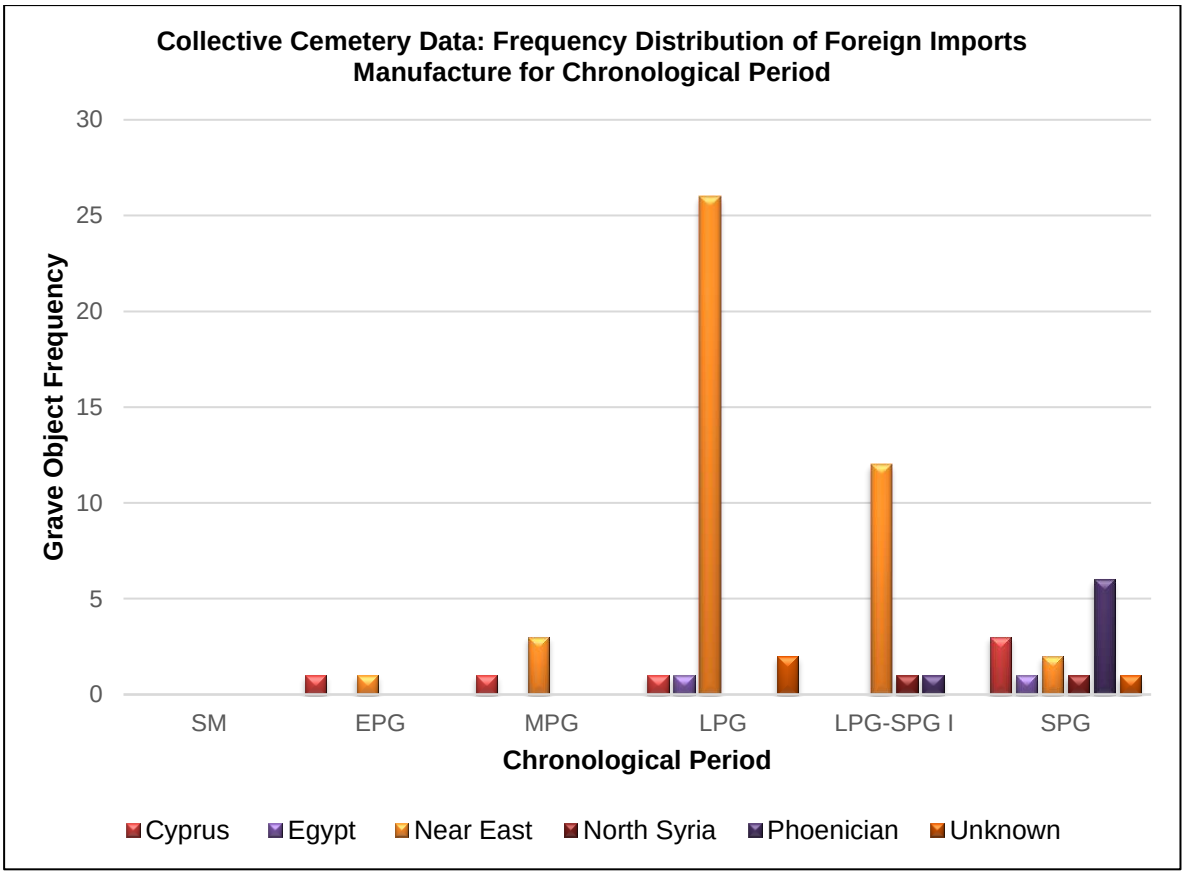
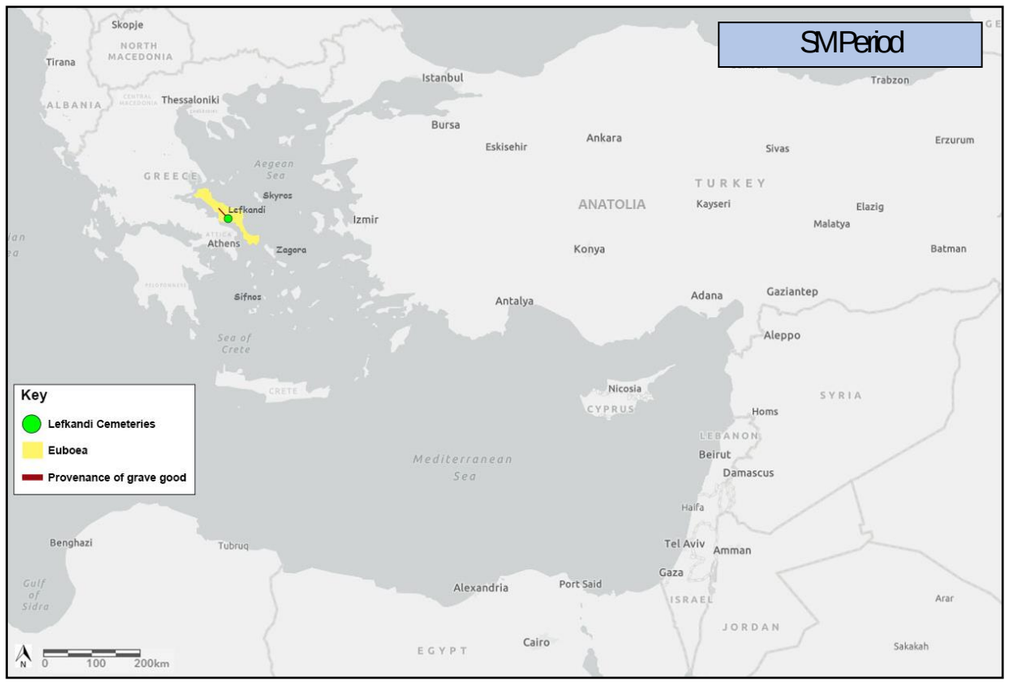
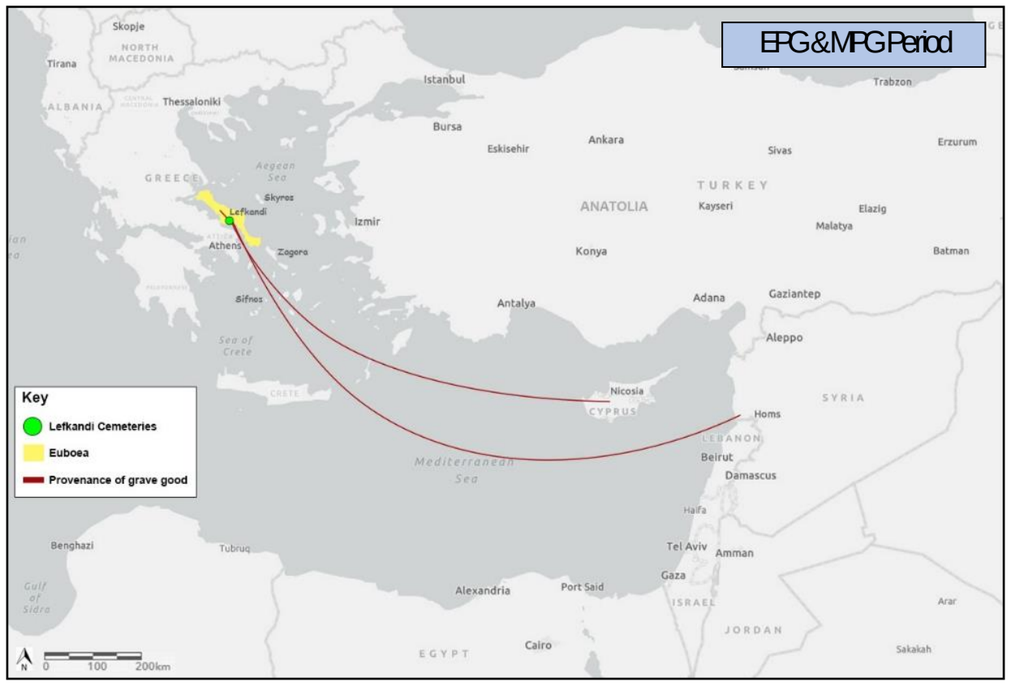
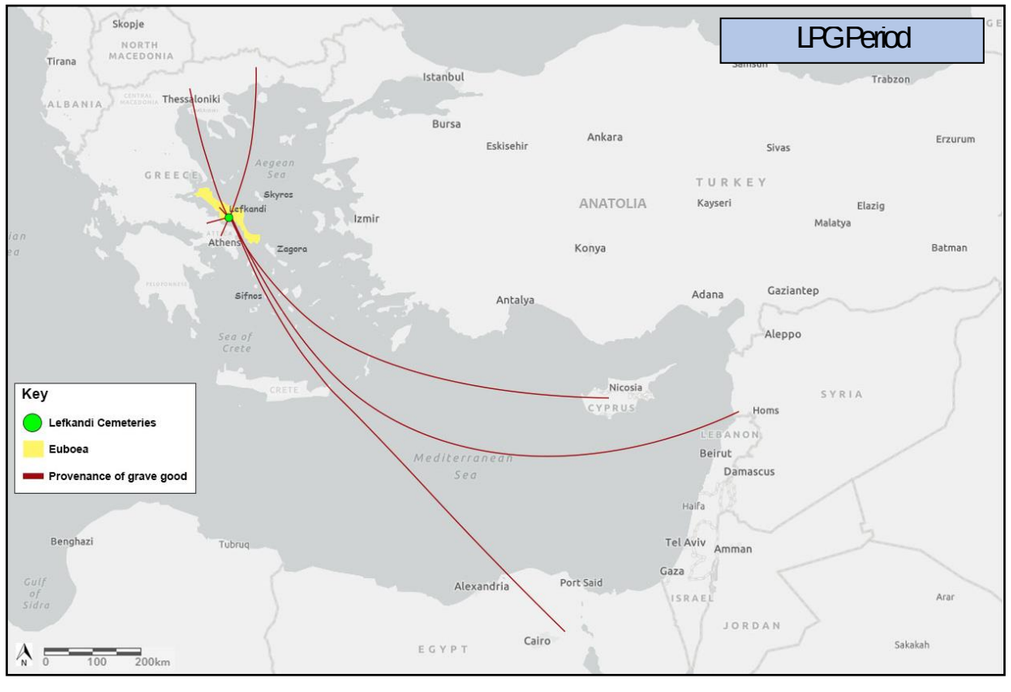


Figure 6.5 **Collective cemetery data – frequency distribution of foreign imports in relation to manufacture location for chronological period.**







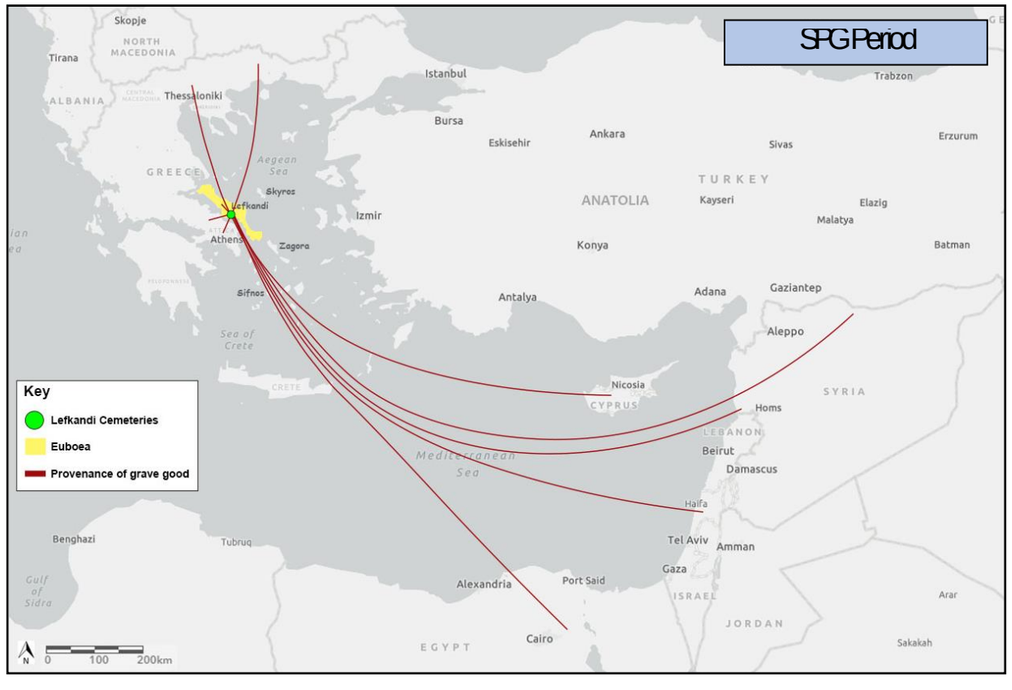


Figure 6.6 **Map of the Aegean and Mediterranean Sea showing the diachronic change of the provenance distribution of grave goods found in the Lefkandi cemeteries.**
ArcGIS Esri "Light Grey Canvas Map" [Basemap], accessed 2021.

7.5 Summary of Results

Overall, the results of the statistical analyses of the collective data from the Skoubris, Palia Perivolia and Toumba cemeteries revealed significant correlations between the frequency of metal and pottery and gold and bronze. This validates the new finding at Lefkandi (Chapters 4–6) that it was evidently a common practice in all three cemeteries: to deposit specific grave objects deliberately together in the form of a package in the tombs. The implications of these results will be discussed in Chapter 8.2.

The trends that were observed in relation to chronological periods were that the proportion of metal and pottery objects were similar in the earlier periods. MPG onwards this changed with pottery totals exceeding the metal totals and metal objects increasing during the SPG phases. Gold and bronze were found in all three cemeteries but was the most dominant of the metal groups in the Skoubris and Toumba cemeteries. Bronze was more dominant than gold in earlier periods which reversed from the LPG onwards. Iron objects were a commonly distributed offering in all three cemeteries but were not correlated with other materials. The frequency of iron increased in the tombs during the LPG period and then multiplied moving into the SPG phases. As previously discussed in Chapter 6.6, majority of metal grave goods have not been scientifically tested and their potential provenance locations will be further discussed in Chapter 8.1.

Observation of the manufacture of all grave objects in relation to chronological periods in Figure 6.6 shows that Euboean grave objects were always prevalent in the tombs across all periods. The rise in the LPG onwards however could be attributed to an increase in local production and the growing practice of displaying high quantities of grave offerings in the tombs. Demonstrated in Figure 6.6, Near Eastern objects occur in every period from EPG onwards. This could indicate a relatively stable relationship between Lefkandi and Near Eastern contacts and the interaction was somewhat frequent. The diversification of objects from other Greek regions and imports such as the rise in Phoenician objects in the LPG onwards demonstrates an expansion of foreign connections and maritime connectivity at Lefkandi.

CHAPTER 8. DISCUSSION

8.1 Detecting the Continuity of Trade Networks in the Early Iron Age

The grave objects that have been recorded and identified in the Lefkandi cemeteries as foreign imports originate broadly from Cyprus, Egypt, Near East, North Syria and Phoenician (Figure 6.6) They show a widespread network of contacts and clear shapes of maritime trade routes operating within the Aegean and Eastern Mediterranean. However, the metal objects that are yet to be classified, could provide a much broader and more extensive network and potentially suggest that contact occurred more frequently than previously thought.

The most popular metals distributed in the tombs including bronze, gold, and iron, can be potentially traced from regions outside of Lefkandi and Greece. Whilst it is not possible to positively identify the provenances of metal at Lefkandi until further metallurgical analyses are performed, Figure 7.1 shows potential sources and production locations based on documentary and archaeological research. The metal groups will be discussed individually, to provide clarity, as they have variability in their provenances and their chronological distribution.

Gold

The majority of gold objects found in the Lefkandi tombs were in the form of jewellery. Scientific analyses of the gold at Lefkandi have determined that it is of high quality however the source in which it came from remains open (Lemos 2002:126–134). Tracing the circulation of gold demonstrates the issue with distinguishing between the original source and the provenance of the manufacturer (Leone 2012:232). Gold was present but scarce at Lefkandi and the Aegean in the earlier periods following the palatial collapse. Lefkandi attains the majority of gold finds in the Aegean in the EIA comparable to that found in the Argolid, Kos and to an even lesser extent Athens (Lemos 2002:126–134). Based on the results of this analysis, gold increased substantially from the LPG onwards which is also evident in wealthy burials in Attica, Skyros, Kos and the Near East (Papangeli 2012).

Based on Homer's account the majority of the sophisticated gold artefacts originated from Egypt and the Near East (Leone 2012:232). Exotic items such as faience, glass, bronze and later ivory types attests to goods being imported from Egypt and the Levant, however very few gold items can be positively attributed to this source at the time (Stampolidis 2012:35–42). Alternatively, Leone (2012:233) has suggested that gold was being mined in the Northern Aegean and more specifically Chalcidike and Skyros. Recent studies have identified several gold deposits in this area, though there is little evidence for gold mining prior to the 6th century BCE (Vavelidis and Andreou 2008). While there is also limited deposition of gold objects in central and eastern Macedonia in the BA and EIA, there is evidence of gold working between the 12th and 10th centuries in the Toumba Thessalonikis. Thus, there remains the possibility that gold may have been mined in central Macedonia and as suggested by Leone (2012), a trade route detected between Euboea and the Northern Aegean.

Cyprus has been suggested as inspiring the production of gold jewellery in Lefkandi because they share similar types of gold items and some manufacturing techniques (Konstantinidi-Syvridi 2020:689). Though goldwork was occurring in Cyprus, it was not locally available and likely imported to the island from gold deposits located in Egypt, Anatolia and the Pontus area along the Black Sea Coast (Kassianidou 2012:244). All the known imported objects in the Lefkandi cemeteries from Cyprus are either pottery or bronze vessels, though it's possible that the Cypriot carriers were also exchanging exotic luxury goods with Lefkandi that were attained from the Eastern Mediterranean.

Aside from the north, the only gold deposits found in the Aegean, are located on Sifnos, Eretria and the southern tip of Euboea which would be instrumental for the Euboean enterprises (Popham et al. 1980:461). Gold objects have been suggested as being locally produced in Lefkandi, as the only parallel for sharing similar styles, such as the attachments and discs that were found in two sites on the island of Skyros (Lemos 2002:133). Evidence of gold ingots, globules and distorted jewellery at Eretria attests to an 8th century goldsmith workshop. It's possible that earlier workshops of this kind were operating and Lefkandi utilised them for obtaining burials goods (Themelis 1983:165). Techniques including granulation and filigree were adopted from Near Eastern, Phoenician and earlier Minoan influence but objects

such as the pendant from the female burial TB2 show local development of sophisticated techniques that are exclusive to Lefkandi. This does however show a form of interaction with foreign contacts or material which Lemos (2002:133) has suggested could indicate itinerant craftsmen operating out of Lefkandi or innovative local craftsman's experimenting and copying from imported jewellery.

The exploitation of gold in Euboea and expansion of local production in Lefkandi could explain the rapid increase in the distribution of gold in the Lefkandi tombs from the LPG onwards. Its presence in tombs at Lefkandi that also display high quantities of grave offerings and elite burials in the Toumba cemeteries shows that it was clearly important and of high value in funerary contexts. The inclusion of gold in three separate forms of funerary packages, with the other part being bronze objects and bronze fibulae and gold rings with bronze objects, can suggest that it was required for multiple funerary packages and contributed to a feasible demand. Though some gold items were clearly being imported, seen by the Near Eastern gold necklace (TB2) (Figure 5.14) and gold and faience Phoenician seal (T36), they could potentially be attained for the object's symbolic value. Whereas to meet the high production demand of gold for both the living and the dead, a source located nearby such as the southern tip of Euboea as well as foreign connections would certainly be ideal and should be strongly considered.

Bronze

Bronze is in circulation throughout the Aegean and the Mediterranean by the EIA as many copper ore deposits were already exploited in the BA. Cyprus is well recorded in the archaeological record as a source of copper and bronze (Kassianidou and Knapp 2005:219). Though copper deposits are found in Anatolia, the Levant and Egypt the original source of Syrian, Phoenician and Euphrates copper is thought to be from Cyprus (Zaccagnini 1990:500). Tin, the metal used with copper to produce bronze was not present in Cyprus and must have been imported, possibly from Iberia (Kassianidou 2012:240). High percentages of tin have been found in bronze objects from the Lefkandi cemeteries (Popham et al. 1980:456). Excavation in eastern Thrace show the area could have had sources of copper minerals and once again indicate a potential trade route between Euboea and the northern Aegean (Kassianidou and Knapp 2005:219).

The collapse of palatial centres arguably disturbed trade routes that transported tin to the Levant and Syria and copper and bronze from Cyprus to upper Mesopotamia through Syria (Kassianidou 2012:241). A shortage of tin and subsequently bronze between c.1025–950 BCE was described by Snodgrass (2000:xxvii) as a brief transitional phase. This was used to explain broken links between the Aegean and Near East where bronze was typically mass produced and iron technology advanced to substitute bronze objects. This may have restricted the circulation of Cypriote copper and bronze in the earlier periods which is demonstrated by its decline in the Lefkandi cemeteries from the SM to MPG periods which is comparable in the cemeteries of Knossos (Dickinson 2006:150).

Chrysokamino on Crete and the Cycladic Islands, namely, Kythnos, Paros, Seriphos and Syros were rich in copper ore deposits, already appear to have been exploited in the BA (Betancourt 2006; Gale et al. 1985:82; Georgakopoulou et al. 2011:123–145). It is possible Lefkandi and certainly Crete were locally manufacturing bronze and sourced copper ores from the Cyclades to supplement the lack of available resources from the east, or vice versa (Kassianidou and Knapp 2005:220). However, the abundant evidence of bronze work at Eretria in the 8th century and the increase in bronze in the Lefkandi tombs provides a more likely relationship. Verdan (2007:352–353) suggests that there is a connection between metal working and the production of offerings in Eretria from the 8th century onwards which could further explain this increase.

Near Eastern influence is certainly prominent in Aegean bronze work with parallels from Cypriot and Near Eastern styles found in local manufacturers in Lefkandi and Crete (Stampolidis 2004:275–276). Aegean bronze work evolved and new shapes including the skyphos-like drinking vessels, one-handled cups and *situlae* were circulating (Matthaus and Vonhoff 2020:556). Though bronze is found in relatively low quantities throughout the Aegean in earlier periods, it appears to remain available in the form of bronze vessels in specific mortuary contexts located in Lefkandi, Knossos, Argos, the Athenian Kerameikos, Orthi Petra/ Eleutherna (Matthaus and Vonhoff 2020:554). While the rate of gold is higher than bronze when placed together from the LPG onwards, an increase in bronze is still apparent.

Regardless of its ratio, the importance appears to be in their relationship as a package and the demand for both materials continue throughout the use of the Toumba and Skoubris cemeteries. This could indicate that an exchange network was operating between Lefkandi and carriers who had access to both metals. This is presumably from regions in the Aegean and the Eastern Mediterranean based on the bronze and gold imports from Cyprus, Egypt, North Syria and Phoenicia.

Iron

Iron technology was known in the Eastern Mediterranean in the BA and was mainly used for prestigious goods and used less than other metals such as bronze. Snodgrass (1971:45) suggests that the practical advantages of iron were realised later in the EIA and used for utilitarian objects such as weapons and tools rather than for ornamental objects. This process is attested by the evidence at Lefkandi which saw a decrease in iron objects from the SM to MPG periods and an increase from the LPG onwards. The spread of iron technology into the Aegean appears to have been a gradual process that was introduced by Cyprus and Near Eastern influence (Muhly and Kassianidou 2012:135). The Near East including Anatolia and the Levant and Cyprus are at the forefront of iron technology. Iron ore has been found in the Troodos foothills in Cyprus and appears to have supplied Crete and regions in the Aegean such as Lefkandi to which they manufactured objects into local styles (Muhly and Kassianidou 2012:135).

Evidence of iron production becomes more expansive in the LPG period onwards including in areas such as Zagora in Andros, Eretria in Euboea and Oropus in Attica (Doonan and Mazarakis Ainian 2007:364–365; Vetta 2020:18–19). Aside from Lefkandi, iron objects have been found in EIA sites including but not limited to the Athenian Agora and the Kerameikos, Eleutherna on Crete, Karphi, Knossos, Nichoria, and Mitrou on the Mainland (Blegen 1952; Dickinson 2006:158; Lemos 2002:122–123; Papadopoulos and Smithson 2017:955–973; Snodgrass 1996:585–589). Bronze and iron objects of the same type are found simultaneously and are well attested in the EIA (Kayafa 2006:246).The high quantities of iron in the tombs at Lefkandi in the LPG onwards could possibly be explained by the exploitation of the practical metal and local sources becoming more available. It could also show a

continued relationship with Cyprus where exchange of commodities may have likely taken place between the two islands.

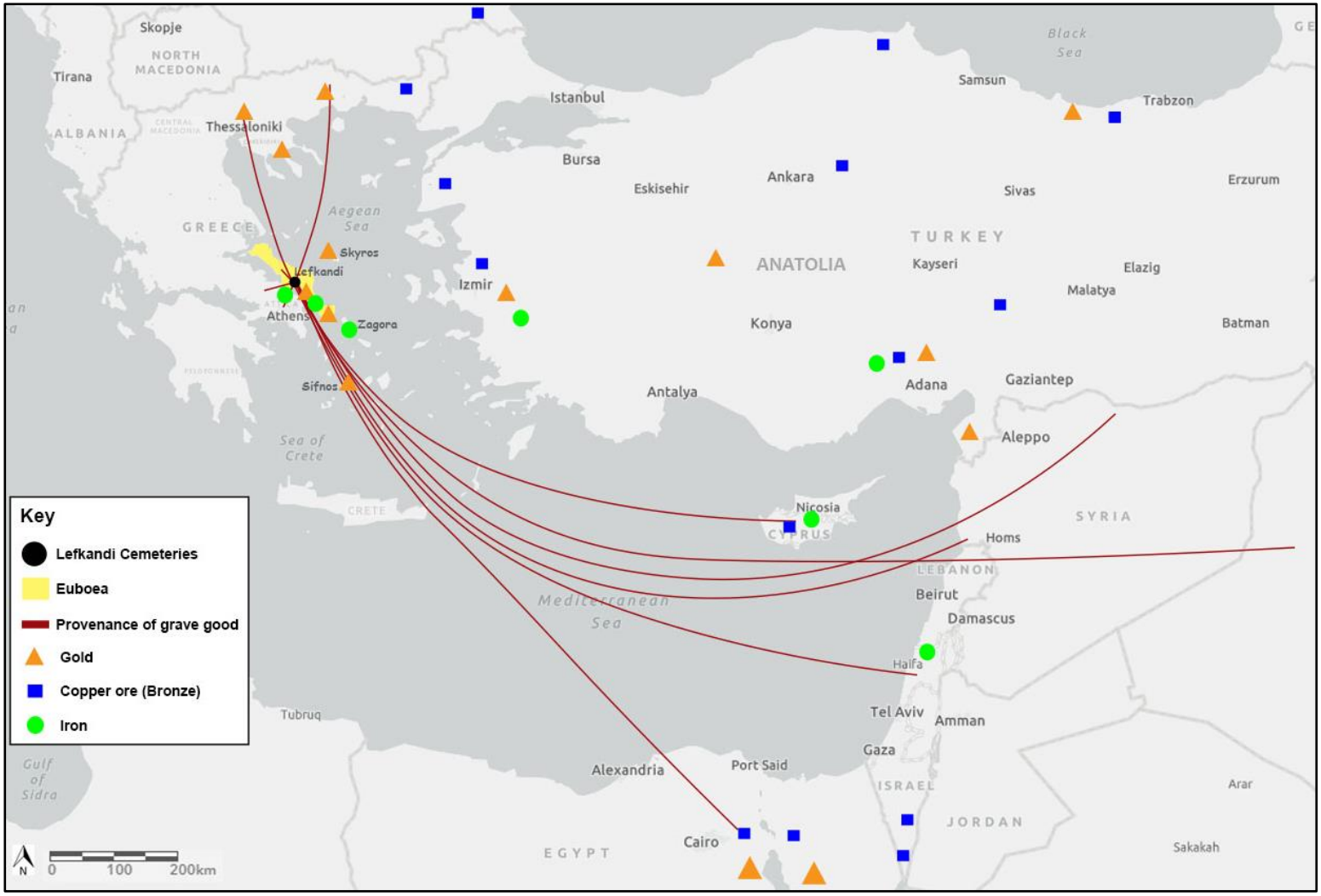


Figure 7.1 **Map of the Aegean and Mediterranean Sea showing the location of potential metal ore deposits and the recorded provenance of grave goods found in the Skoubris, Palia Perivolia and Toumba cemeteries.**

ArcGIS Esri "Light Grey Canvas Map" [Basemap], accessed 2021.

8.2 Nature of Exchange – Funerary Packages and Mortuary Market

New findings for Lefkandi in this thesis (Chapters 4–7) show significant correlations existed between the frequency of certain material objects in the form of grave offerings in the Skoubris, Palia Perivolia and Toumba cemeteries. This is important because it suggests that specific artefacts were being placed in the tombs intentionally together as a ‘funerary package’. Funerary packages that were found in all three cemeteries consisted of pottery and metals and were placed in the tombs from the SM to SPG periods (Figure 7.2), whereas bronze and gold packages were only found in the Skoubris and Toumba cemeteries. In addition, exclusive packages containing bronze fibulae and gold objects were found and bronze objects and gold rings were confined to the Toumba cemetery (Figure 7.3). The function of these types of funerary packages is evidently more symbolic and could represent various forms of status in the cemeteries or possibly distinguish between certain groups of individuals or social identities. Furthermore, 80% of burials are deliberately left unoccupied and treated as token burials or honorific memorials (Chapter 2.4). The grave objects are possibly used as a symbol in place of the body itself which would transform the funerary packages into an agent of significant value. However, identifying these types of social structures is outside the scope of this Master’s thesis.

Figure removed due to copyright restriction

Figure 7.2 **Tomb S16 in the Skoubris cemetery showing common funerary package consisting of pottery and metal.**
Popham et al. 1980: pl. 194c.

Figure removed due to copyright restriction

Figure 7.3 **Funerary packages consisting of a) bronze fibulae and a gold object (earrings); b) bronze object (vessel) and gold ring.**
Popham et al. 1980: a) pl. 251a, 229a; b) pl. 243b, 229a.

The findings also show that similar funerary packages were found in the Skoubris and Toumba cemetery. As previously noted in Chapter 6.6, the ratio of bronze to gold objects was similar and the ratio of gold was expected to be higher in the Toumba cemetery than the Skoubris, considering it displays a higher level of wealth. Explanations for this occurrence could be that the practice of depositing funerary packages was adopted from the Skoubris cemetery. It appears that over time in the Skoubris cemetery, it was more important to deposit gold over bronze in the tombs, whereas in the Toumba cemetery it was more essential to place a high quantity of grave goods. While the Toumba cemetery demonstrated status and wealth in the form of conspicuous consumption of high quantities of grave goods, the Skoubris cemetery displayed fewer offerings but deposited grave objects and materials parallel to the Toumba. This shows that both cemeteries followed similar burial customs and yet their users chose to express wealth differently which could suggest that the cemetery itself had significant meaning by way of association. It is clear the Toumba cemetery was established for the elites, whereas the Skoubris cemetery could represent an ancestral linkage to the SM elites. In contrast, the Palia Perivolia cemetery appears to be substantially poorer and could be proposed as the common people's burial ground.

The distribution of *exotica* in the tombs of all three cemeteries shows that their inclusion is important and potentially symbolic considering it was not placed in all wealthy tombs. This is especially relevant in the Toumba cemetery which contained the highest number of foreign imports. As such, the evidence supports socio-political models that have been previously proposed in Chapter 2.4, that suggest that the inclusion of foreign imports in the Toumba cemetery was a way of elevating status to represent the ruling class (Popham and Lemos 1996:7). Yet, in the case of the Skoubris and Palia Perivolia cemeteries, the tombs that contained *exotica* were in no way more prestigious than tombs without foreign imports (Newton 2016:126). Thus, a new perspective was proposed that the function of *exotica* could possibly be a memento that signifies a member of a merchant family.

The implication of these findings is that there is a requirement and therefore a demand for certain materials that are crucial for funerary packages used in the Lefkandi cemeteries. Aside from pottery which is mainly locally produced, gold and

bronze objects are the most highly demanded material in the Lefkandi cemeteries. This suggests that the demand for certain materials were in alignment with the funerary practices and as such, could have influenced the relationships that Lefkandi were maintaining and forging with trade contacts. Thus, it could be argued that it may have not been only external contacts driving exchange but internal and regional funerary requirements for depositing such goods or packages in the Lefkandi tombs.

As previously mentioned in Chapter 8.1, gold imports possibly from the Eastern Mediterranean continued to be exchanged at Lefkandi and could have been in the same transaction as the exotic goods such as faience and glass beads. The increase of gold in relative quantities to bronze in later periods did however coincide with the expansion of gold production in the Aegean, and thus, the southern tip of Euboea may be a more accessible and available source. It is impossible to determine if the demand at Lefkandi for gold was motivating this expansion, however, when considering the inclusion of a gold and bronze package as a common practice throughout the use of the Skoubris and Toumba cemeteries, it could be suggested that local production and establishment of workshops, increased in response to this demand.

Relations between Lefkandi and the Near East and possibly Cyprus is evidently the most well-established and frequent. Local workshops were operating with potential immigrated Near Eastern craftsman who were producing sophisticated bronze vessels parallel to the Near East (Lemos 2002:133). The material itself however would have required Eastern Mediterranean contacts and been transported via maritime trade routes. The known bronze imports derive from Cyprus, the Near East and North Syria. The majority of foreign imports are from the Near East which also consist of glass and faience beads. These types of foreign imports are also in demand for their representation of wealth and status, mainly in the Toumba cemetery. The rise in Near Eastern imports in the LPG period could be explained in a way that all three Lefkandi cemeteries were operating at this time and consequently the demand for certain object materials was higher. This may have led to a stronger alliance and thus more frequent contact forming between both the Lefkandi and Near Eastern agents and carriers of trade networks. Furthermore, if we accept that a proportion of the metals needed for funerary packages are acquired from the Near

East and Cyprus, this would suggest: one, the demand for certain grave objects for a funerary package contributed to forming and maintaining trade relations with these eastern regions; two, maritime trade was operating in accordance with the funerary culture at Lefkandi, and three, as a result this maritime exchange and interaction created a mortuary economy. Conversely, the decline in Near Eastern imports in the SPG phases could have been a result of sourcing closer contacts such as Eretria which is making bronze by this point, as well as in the western Aegean and the establishment of local production in order to keep up with this demand.

This leads to the discussion on what may have influenced the nature of exchange. Based on the evidence, it can be proposed that trade networks were operating directly in association with an established mortuary market. The requirement of funerary packages as part of the funerary culture at Lefkandi creates a demand and supply-driven mortuary economy. The exchange of particular goods also appears to have resulted in social inequalities which was initiated by chieftains and the ruling class who controlled trade. This is evident especially in the Toumba cemetery, where elites' groups appear to be represented more explicitly by wealthy burials and consequently, they would be profiting from a funerary economy. These aristocratic elites were sustained by the arrival of prestigious and exotic objects (Armada et al. 2018). In this way, it is proposed that the ruling class was at the forefront of influencing and driving this mortuary enterprise.

It is interesting that while bronze was found in relatively low quantities in earlier periods, and potentially in short supply across the Mediterranean, it still appeared in the form of bronze vessels in mortuary contexts throughout the Aegean (Matthaus and Vonhoff 2020:554). This further supports that a niche market for funerary objects was operating and that the agents, craftsman's and carriers of maritime trade in the Eastern Mediterranean have knowledge of and evidently capitalised on. This idea could be equally considered for the information acquired to produce the adequate amount and type of object materials required for the funerary packages at Lefkandi.

The question whether networks were continually reinventing themselves according to evolving socially formed variables from technologies to produce and markets proposed by Leidwanger and Knappett (2018:10–11) should be considered here (see

Chapter 2.3). The continuity of funerary practices that were occurring in the cemeteries did rely on both, local and foreign contacts, that attained knowledge of the demand and trade networks and routes. This interaction could be partially explained by institutional or communicative memory in Aegean and Mediterranean maritime networks. While it has been evaluated that EIA maritime networks, sea routes and cultural traditions were possibly being inherited or shaped by the LBA experience rather than being reinvented (Eder and Lemos 2020:190; Leidwanger and Knappett 2018:10–11), it can be argued that the diversity and extensive number of objects in the tombs at Lefkandi compared to any other EIA burial ground shows that the mortuary economy was driven by the demand within this particular funerary culture. This is not to say that a mortuary economy did not previously exist in the BA, however, it is clear that an economic expansion occurred in the EIA that coincides with the distribution of grave goods in the Lefkandi tombs (see Chapter 8.1). Thus, proposing that Lefkandi was a trade centre, had enough authority and influence in the Aegean and Mediterranean to re-define and revolutionise the mortuary economy. As well as utilise known contacts and networks in order to commercialise and capitalise on a mortuary market operated under socio-political systems, dynamic trade networks and mortuary beliefs.

Lefkandi has an obvious demand for specific funerary materials that the Eastern Mediterranean can certainly provide. A thriving mortuary market within a maritime trade enterprise would surely be enough motivation for foreign relations to maintain longstanding alliances with the main centre of EIA trade, Lefkandi. Conversely, it is not known at this point exactly what Lefkandi exchanged in return in the EIA. Lemos (2001:215–225) suggested clay for manufacturing and Euboean pottery, specifically the pendent semi-circle skyphos (Figure 7.4), as it is found in Cyprus and the Levant at the same time that Near Eastern imports and potential materials are at their highest distribution rate in the tombs at Lefkandi (Kearsley 1989). It is clear, however, that carriers of maritime trade were frequently travelling via seafaring routes with the same goods onboard to Lefkandi that is attested by the continuity of funerary practices. This mortuary market could be explained as a commercial activity showing widespread exchange networks and maritime connectivity from the Eastern Mediterranean to the Northern Aegean, with Euboea and more specifically Lefkandi as being the central hub.

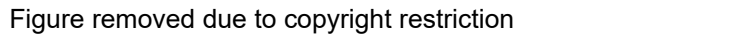


Figure 7.4 Pendent semi skyphos from Lefkandi.
Copyright Irene Lemos. Gauβ and Ruppenstein (2020: Fig. 3.3.5.).

CHAPTER 9. CONCLUSION

The results of the statistical analyses in this thesis present new findings for Lefkandi that demonstrate significant correlations in the composition of the burial assemblage, suggesting an intentionally compiled 'funerary package' was prepared for the tombs at Lefkandi. The analyses of the Skoubris, Palia Perivolia and Toumba cemeteries individually and collectively demonstrated that this was a common practice. In addition, funerary packages were exclusive to particular cemeteries such as the Skoubris, but in particular the Toumba cemetery. This evidence infers that these types of burial assemblages reflect social factors that represent different groups of individuals or identities. The inclusion of foreign imports is important, specifically in the Toumba cemetery, as a way of elevating status to represent the ruling class (Popham and Lemos 1996:7). Whereas in the Skoubris and Palia Perivolia cemeteries, the tombs that contained *exotica* were in no way more prestigious than tombs without foreign imports (Newton 2016:126). Thus, the function of *exotica* appears to be a memento that signifies a member of a merchant family. As such, the users of Skoubris and Toumba cemeteries adopted similar funerary practices and valued the same objects and thus similar funerary packages, however, they expressed wealth and prestige differently. The users of Palia Perivolia were evidently less privileged with lower quantities of goods and this burial ground was likely to have been for the commoners of Lefkandi.

The results of this study imply, that there seems to be a requirement, and therefore a demand for certain material and object types, for the purpose of adhering to common funerary practices in the Lefkandi cemeteries. The analysis of the distribution of foreign imports and the potential provenance of metal goods, that were an imperative piece of the funerary package, reveal a wider scope of foreign trade and exchange contacts that were detected from the Eastern Mediterranean to the Northern Aegean, with Lefkandi playing a central role. This, in turn, demonstrates that the demand for certain objects for funerary packages influenced the nature of exchange and as such, determined what relationships Lefkandi forged and maintained with trade contacts. In this way, internal and regional funerary requirement appear to be motivating foreign exchange. This is demonstrated by frequent interactions with well-established trade contacts, both regional and foreign, for the purpose of exchanging resources that

were driven by the aristocratic elites, who desired prestigious burials and capitalised on a thriving mortuary market. Thus, it can be argued that the continuity of this practice from the SM period to SPG phases supports the idea, that maritime trade networks were operating directly in accordance with this mortuary market at Lefkandi. This is a new discovery for Lefkandi and shows that maritime connectivity enabled a mortuary economy in the EIA Aegean and Eastern Mediterranean.

This thesis and associated mortuary dataset provide a platform for future research into maritime trade networks in the EIA Aegean and Mediterranean and social organisation in the cemeteries at Lefkandi. It would be advantageous to perform further statistical analyses on the categorical variables of the tomb dataset that was beyond the limitations of a Master's thesis. This could reveal more correlations and explain what the function of funerary packages were in the treatment of the dead, and the social identities they represented. This thesis demonstrates that further metallurgical analysis is needed to positively identify the provenances of metal objects that were considered in this study. This type of assembled data could then be applied to network analysis that would be able to visually expose trade relationships and investigate maritime connectivity more confidently. The analytical evidence that this study has provided has shed light on the crucial role maritime trade networks played in shaping the funerary culture at Lefkandi in the EIA. Furthermore, demonstrating the significant research potential of tracing and observing maritime connectivity through the lens of mortuary data.

REFERENCES

Ames, K.M. 2008 The archaeology of rank. In Bentley, R.A., H.D.G. Maschner and C. Chippindale (eds), *Handbook of archaeological theories*, pp. 487–514. Plymouth, UK: Altamira Press.

Arnaud, P. 2011 Ancient sailing–routes and trade patterns: the impact of human factors. In Robinson D. and A. Wilson (eds), *Maritime archaeology and ancient trade in the Mediterranean,* pp. 61–80. Oxford: Oxford Centre for Maritime Archaeology.

Arrington, N.T. 2015 Talismanic practice at Lefkandi: trinkets, burials and belief in the Early Iron Age. *The Cambridge Classical Journal* 62:1–30.

Aubet, M.E. 2001 The Phoenicians and the West: politics, colonies and trade. Cambridge: Cambridge University Press.

Gauβ, W. and F. Ruppenstein 2020 Pottery. In Lemos, I.S. and A. Kotsonas (eds), *A companion in the archaeology of early Greece and the Mediterranean*, pp. 511–548. Newwark: John Wiley & Sons, Incorporated.

Batty, M. 2005 Network geography: relations, interactions, scaling and spatial processes in GIS. In Unwin D.and P. Fisher (eds), *Re-presenting GIS*, pp. 149–170. Chichester: John Wiley & Sons.

Beck, L.A. 1981 *Regional approaches to mortuary analysis*. New York and London: Plenum Press.

Bernbeck, R. 2008 The rise of the State. In Bentley, R.A., H.D.G. Maschner and C. Chippindale (eds), *Handbook of archaeological theories*, pp. 533–547. Plymouth, UK: Altamira Press.

Betancourt, P.P. 2006 The Chrysokamino metallurgy workshop and its territory. *Hesperia Supplement 36*. Princeton: ASCSA Publications

Biers, W.R. 1996 (second edition) *The archaeology of Greece*. Ithaca and London: Cornell University Press.

Blegen, C.W. 1952 Two Athenian grave groups of about 900 B.C. *Hesperia: The Journal of the American School of Classical Studies at Athens* 21(4):279–294.

Boardman, J. 1998 *Early Greek vase painting*. London: Thames and Hudson.

Boardman, J. 1999 The excavated history of Al Mina. In G. Tsetskhladze (ed), *Ancient Greeks, west and east*, pp. 135–162. Leiden: Brill.

Boardman, J. and D.C. Kurtz 1971 *Greek burial customs*. London: Thames and Hudson.

Broodbank, C. 2000 *An island archaeology of the early Cyclades.* Cambridge: Cambridge University Press.

Broodbank, C. 2010 Ships a-sail from over the rim of the sea: voyaging, sailing and the making of Mediterranean societies c. 3500–800 BC. In A. Anderson, K. Barrett and K. Boyle (eds), *The global origins and development of seafaring*, pp. 249–264. Cambridge: McDonald Institute for Archaeological Research.

Broodbank, C. 2013 *Making of the middle sea: a history of the Mediterranean from the beginning to the emergence of the classical world*. London: Thames & Hudson, Ltd.

Brown, J.A. 1981 The search for rank in prehistoric burials. In R. Chapman, I. Kinnes and K. Randsborg (eds), *The archaeology of death*, pp. 25–38. Cambridge: Cambridge University Press.

Catling, H.W. 1985 The arrangement of some grave goods in the Dark Age cemeteries of Lefkandi. *The Annual of the British School at Athens* 80:19–23.

Catling, R.W.V. and I.S. Lemos 1991 *Lefkandi II. 1: the Protogeometric building at Toumba: The Pottery*. Oxford: The British School of Archaeology at Athens.

Chapman, R., I. Kinnes and K. Randsborg 1981 *The archaeology of death*, Cambridge: Cambridge University Press.

Chapman, R. and K. Randsborg 1981 Approaches to the archaeology of death. In R. Chapman, I. Kinnes and K. Randsborg (eds), *The archaeology of death,* pp. 1–24. Cambridge: Cambridge University Press.

Childe, V.G. 1957 (sixth edition) *The dawn of European civilisation*. London: Routledge and Kegan Paul.

Coldstream, J.N. 1968 *Greek Geometric pottery: a survey of ten local styles and their chronology*. London: Methuen and Co Ltd.

Coldstream, J.N. 1977 *Geometric Greece*. London: Ernest Benn Limited.

Coldstream J.N. 1998 The first exchanges between Euboeans and Phoenicians: who took the initiative? In S. Gitin, A. Mazar and E. Stern (eds), *Mediterranean peoples in transition, thirteenth to early tenth centuries BCE*, pp. 353–360. Jerusalem: Israel Exploration Society.

Conolly, J. and M. Lake 2006 *Geographical information systems in archaeology*. Cambridge: Cambridge University Press.

Constantakopoulou, C. 2007 The dance of the Islands: insularity networks, the Athenian empire, and the Aegean world. Oxford: Oxford University Press.

Cramer, H. 1946 *Mathematical methods of statistics*. Princeton: Princeton University Press.

Driessen, J. and J.P. Crielaard 1994 The hero's home. Some reflections on the building at Toumba. *Topoi* 4/1:251–270.

Crielaard, J.P. 1999 Production, circulation and consumption of Early Iron Age Greek pottery (eleventh to seventh centuries BC). In J.P Crielaard, V. Stissi and G. Jan van Wijngaarden (eds), *The complex past of pottery. Production, circulation and consumption of Mycenaean and Greek pottery (sixteenth to early fifth centuries BC). Proceedings of the ARCHON international conference, held in Amsterdam, 8–9 November 1996*, pp. 49–81. Amsterdam: J. C. Gieben, Publisher.

Crielaard, J.P. 2006 *Basileis* at sea: elites and external contacts in the Euboean Gulf region from the end of the Bronze Age to the beginning of the Iron Age. In S. Deger-Jalkotzy and I.S. Lemos (eds), *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, Vol 3. Edinburgh: Edinburgh University Press.

Davidson, A., C.A. Wilson, I.S. Lemos and S.P. Theocharopoulos 2010 Tell formation processes as indicated from geoarchaeological and geochemical investigations at Xeropolis, Euboea, Greece. *Journal of Archaeological Science,* Vol 37 Issue 7:1564–1571.

De Nooy, W., A. Mrvar and V. Batagelj 2018 *Exploratory social network analysis with Pajek: revised and expanded edition for updated software*. Cambridge: Cambridge University Press.

Deger-Jalkotzy, S. 2006 Late Mycenaean warrior tombs. In S. Deger-Jalkotzy and I.S. Lemos (eds) *Ancient Greece: from the Mycenaean Palaces to the age of Homer*, Vol 3, pp. 151–179. Edinburgh: Edinburgh University Press.

Deger-Jalkotzy, S. 2008 Decline, destruction, aftermath. In C. Shelmerdine (ed.), *The Cambridge companion to the Aegean Bronze Age*, pp. 387–415. Cambridge and New York: Cambridge University Press.

Desborough, V.d.A. 1972 *The Greek Dark Ages*. London: E. Benn.

Desborough, V.d.A., R.V. Nicholls and M. R. Popham 1970 A Euboean centaur. *The Annual of the British School at Athens* 65:21–30.

Dickinson, O. 1994 *The Aegean Bronze Age*. Cambridge and New York: Cambridge University Press.

Dickinson, O. 2000 Evidence from Archaeology. In I.S Lemos and A. Kotsonas (eds) *A companion in the archaeology of early Greece and the Mediterranean*, pp. 82–103. Newwark: John Wiley & Sons, Incorporated.

Dickinson, O. 2006 *The Aegean from Bronze Age to Iron Age: continuity and change between the twelfth and eighth centuries B.C.* London: Routledge.

Doonan, R. and A. Mazarakis Ainian 2007 Forging identity in Early Iron Age Greece: Implications of the metalworking evidence from Oropos. In A. Mazarakis Ainian (ed), *Oropos and Euboea in the Early Iron Age: Acts of an international round table, University of Thessaly, June 18-20, 2004*. Volos: University of Thessaly Publications, pp. 361–378.

Dunbabin, T.J. 1957 *The Greeks and their eastern neighbours*. London: The society for the promotion of Hellenic studies.

Eder, B. and R. Jung 2005 On the character of social relations between Greece and Italy in the 12th/11th c. BC. In R. Laffineur and E. Greco (eds), *Emporia: Aegeans in the central and Eastern Mediterranean. Proceedings of the 10th International Aegean Conference/10e Rencontre égéenne internationale, Athens, Italian School of Archaeology, 14–18 April 2004 (Aegaeum 25)*, pp. 485–495. Liège and Austin: Université de Liège and University of Texas at Austin.

Eder, B. and I.S. Lemos 2020 From the collapse of the Mycenaean Palaces to the emergence of Early Iron Age communities. In I.S. Lemos and A. Kotsonas (eds), A companion in the archaeology of early Greece and the Mediterranean, pp. 190–219. Newwark: John Wiley & Sons, Incorporated.

Eder, B. and R. Pruzsinszky (eds) 2015 Policies of exchange: political systems and modes of interaction in the Aegean and the Near East in the 2nd Millennium B.C.E. *Proceedings of the International Symposium at the University of Freiburg Institute for Archaeological Studies, 30th May–2nd June 2012.* Vienna: Austrian Academy of Sciences Press.

Evely, D. (ed) 2006 *Lefkandi IV: The Bronze Age*. Oxford: The British School of Archaeology at Athens.

Evely, D., I.S. Lemos and S. Sherratt (eds) 1996 *Minotaur and centaur: studies in the archaeology of Crete and Euboea presented to Mervyn Popham*. Oxford: Tempus Reparatum.

Field, A. 2009 *Discovering statistics using SPSS* (second edition). London: SAGE Publications Ltd.

Gale, N.H., A. Papastamataki, S, Stos-Gale and K. Leonie 1985 Copper sources and copper metallurgy in the Aegean Bronze Age. In P.T. Craddock and M.J. Hughes (eds), *Furnaces and smelting technology in Antiquity*, pp. 81–102. British Museum Occasional Paper 48. London: British Museum Press.

Georgakopoulou, M., Y. Bassiakos and O. Philaniotou 2011 Seriphos surfaces: A strudy of copper slag heaps and copper sources in the context of Early Bronze Age Aegean metal production. *Archaeometry*, Vol. 53, No. 1, pp. 123–145.

Gimatzidis, S. 2010 Die Stadt Sindos: Eine Siedlung von der späten Bronze- bis zur klassischen Zeit am Thermäischen Golf in Makedonien. Rahden: Verlag Marie Leidorf.

Green, E.S. 2018 Shipwrecks as indices of Archaic Mediterranean trade networks. In J. Leidwanger and C. Knappett (eds), *Maritime networks in the ancient Mediterranean world*. Cambridge: Cambridge University Press.

Green, E.S., M.L. Lawall and M.E. Polzer 2008 Inconspicuous consumption: The sixth-century B.C.E. shipwreck at Pabuç Burnu, Turkey. *American Journal of Archaeology*, Vol 112:685–711.

Harrell, K. 2014 Man/woman, warrior/maiden: the Lefkandi Toumba female burial reconsidered. In Y. Galanakis, T. Wilkinson and J. Bennet (eds), *AOYPMATA: critical essays on the archaeology of the Eastern Mediterranean in honour of E. Susan Sherratt*, pp. 99–104. Oxford: Archaeopress Archaeology.

Horden, P. and N. Purcell 2000 *The corrupting sea: a study of Mediterranean history.* Oxford: Blackwell.

Immerwahr Anderson, S. 1973 *Early burials from the Agora cemeteries*. Princeton and New Jersey: American School of Classical Studies at Athens.

Ivou, G. 2020 Defining social identities at cemeteries of late classical Argos: Age and gender-groups on the basis of distinctive funerary gifts. In N. Dimakis and T.M. Dijkstra (eds), *Mortuary variability and social diversity in ancient Greece: studies on ancient Greek death and burial*, pp. 75–87. Oxford: Archaeopress Publishing Ltd.

Jung, R. and M. Mehofer 2013 Mycenaean Greece and Bronze Age Italy: Cooperation, Trade or War? *Archaeologisches Korrespondenzblatt*, 43:175–193.

Karageorghis, V., A. Kanta, N.C. Stampolidis and Y. Sakellarakis (eds) 2014 *Kypriaka in Crete: from the Bronze Age to the end of the Archaic Period.* Nicosia: A. G. Leventis Foundation.

Karo, G. 1943 *An Attic cemetery*. Philadelphia and Pennsylvania: Oberlaender Trust.

Kassianidou, V. 2012 The origin and use of metals in Iron Age Cyprus. In J. N. Coldstream and M. Iacovou (eds), *Cyprus and the Aegean in the Early Iron Age: The Legacy of Nicolas Coldstream*, pp. 229–260. Nicosia: Bank of Cyprus Cultural Foundation.

Kassianidou, V. and A.B. Knapp 2005 Archaeometallurgy in the Mediterranean: the social context of mining, technology, and trade. In The archaeology of Mediterranean prehistory, pp. 215–251. Oxford, UK: Blackwell Publishing Ltd

Kayafa, M. 2006 From the Late Bronze Age to Early Iron Age copper metallurgy in mainland Greece and offshore Aegean islands. In S. Deger-Jalkotzy and I.S. Lemos (eds), *Ancient Greece: from the Mycenaean Palaces to the age of Homer*, Vol 3, pp. 238–257. Edinburgh: Edinburgh University Press.

Kearsley, R. 1989 *The pendent semi-circle skyphos: a study of its development and chronology and an examination of it as evidence for Euboean activity at Al Mina*. London: University of London, Institute of Classical Studies.

Kiderlen, M., M. Bode, A. Hauptmann and Y. Bassiakos 2016 Tripod cauldrons produced at Olympia give evidence for trade with copper from Faynan (Jordan) to south west Greece, c. 950–750 BCE. *Journal of Archaeological Science*, 8:303–313.

Knapp, A.B. and S. Demesticha 2016 *Mediterranean connections: maritime transport containers and seaborne trade in the Bronze and Early Iron Ages*. London: Taylor & Francis Group.

Knappett, C., T. Evans and R. Rivers 2008 Modelling maritime interacting in the Aegean Bronze Age. *Antiquity* 82 (318):1009–1024.

Konstantinidi-Syvridi, E. 2020 Jewellery. In I.S. Lemos and A. Kotsonas (eds), *A companion in the archaeology of early Greece and the Mediterranean*, pp. 684–708. Newwark: John Wiley & Sons, Incorporated.

Kotsonas, A. 2012 Η ενεπίγραφη κεραμική του ‘Υπογείου’: προέλευση, τυπολογία, χρονολόγηση και ερμηνεία. In M. Besios, G. Tzifopoulos, and A. Kotsonas (eds), Μεθώνη Πιερίας Ι: Επιγραφές, χαράγματα και εμπορικά σύμβολα στη Γεωμετρική και Αρχαϊκή κεραμική από το ‘Υπόγειο’ της Μεθώνης Πιερίας στη Μακεδονία. Thessaloniki: Centre for the Greek Language, pp. 113–304.

Kotsonas, A. 2016 Politics of Periodization and the Archaeology of Early Greece. *American Journal of Archaeology*, 120 (2), pp. 239–270.

Langdon, S. 2008 *Art and identity in Dark Age Greece, 1100-700 B.C.E.* Cambridge: Cambridge University Press.

Leidwanger, J. and C. Knappett 2018 Maritime networks, connectivity, and mobility in the ancient Mediterranean. In J. Leidwanger and C. Knappett (eds), *Maritime networks in the ancient Mediterranean world*, pp. 1–21. Cambridge: Cambridge University Press.

Leidwanger, J. and C. Knappett 2018 *Maritime networks in the ancient Mediterranean world*. Cambridge: Cambridge University Press.

Leidwanger, J., C. Knappett, P. Arnaud, P. Arthur, E. Blake, C. Broodbank, T. Brughmans, T. Evans, S. Graham, E.S. Greene, B. Kowalzig, B. Mills, R. Rivers, T. Tartaron and R. van de Noort 2014 A manifesto for the study of Mediterranean maritime networks. *Antiquity*+ 342. http://journal.antiquity.ac.uk/projgall/leidwanger342.

Lemos, I.S. 1998 Euboea and Its Aegean Koine. In M. Bats and B. d’Agostino (eds), *Euboica: L’Eubea e la presenza euboica in Calcidica e in Occidente (Atti del Convegno Internazionale di Napoli, 13–16 Nov. 1996, Naples*, pp. 45–58.

Lemos, I.S. 2001 The Lefkandi connection: networking in the Aegean and the Eastern Mediterranean. In L. Bonfante and V. Karageorghis (eds), *Italy and Cyprus in antiquity: 1500-450 B.C. Proceedings of an international symposium held at the Italian Academy for Advanced Studies in America at Columbia University, November 16-18, 2000*: pp. 215–225. Nicosia: Costakis and Leto Severis Foundation.

Lemos, I.S. 2002 *The Protogeometric Aegean: the archaeology of the late eleventh and tenth centuries B.C*. Oxford: Oxford University Press.

Lemos, I.S. 2003 Euboea: Lefkandi-Xeropolis and Lefkandi: Toumba. *The British School at Athens Annual Report of Council 2002-03*:30–33, 7–8.

Lemos, I.S. 2004(a) Euboea: Lefkandi-Xeropolis and Lefkandi: Toumba. *The British School at Athens Annual Report of Council 2003–04*:27–33.

Lemos, I.S. 2004(b) Lefkandi. *Archaeological Reports 2003–2004* (50):39–40.

Lemos, I.S. 2005(a) Euboea: Lefkandi-Xeropolis and Lefkandi: Toumba. *The British School at Athens Annual Report of Council 2004–05*:30–34.

Lemos, I.S. 2005(b) Lefkandi. *Archaeological Reports 2004–2005* (51):50–52.

Lemos, I.S. 2006(a) Euboea: Lefkandi-Xeropolis and Lefkandi: Toumba. *The British School at Athens Annual Report of Council 2005–06*:34–38.

Lemos, I.S. 2006(b) Lefkandi. *Archaeological Reports 2005–2006* (52):62–63.

Lemos, I.S. 2006(c) Athens and Lefkandi: a tale of two sites. In S. Deger-Jalkotzy and I.S. Lemos (eds), *Ancient Greece: from the Mycenaean Palaces to the age of Homer*, Vol 3, pp. 505–530. Edinburgh: Edinburgh University Press.

Lemos, I.S. 2009 Lefkandi. *Archaeological Reports 2007–2008* (54):51–54.

Lemos, I.S. 2012 The missing dead: Late Geometric burials at Lefkandi. In J-P Descœudres and S. A. Paspalas (eds), *Zagora in context: settlement and intercommunal links in the Geometric Period (900–700 BC), Proceedings of the conference held by The Australian Archaeological Institute at Athens and The Archaeological Society at Athens, Athens, 20–22 May, 2012*, pp. 159–172.

Lemos, I.S. 2014 Communities in transformation: an archaeological survey from the 12th to the 9th Century B.C. *Pharos*, 20(1):163–194.

Lemos, I.S 2016 Lefkandi. Oxford Classical Dictionary. Accessed 01 May 2021, https://oxfordre.com/classics/view/10.1093/acrefore/9780199381135.001.0001/acrefore-9780199381135-e-3629

Lemos, I.S. and A. Kotsonas 2020 *A companion in the archaeology of early Greece and the Mediterranean*. Newwark: John Wiley & Sons, Incorporated.

Leone, B. 2012 A trade route between Euboea and the Northern Aegean. In J-P Descœudres and S. A. Paspalas (eds), *Zagora in context: settlement and intercommunal links in the Geometric Period (900–700 BC), Proceedings of the conference held by The Australian Archaeological Institute at Athens and The Archaeological Society at Athens, Athens, 20–22 May, 2012*, pp. 229–241.

Liverani, M. 1990 *Prestige and interest: international relations in the Near East ca. 1600–1100 B.C*. Padua: Sargon.

Smithson, E.L. 1968 The tomb of a rich Athenian lady, CA. 850 B. C. *Hesperia: The Journal of the American School of Classical Studies at Athens* 37(1):77–116.

Smithson, E.L. 1974 A Geometric Cemetery on the Areopagus: 1897, 1932, 1947. *Hesperia: The Journal of the American School of Classical Studies at Athens* 43(3):325–390.

Manolova, T. 2020 The Levant. In I.S. Lemos and A. Kotsonas (eds), *A companion in the archaeology of early Greece and the Mediterranean*, pp. 190–219. Newwark: John Wiley & Sons, Incorporated.

Matthäus, H and C. Vonhoff 2020 Bronze Vessels. In I.S. Lemos and A. Kotsonas (eds), *A companion in the archaeology of early Greece and the Mediterranean*, pp. 251–284. Newwark: John Wiley & Sons, Incorporated.

McKinley, J.I. 2013 Cremation: excavation, analysis, and interpretation of material from cremation-related contexts. In S. Tarlow and L. Nilsson Stutz (eds), *The Oxford handbook of the archaeology of death and burial*, pp. 147–171. Oxford: Oxford University Press.

Mehta, C.R. and N.R. Patel 1983 A network algorithm for performing Fisher's exact test in r x c contingency tables. *Journal of the American Statistical Association* 78 (382):427–434.

Morris, I. 1989 *Burial and ancient society: the rise of the Greek city-state*. Cambridge: Cambridge University Press.

Morris, I. 1997 Periodization and the heroes: inventing a Dark Age. In M. Golden and P. Toohey (eds.), *Inventing ancient culture: historicism, periodization, and the ancient world,* pp. 96–131. London and New York: Routledge.

Morris, I. 1998 Lefkandi III: the Early Iron Age cemetery at Toumba. The excavations of 1981 to 1994. Plates. *American Journal of Archaeology* 102:217.

Morris, I. 2009 The eighth-century revolution. In K.A. Raaflaub, and H. van Wees (eds), *A companion to Archaic Greece,* pp. 64–80. Oxford: Wiley-Blackwell,

Muhly, J. and V. Kassianidou 2012 Parallels and diversities in the production, trade and use of copper and iron in Crete and Cyprus from the Bronze Age to the Iron Age. *British School at Athens Studies,* 20:119–140.

Murray, S.C. 2017 *The collapse of the Mycenaean economy: imports, trade, and institutions 1300–700 BCE.* Cambridge: Cambridge University Press.

Murray, S.C. 2018 Imported objects in the Aegean beyond elite interactions: A contextual approach to Eastern *exotica* on the Greek mainland. In Ł.

Neisiolowski-Spanỏ and M. Węcowski (eds), *Change, continuity and connectivity: North-Eastern Mediterranean at the turn of the Bronze Age and in the Early Iron Age.* Wiesbaden: Harrassowitz Verlag.

Newton, P. 2016 *A quantitative comparative analysis of the Skoubris, Palia Perivolia and Toumba Cemeteries at Lefkandi.* Unpublished Honours thesis, Department of Archaeology, University of Sydney, Australia.

Nuñez, E.A., 2020 *Re-connecting the sea: The Rochelongue metals assemblage, maritime connectivity and cultural interactions in West Languedoc, France, seventh to sixth centuries B.C*. Flinders University, Adelaide.

Oka, R. and C.M. Kusimba 2008 The archaeology of trading systems, part 1: towards a new trade synthesis. *Journal of Archaeological Research* 16:339–395.

Papadopoulos, J.K. 1997 Phantom Euboians. *Journal of Mediterranean Archaeology*, 10(2):191–219.

Papadopoulos, J.K., and M.R. Schilling 2003 *Ceramicus redivivus: The Early Iron Age potters' field in the area of the classical Athenian Agora*. Princeton: American School of Classical Studies at Athens.

Parker, A.J. 1999 A maritime cultural landscape: The Port of Bristol in the Middle Ages. *The International Journal of Nautical Archaeology*, 28(4):323–342.

Parker Pearson, M. 1999 *The archaeology of death and burial*. College Station: Texas A&M University Press.

Polzer, M.E. 2011 Early shipbuilding in the Eastern Mediterranean. In A. Catsambis, B. Ford and D.L. Hamilton (eds), *The Oxford handbook of maritime archaeology.* Oxford: Oxford University Press.

Popham, M.R. 1994. Precolonisation: early Greek contacts with the east. In G. R. Tsetskhladze and F. De Angelis (eds), *The archaeology of Greek colonisation, essays dedicated to Sir John Boardman*, pp. 11–34. Oxford: Oxford University Committee for Archaeology.

Popham, M.R. 1995 An engraved Near Eastern bronze bowl from Lefkandi. *Oxford Journal of Archaeology* 14(1):103–107.

Popham, M.R., P.G. Calligas and L.H. Sackett 1988 Further excavation of the Toumba cemetery at Lefkandi, 1984 and 1986, a preliminary report. *Archaeological Reports* 35:117–129.

Popham, M.R., P.G. Calligas and L.H. Sackett (eds) 1993 *Lefkandi II. 2: The excavation, architecture and finds*. Oxford: The British School of Archaeology at Athens.

Popham, M.R. and I.S. Lemos 1995 A Euboean warrior trader. *Oxford Journal of Archaeology* 14(2):151–157.

Popham, M.R. and I.S. Lemos (eds) 1996 *Lefkandi III: The Toumba cemetery: the excavations of 1981, 1984, 1986 and 1992-4, plates.* Oxford: The British School of Archaeology at Athens.

Popham, M.R. and E. Milburn 1971 The Late Helladic IIIC pottery of Xeropolis (Lefkandi): a summary. *The Annual of the British School at Athens* 66:333–52.

Popham, M.R. and L.H. Sackett. 1968 *Excavations at Lefkandi, Euboea, 1964/1966. A preliminary report*. London: Thames and Hudson.

Popham, M.R., L.H. Sackett and P.G. Themelis (eds) 1979, 1980. *Lefkandi I: The Iron Age: the settlement, the cemeteries, text and plates*. The British School of Archaeology at Athens: Thames and Hudson.

Popham, M.R., E. Touloupa and L.H. Sackett 1982(a) Further excavation of the Toumba cemetery at Lefkandi, 1981. *The Annual of the British School at Athens* 77:213–248.

Popham, M.R., E. Touloupa and L.H. Sackett 1982(b) The hero of Lefkandi. *Antiquity* 56:169–74.

Renfrew, C. 1975 Trade as action at a distance: questions of integration and communication. In J.A. Sabloff and C.C. Lamberg-Karlovsky (eds), Ancient Civilization and Trade, Albuquerque: University of New Mexico Press, pp. 3–59.

Sackett, L.H., V. Hankey, R.J. Howell, T.W. Jacobsen and M.R. Popham 1967 Prehistoric Euboea: contributions toward a survey. *The Annual of the British School at Athens* 61:33–112.

Sackett, L.H. and M.R. Popham 1972. Lefkandi: A Euboean town of the Bronze Age and the Early Iron Age (2100–700 B.C.). *Archaeology* 25 (1):8–19.

Service, E.R. 1975 *Origins of the State and civilization: the process of cultural evolution*. New York: Norton.

Sherratt, A.G. and E.S. Sherratt 1993 The growth of the Mediterranean economy in the early first millennium BC. *World Archaeology,* 24(3):361–378.

Sherratt, S. 2020 From the Near East to the far west. In I.S. Lemos and A. Kotsonas (eds), *A companion in the archaeology of early Greece and the Mediterranean*, pp. 251–284. Newwark: John Wiley & Sons, Incorporated.

Snodgrass, A.M. 1971 *The Dark Age of Greece: an archaeological survey of the eleventh to the eighth centuries B.C.* Edinburgh: Edinburgh University Press.

Stampolidis, N.C. 2012 Introduction. In N.C. Stampolidis and M. Giannopoulous (eds), *"Princesses" of the Mediterranean in the dawn of history*, pp. 23–56. Athens: Museum of Cycladic Art.

Tarlow, S. and L. Nilsson Stutz 2013 *The Oxford handbook of the archaeology of death and burial*. Oxford: Oxford University Press.

Tartaron, T.F. 2013 Maritime networks in the Mycenaean world. New York: Cambridge University Press.

Themelis, P.G. 1983 An 8th century goldsmith's workshop at Eretria. In R. Hägg (ed), *The Greek Renaissance of the eighth century B.C.: Tradition and Innovation. Proceedings of the first international symposium at the Swedish Institute in Athens*, pp. 157–165.

Toffolo, M.B., A. Fantalkin, I.S. Lemos, R.C.S. Felsch, W-D. Niemeirer, G.D.R. Sanders, I. Finkelstein and E. Boaretto 2013 Towards an absolute chronology for the Aegean Iron Age: new radiocarbon dates from Lefkandi, Kalapod and Corinth. *PloS One*, Vol 8(12): E83117.

Vavelidis, M. and S. Andreou 2008 Gold and gold working in Late Bronze Age Northern Greece. *Naturwissenschaften,* 95(4):361–366.

Verdan, S. 2007 Eretria: Metalworking in the Sanctuary of Apollo Daphnephoros during the Geometric Period. In A. Mazarakis Ainian (ed), *Oropos and Euboea in the Early Iron Age: Acts of an international round table, University of Thessaly, June 18-20, 2004*. Volos: University of Thessaly Publications, pp. 345–359.

Vetta, I.G. 2020 *Slags and Ores: Metalworking in the Greek Early Iron Age Settlement at Zagora, Andros,* University of Sydney.

Voutsaki, S. 2001 Economic Control, Power and Prestige in the Mycenaean World: The Archaeological Evidence. In Voutsaki, S. and J. Killen (eds.), *Economy and Politics in the Mycenaean Palace States: Proceedings of a Conference Held on 1–3 July 1999 in the Faculty of Classics, Cambridge (Cambridge*

Philological Society Supplementary Volume 27), pp. 195–213. Cambridge: Cambridge Philological Society.

Westerdahl, C. 1992 The Maritime Cultural Landscape. *The International Journal of Nautical Archaeology*, 21(1): pp. 5–14.

Whitley, J. 2020 *The re-emergence of political complexity*. In I.S. Lemos and A. Kotsonas (eds), *A companion in the archaeology of early Greece and the Mediterranean*, pp. 82–103. Newwark: John Wiley & Sons, Incorporated.

Zaccagnini, C. 1990 The transition from bronze to iron in the Near East and in the Levant: marginal notes. *Journal of the American Oriental Society* 110:493–502.

APPENDICES

Appendix A – List of Grave Objects in the Skoubris Cemetery

Object	Material	Sub- Material	Total No. of Objects
Dirk	Metal	Iron	1
Earring		Bronze	2
		Gold	8
Fibula		Bronze	56
		Iron	4
Foil		Gold	1
Fragment		Bronze	1
		Iron	2
Mace head		Unknown	1
Pendant		Bronze	1
Pin		Bronze	7
		Bronze & Iron	1
		Gold & Iron	2
		Iron	9
Plaque		Lead	1
Plate (Scale cuirass)		Bronze	1
Ring		Bronze	21
		Gold	8
Scale pan		Lead	2
Alabastron (Feeder)	Pottery		1
Amphora			10
Amphoriskos			12
Askos			1
Bottle			1
Bowl			18
Cup			31
Dish			1
Flask			1
Hydria			5
Jar			1
Jug/Juglet			10
Jug (Feeder)			2
Kalathoi			24
Lekythos			13
Oenochoe			12

Object	Material	Sub- Material	Total No. of Objects
Pot			2
Pyxis			9
Skyphos			9
Tripod			1
Vase			8
Jar	Faience		1
Necklace	Faience		1
Fragment	Ivory		1
Fragment	Textile		6
Fragment	Shell		2
Total			313

Appendix B – List of Grave Objects in the Palia Perivolia Cemetery

Material	Sub- Material	Total No. of Objects
Metal		31
	Bronze	8
	Bronze & Iron	2
	Gilt Lead	2
	Gold	2
	Iron	16
	Lead	1
Pottery		242
Clay		6
Faience		3
Glass		1
Ivory		1
Stone		2
Textile		8
Total		294

Appendix C – List of Grave Objects in the Toumba Cemetery

Object	Material	Sub Material	Total No. of Objects
Arrowheads	Metal	Iron	42
Attachment		Gold	35
Axe		Iron	2
Band		Gold	15
Beads		Gold-	42
		Gold & Crystal	2
Bowl		Bronze	5
Bracelet		Bronze	9
		Gilt	2
		Gold	2
		Gold & Bronze	4
Cauldron		Bronze	1
Coil		Gilt	14
Diadem		Gold	4
Disc		Gold	9
Earring		Gold	19
Fibula		Bronze	88
		Gold	1
		Iron	13
Foil		Gold	13
Fragment		Gold	2
		Iron	3
Grater		Bronze	5
Jug		Bronze	3
Knife		Iron	7
		Iron/Bronze/Ivory	1
Miscellaneous		Bronze	1
Necklace & Pendant		Gold	1
Needle		Iron	1
Oenochoe		Bronze	1
Pendant		Gold	5
		Gold & Crystal	1
Phiale Mesomphalos		Bronze	1

Object	Material	Sub Material	Total No. of Objects
Pin		Bronze	3
		Bronze & Iron	1
		Gilt	12
		Gold/Iron/Amber	2
		Iron	19
Ring		Gold	89
Seal		Gold & Faience	1
Spear		Iron	2
Spearhead		Bronze & Iron	1
Sword		Iron	7
Situla		Bronze	2
Spiral		Gold	1
Strap		Gold	2
Rivet		Bronze	1
Vessel		Bronze	1
Wheels		Bronze	1
Vessel		Bronze	4
Unspecified		Bronze	10
		Iron	1
		Lead	3
Amphora	Pottery		11
Amphoriskos			14
Bottle (Feeder)			5
Bowl			4
Crater			2
Cup			58
Cup (Feeder)			1
Flask			1
Hydria			14
Jug/Juglet			50
Jug/Juglet (Feeder)			1
Kalathos			100
Kantharos			7
Lekythos			22
Mug			1
Oenochoe			40
Oenochoe (Feeder)			3

Object	Material	Sub Material	Total No. of Objects
Pendant			1
Plate			6
Pot			20
Pyxis			53
Skyphoi			36
Vase			1
Unspecified			56
Other			
Amorphous		Terracotta	1
Amulet		Faience	1
		Stone	2
Askos		Faience	1
Balls		Terracotta	3
Beads		Amber	9
		Terracotta	14
		Crystal	3
		Faience	26
		Glass	18
Bowl		Faience	1
Bulb		Amber	2
		Crystal	2
Cart		Terracotta	1
Cylinder		Terracotta	3
Disc		Terracotta	3
Figurine		Terracotta	5
		Faience	1
Flakes		Ivory	1
Flask		Faience	6
Fragment		Textile	3
Horse		Terracotta	1
Inlay		Amber	2
Necklace		Faience	2
		Glass	1
Necklace & Pendant		Faience	1
Pendant		Amber	2
		Crystal	1
		Faience	7

Object	Material	Sub Material	Total No. of Objects
Pin		Ivory	1
Plaque		Bone	1
Rhyton		Terracotta	1
Ring		Faience	6
Seal		Terracotta	1
		Faience	2
		Glass	2
		Stone	1
Shell		Shell	1
Vessel		Faience	1
Wheels		Terracotta	1
Weights		Terracotta	4
		Stone	16
Unspecified		Terracotta	15
		Stone	2
Total			1228

Appendix D – Statistical Equations

The statistical methods that were used using SPSS Software to test the significance of trends in the accumulated data are provided in Appendix D. These patterns include the categorial variables against the grave object's frequency and distribution. The grave objects in the tombs of the Skoubris, Palia Perivolia and Toumba cemeteries at Lefkandi were analysed individually before the data was tested collectively for significant results.

Object Correlations

Correlation Coefficients

The grave objects variables were tested against each other in their individual cemeteries and altogether in order to determine which were correlated. The frequency distribution of these variables demonstrated that these objects are not normally distributed thus non-parametric test were undertaken. The correlation coefficients used were Spearman's Rho and Kendall's Tau.

Calculation of the Spearman's Rho coefficient ranks the data and applies the Pearson's product moment correlation equation - Equation 1.1 (Field 2009:175–82). Given grave object frequencies for the two variables being tested indicated as X_i and Y_i, the ranks of the frequencies are converted, and Spearman's rho is calculated by:

Equation 1.1 $$\rho = \frac{covariance(r_x, r_y)}{s_x s_y}$$

Where
- r_x = First grave object frequencies ranks.
- r_y = Second grave object frequencies ranks.
- sx = The standard deviation of r_x
- sy = The standard deviation of r_y

The rank correlation coefficient significance is determined from a t-statistic that is calculated directly from Spearman's Rho. A table of critical values of the t-distribution can be used to find the significance. However, this study used the p-value provided by SPSS.

Calculation of Kendall's Tau is done by ranking the corresponding elements of all data pair combinations. The ratio of the difference between concordant pairs and discordant pairs to the total number of combinations is the resulting value (Field 2009:178–80). This is described in Equation 1.2 below:

Equation 1.2 $\tau = \frac{n_c - n_d}{n(n-1)/_2}$

Where n_c = The number of concordant data pairs.

n_d = The number of discordant data pairs.

n = The total number of data pairs.

When the ranks of both components of the pair agree they are a concordant pair. A pair. That is, for a pair of observations (x_i, y_i) and (x_j, y_j), $x_i > x_j$ and $y_j > y_j$ (or vice versa). Kendall's Tau is considered to be more accurate when the sample size is small and there are a number of tied ranks (Field 2009:175). This was the case for many grave object variables, when the number of tied ranks was low, Spearman's Rho was calculated.

The p values calculated determine the likelihood of there being a correlation, assuming the null hypothesis was true. The null hypothesis, H_0, along with the alternative hypothesis, H_1, is given below. As noted with the alternative hypothesis, the correlation tests were one sided and positive. That is, it was tested whether the frequency of one variable increased when the frequency of the second variable increased. As such, the accepted significance level for which the null hypothesis was rejected was .05.

H_0: No relationship yielded between the frequencies of the two objects being tested.

H_1: The frequency of one object increased when the frequency of the other object increased, and vice versa.

Linear Regression

Linear regression analyses were used for the object variables that were found to be significantly correlated. The b value, which shows the slope of the regression line, reflects the average ratio of the arbitrary predictor variable to the dependent variable in the burials (Field 2009:197–214). It should be noted that for the analysis, one of the object variables was chosen arbitrarily as the independent variable. The chosen predictor variable was only used for the purpose of keeping consistent throughout the burial analyses and allowing for accurate comparison.

Equation 1.3 $Y_i = bX_i + c$

Where
- Y_i = The predicted value of the arbitrary independent object variable.
- X_i = The input value of the arbitrary independent object variable.
- b = The regression coefficient of the independent variable, i.e., the slope of the regression line.
- c = The y-intercept of the regression line

A standardised residuals plot was produced for each model. These residuals plots show the standardized residuals as a function of the standardized values which the model predicts. The residuals plot is examined to determine the validity of the assumptions made below when performing the regression analysis:

- *Linearity*: an even number of points above and below zero should be in the residuals plot.
- *Homoscedasticity*: a random dispersion of points to reflect constant variance in the data should be in the residuals plot.

Models that appeared to disobey these assumptions were analysed in greater detail. The correlating variables were filtered based on the categorical variables. All subcategory of the data had a regression analysis performed on it. The t test was used on the predictor coefficient to determine if the regression models corresponded

well with the data. The null hypothesis being that the b value is zero is tested using the t statistic determining the likelihood of this occurring. That is, whether the frequency of one variable had any effect or influence on the frequency of the other variable.

Categorical Analysis

The second major component of this study was categorical analyses. This section will explain the methods used to show how trends between the occurrence of objects in specific cemeteries or burials from a region formed when filtered based on the categorical variables that were described in Section 3.4.1.

These categorical variables that were examined as part of this analyses include:

- Tomb location (Skoubris, Palia Perivolia, Toumba cemetery)
- Chronological period
- Object type/shape
- Object material
- Object manufacturing/origin

Single Grave Object Variables

The distribution of all grave object variables was tested for an association with all categorical variables. Below are the hypotheses for these variables tested.

H_0: No relationship yielded between the frequency of the object being tested and the categories in the nominal variable being tested.

H_1: The frequency of the object being tested was associated with the categories of the nominal variable being tested.

To test these hypotheses the chi squared goodness-of-fit test was used to determine if the observed frequency distribution was different from the theoretical distribution of grave objects that were equally placed. The number of total grave objects in each category was not the same thus the theoretical distribution was weighted accordingly. The expected values were calculated using Equation 1.4 below.

Equation 1.4 $E_i = N\frac{t_i}{T}$

Where N = The total number of the object being tested.

t = The total number of objects in category i.

T = The total number of objects in all categories.

To identify the observed frequencies and subsequently calculate the expected frequencies, a 1-by-x contingency table was created, where x is the number of categories in the nominal variable that is tested. Equation 1.5 was used to calculate the chi squared test statistic (Field 2009:686–97).

Equation 1.5 $\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$

Where O_i = The frequency of objects in category i.

E_i = The expected object frequency in category i.

n = The number of categories being tested.

The degree of freedom for the test is given by the number of categories minus one (Field 2009:686–697). The corresponding p values for the chi-squared test were determined by referencing a table of critical values of the chi squared distribution (see Appendix E).

Multiple Grave Object Variables

Beyond testing the single grave object variables, grave objects of more than two were tested against the nominal variables. Variable were grouped in pairs that were found to be significantly correlated and inspected on which variable were significant individually against the nominal variable.

These tests were calculated using the chi-squared test for independence. In the case of this study, the test identified if there was a relationship between the frequencies of the multiple variables and the categories of the nominal variable (Field 2009:686–715). Below are the hypotheses for these variables tested.

H_0: No relationship yielded between the frequencies of the objects being tested and the categories in the nominal variable being tested.

H_1: The frequencies of the objects being tested were associated with the categories of the nominal variable being tested.

Contingency tables of the observed frequencies of the grave objects in each category were created to conduct the chi-squared tests for independence. Equation 1.6 below was used to calculate the expected values. Equation 1.5 and the table of critical values of the chi-squared distribution provided in Appendix E were used to calculate the test static and p-values.

Equation 1.6 $$E_{i,j} = \frac{r_i c_j}{n}$$

$$df = (m-1)(n-1)$$

Where $E_{i,j}$ = The expected frequency in row I and column j.

r_i = The sum of observed frequencies in row i.

c_j = The sum of observed frequencies in column j.

m = The number of rows in the contingency table which equates to the number of categories in the nominal variable.

n = The number of columns in the contingency table which equates to the number of object variables being tested.

Fisher's Exact Test

The p values produced from the chi-squared distribution are only accurate for large sample sizes (Field 2009:710–751). For small sample sizes, it is less accurate to assume that the sampling distribution of the test statistic has an approximate chi-squared distribution. Calculating the p-value directly can be done using the Fisher's exact test method. Where there were more than 20% of the expected frequencies less than five, this method was used. Equation 1.6 describes how Fisher's p value is calculated below (Mehta and Patel 1983:427–34).

Equation 1.7 $$Fisher's\ p = \frac{\prod_{i=1}^{m}(r_i)! \times \prod_{j=1}^{n}(c_j)!}{n! \prod_{i=1}^{m}\prod_{j=1}^{n}(o_{i,j})!}$$

Where $O_{i,j}$ = The observed frequency in row I and column j of m-by-n contingency table.

r_i = The sum of observations in row i.

C_j = The sum of observations in column j.

n = The sum of all observed frequencies.

Strength of Association

The strength of the relationships identified as significant were measured using Cramer's V. Equation 1.7 calculates the value between 0 and 1. The table below gives the interpretation of Cramer's V Values based on the calculated results (Cramer 1946:80–87).

Equation 1.8 $$V = \sqrt{\frac{\chi^2}{n(k-1)}}$$

Where χ^2 = The chi-squared statistic.

n = The total sum of frequencies for all object variables in the test.

k = The smaller out of the number of rows and number of columns.

Interpretations of Cramer's V Values.

Cramer's V	Strength
0.00	No relationship
.00 to .20	Weak
.20 to .30	Moderate
.30 to .40	Strong
.40 to 1.00	Extremely strong
1.00	Perfect relationship

Category Independence

Accuracy of the chi-squared tests requires independence of the categories of the nominal variable. Overlapping categories were removed from the data for the test to remain valid. In the case of the nominal variable of chronological period, LPG-SPG were not independent to the categories of LPG or SPG and thus were removed from the test.

This was also the case for categories that were recorded as unspecified or unknown. With respect to the test hypotheses, these categories did not have meaning and would only skew the results. The contingency tables were reduced in dismiss these categories and as a result their observed frequencies did not contribute to the overall result.

Appendix E – Critical Values of the Chi-Squared Distribution

Field 2009: Appendix A1.

Figure removed due to copyright restriction.