A Statistical Analysis of the Hidden Patterns Found in the Burial Customs of MM/MH III – LM/LH IIIA1 Mainland Greece and Knossos

A Thesis Submitted to the Committee on Graduate Studies
in Partial Fulfillment of the Requirements for the Degree of Master of Arts
in the Faculty of Arts and Sciences

TRENT UNIVERSITY

Peterborough, Ontario, Canada

Anthropology M.A. Graduate Program

May 2022

ABSTRACT

A STATISTICAL ANALYSIS OF THE HIDDEN PATTERNS FOUND IN THE BURIAL CUSTOMS OF MM/MH III – LM/LH IIIA1 MAINLAND GREECE AND KNOSSOS

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This study explores different ways of interpreting mainland and Knossian burial customs and assessing the manner in which they were used to explore themes of political and social status. In order to complete this study, correspondence analysis was applied to 98 tombs from Bronze Age (1700-1360 BCE) Knossos, Pylos, and Mycenae. Through the use of CA 14 hidden clusters and two hypotheses were generated and then analyzed in order to answer the following three research questions: can traditional explanations for the changes seen in Final Palatial Knossian burial customs be challenged; does the nature of Final Palatial burial customs support the theory of a mainland invasion; and can these patterns inform us about Knossian, Pylian, and Mycenaean society and the manners in which burials were used for social and political display. By answering these questions it became possible to understand Knossian, Pylian, and Mycenaean societies and their diverse uses of burial customs to display social and political status.

Keywords: Burial Customs, Chi-Square, Correspondence Analysis, Crete, Final Palatial Period, Knossos, Mainland Greece, Mortuary Studies, Mycenaean Knossos, Neopalatial Period, Pylos

Acknowledgements

I would first like to thank my supervisor, Dr. Rodney Fitzsimons, for all the help and support he has provided me throughout the past few years. Without his guidance, feedback, and translations, my research and this thesis would not have been possible to complete. I would also like to thank my committee members, Dr. Gyles Iannone, who provided insightful feedback and advice on my topic, especially concerning the concept of ethnicity, and Dr. James Conolly, who not only provided helpful feedback but also taught a course on how to use R version 2.4 and how to create a correspondence analysis. It is with both of their help that I was able to understand and complete my statistical analyses and this study.

Lastly, I would like to give a huge thank you to my parents and my sister for providing me with unconditional love and support. Not only did they have to deal with me being home for an entire year and a half because of the pandemic, but they also had to deal with my constant stress and breakdowns over writing this thesis. So thank you for being there for me and always supporting me in everything that I do.

Thank you to everyone for your continual support and just know that I would not have been able to accomplish any this without any of you.

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List of Abbreviations

CA – Correspondence Analysis

HC – Hierarchical Clustering

HAC – Hierarchical Agglomerative Clustering

HDC – Hierarchical Divisive Clustering

MCA – Multiple Correspondence Analysis

PCA – Principal Components Analysis

MM – Middle Minoan period

MH – Middle Helladic period

LBA – Late Bronze age (ca. 1600 – 1190/1070 BCE)

LM – Late Minoan period

LH – Late Helladic period

Chapter One

Introduction

Mortuary studies is a complex practice that has been a predominant part of archaeology ever since its inception in the early 70s. The study of mortuary practices has evolved over time from the early culture-historical approach which sought to organize mortuary data to create and comprehend 'culture groups', or, populations with distinctive cultural characteristics (see Kroeber 1927; Gluckman 1937; Preston 2000: 54), to the more modern processual and post-processual methods. Processualism follows the Saxe-Binford approach (Saxe 1970; Binford 1971), linking material culture from the mortuary landscape to social organization in an attempt to understand the social roles of the individuals (Parker Pearson 1982: 99). Post-processualism, on the other hand, places a greater emphasis on the meaning and symbolism of the burial customs as a proxy for both human and material culture agency (Parker Pearson 1982; Preston 2000: 79). Mortuary practices are now understood as a reflection of complex influential themes beyond social organization, touching upon such topics as power strategies, selfhood and identity, emotional responses to death, and changing social conditions (Preston 2000: 82).

During the Final Palatial period (1450-1360 BCE), the area of Knossos underwent a series of cultural changes in the political, social, and mortuary landscapes. The most prominent of these changes can be seen in the new mortuary landscape, which saw the introduction of single-chamber tombs with long narrow dromoi, wealthy grave assemblages, and new burial customs including burials with bronzes and burials with weapons (Preston 1999: 131; 2000: 42-47; Nafplioti 2008: 2308). In past studies this novel mortuary landscape has been used to support the hypothesis of a Mycenaean

invasion that argues that during the LM II-IIIA1 period a group of Mycenaean elites invaded Crete and ruled the island from Knossos, because these new burial customs are considered to have been indebted to contemporary mainland practices (Preston 1999: 131). A similar situation emerges in the area of Pylos, in Messenia. Pylos became a significant Mycenaean state in the LH III period, judging from the presence of the Mycenaean palace, known as the palace of Nestor, and the large number of Linear B documents found in it (Bennet and Galanakis 2005: 144; Blegen and Kourouniotis 1939; Blegen and Rawson 1966; Cosmopoulos 2006: 206; Murphy 2014: 210, 211). Unfortunately, the relationship between Pylos and Mycenae during the LH III period has caused the Pylian burial customs to often be studied in regard to what they can tell us about Mycenae and Mycenaean burial customs as opposed to its own context (Murphy 2014: 210, 211). The problem with this attempt to assess the Mycenaean cultural influence on Knossian and Pylian societies is that the focus is on identifying and isolating a specifically Mycenaean presence, rather than opting to explore and understand how these societies utilized their burial customs as a way to construct their own unique social and political identities (Preston 2000: 48, 53; Kerr 2012: 25).

The purpose of this study is not to refute the argument for a Mycenaean invasion or for a Mycenaean influence at both the Knossian and Pylian areas, as there is no doubt that an influence did exist (Preston 2000: 48). Instead, the goal here is to develop more nuanced interpretations of the MM/MH III-LM/LH IIIA1 Knossian, Pylian, and Mycenaean societies and their burial customs in an effort to gain a greater understanding of how these cultures used and manipulated their burial customs to display themes of social and political prestige and status.

1.1: Research Goals

The main objective of this study is to analyze hidden patterns that are found between the Knossian, Pylian, and Mycenaean mortuary data, which is why Correspondence Analysis (CA) was chosen. CA is an exploratory technique that is not used to test hypotheses, but rather to generate them (Chapter 3). For this reason, this thesis does not begin with any set hypothesis, but rather with three pre-set research questions that may be answered based on the patterns and hypotheses that emerge from the CA. The questions are as follows;

1. Can the traditional explanations for Final Palatial burial customs be interpreted differently?
2. Does the nature of Final Palatial burial customs support the argument for a mainland invasion of Crete?
3. Can these patterns inform us about the society and the manners in which Knossian, Pylian, and Mycenaean burial customs were used for social and political display?

The objective of answering these research questions is to offer more diverse interpretations of how Knossian, Pylian, and Mycenaean societies used their burial customs to display themes of social status and political prestige.

1.2: Definitions of Terms

The purpose of this section is to define the main terms that are used consistently throughout this thesis.

Burial Customs: This term refers to customs associated with the deposition of the dead and the expression of attitudes towards the deceased.

Burial, Tomb, Grave: All three terms are used throughout this thesis. Therefore, the differences between their definitions needs to be explained. A burial refers to a grave or the remains found within it. A grave refers to the place of burial for a dead body, and a tomb refers to an enclosure for a corpse or a monument to the memory of the deceased.

Early Mycenaean Period: The Early Mycenaean period refers to that period of time from the adoption of Mycenaean culture near the end of the Middle Minoan period to the horizon of destructions on Crete marked by the presence of Late Minoan IB pottery. This period is equivalent to late Middle Helladic, Late Helladic I, and Late Helladic IIA periods on the mainland, which are sometimes referred to together as the Proto-Palatial period, the time right before the Mycenaean palaces were erected (Dickinson 1970: 1; Fitzsimons 2011: 89).

Ethnicity: The term ethnicity refers to a form of group identity where membership is determined by putative kinship and beliefs about shared descent (Mac Sweeney 2009: 102). It can be both constructed through the use of cultural traits and influenced by the normative effects of culture on individuals (Eriksen 1993).

Final Palatial Period: The Final Palatial period refers to the Late Minoan II to the Late Minoan IIIA1 period on Crete. It is also known as the Post-Palatial period, as all the palaces except for those at Knossos and perhaps Chania (McEnroe 2010: 117) were destroyed. This period has also been dubbed the ‘Mycenaean’ period based on the changes in the mortuary sphere discussed above (Preston 1999: 131). This period roughly corresponds to 1450-1360 BCE

Minoan: This term, coined by Sir Arthur Evans during his excavations and named after the mythological King of Crete, Minos, is usually used to describe monuments, objects, and people related to the Bronze Age civilization of Crete (Karadimas and Momigliano 2004: 243).

Minoanization: This is a modern term for a heterogeneous range of ancient material cultural traits and practices that indicate the adoption of Cretan practices in places beyond the island (Broodbank 2004: 46).

Mortuary Practices: Activities associated with the disposition of the dead. They exclude cultural practices such as funeral rites.

Mycenaean: This term originates from Schliemann's discovery of Late Bronze Age society at Mycenae in the Argolid in 1876 (Mac Sweeney 2008: 105). It is used to refer to the societies of central and southern Greece, which appear to have shared a set of increasingly similar cultural traits in the Late Bronze period (Mac Sweeny 2009: 102). It also may refer to the elite members of society during the Late Bronze Age (Feuer 2011: 507).

Mycenaeanization: This is a term used to describe the adoption of elements of Greek Mainland Mycenaean culture and behaviour elsewhere in the Aegean.

Neopalatial Period: This term refers to the Middle Minoan III to the Late Minoan IB period on Crete. It also refers to the 'new' or 'second' palace phase. It corresponds roughly to the years 1700-1450 BCE.

Palace: The definition of a Minoan palace is a complicated. The term was first used by Sir Arthur Evans to describe the large centres he found on Crete while excavating the Palace of Minos (Evans 1921). However, these centres were not actual palaces but rather large centres with several functions that may have included: royal residences,

administrative centres, economic centres, manufacturing centres, and cult centres (McEnroe 2010: 54). The first palaces appeared in the Protopalatial period (1900-1750 BCE) and were located at Knossos, Phaistos, and Malia (McEnroe 2010: 53), although there has been some arguments made that suggest the appearance of palaces in the Early Bronze Age (Schoep 2006; 2007; Driessen 2007; Tomkins 2018). According to Jan Driessen, the term has been used to describe a number of different centres and there is no consensus yet on its definition (Driessen 2002). In this thesis, the term palace is applied to large complexes that have been called palaces previously.

Shaft Grave Era: The Shaft Grave Era refers to the Middle Helladic III to the Late Helladic IIA period, when evidence of a new elite class appeared in the Argolid towards the end of Middle Helladic III (Fitzsimons 2011: 76). Grave Circles A and B appeared in the Prehistoric Cemetery at Mycenae, and their shaft graves contained an enormous amount of wealth and prestigious goods. The period ended with the abandonment of the shaft graves towards the end of Late Helladic II. This era roughly dates to 1600-1450 BCE.

Warrior Graves: This term was coined by Sinclair Hood during his excavations of the Ayios Ioannis tombs at Knossos (Hood 1956). These tombs belong to the early LM landscape at Knossos and are single-graves containing one or at most two bodies, accompanied by a large array of weapons and, occasionally, a large number of clay vases. The list of warrior graves includes the shaft grave at Ayios Ioannis, Tombs II, III and V at the New Hospital site, and Zafer Papoura tombs 36, 42, 43, 55, and 98.

1.3: Thesis Outline

Chapter 2 provides a comprehensive overview of the socio-political background of MM/MH III-LM/LH IIIA1 Knossos, Mycenae, and Pylos. The chapter begins with a brief outline of the chronological parameters that exist for dating the Bronze Age Aegean, as well as a mention of the chronological parameters used for this study. Following this is a discussion on the socio-political backgrounds of Crete and the mainland during the MM/MH III-LM/LH IB and LM/LH II-LM/LH IIIA1 periods, as they are presently understood. Each region is separated into these two phases in order to illustrate the internal changes that occurred at Knossos, Pylos, and Mycenae. The chapter then touches upon the scholarly arguments surrounding the Mycenaean invasion hypothesis with a brief examination of the evidence used in support of this theory. Finally, the chapter ends with a discussion of ethnicity in archaeology and the issues surrounding the attempts to discern the ethnic composition of the occupants buried in the Final Palatial tombs.

Chapter 3 explains the methods used for this thesis. It outlines the development of correspondence analysis and its introduction to the field of archaeology, as well as the different ways in which CA can be applied to archaeological data, specifically to mortuary data. Three case studies are then examined, all of which illustrate the application of CA to mortuary data. The final two case studies exhibit how CA can be used to answer and explore research goals similar to the ones at the heart of this thesis. The final section summarizes the chi-square test, how it works, and why it is needed along with CA.

Chapter 4 presents the data selected for this study and outlines the selection process, which includes the limitations that were encountered and the criteria each tomb was required to meet in order to be included in this study. The chapter gives a

presentation of the mortuary data from Knossos, Pylos, and Mycenae including: the location, the excavation history, the date of use, the number of burials, and why each tomb was selected. A data table was then created from the mortuary context and variables, where the variables include ten categories that were created using the most common grave goods.

Chapter 5 examines the results of both the CA and the chi-square tests. This chapter examines the three CA factor maps in detail and illustrates how patterns emerged and were interpreted. Based on the patterns that emerge, two hypotheses are then generated and their significance is tested using the chi-square test. The chapter ends with a discussion of the results and significance of the chi-square tests.

Chapter 6 further analyzes the results found in Chapter 5 and discusses whether or not they answer the three research questions posed above. A discussion of the CA clusters regarding what they can tell us about the MM/MH III-LM/LH IIIA1 Knossian, Pylian, and Mycenaean societies and their burial customs is also included.

Chapter 7 begins with a brief summary of all the results and the research questions that were answered. The chapter then discusses the significance of this study and ends with a consideration of potential avenues for future research.

Chapter Two

A General Background of MM/MH III – LM/LH IIIA1 Crete and Mainland Greece

The purpose of this chapter is to discuss the background of MM/MH III-LM/LH IIIA1 Crete and mainland Greece with a focus on the areas of Knossos, Mycenae, and Pylos. The chapter begins with an overview of Aegean Bronze Age chronology, including the different dating techniques that are employed to determine chronological frameworks, the multiple chronological systems used by Aegean scholars, and the chronological framework used for this particular study. Following this is a discussion of the socio-political situation on Crete and the mainland during the MM/MH III-LM/LH IIIA1 period. The period under study has been subdivided into two broad phases (MM/MH III-LM/LH IB and LM/LH II-LM/LH IIIA1) to better illustrate the internal changes that occurred at Knossos during the Final Palatial period, which this thesis aimed to address. The chapter then focuses on the scholarly arguments and evidence used in support of the Mycenaean invasion hypothesis, and ends with a discussion on the study of ethnicity in archaeology and the issues surrounding attempts to discern the ethnic composition of the occupants buried in the Final Palatial tombs.

2.1: Bronze Age Aegean Chronology

There are multiple chronological and terminological systems that are used for dating the Aegean Bronze Age and they are based on both absolute and relative dating techniques. The purpose of this section is to discuss both of these dating techniques in order to establish the chronological parameters of Crete and the mainland, and to outline the chronological system implemented for the current study.

Aegean Relative Chronology

Relative chronology refers to the temporal ordering of objects and events relative to each other, such that assemblage A is older, younger, or equivalent to assemblage B and so on (Manning 2010: 12-13). In the case of the Aegean Bronze Age, the relative chronology is based largely on the correlations between pottery and the changing pottery styles. These styles are found in reliable stratified deposits that are then used to date buildings, tombs, and destruction levels (Dickinson 1970: 16; Shelmerdine 2008: 3).

When excavating the Palace of Minos at Knossos Sir Arthur Evans discovered the remains of an earlier palace underneath that possessed completely different styles of pottery (Manning 2010: 13). The discovery of these different pottery styles prompted Evans to create the Three Age System, which was first introduced in a paper published by Evan's assistant Duncan Mackenzie which discusses the pottery found at Knossos (Mackenzie 1903). Evans' Three Age System divides Crete into three chronological categories: Early Minoan, Middle Minoan and Late Minoan, where the term Minoan is used to describe Cretan culture and is named after the legendary King Minos (Manning 2010: 11; Rutter 2019). The creation of this system was heavily influenced by Evolution Theory and the works of early evolutionists such as Charles Darwin (1859), Edward Tylor (1871; 1881), and Lewis Henry Morgan (1877). Evolution theory divides mankind's history on earth into three general stages of life: savagery, barbarism, and civilization (Darwin 1859), where each stage can be defined by certain technological and economic criteria: savagery or the hunters and gatherers; barbarism, which sees the beginning of agriculture; and civilization, which sees the introduction and use of writing (McNeal 1973: 207). Evans adopted the idea of cultural evolution and sought to divide Minoan history into these three stages of life based on the changing pottery styles he

witnessed in the different phases of the palace. He later expanded this system to include nine sub-phases, in an attempt to further uncover how the Minoans evolved over time into a civilization (McNeal 1973: 207). In 1961 a Greek archaeologist, Nikolaos Platon (1966), put forward a new system for dating the Minoan period following his discovery of the palace of Zakros. The system was based on the developments and abandonments of the Minoan palaces at Knossos, Phaistos, Malia and Kato Zakros, and divides the Minoan period into the Prepalatial (EM I-MM IA), Protopalatial (MM IB-MM II), Neopalatial (MM IIIA-LM IB), and Final Palatial periods (LM II-LM IIIC) (Rutter 2019).

The Three Age system put in place by Evans set the precedent for linking historical periods together through the phases of pottery styles (Dickinson 1970: 3). For this reason, in 1915 and 1916, when Carl Blegen and Alan J. Wace were excavating Korakou near Corinth on the mainland, they published a paper (Wace and Blegen 1916/17 – 1917/18) in which the major pre-Mycenaean wares found at the site were organized in a way that established the newly created three divisions of mainland Greece: Early Helladic, Middle Helladic and Late Helladic. The two coined the term 'Helladic' to describe mainland culture, after the Greek name for Greece, 'Hellas' (Rutter 2019). Blegen later subdivided these three divisions into nine sub-phases in order to equate them with Evans' nine phases on Crete; their correlation can be seen in Table 2.1.

The current study makes use of Evans' Three Age System for Crete, Platon's naming system, and Wace and Blegen's system for mainland Greece with the period of focus being on MM/MH III-LM/LH IIIA1.

Aegean Absolute Chronology

Absolute dating is the attempt to allocate the western calendar timescale to archaeological contexts, objects, or discussions (Manning 2010: 18). In other words, it is the process of dating objects to a set of years or, if lucky, a specific year (Manning 2010: 18). There are two main types of absolute dating, science-based methods, which includes radiocarbon dating and dendrochronology, and archaeology-based methods. The most common of the latter method involves creating links between the Aegean and areas such as Egypt, the Near East, and Assyria, whose absolute dates are already known on the basis of various written sources and inscribed records (Manning 2010: 19). There are some problems that occur while attempting to establish accurate calendar years for the Aegean Bronze Age, with the main sticking point being the date of the Theran eruption. Two different chronologies have been proposed based on the absolute dating techniques: a high chronology, which places the eruption around 1700-1675 BC (Manning et al. 2006; Friedrich et al. 2014; Manning et al. 2014) that is based on scientific methods, and a low chronology that rejects these scientific methods and focuses on Aegean-Mediterranean links, placing the eruption around 1600-1580 BC (Warren and Hankey 1989; Wiener 2010; Cherubini et al 2014).

The high chronology is supported by scientific evidence such as the radiocarbon dating of an olive branch found in the tephra at Thera whose C^{14} calibration curve supports a late 17th century BCE date (Niemeier 1994; Manning et al. 2006; Friedrich et al. 2014; Manning et al. 2014). Scientific studies of the Greenland ice cores also favours the high chronology. These ice cores record the annual deposition of snow fall where the amount of sulfate seen in the cores is directly related to the emissions of sulfur by

volcanoes (Betancourt 1998: 292). The ice cores show that the amount of sulfate was substantial in 1623 BC, thus supporting the higher chronology (Betancourt 1998: 2929).

The low chronology follows the original dates put forth by Peter Warren and Vrowny Hankey in 1989 that appear to be strongly supported by archaeological evidence from Egypt and the Near East (Warren and Hankey 1989; Wiener 2010: 367), such as the traces of pumice and tephra that were created by the Theran eruption that have been found at fifteen sites in Egypt, the Near East, Cyprus, the Anatolian coast, and in the Aegean (Cherubini et al. 2014: 271). One particular investigation found a major deposit of waterborne Theran pumice in the workshop area of the palace at Tell el-Dab'a of Tuthmosis III (Wiener 2010: 374). If the high chronology is correct, then there are roughly 130 years of separation between the eruption and the pumice deposit. Therefore, the traces of pumice found support the low chronology date (Wiener 2010: 374). The low chronology date is also strongly supported by interconnections with datable Egyptian material such as the alabaster lid of a jar bearing the cartouche[1] of the Hyksos ruler Khyan found in the Palace of Minos at Knossos. Khyan was originally believed to have been the first of the Hyksos rulers, with a reign from 1648-1630 BCE. However, recent research has moved Khyan's reign to fall between 1610-1580 BCE, with the possibility that it lasted anywhere between sixteen and nineteen years (Wiener 2010: 375). The alabaster lid was found in a MM III context. The high chronology ends the MM IIIB period around 1700 BCE, meaning that the alabaster lid, which is now dated from 1610-1580 BCE, could have only arrived in this context via a higher stratum. Therefore, the evidence of the lid, although not conclusive, fits more with the low chronology (Wiener

[1] In Egyptian hieroglyphics, a cartouche is an oval typically representing the name and title of a monarch.

2010: 375). The well-known Cypriot White Slip I bowl sherds from Thera provides another critical form of evidence for the chronological debate. This bowl travelled from Cyprus to Thera, where it was used and repaired all prior to the eruption. According to the dates of the Late Cypriot IA2 period, also known as the White Slip I pottery period, which was around 1550 BCE (1570 BCE at the earliest), the earliest possible date for the Theran eruption is 1560 BCE (Wiener 2010: 377).

The debate between the high and low chronology of the Theran eruption remains unsettled. Without a set, agreed-upon date, no accurate historical reconstructions can truly be made possible without the correct chronological relationship. This means that should the high or low chronology prove to be correct, a reassessment of the history of the Late Bronze Age Aegean will be required . Thankfully, its relevance to this study is limited as the relative chronology was favoured over the absolute chronology.

Table 2.1: Full Comprehensive Chronological Framework for the Bronze Age Aegean (from Tartaron 2007)

Crete (Minoan)			Mainland (Helladic)		
	Pottery Phase	Calendar dates	Pottery Phase	Calendar dates	
Prepalatial	Early Minoan (EM) I	3100–2700	Early Helladic (EH) I	3100–2700	
	EM II	2700–2200	EH II	2700–2200	
	EM III	2200–2100	EH III	2200–2000	
	Middle Minoan (MM) IA	2100–1900	Middle Helladic (MH) I	2000–1850	
Protopalatial	MM IB	1900–1800			
	MM II	1800–1700	MH II	1850–1700	
Neopalatial	MM III	1700–1600	MH III	1700–1600	Shaft Grave Era
	Late Minoan (LM) IA	1600–1480	Late Helladic (LH) I	1600–1500	
	LM IB	1480–1425			
Final Palatial	LM II	1425–1390	LH IIA	1500–1440	Mycenaean
			LH IIB	1440–1390	
	LM IIIA1	1390–1370	LH IIIA1	1390–1370	
Postpalatial	LM IIIA2	1370–1300	LH IIIA2	1370–1300	
	LM IIIB	1300–1190	LH IIIB	1300–1190	
	LM IIIC	1190–1070	LH IIIC	1190–1070	
	Subminoan	1070–1000	Submycenaean	1070–1015	

[a] The relative merits of low and high chronologies are discussed in the text. All dates B.C.

2.2: The Socio-Political Organization of Crete with a Focus on Knossos

Discussion of the socio-political Cretan background within the MM III-LM IB and LM II-IIIA1 periods is necessary in order to understand the context of the mortuary data that was used for this study. This section also highlights the specific changes that occurred in Final Palatial Knossos, which this study aimed to interpret. The next section focuses on Crete with an emphasis on the area of Knossos in the LM II-IIIA1 period, and addresses the political organization of the island as it is currently understood, as well as Crete's interactions with the rest of the Aegean and the Mediterranean.

The Neopalatial Period (MM III – LM IB) (1700 – 1450 BCE)

The Neopalatial period is seen as Crete's most prosperous phase with respect to wealth, prestige, and cultural influence (Preston 2000: 26) and is often considered to have been the 'Golden Age' of both Minoan civilization and the Bronze Age (Evans 1921; Rehak and Younger 1998: 100). This period was characterized by a complex regional political landscape attested through the development of a high degree of elaboration in architecture (McEnroe 2010; Shaw 2015) and the arts (Chapin 2004; Panagiotopoulos 2012), multiple trade and exchange connections throughout the Aegean and the Mediterranean (B. Davis 2006; J. Davis 2008), various writing systems put in place to document and manage the administrative records (Nakassis, Parkinson, and Galaty 2011; Perna 2014), and a strong cultural influence known (wrongfully so) as the Minoan Thalassocracy (Broodbank 2004; Niemeier 2004; 2009). The complex political landscape of Crete cannot be fully understood which has led to the debate between two dominant

but opposing schools of thought that both emerged from the archaeological evidence, administrative records, and the topography of the island.

The first school of thought argues that during the Neopalatial period, the island of Crete fell under the political and social domination of Knossos and is known otherwise as the Knossocentric ideal (Hood 1983; Hallager and Hallager 1985; Wiener 1987; 1990; 2007; Dickinson 1996; Hamilakis 2002: 182; Adams 2006: 1; Cutler and Whitelaw 2019: 1-2). The main arguments in support of a Knossian hegemony are as follows: the impressive expenditure in the production and consumption of material culture such as architecture and pottery; the adoption of many Knossian cultural forms throughout the island; the size and monumentality of the palace at Knossos, which had reached its maximum extent and was the largest palatial site known island-wide (Whitelaw 2004; Cutler and Whitelaw 2019: 1-2); the clustering of many important centres that are automatically seen as being organized into hierarchies, including the 'villas' or 'country houses' (Wiener 2013: 151); and the absence of fortification walls around the other palatial centres (Hamilakis 2002: 182). Other forms of evidence stem from the discovery of clay sealings found at Chania, Ayia Triada, Zakro and Sklavokambos that had the same shapes as, and similar imagery to those found in the Temple Repositories at Knossos, suggesting that the rings that made these similar sealing impressions belonged to Knossian officials who travelled around the island on behalf of the main Knossos centre (Hallager 1996: 207-13; Schoep 1999: 213-217; Schoep 2004: 289-290; Wiener 2007: 236).

The second school of thought stems from John Cherry's Peer Polity Model, created by John Cherry and Colin Renfrew in 1986 as a way to explain changes that occur within a society (Cherry and Renfrew 1986). Cherry applied the Peer Polity model to

Crete and argued that the island was made up of a patchwork of small independent polities centred around the palaces that evolved out of competition, symbolic entertainment, and increased trade (Cherry and Renfreew 1986: 19-45; Hamilakis 2002: 182; Whitelaw 2011). The main arguments in support of a peer polity are: the presence of multiple large palatial centres across the island (Figure 2.1); the wide distribution and use of Linear A and clay sealings (Bennet 1990; Weingarten 1990; Preston 2000); and the differential formatting of tablets and booking of commodities, demonstrating that different forms of writing were in use across several locations on Crete, and thus indicating that the island did not conform to the same systems that were in place at Knossos.

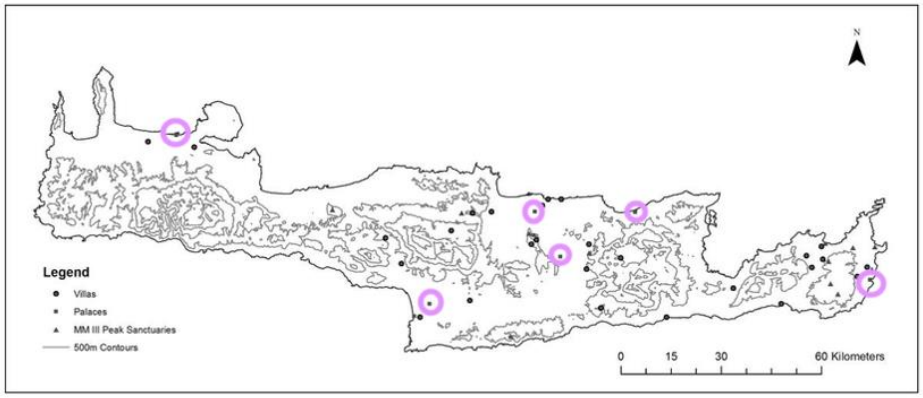

Figure 2.1: Map of Crete during the Neopalatial Period (1700-1450 BCE), showing the location of the palace sites indicated with little black squares that are circled in purple (modified from William Megarry 2012, fig. 9).

Regardless of the political organization of the island, Neopalatial Crete was a complex political entity whose existence was related in part to its involvement with the rest of the Aegean and the Mediterranean. Between 1750-1450 BCE, several areas across the southern Aegean, including the Ionian islands, the Cyclades, Dodecanes, and coastal

western Anatolia, were ‘Minoanised’ (Nikolakopoulou and Knappett 2016: 102; Broodbank 2004: 48). The term Minoanisation is defined by Broodbank as the “heterogeneous range of ancient material culture traits and practices that indicate the adoption in places beyond Crete, through whatever means, of ways of doing things, that originated directly or indirectly within that island” (Broodbank 2004: 46). In other words, the material culture found at these sites displayed traits that were similar to those on contemporary Minoan Crete (Nikolakopoulou and Knappett 2016: 102). The most notable examples of Minoanisation can be seen in architecture, fresco paintings, religion, and cult, as well as in pottery, both decorated wares and domestic vessels (Wiener 1990: 134-45; Niemeier 2004: 394), at sites such as the Ionian island Kythera (Broodbank and Kiriatzi 2007), Phylakopi on Melos (Whitelaw 2005), Ayia Irini on Keos (Caskey 1972), and Akrotiri on Thera (Nikolakopoulou 2013; Doumas 2000). Other evidence for Minoanisation includes the occurrence of balance weights of the Minoan weight system and Linear A inscriptions on locally produced clay vessels at Phylakopi, Akrotiri, and Ayia Irini, as well as Kythera (Niemeier 2004: 394). Linear A tablets have even been found at Akrotiri and they may indicate political control by the Minoans (Niemeier 2004: 394; Schoep 2004). The most intense Minoanised settlements were situated along the main trade routes connecting Crete with regions rich in metal sources; Phylakopi, Akrotiri and Keos are situated along the ‘Western String’ route between Crete and Attica, and Karpathos, Kasos, Rhodes, Telos, Kos, Kalymnos, and Samos on the route between Crete and the west coast of Asia Minor, with contacts via Rhodes to Cyprus, the Levant, and Egypt (Niemeier 2009: 17).

There are some scholars who believe that the Minoanisation of the Aegean came about as a result of a Minoan Thalassocracy. The Minoan Thalassocracy is the idea that

Crete ruled the Aegean with their large naval power (J. Davis 2008: 187; Niemeier 2009: 12) and is based on Evan's vision of a Minoan empire, which is bolstered by the classical legends of King Minos of Crete who, in historical Greek literature, possessed a navy that enabled him to rule over a wide dominion (Evans 1921; Broodbank 2004: 54; J. Davis 2008: 186; Niemeier 2009: 12). However, there is no concrete evidence that can be used to support the existence of a Minoan Thalassocracy, which leads to the issue of how the process of Minoanisation came to be (Nikolakopoulou and Knappett 2016: 103). There are two possibilities often considered to explain this cultural phenomenon, colonisation and acculturation. The colonisation model maintains that the Minoan features seen beyond Crete require such in-depth knowledge of Minoan ways that the only plausible explanation is that they were brought over and used by Minoans who emigrated (Nikolakopoulou and Knappett 2016: 103). The acculturation model, on the other hand, posits that local communities willingly adopted various aspects of Minoan culture perhaps for prestige (Nikolakopoulou and Knappett 2016: 103). While it seems that the island of Crete may have ruled the seas and controlled the trade routes, it does not follow that there was a Minoan Thalassocracy where Cretans were actively present and ruling these areas (J. Davis 2008: 187; Niemeier 2009: 16). Instead, it appears that a strong cultural influence came into existence, allowing Crete to access trade and exchange routes across the Mediterranean.

Towards the end of LM IB, there were a series of island-wide destructions that brought about the end of the Neopalatial period. A number of theories have been suggested to explain the cause of these island-wide destructions, including: a series of physical causative factors including earthquakes, and fires (S. Marinatos 1939); inter-state warfare occurring on Crete that led to the island's self-destruction (Niemeier 1983;

Hallager 1988); internal factors such as social unrest and social competition across the island (Driessen and Macdonald 1997; Preston 2000: 28; Nafplioti 2008; Driessen 2019); and finally, the argument that prompted this study, the invasion hypothesis, that is, the idea that Crete was taken over by Mycenaean forces who ruled the island from a base at Knossos during LM II-IIIA1, or similarly, that Knossos enlisted Mycenaean mercenaries to help conquer and rule Crete (Hood 1985; Popham 1994: 93; Dickinson 1996; Wiener 2007). The invasion hypothesis stems from the widespread introduction of mainland-derived artifact types and symbols, which will be discussed later in this chapter. Regardless of the causes, the end of the Neopalatial period saw a series of island-wide destructions that led to the downfall of almost every palatial centre and ended the so-called Golden Age.

The Final Palatial Period (LM II – LM IIIA1) (1450-1360 BCE)

Following these destructions, the Final Palatial period saw clear, observable changes within the material culture which confirm that a new socio-political landscape was introduced on the island (Bennet 1990: 193; Driessen and Schoep 1995: 650; Preston 2000: 28). Some of these changes include: the disappearance of a number of Neopalatial elements such as Linear A, sealstones, and architectural symbols; the decline in the elaboration of crafts like frescoes and the production of jewelry that merged with the mainland style; and the existence of new mainland elements, including Linear B, and pottery and architectural styles (House He, Plati) (Rehak 1997: 51-62). Several of these new elements, including the replacement of Linear A with Linear B tablets and the rebuilding of the palace, show that Knossos assumed a degree of political and

administrative control in the LM II-IIIA1 period (Bennet 1985: 231; 1990: 208; Merousis 2002: 164; Preston 2008: 312). The newly introduced political landscape can be fairly well understood because of the decipherment and study of the Linear B tablets by Michael Ventris (Bennet 1985; 1990; Driessen 1990; Weingarten 1990). Based on the presence of these documents, it appears that a number of sites were dependent on Knossos for their main economic goods, that included wool and textiles, whose production and distribution were staples of the Cretan economy, implying that Knossos functioned alone as a first-order administrative centre for most of central, west-central, and western Crete (Bennet 1985: 245; Shelmerdine 1997: 569; Preston 2000: 29; McEnroe 2010: 117; Isaakidou et al. 2019: 36).

Crete's relations with the rest of the Aegean decreased significantly in intensity, likely at least in part because of the collapse of the minoanized settlements. However, the island did still possess relations with the Eastern Mediterranean, as evidenced by the Egyptian and Near Eastern objects, also called Orientalia, found on Crete, and the Minoan pottery and artifacts found in Egypt, Anatolia and Syria-Palestine (Cline 1997: 164-167; Cline 1999: 116-117). Interregional trade and exchange still prospered based on the continuation of Mycenaean pottery vessels including the Kylix, the Ephyraean goblet, and the squat alabastron (Watrous 1993: 86; Preston 2000: 43), as well as the Cypriote White Slip bowls and Canaanite jars (Day et al. 2020: 6). Although there was a decline in the level of Crete's prosperity and the intensity of its trade with the rest of the Aegean, the island managed to prosper because of its strong relations with the Mediterranean and the mainland cultural influence, and the influx of new pottery vessels.

The Final Palatial period saw internal changes after the destructions that occurred at the end of the preceding Neopalatial period. Western Crete was now under a Knossian

hegemony with less wealth and a few remaining Aegean and Mediterranean trade contacts. Nevertheless, the island continued to prosper under Knossian rule until the beginning of LM IIIA2.

2.3: The Socio-Political Background of Mainland Greece with a Focus on Mycenae in the Argolid, and Pylos in Messenia

Unlike the case with Crete, not much is actually known about the situation on the mainland, as there is virtually no evidence available regarding the social and political landscape for the MH III-LH IIIA1 period (Voutsaki 1995: 55-56). Instead, majority of our knowledge comes from examining the mortuary data and practices and comparing them with the settlement organization in an attempt to reconstruct social and political changes (Voutsaki 1995: 56-57; 1997: 41). The following section discusses the current understanding of the areas of Mycenae and Pylos throughout the MH III-LH IB and LH II-LH IIIA1 periods based on the available mortuary data. The mortuary landscape itself will not be discussed in full detail, as it is discussed later on in Chapter Four.

Early Mycenaean Period (MH III – LH IA) (1700 – 1450 BCE)

In the Argolid, the previous early Middle Helladic period can be characterized as one of simplicity and poverty based on the mortuary practices (Cavanagh and Mee 1984: 61; Voutsaki 1997: 40; Voutsaki 2012: 164). The deceased were buried in small, single intramural graves located below or between houses, with few to no offerings (Voutsaki 1997: 40; 2012: 164-168). The situation in the mortuary record changed during the transition period from MH III-LH I. Starting in LH I, the Argolid saw an influx of wealth,

the majority of which was located in the new shaft graves from Grave Circles A and B located at Mycenae (Voutsaki 1995: 58) (Figure 2.2).

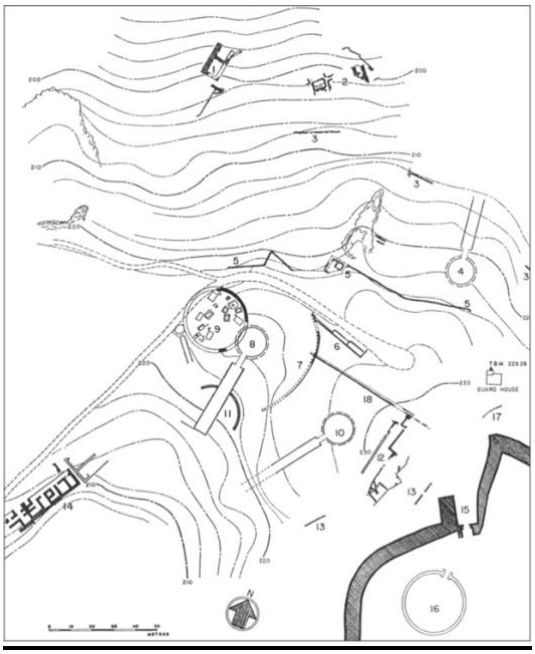

Figure 2.2: Plan of the site of Mycenae, showing the locations of the rich Grave Circles A (no.16) and B (no.9) (from Wace 1954, fig. 1).

These shaft graves consisted of deep shafts with the actual burials placed at their bottom. Because of the extreme amount of wealth and the enormous concentration of exotic and valuable grave goods, this period has been dubbed the 'Shaft Grave Phenomenon' (Voutsaki 1995: 58; 1997: 21; Fitzsimons 2011: 79; Voutsaki 2012: 165). The origins of the shaft graves and the sudden appearance of their wealth has been the subject of many scholarly debates, and several attempts have been made to identify the occupants buried in these graves. Early attempts argue that the Grave Circles were built by foreign rulers who invaded Mycenae and brought over their own exotic grave goods and tomb styles (Dickinson 1970: 307; Fitzsimons 2011: 77). However, this explanation is dismissed in favour of the argument that the shaft graves developed locally and that the deceased were most likely the new emerging Mycenaean elites (Fitzsimons 2006: 279-280; 2011: 77).

The wealth and power of these new elites can also be seen biologically, through the skeletons that show that the deceased were taller, larger, and healthier people who enjoyed an overall greater lifestyle than most (Dickinson 1977: 54, 57-58; Wright 1987: 10). Despite the escalation in wealth and the new form of burial, there is no reason to doubt that the inhabitants were local, as the materials, symbolic wealth, and tomb architecture were all rooted in Middle Helladic tradition (Dickinson 1984; Voutsaki 1999; Fitzsimons 2011: 77).

In the previous Middle Helladic period the area of Messenia (Figure 2.3) saw a number of visible and labour intensive tumuli, and several intramural burials (Bennet 1995: 596; Voutsaki 1998: 50). The situation in the mortuary landscape changes and Messenia witnesses similar developments to those in the Argolid with an increase in wealth characterized by the introduction of the first tholos tombs in MH III at Koryphasion, as well as the first poor chamber tombs (Voutsaki 1998: 42, 51; 1995: 58).

Figure 2.3: Map of Messenia with the area of Pylos encircled (after Alcock et al. 2005: 148, fig. 1).

In both Messenia and the Argolid the concept of differentiation emerged and can be witnessed in the conspicuous consumption characteristic of the mortuary landscape, including the elaborate shaft graves at Mycenae, and the tholos tombs at Pylos and the new lavish deposition of wealth (Voutsaki 1997: 34; 1998: 53). The difference between the two regions is that that the tombs at Pylos contain lower levels of wealth than Grave Circles A and B, although we cannot be completely sure that looting does not play a factor (Voutsaki 1998: 54). Another difference is that the distribution of wealth and the placement of valuable objects in Messenia is far more symmetrical and spread out within sites such as Pylos, Nichoria, and Iklaina (Voutsaki 1998: 54), while in the Argolid, the wealth centred mostly at Mycenae in the shaft graves (Voutsaki 1998: 54). The general socio-political picture for both regions during MH III-LH IA shows an increase in wealth and elaboration through the use of the mortuary practices.

Unlike the situation on Crete, the mainland did not see a lot of connection with the rest of the Aegean in this period. Despite the lack of trade, the mainland did see a strong artifactual, architectural, artistic, and ideological Minoan and Minoan-style influence (Voutsaki 1999: 103; Fitzsimons 2006: 308; 2011: 77). Cretan cultural influence can be seen through the sudden inflow of prestigious goods being deposited in the burials most of which have the closest parallels to Crete (Voutsaki 1997: 46). This influence is also seen at Pylos through the use of ashlar masonry that was used for prepalatial buildings on the acropolis and the local adoption of Minoan architectural styles such as the masons' mark and the horns of consecration, both of which were found beneath Room 7 of the Palace of Nestor (Blegen and Rawson 1966: 44, 95, fig. 16; Murphy et al. 2020: 32). This Minoan influence does not fully explain the metamorphosis of mortuary practices, but rather represents the use and manipulation of these goods in a way that best suited the

Pylians own cultural preferences and social needs (Voutsaki 1997: 46). During the Shaft Grave era, the occupants of the mainland attempted to assert themselves and create their own separate identity through the use and adoption of external prestigious influences (Voutsaki 1997: 46).

Based on the current understanding of the mortuary record the mainland transformed from a relatively poor society to one with newly emerged elites who focused more on prestigious items and conspicuous consumption through the use of burial customs. In the Argolid, there is an uneven distribution of wealth mostly centred at Mycenae due to the introduction of Grave Circles A and B. Pylos in Messenia, on the other hand, saw a more evenly spread-out distribution of wealth with the construction of the first tholos tombs and chamber tombs. The MH III-LH IB transition period on the mainland marked the beginning of attempts to create individual identities through the use of material culture. There is no significant break between LH IB and LH IIA as there is on Crete; instead LH II witnessed the abandonment of the shaft graves, as the mainland moved towards a more elite society with more focus on interstate competition.

The Proto-Palatial Period (LH II – LH IIIA1) (1450-1360 BCE)

The beginning of the LH II period is characterized by the abandonment of the shaft graves and the creation of a new mortuary landscape. In the Argolid the wealth became more evenly distributed, as illustrated by the large numbers of wealthy chamber tombs and monumental tholos tombs found at Mycenae as well as sites such as Prosymna and Dendra (Persson 1931; Blegen 1937; Voutsaki 1995: 60). The appearance of these elaborate tombs indicates that the occupants were utilizing the mortuary landscape as a

venue to express competition among elites, indicating that the period was fragile and a time of political and social stress (Voutsaki 1997: 44; Fitzsimons 2011: 100). Therefore, Mycenae was characterized by the competition and struggle for power and social status which is exhibited by the use of newly adopted, ostentatious burial customs, including the more common disposal of exotic and lavish goods (Fitzsimons 2006; 2011: 100).

In Messenia, the general socio-political situation did not change as much as it did in the Argolid (Voutsaki 1998: 54). Here, the distribution of wealth remained relatively the same, but with a reduction in the number of tholos tombs between LH II and IIIA1, and the continuation of the use of chamber tombs, now far wealthier than in the preceding period. The region witnessed the building of larger fortified settlements in the areas of Pylos, Malthi and Peristeria that demonstrate the emergence of 'petty kingdoms' centred on larger settlements (Voutsaki 1998: 54).

In the preceding period, the mainland was most likely influenced by Cretan culture, as is suggested by the nature of the prestigious grave goods found in the shaft graves and the overall trends in architecture and artifacts, but there were few trade connections with the rest of the Aegean (Watrous 1993: 82-85). The situation changes in LH II according to the copious amounts of Mycenaean pottery found throughout the Aegean (Watrous 1993: 85). As previously discussed, on Crete there was a greater Mycenaean influence not only in pottery styles but also in the burial customs. At Malia, for example, there was a mixture of Minoan and Mycenaean features, including the use of Linear B and the introduction of Mycenaean architecture (Driessen and Farnoux 1994). Mycenae also had strong ties with Cyprus based on the drastic increase in the quantity of Mycenaean pottery that was imported to the East Mediterranean in LH II (Steel 1998: 286). The presence of pottery found throughout the Mediterranean shows that

Mycenaeans largely participated in the multi-faceted trade networks that existed in the Aegean.

The Proto-Palatial period on mainland Greece saw the emergence of an unstable environment that can be characterized by the start of elite competition through the use of elaborate burials and practices, wealthy grave assemblages, and a new desire for prestigious grave goods. This instability gradually led to the beginning of a more rigid hierarchy that emerged in the LH III period, wherein there was a restriction of wealth and tholos tombs to Mycenae and the building of the first palatial centres at Mycenae and Tiryns.

2.4: Towards a 'Mycenaean' Final Palatial Period

As briefly mentioned above, the Mycenaean invasion hypothesis argues that a group of Mycenaean elites conquered and ruled Crete from Knossos. This debate has been prominent ever since the decipherment of Linear B in the early 1950s by Michael Ventris, which provided conclusive evidence for the existence of a mainland presence occupying Knossos (Preston 2000: 42). The majority of scholars have focused on trying to prove the Mycenaean invasion of Crete, which has led the whole period to be characterized by a Mycenaean influence, and to be commonly referred to as 'Mycenaean Crete' (Preston 2000: 42; Kerr 2012: 25). Evidence for this hypothesis is based mainly on features such as pottery vessels, domestic and funerary architecture, ritual and burial practices, writing, and administration (Preston 2000; Nafplioto 2008; Kerr 2012). The remainder of this section summarizes the contributing evidence, including the newly-

introduced Linear B tablets, the mainland-derived pottery styles, and the mortuary practices.

The introduction and discovery of Linear B as an early form of Greek that was used on the mainland is viewed by some scholars as irrefutable evidence of a Mycenaean presence (Driessen 1990; Popham 1994: 93; Wiener 2007; Nafplioti 2008). In the preceding Neopalatial period, there was a wide distribution of the undeciphered Linear A script spread out across 63 different sites on the island (Bennet 1985: 233). However, in the Final Palatial period, Linear B replaced Linear A and the majority of the tablets, along with all writing, was restricted to Knossos (Bennet 1990; Cline 1997; Wiener 2007). These tablets suggest that a new mainland-derived administration was put in place at Knossos, from which foreigners occupied and ruled Crete (Bennet 1985; 1990). There has been some general debate regarding the date of use of the Linear B tablets. The main consensus is that they appeared in LM II, but Erik Hallager (1977) argues that they were not used until LM IIIB and that the Mycenaeans did not arrive on Crete until well after the LM IIIA destruction of the palace of Knossos (Niemeier 1985; Hallager 1988; Cline 1997). Regardless of their date of use, the Linear B tablets appear to provide irrefutable evidence that a Mycenaean presence existed at Knossos.

With regard to the vessels, the initial adoption of mainland-style pottery, such as the kylix, the Ephyraean goblet, the squat alabastron and the bell-shaped cup, dates to LM II and early LM IIIA1, when they were more commonly found in the grave assemblage along with traditional Cretan vessels, such as cups (Popham 1994: 94; Preston 2000: 43). Arne Furumark realized that there were stronger interrelations between Knossos and the mainland based on the Knossian adoption of not only pottery styles, but also of the fondness for shapes such as the large amphorae in the mainland Palace Style (Furumark

1972; Popham 1994: 95). The decorative motifs used on some vessels reflect connections with the mainland, including the figure-of-eight shield, the boar's tusk helmet, and images of swords and daggers (Popham 1994: 93). While the majority of the motifs were unique to Knossos, the changes in style and shape are what is used as evidence of a Mycenaean presence.

The majority of the changes can be seen in the mortuary landscape through the newly introduced styles of chamber tombs, new burial customs, and a larger number of physical burials in general. Final Palatial chamber tombs consisted of smaller, single-chambers with a long narrow dromos, and are considered to have been similar to the new, wealthy chamber tombs that appeared on the mainland in LH IIA (Popham, Catling, and Catling 1974: 255; Nafplioti 2008: 2308). Other similarities include burials with bronzes, in which bronze vessels were deposited in the tombs, and the elite warrior graves that included large numbers of weapons and occasionally armour (Hood 1956; Preston 2000: 156; Nafplioti 2008: 2308). Warrior graves in particular are used as evidence to suggest the existence of elite Mycenaeans buried in the Final Palatial tombs because of their close connections with the Grave Circles of Mycenae (Wiener 2007: 132-134; Nafplioti 2008: 2308).

During the Final Palatial period, it is universally accepted that mainlanders were somehow involved in the LM II-IIIA1 period at Knossos due to the introduction of a new material culture that had parallels with the mainland burial customs (Preston 2000: 46, 47). However, it remains unknown as to how involved the mainlanders were and whether or not they were actually present at Knossos.

2.5: The Debate over the Ethnicity of Final Palatial Knossos

The study of LM II-IIIA1 Knossos is preoccupied with attempting to associate an ethnic identity with the material culture in order to prove the existence of Mycenaean elites as the occupants in the Final Palatial Knossian burials (Preston 2000: 343; McEnroe 2010: 118; Kerr 2012: 25).

The concept of ethnicity has been a key focus in the field of archaeology since its inception in the late nineteenth century (Emberling 1997: 295; Lucy 2005: 86). It has since then been one of archaeology's main goals, to identify ethnic groups in past societies (Lucy 2005: 86). Early archaeological approaches, such as the culture-history model, attempted to trace the existence of ethnic groups based on the assumption that certain ethnic groups could be characterised by a stable repertoire of culture traits including language, artifacts, and religion, which could all be objectively identified (Mac Sweeney 2009: 102, 103). For instance, Stanley Casson (1921) applied the culture-history model in an attempt to track down the historical Dorians (Casson 1921: 212). He associated the Dorians with the appearance and steady development of a culture distinguished by objects of pottery and bronze, known as geometric (Casson 1921; Jones 1997: 16). The problem with this method is that the trait distributions used for defining boundaries and distinguishing ethnic groups did not coincide. For example, when studying the Limba, Yalunka and Kuranko groups of northeastern Sierra Leone, DeCorse (1989) concluded that the material culture distributions provided only a limited indication of the division between the three groups and that the ethnic groups may actually share a relatively homogenous material culture while still having separate ethnic identities (Lucy 2005: 91). The same can be said for languages and religion. Therefore, it is not possible to determine ethnicity solely on the basis of material culture and prove that adoption of

certain stylistic and ideological influences signals the forceful imposition of foreign influences by the immigration population on the host population (Nafplioti 2008)[2].

The perspective on ethnicity shifted in the last two to three decades towards the instrumentalist theoretical approach which can be characterized by a concern with the role of ethnicity in the mediation of social relations and the access to economic and political resources (Jones 1997: 72). In anthropology, the works of a Norwegian anthropologist, Fredrik Barth (1969) played a pivotal role in the development of the instrumental approach. Barth emphasised the subjective aspects of ethnic identity, rather than the objective ones like artifacts and language and that ethnicity is a social construct that can change over time (Barth 1969). He summarized the term ethnic group as a population which:

1. is largely biologically self-perpetuating;
2. shares fundamental cultural values, realized in overt unity in cultural forms;
3. makes up a field of communication and interaction and;
4. has a membership which identifies itself, and is identified by others, as constituting a category distinguishable from other categories of the same order

Ethnicity is a complex concept that requires both subjective and objective materials in order to study and determine the existence of ethnic groups and while it is possible to determine the ethnicity of certain cultural groups, it remains a problem to identify intrusive mainlanders at Knossos during the Final Palatial period.

Preston (1999; 2008) argues that the identification of material culture as either 'Mycenaean' or 'Minoan' is extremely problematic because these terms are based on simplistic correlations between particular artifact types and languages within the territories of these so-called culture groups (Kerr 2012: 26). In other words, 'Mycenaean'

[2] Although, there are certain aspects of material culture that can be used to study and explore ethnicity including; cuisine, food, and cooking. See the Journal of Ethnic Foods.

and ‘Minoan’ ethnic groups have not actually been proven to exist and until they have been, it is impossible to determine ethnicity as reflected in Final Palatial material culture (Preston 1999; 2008). Instead of choosing to focus solely on proving ethnicity, material culture needs to be studied separately in order to gain a greater understanding of LM II and LM IIIA1 Knossos, and how the burial customs were used.

Therefore, the purpose of this thesis was not to attempt to identify the ethnicity of the occupants buried in the tombs, nor was it to negate the Mycenaean invasion theory, as it is altogether possible that the adoption of these mainland elements may have come about through an invasion. Instead, the goal was to find hidden patterns that reflect differences between Knossian, Mycenaean, and Pylian societies and their burial customs and explain how these burial customs were used to display social and political status.

2.6: Summary

This chapter has provided a brief background to the socio-political situation of Knossos, Pylos, and Mycenae during MM/MH III-LM/LH IIIA1. The information provided in this chapter not only highlights the drastic changes that occurred in Final Palatial Knossos, but also sets the groundwork for understanding the evidence used to support the theory of a ‘Mycenaean Crete. The goal of this thesis was not to attempt to prove ethnic identities or refute the invasion hypothesis. Rather, it was to study the burial customs in order to uncover new interpretations of the Knossian, Pylian, and Mycenaean societies through the use of hidden patterns that emerged via a correspondence analysis, which is discussed in the following chapter.

Chapter Three

Correspondence Analysis and the Chi-Square Test

The purpose of this chapter is to provide an understanding of the methods that were used to accomplish this study. Chapter 3 begins with a brief explanation of what correspondence analysis (hereafter CA) is, how it was developed, and how it works. A case study is then provided to further explore how CA works when applied to archaeological data. Following this is a discussion of the specific applications and uses of CA in the field of archaeology, along with its advantages and disadvantages over other multivariate analyses methods. Two other case studies are then examined, both of which involve the application of CA to mortuary data whose goals are similar to those of this particular study. The chapter ends with an explanation of what the chi-square test is, how it works, and a justification for why it was used along with CA.

3.1: Correspondence Analysis

At its simplest, CA is a statistical technique that allows the user to visualize and graphically represent a table of non-negative numbers. The data from the contingency table is then presented in a scatter plot graph where rows and columns are represented by points in two-dimensional space (Figure 3.1) (Baxter and Cool 2010: 211; G. Alberti 2013: 481). The row and column points form clusters that can be used to interpret relationships between the data and formulate hypotheses. For this reason Bølvken et al. (1982: 56) believed that CA was a useful technique to employ, as it can uncover general structures that are not observable by mere inspection of the original data table, making it a valuable Multivariate Analysis method.

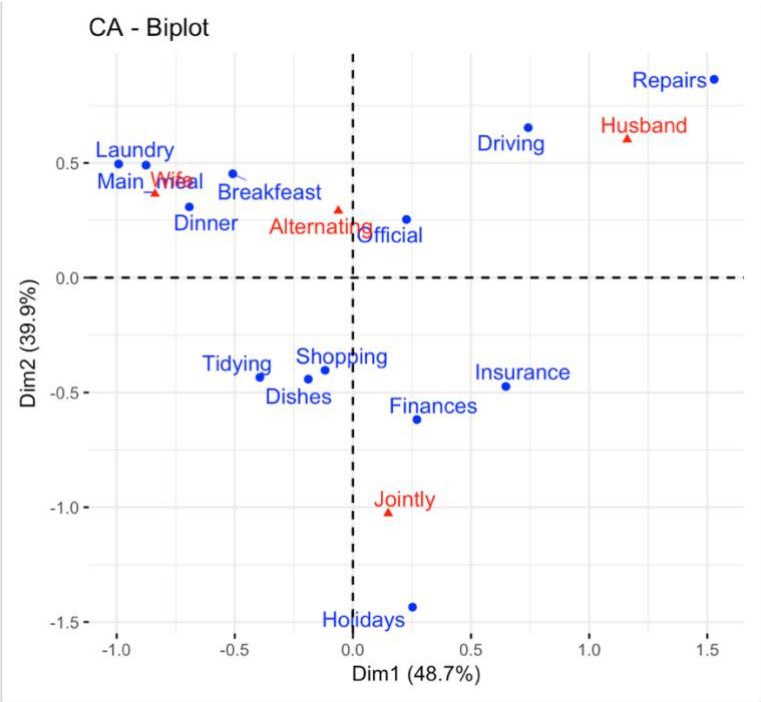

Figure 3.1: An example of a correspondence analysis biplot where the row (blue) and column (red) points are superimposed onto a two-dimensional map. This CA map shows the correspondence between household chores and the frequency of who completes them (Kassambara 2017).

The history of CA is described by Greenacre and Blasius (2006: 5-6), who trace the mathematical theory behind CA all the way back to Herman Otto Hirschfeld (1935), who created an algebraic formulation between rows and columns of a contingency table. In 1940, Ronald Aylmer Fisher used the same ideas in his framework for Discriminant Analysis, a technique used for examining the differences between two or more groups of objects with respect to several variables (Klecka 1980: 5). The concept of Discriminant Analysis is similar to CA in the sense that both methods attempt to examine differences between variables, which is why Fisher is credited as one of the 'Founding Fathers' of CA. Finally, Louis Guttman (1941) is credited as the originator of Multiple

Correspondence Analysis (MCA)[3] because he independently developed a method of constructing scales for categorical data involving more than two qualitative variables (Greenacre and Blasius 2006: 5). MCA is an extension of CA as they are both statistical techniques that work with a data table and display results graphically (Abdi and Valentin 2007: 1; Bock 2017). The difference is that CA works with a data table of only two dimensions whereas MCA can be applied to data tables with multiple dimensions (Abdi and Valentin 2007: 1). Unlike these early techniques which only provide numerical results, with the exception of MCA, CA produces visuals on a graph in two-dimensional space so that relationships between row and column points can be observed from new perspectives. Despite these differences, the mathematical theory behind all these statistical techniques remains the same which is why they are credited as the early theories which led to the development of CA.[4]

CA was first developed in France during the late 1960s and 1970s using the early mathematical theories mentioned above. It was developed by the French linguist and mathematician, Jean-Paul Benzécri (1969), and was the central philosophy for the French School of 'Analyses des Données' or 'Data Analysis', led by Benzécri himself (de Leeuw 2013: 64). The philosophy behind CA is that the model should follow the data, not the other way around, i.e., the data should be the centre of attention for the researcher (Greenacre and Blasius 2006: 5-6).

While popular in France in the 1960s, it was not until the mid to late 1980s that the English-speaking world started to show an interest in the method. It was first

[3] MCA will not be discussed in detail as it will not be used for this analysis. For more information on this method, see Abdi and Valentin 2007; Greenacre and Blasius 2006.
[4] For more information on the history of CA discussed in detail, see de Leeuw (1973), Nishisato (1980), Greenacre (1984), and Gifi (1990).

introduced statistically in the publication of textbooks written by Lebart et al. (1984) and Greenacre (1984). However, credit for the introduction of CA to the field of archaeology is given to a Scandinavian paper written by Bølvken et al. (1982) that proved that CA could be used as a better alternative to the older multivariate method, Principal Component Analysis (PCA). Despite its importance and its growing popularity in Europe, CA did not become widely prevalent in the field of archaeology until around the 1990s (Baxter and Cool 2010: 212). This delay in the adoption of the statistical method may have been because archaeologists tended to look to statisticians for guidance and in the field of statistics, CA was not well known or used until the late 1980s (Leeuw 2013: 64) where a British statistician, Trevor Ringrose (1988), was the first to introduce and use CA in the field. After the 1990s, CA became one of the most widely used multivariate methods in archaeology, possibly because of efficient marketing and the swift introduction of readily accessible PC programs including: SAS, SPSS, BMDP and R, the latter of which was used for this analysis (Jensen and Nielson 1997: 38).

3.2: How CA Works

Essentially, CA works by reducing a data table into two factor maps that are then displayed in two-dimensional space. The first map plots the points that correspond to the rows of the table (the units), while the second map plots the points that correspond to the columns (the variables) of the table (Clouse 1996: 97; Baxter and Cool 2010: 212). These two maps allow the units and variables to be compared individually at first in regard to their profiles, which simply means a system of proportions where the space between points represents their diversity (Clouse 1996: 97). Row points that have similar profiles

in terms of their find assemblages are close together on the first map, while column points that are close together identify finds with similar distributions across sites (Baxter and Cool 2010: 212; G. Alberti 2013: 481). The two maps are then superimposed and viewed together in two-dimensional space, allowing the similarities and differences, or in other words the correspondences, between both row and column points to be analyzed together as a whole (Clouse 1996: 97). The visualization of the data in this way is what allows analysts to interpret hidden patterns and form hypotheses based on the correspondence of the row and column points.

CA is an exploratory technique that is best used for observing patterns that may not be seen by only looking at the raw data. It allows analysts to generate new, testable hypotheses based on hidden patterns that emerge (de Leeuw 2013: 80). In order to form these hypotheses, the distance between the points on the map need to be studied as it is these distances that indicate the nature of their relationship (Clouse 1996: 97; Baxter and Cool 2010: 212). The closer a row point is to a column point, the greater the proportion is that the column category makes up the row profile (G. Alberti 2013: 481). In simpler terms, the closer the points are, the more similar their profiles are or the further the points the more dissimilar they are (G. Alberti 2013: 481). By presenting the data on the superimposed set of axes, the observer is able to view the row and column points in relation to one another and it is with these points that clusters can be created. The resulting clusters group together all the points that have similar profiles and are closest to one another in an area on the graph. From these clusters hypotheses can then be developed. The next section presents a case study by Bolvken et al. (1982) demonstrating how CA works to generate new hypotheses when applied to archaeological data.

Late Stone Age Sites near Iversfjord in Finmark

The Late Stone Age houses near Iversfjord in Finmark are found along the entire coast of northern Arctic Norway and have frequently been interpreted as being winter coastal fishing villages (Bølvken et al. 1982: 44). In this study Bølvken et al. used CA to test whether or not this hypothesis was true and whether or not the Late Stone Age houses formed winter coastal fishing villages. They also planned to "determine the amount and kind of variation, if any, in resource utilization/procurement activities which are evidenced at a single coastal locality" (Bølvken et al. 1982: 44). According to Bølvken et al., if the hypothesis was true, the expected CA results would show all the houses grouped together in a single cluster along with all the tools representing winter seasonal fishing activities.

In order to test this hypothesis, a CA was run using all thirty-seven lithic types found in the fourteen house site assemblages (Table 3.1) (Bølvken et al. 1982: 46). While the houses did form clusters, a clear interpretation of the possible different activity patterning was too difficult to decipher because of all of the 'noise', where 'noise' was produced by outliers. Outliers are discussed in greater detail towards the end of this chapter, but essentially, they are points on the map that do not belong and can skew the results so that no patterns can be found (Baxter and Cool 2010: 220). In order to eliminate this 'noise', the table was reduced by grouping the thirty-seven lithic variables into nine tool categories: points, scrapers/burins, core tools, knives, net sinkers, tool manufacture, slate fragments, utilized flakes and perforated stones (Bølvken et al. 1982: 46, Table 3.2), and a second CA was then run, producing results that were far easier to interpret (Figure 3.2) (Bølvken et al. 1982: 47).

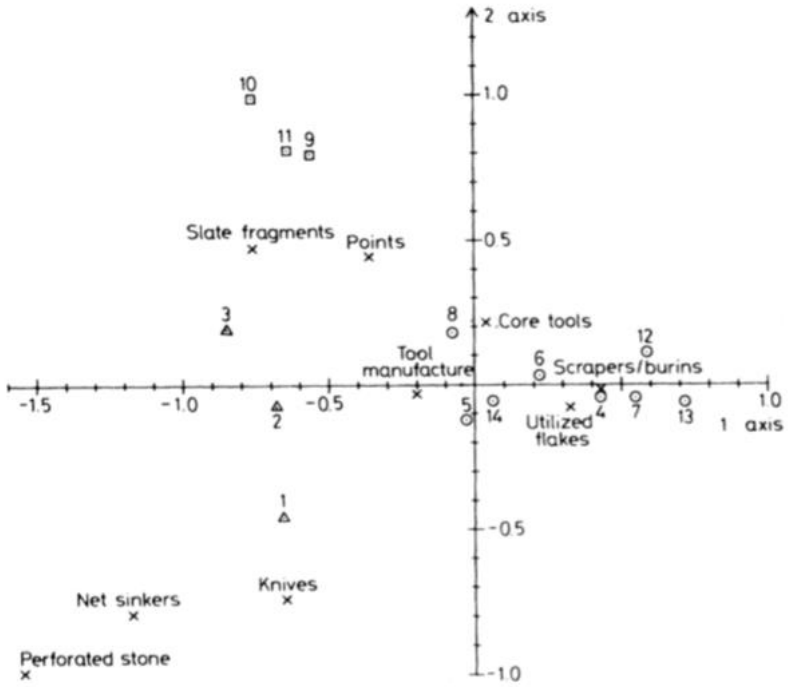

Figure 3.2: Correspondence analysis map of the Late Stone Age houses near Iversfjord in Finmark, Arctic Norway, where the shapes on the map represent the different clusters that were formed (circles = group 1, squares = group 2, triangles = group 3) (Bølviken et al. 1982: 47, fig. 3).

Table 3.1: Table showing the archaeological assemblage from the fourteen houses

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	14	4	0	0	1	4	2	2	9	0	1	0	0	1	0	3	0	1	0	0	0	15	2	0	19	38	18	0	0	0	6	4	0	14	0	2	1
2	6	2	0	0	0	1	1	0	2	0	0	0	0	0	0	3	0	0	0	1	0	2	0	1	5	22	4	0	0	0	2	6	0	5	0	0	1
3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	19	1	0	0	0	2	0	4	1	0	1	0
4	9	3	3	0	0	26	33	11	42	4	9	0	2	0	0	9	0	4	0	0	0	2	0	0	0	60	4	2	2	2	2	1	1	48	2	3	0
5	5	2	0	1	0	13	11	3	15	3	0	0	1	1	0	6	0	1	0	1	0	5	2	0	5	39	4	3	1	0	3	7	1	18	0	1	0
6	28	2	6	0	0	29	20	17	16	2	3	2	1	1	1	7	0	0	2	0	0	3	4	0	2	51	5	4	0	2	2	1	0	49	0	0	0
7	2	0	1	0	0	11	7	6	16	2	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0	14	1	0	0	0	3	0	0	24	0	0	0
8	22	3	6	2	2	14	6	10	11	0	3	0	0	1	1	12	1	0	0	0	0	4	0	0	2	64	2	0	4	3	8	3	0	23	1	0	0
9	4	0	0	0	1	0	1	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	1	3	4	2	2	2	0	0	0
10	6	2	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	5	0	0	0	0
11	9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	3	0	0	0	0	1	0	0	1	0	0	0
12	1	0	0	0	0	1	2	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0
14	1	0	0	0	0	3	1	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	14	1	1	0	0	0	0	0	1	0	0	0

(Bølvken et al. 1982: 46)

Table 3.2: Table showing the archaeological assemblage broken up into nine tool categories from the fourteen houses

Units	Points					Scrapers/burins												Core tools				Knives			Net sinkers	Tool manufacture					Slate fragments			Utilized flakes			Perforated stones
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	14	4	0	0	1	4	2	2	9	0	1	0	0	1	0	3	0	1	0	0	0	15	2	0	19	38	18	0	0	0	6	4	0	14	0	2	1
2	6	2	0	0	0	1	1	0	2	0	0	0	0	0	0	3	0	0	0	1	0	2	0	1	5	22	4	0	0	0	2	6	0	5	0	0	1
3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	19	1	0	0	0	2	0	4	1	0	1	0
4	9	3	3	0	0	26	33	11	42	4	9	0	2	0	0	9	0	4	0	0	0	2	0	0	0	60	4	2	2	2	2	1	1	48	2	3	0
5	5	2	0	1	0	13	11	3	15	3	0	0	1	1	0	6	0	1	0	1	0	5	2	0	5	39	4	3	1	0	3	7	1	18	0	1	0
6	28	2	6	0	0	29	20	17	16	2	3	2	1	1	1	7	0	0	2	0	0	3	4	0	2	51	5	4	0	2	2	1	0	49	0	0	0
7	2	0	1	0	0	11	7	6	16	2	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0	14	1	0	0	0	3	0	0	24	0	0	0
8	22	3	6	2	2	14	6	10	11	0	3	0	0	1	1	12	1	0	0	0	0	4	0	0	2	64	2	0	4	3	8	3	0	23	1	0	0
9	4	0	0	0	1	0	1	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	1	3	4	2	2	2	0	0	0
10	6	2	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	5	0	0	0	0
11	9	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	3	0	0	0	0	1	0	0	1	0	0	0
12	1	0	0	0	0	1	2	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0
14	1	0	0	0	0	3	1	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	14	1	1	0	0	0	0	0	1	0	0	0

(Bølvken et al. 1982: 46)

The horizontal axis was interpreted by Bølvken et al. as denoting the contrast between maintenance activities (reflected by the presence of scrapers, burins, and utilized flakes) and active procurement (reflected by the presence of fishing equipment and perforated stones) such as fishing and possibly sea-mammal hunting. The vertical axis contrasts the two different procurement activities at the site, hunting (projectile points and worked slate fragments) and fishing (polished slate knives and fishing equipment) (Bølvken et al. 1982: 47). It was therefore concluded that the first two axes differentiated between multiple economic activities: fishing and hunting on the one hand, and maintenance support or activities on the other (Bølvken et al. 1982: 47).

According to these results, the house sites appear to fall into three different clusters. The first cluster – houses 4, 5, 6, 7, 8, 12, 13, 14 – centres on maintenance activities; the second cluster – houses 9, 10, 11 – focuses on hunting; the third cluster – houses 1, 2 and 3 – is associated with fishing activities. Since the results do not show all

the houses together in one cluster relating to fishing activities, the hypothesis stating that these houses were winter coastal fishing villages, was, in fact, false. Instead, the CA results provided a better understanding of economic activities and different types of settlement permanence than had originally been determined from only studying the raw data of the area. The distances between the points on the graph allowed the three different clusters to be created, which resulted in the new hypothesis that these houses were related to more than just fishing activities; they were also related to hunting and maintenance activities.

3.3: The use of CA in Archaeology

Within archaeology CA has many purposes ranging from burial assemblage analysis, on-site distribution of faunal remains, distribution of pottery types in different kinds of contexts, stratigraphy, and formation processes (G. Alberti 2013: 480). The following section focuses on the application of CA with mortuary data.

Archaeologists often apply CA to mortuary data in order to focus on three different applications: seriation/chronology, chorology, or social analysis (Jensen and Nielson 1997: 30; Falconer 2014: 70), each of which determines the type of data that is selected. For the study of seriation/chronology, the variables used must contain style-related characteristics that are most common in burials and that can show change over time, typically, pottery, dress accessories, and weaponry (Jensen and Nielson 1997: 33). The one thing to look out for when selecting data is materials that might have been imports, heirlooms, or items that are much older than the burial in general as they can be difficult to analyze chronologically. If a chronological pattern does exist within the data,

the points on the resultant graph produced would be arranged in the form of a parabolic curve, as long as there is a perfect seriation present (Jensen and Nielson 1997: 38).

Chorology refers to the study of places or regions, and also requires variables with primarily style-related characteristics. In order to study chorology successfully only data which derives from and reflects specific regional characteristics should be used, such as jewelry, dress accessories, and pottery. For this reason, foreign imports should not be included in the dataset as they do not directly derive from the area of study (Jensen and Nielson 1997: 37). The structure of the data on the CA plot depends on the social organization of a culture. For example, a social organization that uses material culture as a marker of status is more likely to produce clustered results where each cluster represents a diverse social group. On the other hand, a society that lacks a clear hierarchy may produce a more gradual, parabolic curve (Jensen and Nielson 1997: 37; Falconer 2014: 73).

Finally, performing a social analysis on archaeological material is a way to try and understand the intentions of the members of a past society and ask the question: ‘what did they want to express?’ (Jensen and Nielsen 1997: 31). In this case, function-related variables must be used, although they appear less frequently than style-related variables. These variables characterize the actual person who was buried and include drinking vessels or clothing, as a way to try and understand the intentions of the members of the society (Jensen and Nielson 1997: 31, 34). Social analysis does not explain why these changes occurred; it only explains that they did. The present study focused on determining the social analysis of mainland and Knossian burials in an attempt to understand what the occupants of the tombs were trying to express.

3.4: The Advantages and Disadvantages of CA over other Methods

There are other statistical methods, such as PCA, that can be applied to mortuary data and that could have been used for this particular study. However, CA does possess a number of advantages over other methods. Therefore, the purpose of this section is to discuss both the advantages of using CA, as well as the disadvantages that can occur while using CA.

The Advantages of Using CA

PCA is one of the oldest methods of data analysis and is used by almost all scientific disciplines. Much like CA, it is a multivariate technique that examines the correlations between tests and reduced variable sets (Lacher and O'Donnell 1988: 455). The central idea of PCA is to reduce the dimensionality of a data set that consists of a large number of interrelated variables, while retaining as much of the variation present in the data set as possible (Jolliffe 1986: 1). This is achieved by transforming the data into a new set of variables, called principal components, which are uncorrelated and ordered so that the first few principal components retain most of the variation present in all of the original variables (Jolliffe 1986: 1). In other words PCA takes a large set of correlated data, extracts the important information, and then expresses it as a set of new orthogonal, uncorrelated variables called principal components. The newly reduced data is then plotted on a graph giving a visual representation of what the data looks like. While PCA is a useful method there are some advantages that CA has, making it the overall better choice for the current study.

CA and PCA are both multivariate statistical techniques set on visually displaying data to find patterns and relationships between points. However, one of the main advantages CA has over PCA is that it can be applied to any sort of data table with non-negative entries, whereas the application of PCA is strictly limited to metric data (Blasius 2011: 319). CA can be applied to presence and absence data while PCA cannot. This means that CA works with a series of 1s and 0s based on the presence or absence of an artifact in a burial, the type of data that is most often encountered in archaeology (Jensen and Nielson 1997: 38).

Another advantage is that CA allows the user to postpone the choice of interpretation in terms of cluster or seriation until after the analysis (Jensen and Nielson 1997: 38). Interpretations can be made after the CA has been run, and there is no need to determine whether you are looking for seriation or chorology beforehand; you can simply look at the patterns that emerge from the graph and go from there. This is why CA is used to generate hypotheses and not actually test them. Unless you know specifically what you are looking for and you wish to choose data relating specifically to chronology, chorology, or social analysis, there is no need to choose specific data entries. The results of CA are not heavily influenced by frequency counts, which is the measure of the number of times that an event occurs. Other methods of analysis, including PCA, allow higher frequency variables to dominate, which may produce inaccurate results, whereas CA reduces the domination of frequency counts and instead focuses on the relationships between the objects and their context (Clouse 1996: 98).

The Disadvantages of Using CA

Despite being easy to use and the most effective multivariate analyses method for burial assemblages and mortuary data, CA does have its share of disadvantages. The biggest disadvantage is that CA is extremely sensitive to outliers, as mentioned when discussing the coastal fishing village case study. An outlier is a point on the map that lies at some distance from the other points on the plot (Baxter and Cool 2010: 220). These outliers can represent rogue datum points that may have arisen because of a small sample size, or they may be associated with a large total but be simply very different from other row or column points (Baxter and Cool 2010: 220, 225). The impact of an outlier often overshadows the patterns emerging from the bulk of the data (Bølvken et al. 1982: 56), meaning that having outliers in the dataset can mess up the CA results and cause points to either bunch together or spread out, thus obscuring otherwise interpretable data. For this reason, outliers need to be removed from data tables in order to properly run the CA. One way of doing this is by grouping the column points into categories, as in the example given by Bølvken et al., so that the CA is not overwhelmed with a large data set.

Another limitation with CA is that the distances between row and column points are not mathematically defined (Sourial et al. 2010: 645). One must be cautious when attempting to interpret relationships that may be visible on the map as the distance does not actually determine whether these relationships are significant. Since the concepts of CA are more geometric than statistical, it can only be used to find patterns, which can be useful on its own as it reveals the nature of clusters through the relationship between the units and variables (Bølvken et al. 1982: 55). However, once a hypothesis is generated, there is no way to determine the significance of said hypothesis or the relationship between variables, which is why hypotheses need to be tested using other statistical

methods, in the case of this study, the chi-square test, in order to determine the significance of the relationships.

The next section examines two different case studies whose primary focus was to find patterns and relationships between specific burial customs involving the age and sex of the occupants in order to discover different interpretations of the manner in which these cultures utilized their burial customs. These two studies were chosen because, as is the case with this study, they involve the application of CA to mortuary data as a way of studying different interpretations of the burial customs and determining hypotheses involving the status of the deceased and society as a whole.

3.5: Case Studies

Coles Creek Mortuary Data

Coles Creek is a late woodland archaeological culture located in the lower Mississippi valley. Sites at Coles Creek are known for a paucity of grave goods, which tend to be the main focus of most discussions regarding the mortuary program located there. In this case study, Megan Kassabaum (2011) chose to analyze three different sites at Coles Creek and examine the sex, age, and burial position of the deceased. Kassabaum applied CA to the mortuary data with the hope of recognizing patterns that could tell us something more about Coles Creek burial practices. The three sites chosen were Greenhouse, Lake George, and Mount Nebo because of the availability of high-quality data from a significant number of burials at each site (Kassabaum 2011: 215).

The goal was to identify patterns in the mortuary sphere using the sex and age data rather than the grave goods, as there are far too few of them. In order to do this,

counts were made for all burial positions by sex and age at each site (Kassabaum 2011: 220-221) and then a CA was run using this data. Unfortunately, no compelling sex-related patterns could be identified because of the small number of skeletons that were confidently sexed. It was then concluded that sex-based patterning was not likely meaningful in the Coles Creek mortuary program. However, the age-related patterns revealed plenty of information about the three sites. The first CA found that of the 98 burials at Greenhouse, most were laid out in the extended position. Infants were buried in the flexed position, subadults were associated with skull burials, young adults were buried in the semi-flexed or bundled position, and adults were laid out in the extended position (Figure 3.3) (Kassabaum 2011: 222). The second CA graph represented the 187 burials at Lake George, and also showed significant patterning. Infants were associated with the extended-supine and flexed position, subadults were primarily skull burials and adults were associated with the extended-prone and bundle types (Figure 3.4) (Kassabaum 2011: 222). Finally, the third CA graph showed that, of the 93 burials at Mount Nebo, infants and subadults were both associated with skull burials while adults were associated with extended bundle and flexed types (Figure 3.5) (Kassabaum 2011: 222).

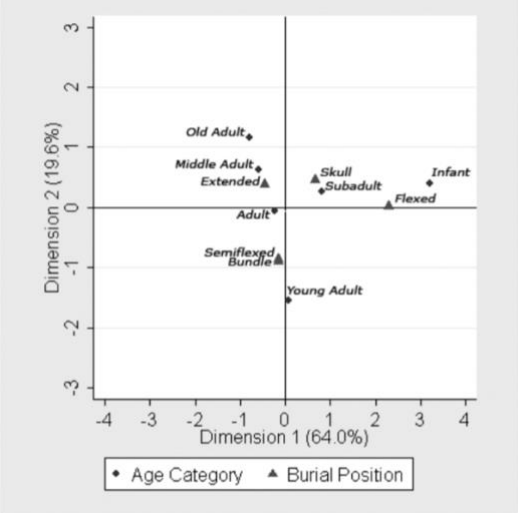

Figure 3.3: Correspondence analysis biplot from the Greenhouse site showing burial types on the left and age categories on the right (Kassabaum 2011: 222, fig. 5).

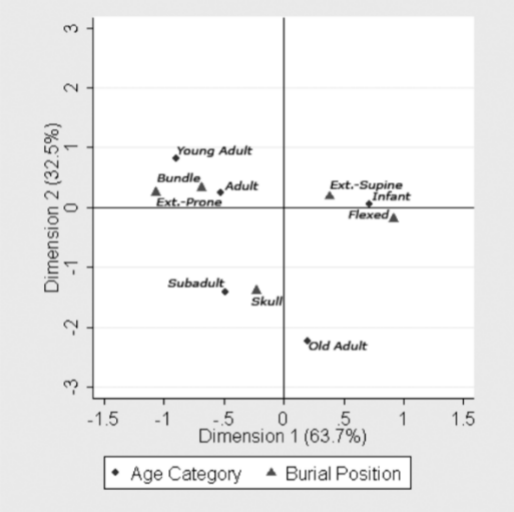

Figure 3.4: Correspondence analysis biplot from the Lake George site showing burial types on the left and age categories on the right (Kassabaum 2011: 222, fig. 7).

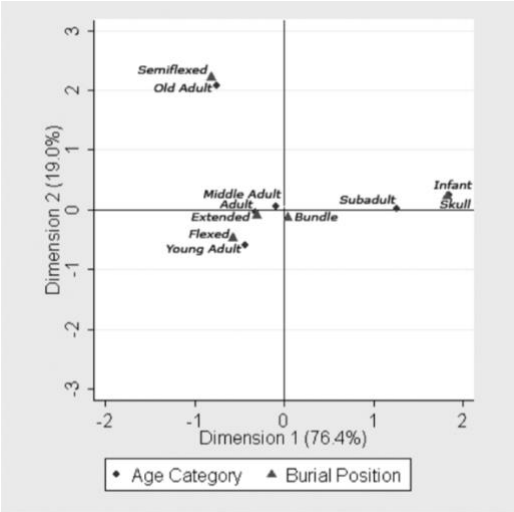

Figure 3.5: Correspondence analysis biplot from the Mount Nebo site showing burial types on the left and age categories on the Right (Kassabaum 2011: 222, fig. 6).

A number of age-related patterns can be observed from this analysis at all three sites (Kassabaum 2011: 220). First, at all three sites subadults were associated with skull burials and were most often buried in the extended position. The Greenhouse and Lake George burials shared associations between infants in the flexed position and young adults with bundle burials, but Mount Nebo did not follow either of these patterns. The

most significant pattern found in the correspondence graphs was that infants, young adults, and older adults were always the furthest from the center of the graph. While these three age categories were not treated consistently from site to site, they were consistently treated differently from each other and from everyone else (Kassabaum 2011: 220). These results show that the burial data from Coles Creek cemeteries represented a mortuary program that differed from site to site and was characterized by mass burials consistently expressing age as a strong variable in determining the burial position. Just because the number of grave goods was low does not mean that the mortuary practices at Coles Creek were unpatterned, unintentional or unplanned. Instead, the CA showed that there were a number of age-related patterns following distinct patterns associated with each individual.

This case study provides a good example of using CA to find new ways of interpreting burial customs using the given data, which is exactly what this thesis aimed to accomplish. The current thesis hoped to move away from the idea of identifying Mycenaean ethnicities in the burial customs of Knossos and Pylos and instead discover different interpretations of how the burial customs were used.

Durankulak Cemetery on the Bulgarian Black Sea Coast

The cemeteries at Durankulak on the Bulgarian Black Sea Coast have been frequently studied using a univariate analysis. It was found that the body positions and grave goods depend on the sex of the body interred. Susan Stratton (2016) aimed to reanalyze the Durankulak cemetery using CA as a multivariate analysis in order to show that there is a connectedness among artifacts that is not just related to sex.

The Durankulak cemetery burials are attributed to two cultural phases, the Hamangia culture (spanning the Late Neolithic to Middle Copper Age) and the Varna culture (Late Copper Age) (Stratton 2016: 858). A univariate analysis was run on the relationship between the sex of the deceased and the distribution of types of grave goods, using only the confidently sexed and aged individuals in order to not obscure patterns with inaccurate sexing. The analysis found that a number of artifact types correlated directly with sex. Females were buried with more items of jewelry and polishing stones, likely related to some kind of processing activity, while male burials had axes made of antler, stone and copper (Stratton 2016: 858). It was also found that the burial position was also related to the sex of the deceased: males were laid extended on their backs, and females were crouched (flexed) on either their left or right sides. This pattern was discovered to be present throughout the entire span of the cemetery's use (Stratton 2016: 858). The analysis clearly shows that sex had an important impact on the way an individual was buried and what accompanied them. However, problems arose when the non-confidently sexed burials, which made up 25% of the total burials, were added to the study. It was found that they did not conform to the same patterns; in fact in numerous cases they even contradicted the previous patterns found. Stratton (2016: 859) mentions that this was the case especially for burial positions, where almost 100% of the confidently sexed males were in the extended position, while 80% of the possible males were in the crouched position. This caused problems with the idea that there should be a binary sex-based gender pattern at the cemetery.

Stratton's goal was to analyze the cemetery using an alternative approach, a multivariate statistical technique, specifically CA. She wanted to reveal hidden patterns that could be compared with other factors, such as sex, to explore potential social

identities. In order to run the CA, both the objects (the burials) and the variables (the types of grave goods) were added to a contingency table, which included all burials regardless of whether or not they were confidently sexed. The graph presented in Figure 3.6 describes the relatedness of the different burials on the basis of their grave assemblages; burials that are clustered together represent a greater relatedness in grave assemblages while the farther apart they are the less overlap there is in artifact type (Stratton 2016: 863, 864). The CA showed that there was a degree of overlap between the two burial phases, probably owing to an inclusion of burial 'staples' that were standard at the time, namely, pottery related to aspects of the funerary ritual rather than the deceased person. The graph was then considered in terms of sex, which was done by adding the sex information of the burials onto the plot using colours (red for female and blue for male). Here were some of the patterns Stratton (2016: 864-865) found that emerged from the plot:

1. The majority of female burials were closely clustered in the same area over both cultural phases; therefore, similar items were buried with biological females over both periods.
2. The area on the plot around the zero point on both axes was not exclusively female; instead, adult males and children were also found meaning that the artifact grouping was non-specific and that the artifacts were probably common ones buried across all of society.
3. There was a separate cluster (a) of Hamangia female burials along with three unconfidently sexed individuals who were possibly females, three children, and two cenotaphs (symbolic graves without human remains). These burials were associated with bone finger rings, clay idols, and Spondylus amulets, as well as some types of shell beads. This plot seems to relate to specifically female artifacts.
4. Males from the Varna phase had a similar distribution to the females, but Hamangia males were much more widely distributed, which indicates that the males in the Hamangia phase were being buried with different artifacts from the females, with a possibly greater diversity.
5. Within circle (b) there was a dense clustering of adult male burials and cenotaphs containing what are considered to have been male grave goods (antler axes, chalcedony beads, and footed and pedestalled bowls).

6. Within cluster (c) there was a group of Varna phase burials associated with copper tools: needles, axes, and awls. This shows an increased use of copper for a greater variety of artifacts in the Copper Age, which is unsurprising.

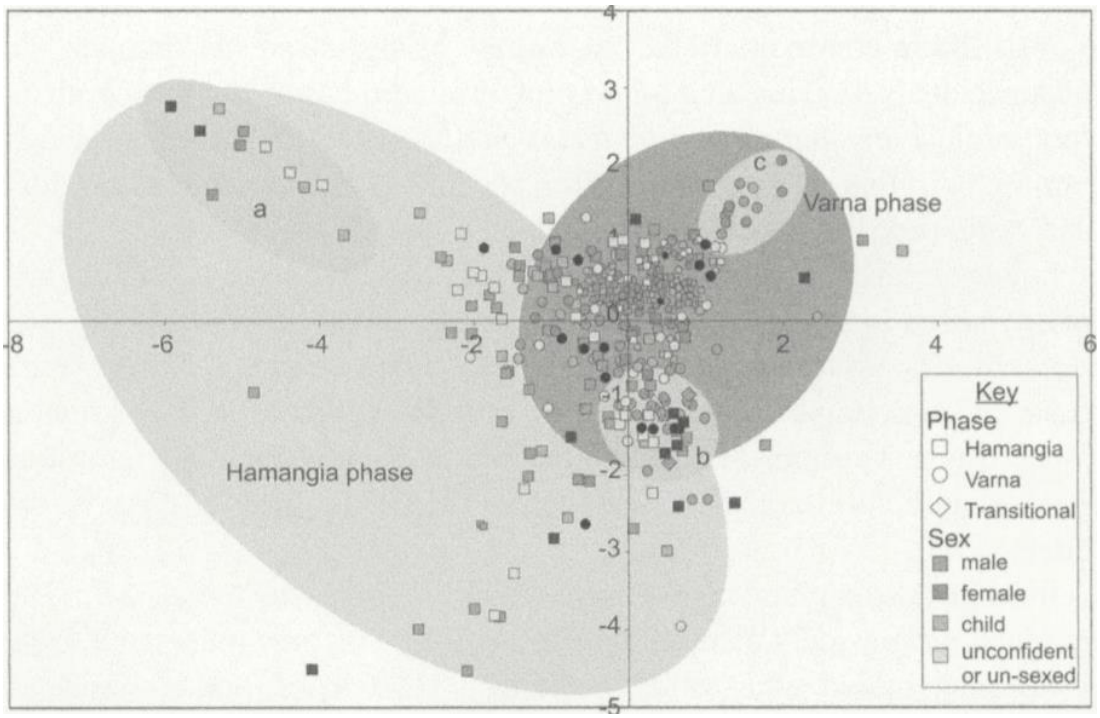

Figure 3.6: An example of a correspondence analysis plot, showing the Durankulak burial data, including all the confidently sexed burials from both phases of the site's use. This CA plot describes the relatedness of the different burials on the basis of their grave good assemblage(Stratton 2016: 863, fig. 7).

What this analysis showed is that the individual's sex did not determine the position they were buried in or the grave goods they were buried with. The CA actually showed that there was a large amount of crossover in artifacts over the two periods and that there were no exclusively 'male roles' and 'female roles' within the society. Instead there was a larger set of patterns that emerged that can provide further detailed information on the society in question. The data suggests that there were differences between males and females during the Hamangia phase, but that during the Varna phase, gender was not as significant (Stratton 2016: 865).

Like the first case study, Stratton's study provides an example of applying CA to mortuary data in order to uncover hidden patterns that display different hypotheses from those previously suggested. Sutton used CA to explain the notion that gender does not determine the burial position or the grave goods found in the tombs. The current study aimed to uncover different interpretations for burials with weapons and found that they should not immediately be classified as 'warrior graves', rather, the results have shown that these burials with weapons actually represented status and prestige especially when deposited with grooming items.

3.6: Chi-Square Test

The chi-square is a statistical test widely used for testing the relationships between two variables with nominal or ordinal data, which is data that is organized into categories (Vaughan 2001: 75). Its name was taken from the Greek letter chi and is denoted as such, X^2. The formula for the chi-square test is as follows:

$$X^2 = \sum \frac{(O_i - E_i)^2}{Ei}$$

where O stands for the observed frequency, and E for the expected frequency. The test aims to compare the differences between the observed and expected cell values (Hess and Hess 2017: 877). The observed frequency refers to the data the analyst has actually observed, while the expected frequency refers to the values calculated based on the assumption that the two variables are independent (Hess and Hess 2017: 877). The expected value is calculated as follows:

$$E = \frac{M_R \times M_C}{n}$$

where M_R is the row, M_C is the column, and n is the total sample size. Once the expected value has been calculated the chi-square test can be run.

In archaeology the most commonly used chi-square test is Pearson's chi-square (Hunt 2017: 71). Pearson's chi-square has two different tests, the goodness of fit test and the test for independence. These are used to evaluate large populations of unpaired data to determine the probability that the observed difference between populations arose by chance (Hunt 2017: 71).

The first of the Pearson's chi-square test is the goodness of fit test. This is used to see whether the observed frequencies in a distribution 'fit' or are consistent with a corresponding set of theoretical frequencies that are expected (Nesbitt 1966: 1). This type of test requires only one variable type compared against a population or site. For example, the goodness of fit test could be used to determine whether smoking is dependent on gender.

The second test is the test of independence. This is used to test the hypothesis that two variables are not related and that they are independent (Nesbitt 1966: 1). Like the goodness of fit test, this compares the observed and expected values but it requires more than one variable, for example, testing to see if the probability of a six-sided die is balanced, meaning that there is a one in six chance of the die landing on each side.

Before running a chi-square test a null hypothesis (H_0) and a hypothesis (H_1) must be formulated. The H_0 suggests that there is no relationship between the variables being calculated, or that they are independent of one another. The H_1 suggests that a relationship does in fact exist and that the variables are dependent on one another. To determine whether the results of the test are significant, the H_0 must be rejected. In order

to do this, the p value, which is the probability that the null hypothesis is true, must be smaller than the set level of significance. The level of significance is the level at which one rejects or accepts the null hypothesis. It can be set to either 0.05 or 0.01 depending on the data and the researcher. Therefore, $p < 0.05$ or $p < 0.01$ in order to reject H_0 allowing for the conclusion that there is a significant relationship between variables.

Pearson's chi-square test requires that the data pass several 'assumptions' in order to appropriately test for independence. The first assumption is that the observations in the dataset are independent, examples include groups such as gender (males and females), profession (doctor, nurse, physician), etc. Therefore, the data cannot fit into more than one category, if that is the case then the chi-square analysis is not appropriate since it can no longer test for independence (McHugh 2013: 144, Zach, 2021). The second assumption involves the sample size. It is assumed that the sample size is sufficiently large, normally over 50. This is because if a chi-square test is conducted on a small sample size, inaccurate inferences may be yielded (Namuth-Covert, Merk, Haines 2021). One final assumption is that the value of the expected cells should be five or more in a minimum of 80% of the cells, and that no cell should have an expected value of less than one (McHugh 2013: 144).

It is also important to keep in mind that the chi-square results allow researchers to test hypotheses about variables and to see whether significant relationships exist. They do not indicate the strength of these relationship. This requires a different statistical test altogether. Therefore, the results only answer the question "is there or is there not a relationship?" and will help prove or disprove hypotheses. For the present analysis, the chi-square test was used to determine the significance of hypotheses developed based on the CA. Results that are deemed significant indicate that the hypotheses are true.

3.7: Summary

Correspondence analysis is a multivariate analysis method that can be used to study mortuary data and uncover hidden patterns which is why it was chosen for this study. CA is applied to a contingency table made up of units and variables, and the data is then projected onto a two-dimensional space where hidden patterns emerge based on the correspondence between these data points. The contingency table for the present study is made up of rows, representing the total tombs used, and columns, representing the different types of variables or grave goods, which is discussed in the following chapter. From there, CA plots the points on a graph and allows patterns to emerge based on the relationships between burials and grave goods. Two hypotheses are then generated, and the chi-square test is used to determine their significance.

Chapter Four

Methodology and Data Description

This chapter introduces and discusses the mortuary data that was collected and used for this study. The first section goes over the criteria required to select the cemeteries and the individual tombs. It also mentions some of the limitations that arose while the data was being selected. Following this is a discussion of the cemeteries and individual burials from Knossos, Mycenae, and Pylos with a presentation of their location, their excavation history, their date of use, the number of burials they contain, and the total number of tombs included in this analysis, as well as why these particular cemeteries and tombs were chosen. The chapter ends with a discussion of the mortuary contexts and variables used to create the database and explains why they were chosen.

4.1: Data Selection

When it came to selecting the tombs for this study there was a particular set of criteria that needed to be met in order to ensure that the CA produced the most accurate results possible. The first criterion was the period in which the tombs were in use. Since this study focused on the MM/MH III-LM/LH IIIA1 periods, only tombs that were in use during those periods were considered. There are some cemeteries that started to be in use during the period of study but that were reused afterwards and contained grave goods from later periods. For example, the Mavro Spelio cemetery began to be in use in MM II and continued in use until LM IIIB. As a results, some of the burials, such as those in Tombs VII and IX, contained LM IIIB pottery sherds. Because these objects do not fall into the period of study, they were not included in the dataset (Forsdyke 1926/27; Preston

2000: 115). The second issue is that of looting. Unfortunately, a large number of tombs, especially those at Mycenae, had been looted prior to their excavation and as a result could not be used because too little of their original contents remained. The problem of looting is related to the final issue involved with the selection process, namely, the number of variables present in each tomb. A list of ten variables, which are groupings of grave goods, was created and each tomb was required to contain four or more variables in order to be selected, as the outcome of the CA conducted on tombs with too few variables resulted in the presence of several outliers, preventing meaningful patterns from emerging (Figure 4.1) (Bølvken et al. 1982: 56; Baxter and Cool 2012: 220). Once all of the criteria were applied, a total of 98 suitable tombs remained, 58 of which are Knossian tombs, 33 of which are tombs from Mycenae, and seven of which are Pylian tombs.

Figure 4.1: An example of a first attempt at a correspondence analysis map with a large number of outliers present, including points 14, 59, 1, 20 etc. and Incense Burners as well.

4.2: Cemeteries

The following sections discuss the cemeteries and individual tombs that were selected for this study based on the criteria above. They are discussed in regard to their location, their excavation history, their date of use, the number of tombs each cemetery contains, and the number of tombs included in this analysis, as well as why they were chosen. The cemeteries have been broken up by location (Knossos, Mycenae, and Pylos) and further organized by their excavation date, to ensure that the data is presented in the most clear and concise way possible.

4.3: Neopalatial and Final Palatial Knossos Cemeteries

The Knossos area was chosen for this study because practically all of the Cretan mortuary evidence for the Final Palatial period, and the majority of the Neopalatial period, is located here (Preston 2000: 112; Preston 2004: 138). There are several cemeteries and isolated tombs scattered across the MM III-LM IIIA1 Knossian mortuary landscape (Figure 4.2), and a total of 58 of them were included in this study. As previously mentioned in Chapter 2, the Final Palatial mortuary landscape saw changes occur in tomb architecture, tomb style, and the grave assemblages. These changes can best be highlighted below by a comparison of the Neopalatial and Final Palatial mortuary landscape.

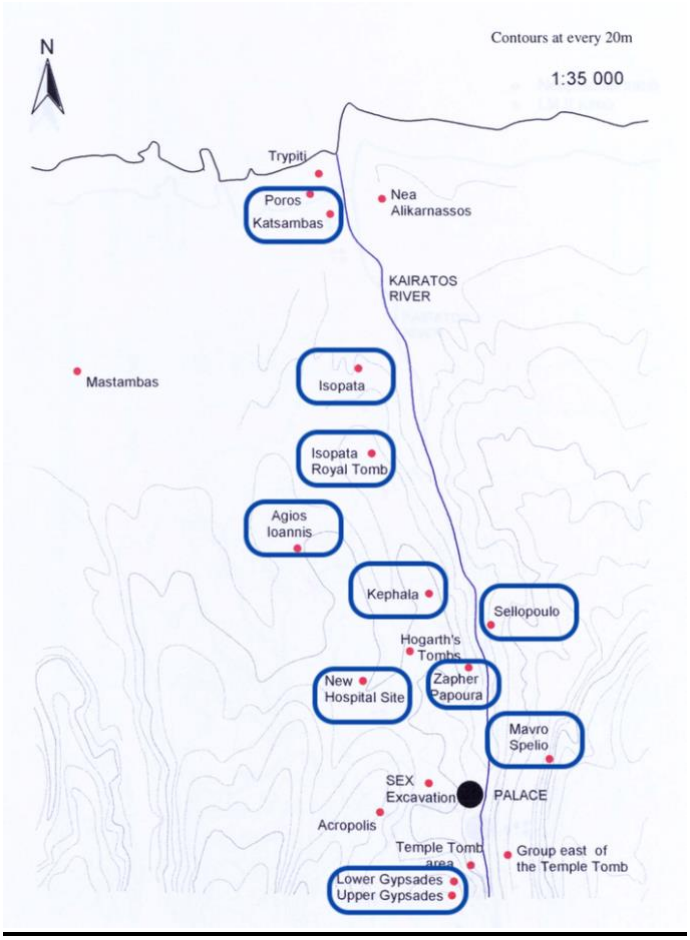

Figure 4.2: Map of the Knossos area, showing all the known excavated cemeteries from both the Neopalatial and Final Palatial periods. The cemeteries that are focused on in this study are circled in blue (after Preston 2000, fig. 4.1).

In the Neopalatial period there is a lack of visibility in burials because of the use of methods that do not result in archaeological recovery. These methods include: unmarked shallow pits, open air exposure, and potential burials at sea (L. Alberti 2004: 128; Preston 2004: 324; Preston 2004: 321; Hatzaki 2012: 309). The burials that were visible appear to have been organized into cemeteries composed of grouped tombs that reflected kinship and family relations. They also had a close association with either the palace or the harbour site based on their close proximity (L. Alberti 2004: 127; Preston 2013: 67). These tombs were mainly large, irregular multi-chamber tombs (Figure 4.3)

with multiple interments and are considered to have been poorer with respect to their grave assemblages, which mostly contained clay pottery and occasional pieces of jewelry worn on the corpse (Preston 2000: 96-98; L. Alberti 2013: 51; Preston 2013: 67). The Poros tombs were an exception, as they contained higher quality grave assemblages composed of ornaments, jewelry, weapons, and even armour (Dimopoulou 1999: 28-29; Preston 2000: 98; Preston 2004: 321). The mortuary picture changed in the Final Palatial period with the appearance of a new mortuary landscape that is characterized by more individual tombs reflecting groups and family affiliations (Hood and de Jong 1952: 246; Preston 2000: 149). The chamber tomb remained the dominant type, but a new form of smaller, single-chambered tomb with a long narrow dromos, single interments, and a wealthier grave assemblage became popular (Figure 4.4) (Hood and Huxley 1958: 196; Preston 2000: 117). The following section discusses the Neopalatial and Final Palatial cemeteries that were selected for this study.

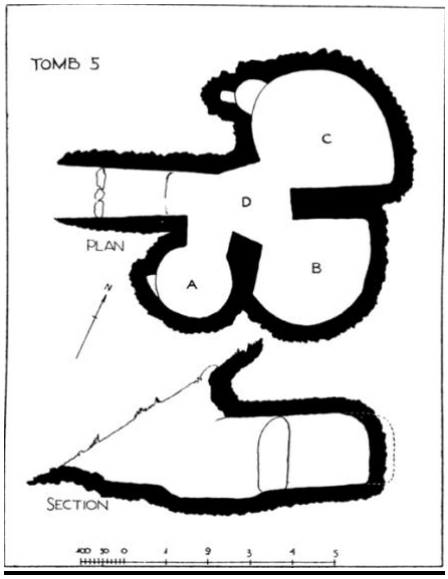

Figure 4.3: Plan and section of Tomb 5 at Mavro Spelio, a multi-chambered tomb with a short dromos dated to the Neopalatial period (Forsdyke 1926/ 1927, fig. 8).

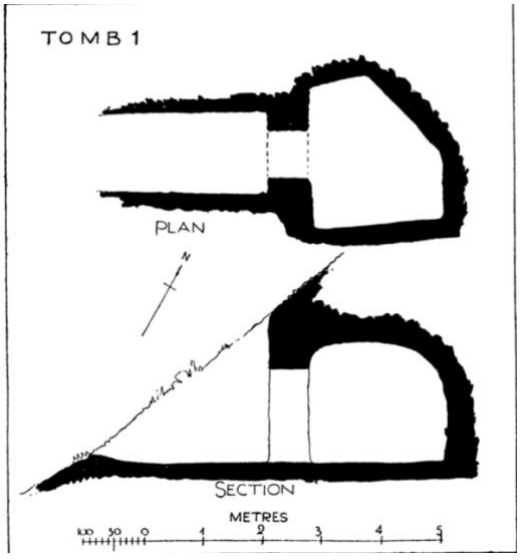

Figure 4.4: Plan and section of Tomb 1 at Mavro Spelio, a small, single chamber tomb with the long, keyhole-shaped dromos dated to the Final Palatial period (Forsdyke 1926/ 1927, fig. 4).

Zafer Papoura (LM IIIA1 – LM IIIB) (1900, 1904)

The largest Final Palatial cemetery at Knossos is located at Zafer Papoura (Figure 4.5), on a hill about 600 m due north of the Palace of Knossos (Evans 1906: 1). In 1900 David George Hogarth discovered eight isolated tombs on the southern side of the hill along a low cliff-edge. Seven of these graves contained only interments from the Geometric period (900-700 BCE), but the shape of their chambers and dromoi made it clear that these tombs had originally been carved in an earlier period (Hogarth 1899/1900: 82; Evans 1906: 1-2). No more tombs were found until 1904, when Sir Arthur Evans renewed explorations in the area and found a large cemetery on the eastern side of the Zafer Papoura hill (Evans 1906: 2). Here he excavated one hundred tombs that included a mixture of chamber tombs, shaft graves, and pit-caves. Unfortunately, 40% of the tombs had been looted prior to excavation, leaving only 18 chamber tombs, 25 shaft graves, and 17 pit-caves as possible candidates for this study. Of the remaining 60 tombs, 15 contained next to nothing, and a large portion of the remaining 45 tombs did not contain four or more variables (Evans 1906). Therefore, only 20 tombs qualified for this analysis. The Zafer Papoura cemetery was used for this study because these tombs provide examples of burials that began to be in use in LM IIIA1 and continued in use until LM IIIB. It thus serves as an illustration of Final Palatial burial customs, as well as an example of tombs that are restricted to LM IIIA1, thereby allowing the Final Palatial burial customs to be broken up into two separate phases, LM II and LM IIIA1. Laura Preston (1999: 132; 2000: 113) argues that the indiscriminate combination of LM II and LM IIIA1 mortuary data remains a problem, as there are differences that exist between the burial customs of each subphase. Since one of the goals of this study was to assess whether there are other ways to interpret traditional explanations of Final Palatial burial

customs, it was important to study both LM II and LM IIIA1 tombs together and separately to discover similarities and differences that exist between them.

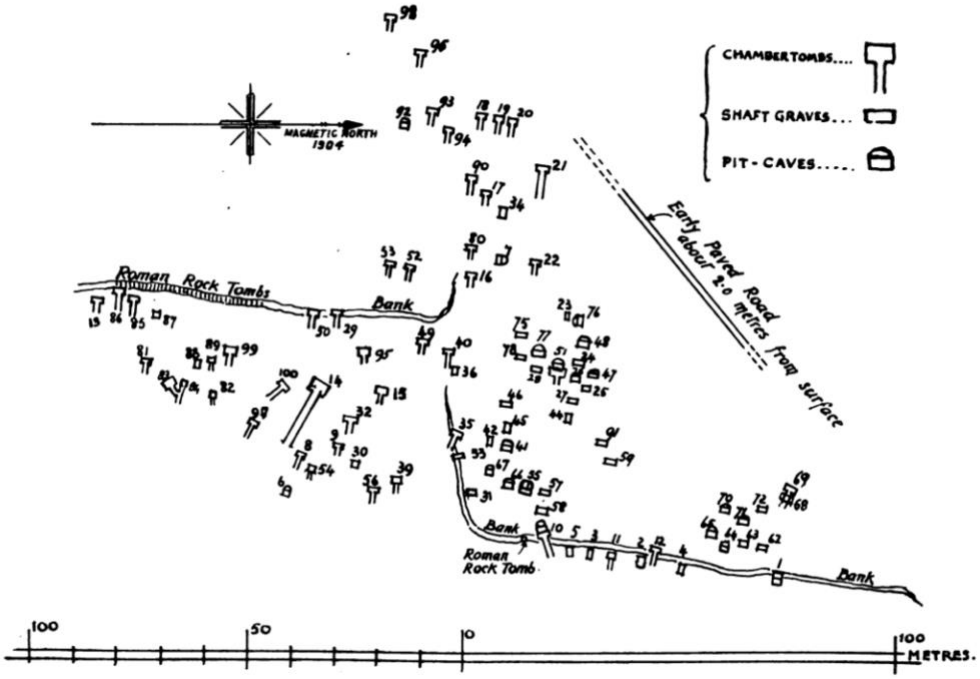

Figure 4.5: Plan of the LM IIIA1 cemetery at Zafer Papoura that was excavated by Arthur Evans in 1906 and held a mixture of chamber tombs, pit caves, and shaft graves (Evans 1906, fig. 108).

Isopata (LM II – LM IIIB) (1904 - 1910)

The Isopata plateau is located 3 km north of the palace and overlooks the harbour town of Poros (Preston 2007: 257). The cemetery was known as early as 1904, when Evans excavated the 'Isopata Royal Tomb' (Figure 4.6) and an adjacent LM II chamber tomb (Evans 1906: 136-72). The remaining tombs were found about half a kilometre further to the north of these tombs, thanks to the discovery of a deposit of material known as the 'Isolated Deposit' (Preston 2007: 257). Two tombs were excavated in 1909, and another six in 1910 by Duncan Mackenzie, but the cemetery and its remains were

published by Evans in 1914.[5] Unfortunately, most of the tombs are no longer visible as they have either been filled in or destroyed, and no plan of the cemetery was created at the time of the excavation, so the exact location of each tomb is difficult to establish (Preston 2007: 258). There are ten tombs in the Isopata cemetery, in addition to the Isopata Royal Tomb, and for this study all tombs except for that represented by the Isolated Deposit were used as the latter did not contain enough variables. For gathering the data, Evan's publications on the Royal Tomb (Evans 1906: 136-172) and on the Isopata cemetery were used (Evans 1914), as well as Laura Preston's 2007 report on the Isopata cemetery because it makes use of the information already published, and additional material from Mackenzie's day books, which was left out of Evans' original publication. The Isopata cemetery was included for two reasons. The first is because these burials are monumental tombs that reflect a mainland influence in terms of their architectural design and rich grave assemblages (Preston 2007: 294). The second reason is that the dates of the Isopata cemetery allow the LM II burials to be studied separately from those in use in LM IIIA1.

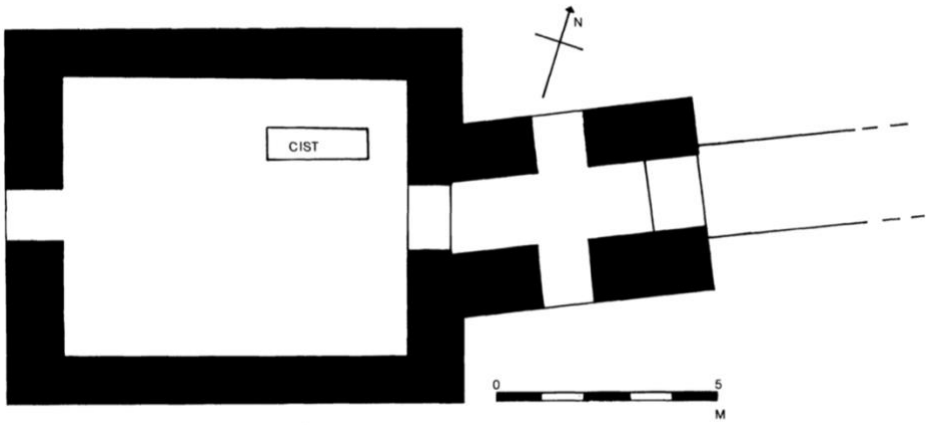

Figure 4.6: Plan of the Isopata Royal Tomb (Evans 1905, pl. xciv).

[5] See *The Tomb of the Double Axes and Associated Group, and Pillar Rooms and Ritual Vessels of the 'Little Palace' at Knossos* for Evans' publication (Evans 1914).

Mavro Spelio (MM II – LM IIIB) (1926-1927)

The cemetery (Figure 4.7) is located on the west slope of Mount Profitis Ailias, along a series of rough terraces (Forsdyke 1926/27: 245). It is situated east of the palace and northwest of the 'Mavro Spelio' (which means Black Cave) (Forsdyke 1926/27: 248; L. Alberti 2013: 47). The tombs at Mavro Spelio were first excavated in 1926 and 1927 by Evans, who discovered six tombs, and then again in 1927 by Edgar J. Forsdyke, who discovered the remaining sixteen tombs and published the cemetery using Evans' notes (Forsdyke, 1926/1927).[6] Of these 22 tombs, ten were used for the current study as the remaining 11 tombs did not contain enough variables. The Mavro Spelio cemetery was first in use during the MM II period and continued to be in use until LM IIIB, although there was a decline in the frequency of burials that took place from LM IB onwards (Cook and Boardman 1954: 166; L. Alberti 2013: 48). Mavro Spelio was an important cemetery to include in this study because, unlike the other Neopalatial cemeteries, it remained in use until the LM IIIB period, thus providing a proper illustration of the changes that occurred between the burial customs over time (L. Alberti 2013: 48)

[6] There is no publication by Evans, but he gave all his notes to Forsdyke to publish (Forsdyke 1926/1927: 243).

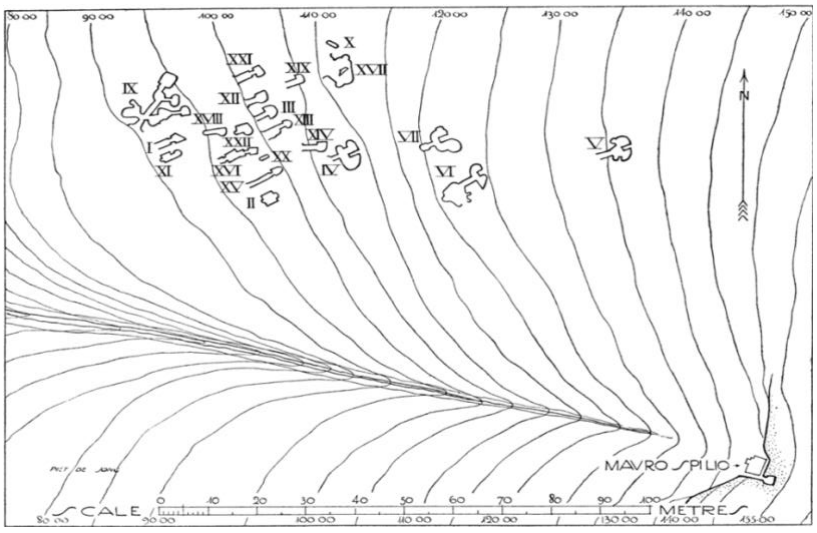

Figure 4.7: Plan of the MM II-LM IIIB Mavro Spelio cemetery (Forsdyke 1926/27, fig. 1).

Hutchinson's Tomb (LM IIIA1) (1940)

The tomb is located south of the Temple Tomb and on the opposite side of the Herakleion-Archanes road (Hutchinson 1956: 68). The small LM IIIA1 chamber tomb was excavated on April 24th, 1940 by Richard W. Hutchinson and Vronwy Fisher, after the discovery of three stone vases (Hutchinson 1956: 68). The tomb was in use during the LM IIIA1 period and was included in this study because of the large number of pottery vessels and bronze weapons that were found in the grave assemblage (Figure 4.8) (Hutchinson 1956; Hood and Smyth 1981: 59; L. Alberti 2004: 129). Burials with a large number of weapons are often considered to have been 'warrior-graves' that housed elite Mycenaeans, they were included in this study so that different interpretations of this specific burial custom could come forth, thereby answering the first research question outlined in Chapter 1.

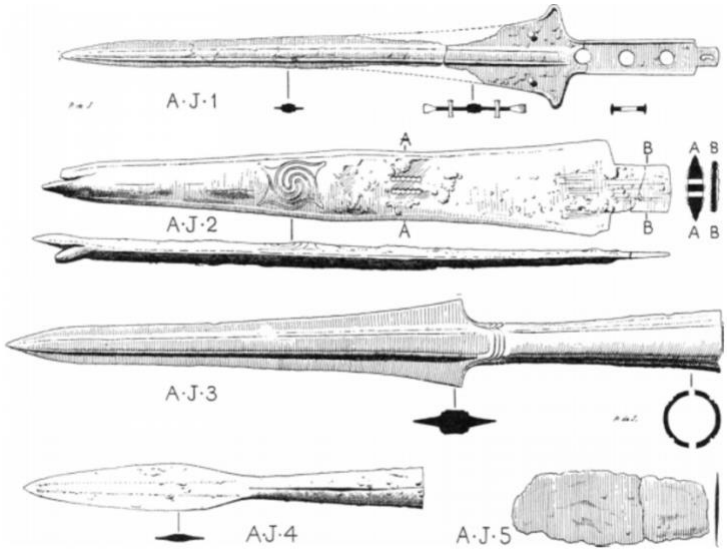

Figure 4.8: An example of the weapons that are a part of the so-called 'warrior grave' assemblage. They include bronze weapons such as spears, swords, and daggers (Hood and de Jong 1952: 262, fig. 8).

Poros (MM IIB – LM II) (1940s and 1960s)

Poros was the main port or harbour town of Knossos (Evans 1921: 298-299). The cemetery is located on a low hill bordering the town on the southwest (Dimopoulou 1999: 27). The cemetery started being used in MM IIB, but its main period of use was MM IIIB-LM IA (Dimopoulou 1999: 28). A total of seven tombs have been discovered and excavated throughout the 1940's to the 1990's by the likes of Nikolaos Platon (1941: 270-271), Angeliki Lembessi (1967: 195-209), James D. Muhly (1992: 27), Iannis. Tzedakis, and Antonis Vassilakis (unpublished), and more recently Nota Dimopoulou (1988; 1994; 1999; 2004). For this study, only three of the tombs were included because information on the other tombs only appears in Greek. The Poros cemetery provides clear evidence for experimentation with mainland ideals in the mortuary context. These tombs and their grave assemblages are similar to those at Mycenae but are not considered as evidence of a Mycenaean presence (Dimopoulou 1999; Preston 2000: 123). Instead, they reflect a

different cultural group that existed at the time of the Neopalatial period whose members utilized different burial customs than the rest of the island.

New Hospital Site (LM II) (1951)

The New Hospital cemetery (Figure 4.9) is located on the south slope of a hill that forms the base of the Ayios Ioannis ridge, a short distance north of a little stream that marks the boundary of the Minoan settlement at its widest extent (Evans 1921: 547; Hood and de Jong 1952: 246). The cemetery was discovered in the spring of 1951 during construction work for a new hospital. The cemetery site was excavated by Sinclair Hood and Piet de Jong on behalf of the British School, revealing three chamber tombs, one shaft grave, and a possible fifth tomb that may have been a pit-cave (Hood and de Jong 1952: 246). The tombs were found scattered in a rough line along the slope of the hill, raising the possibility that they lay beside a path that followed the contour of the hill (Hood and de Jong 1952: 246). All tombs except for the potential pit-cave and the shaft grave were used for this study. Not only were these good examples of LM II chamber tombs, but like Hutchinson's tomb, they were classified by Hood as 'warrior graves' because of the deposition of a large number of weapons and were included in this study as a way to discover different interpretations that challenge the traditional interpretations of these burials with weapons (Hood and de Jong 1952: 243).

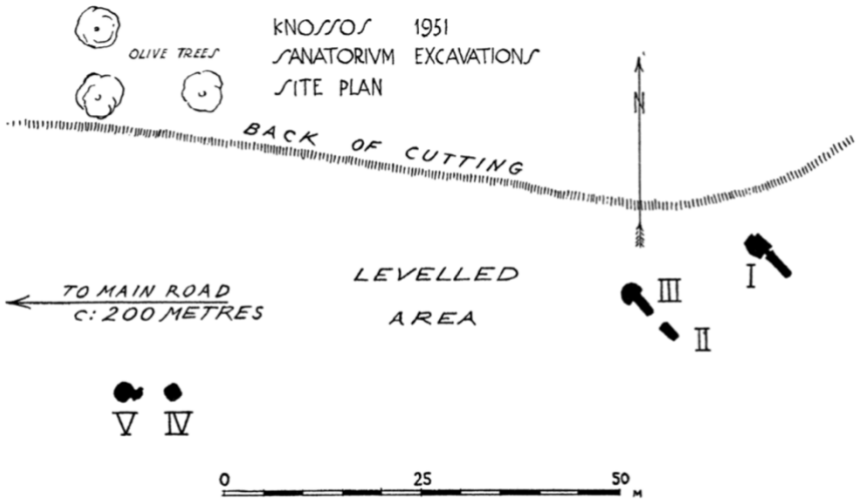

Figure 4.9: Plan of the New Hospital site showing the location of the three tombs (Hood and de Jong 1952: 247, fig. 3).

Katsambas (LM II – LM IIIB) (1953)

The Katsambas necropolis (Figure 4.10) is situated near the presumed site of the harbour relatively close to the palace of Knossos (L. Alberti 2004: 127). It was excavated in 1953 by Stylianos Alexiou, who discovered a total of eight chamber tombs (Alexiou 1967; L. Alberti 2004: 131). Of these eight tombs, two were in use starting in LM I; the remaining six were in use from LM II to LM IIIA1 (L. Alberti 2004: 130). The six tombs that were in use in LM II were used for this analysis because they satisfied all the criteria listed earlier. The Katsambas cemetery itself was selected because it represents the newly changed Final Palatial mortuary sphere, with the smaller, single chamber tombs and rich assemblages of higher quality pottery and jewelry that is argued to have included many mainland parallels (Dimopoulou 1999: 36).

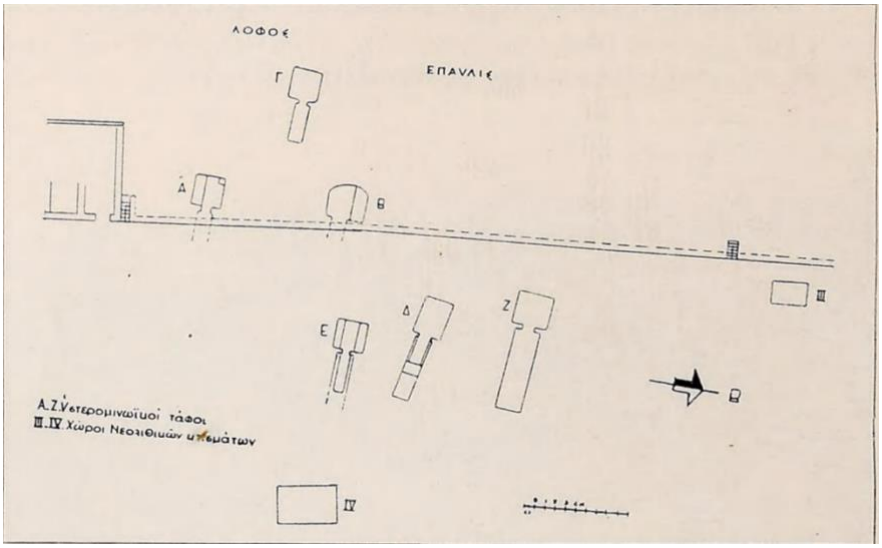

Figure 4.10: Plan of the LM II – LM IIIB cemetery at Katsambas, showing the location of the tombs (Alexiou 1967, fig. 2).

Ayios Ioannis (LM II and LM II – LM IIIA1) (1953 and 1959)

There were two tombs found on the south edge of Ayios Ioannis, which lies between Knossos and Herakleion (Hood and Coldstream 1968: 205). The first tomb (Figure 4.11) was discovered early in the summer of 1953 and was excavated by Sinclair Hood on behalf of the British School at Athens (Hood 1956: 83-84). The second tomb (Figure 4.12) was found in January of 1959 during the excavation of a ditch for a water pipe in connection with an orphanage that was being built. It was excavated over a fortnight in the summer of 1959 by Sinclair Hood and Nicolas Coldstream (Hood and Coldstream 1968). Both tombs date to the LM II period based on the pottery vessels and bronze weapons found in their grave assemblage, but only the second tomb remained in use until LM IIIA1 (Hood 1956: 81; Hood and Coldstream 1968: 209). Both tombs were included because of the high volume of weapons in each grave assemblage, once again presenting an opportunity to explore different interpretations of burials with weapons rather than the traditional explanations.

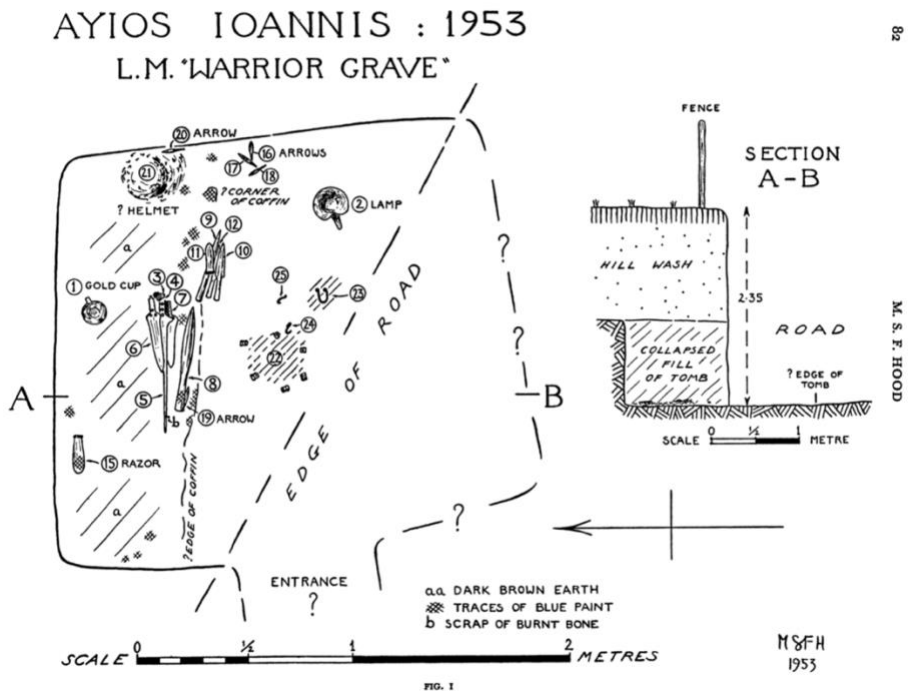

Figure 4.11: Plan and section of the first warrior grave found at Ayios Ioannis, dated to the LM II period (Hood 1956: 82, fig. 1).

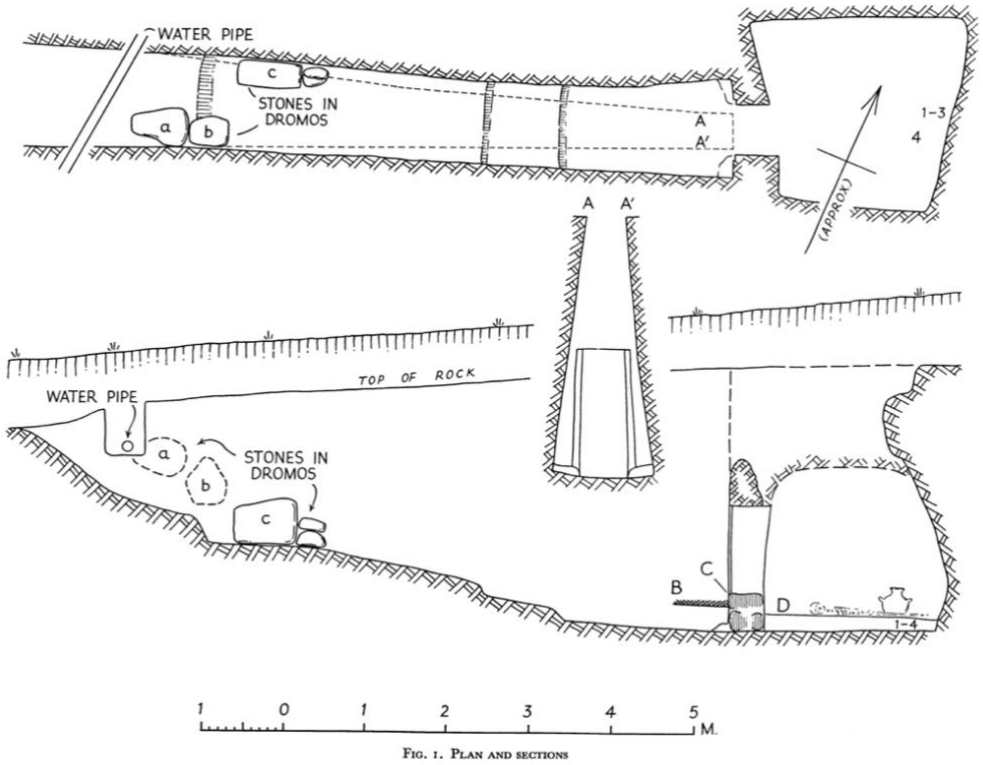

Figure 4.12: Plan and section of the second warrior grave located at Ayios Ioannis, dated to LM II - LM IIIA1 (Hood and Coldstream 1968: 208, fig. 1).

Gypsades (LM IIIA1 – LM IIIB) (1955)

The Gypsades cemetery (Figure 4.13) is located on the northeast slopes of the Upper Gypsades Hill and is situated about one kilometer south of the palace. The existence of LM tombs in this area was first noted by Evans in *The Palace of Minos* (Evans 1921: 547; Hood et al. 1958/59: 194). The site was excavated in August, September and October of 1955 by Sinclair Hood, George Huxley, Nancy Sandars and Alfred E. Werner (Hood et al. 1958/1959), who brought to light a total of nineteen tombs. Of these tombs, eighteen were in use starting in LM III, after the destruction of the LM II palace (around 1400 BCE) (Hood et al. 1958/1959: 195). The other tomb, Tomb XVIII (Figure 4.14), was in use during the MM III period (Hood et al. 1958/1959: 196). Only the latter was included in this study as it dates to the Neopalatial period and provides an example of early MM III burial customs.

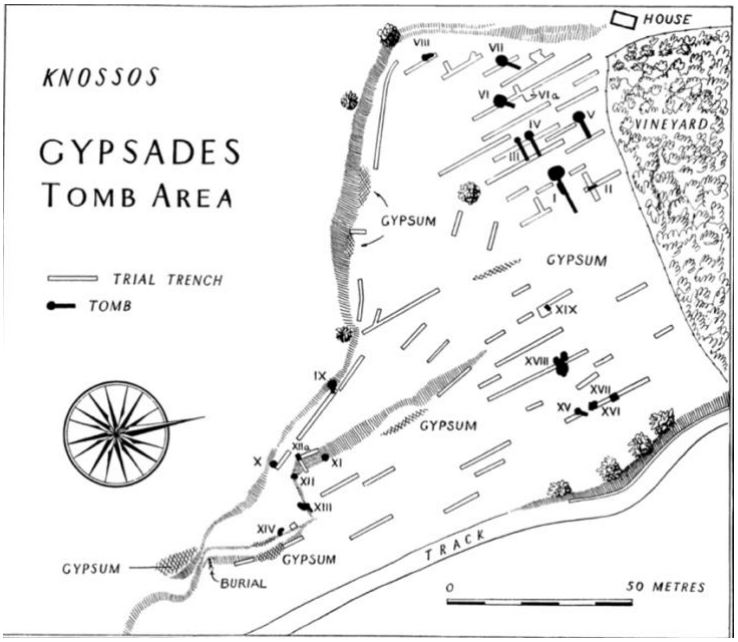

Figure 4.13: Plan of the LM IIIA Gypsades cemetery (Hood et al. 1958/1959: 195, fig. 1).

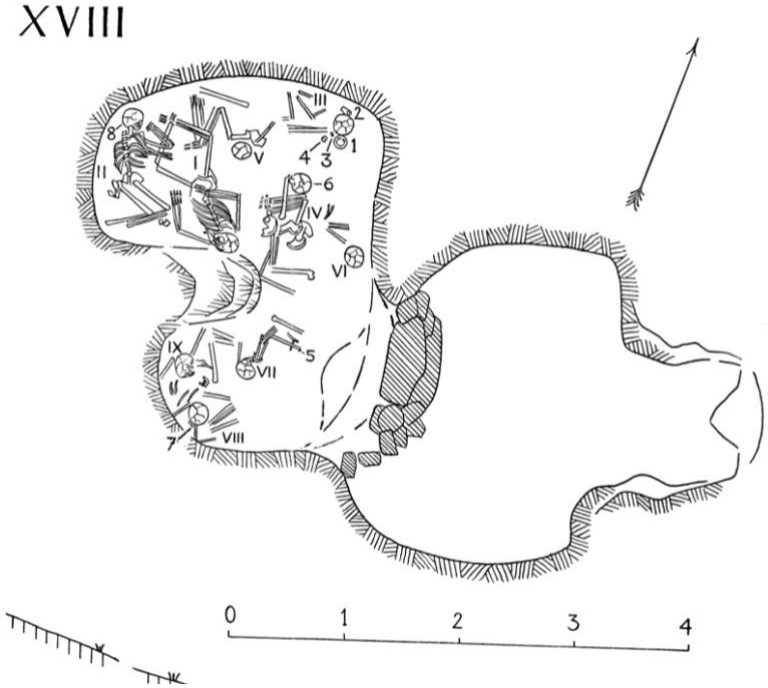

Figure 4.14: Plan of the large kidney shaped MM III Tomb XVIII located in the Gypsades cemetery (Hood et al. 1958/1959: 221, fig. 21).

Kephala Tholos Tomb (LM II – LM IIIB) (1956)

The Kephala tholos tomb (Figures 4.15 and 4.16) is located roughly 1.5 km north of the Palace of Knossos, on a ridge that forms part of a headland running north up the centre of the Knossos valley (Hutchinson 1956: 74; Hood and Smyth 1981: 35; Preston 2005: 61). It was discovered in December of 1938 by the Ephor, Nikolaos Platon. The tomb was then excavated by R. W. Hutchinson in 1956 on behalf of the British School at Athens, with the help of Vincent Desborough and Vronwy Fisher (Hutchinson 1956). The tholos tomb is considered to be a unique example of a mainland style that originated in the Middle Helladic period at Messenia (Voutsaki 1998: 42-43; Fitzsimons 2011: 89-90). Its new appearance at Knossos in the Final Palatial period has led some scholars to suggest a Mycenaean presence or invasion of the island (Owens 1998: 150; Preston 2005: 67; Wiener 2015: 132). The Kephala tholos tomb was included to allow a proper

comparison between the mainland and Knossian tholoi to occur in order to analyze their similarities and differences and allow potential new interpretations to emerge.

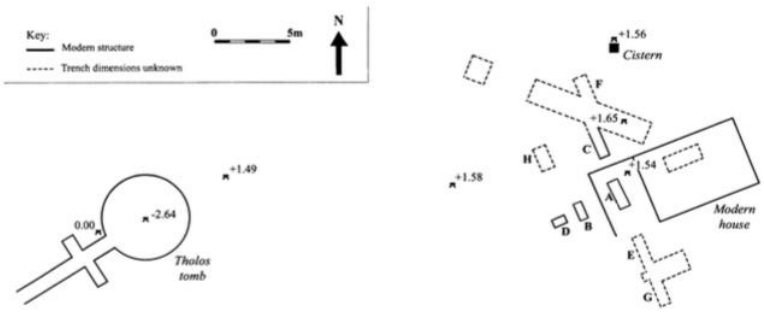

Figure 4.15: Plan of the Kephala area, showing the location of the tholos tomb (Preston 2005: 64, fig. 3)

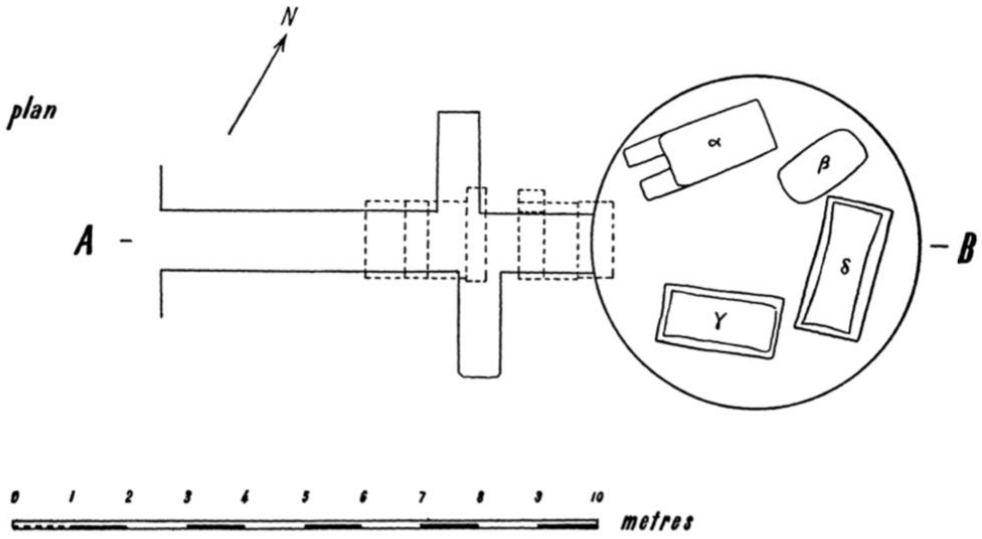

Figure 4.16: Plan of the LM II Kephala tholos tomb (Hutchinson 1956: 75).

Sellopoulo (LM IIIA1 – LM IIIB) (1957)

Sellopoulo is a small village located on the east bank of the river Kairetos, less than two km north of Knossos (Popham, Catling and Catling 1974: 195). The cemetery

(Figure 4.17) was first excavated by David George Hogarth in 1900, when he found what he described as a 'tholos tomb built of small stones' (Popham, Catling and Catling 1974: 195). The tomb was later excavated in 1957 by George Huxley and Nikolaos Platon who revealed two chamber tombs located about 150 metres south of the Sellopoulo village. During subsequent trials in May and June of 1968 another chamber tomb, Tomb 4 was discovered and it was the richest of the five Sellopoulo tombs. For this analysis, Tombs Three and Four were used because of their wealthy grave goods and their inclusion of a large number of weapons. Like Zafer Papoura, the Sellopoulo tombs were in use from LM IIIA1 until LM IIIB. These tombs were again used to analyze the similarities and differences between the LM II and LM IIIA1 burials with the hope of uncovering different interpretations of Final Palatial burial customs.

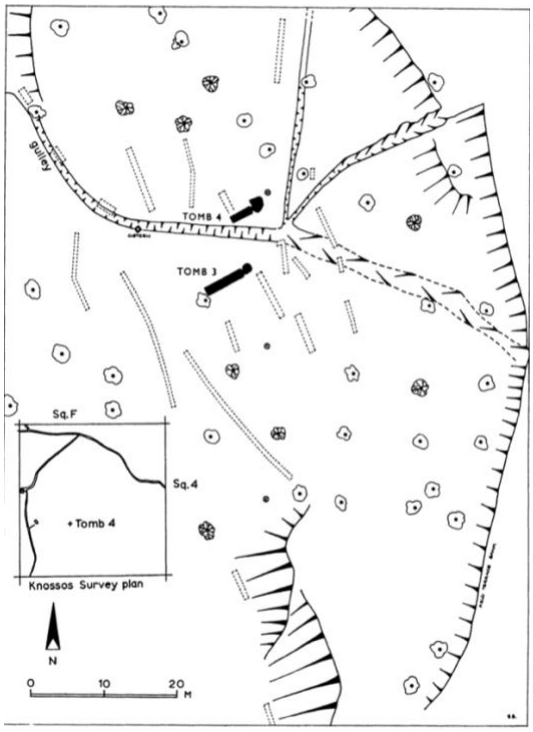

Figure 4.17: Plan of the LM IIIA1 cemetery at Sellopoulo, showing the location of the trial trenches and Tombs 3 and 4 (Popham, Catling and Catling 1974: 197, fig. 1).

4.4: Mycenaean Cemeteries

The site of Mycenae was included in this study because it is their burial customs and assemblages that were introduced to Knossos in LM II-IIIA1, either because of a strong influence or a Mycenaean invasion. Therefore, a proper comparison is needed in order to study the similarities and differences that exist between the Knossian, Pylian, and Mycenaean burial customs (Wiener 2007: 131; Nafplioti 2008: 2308). The Mycenaean mortuary sphere is made up of several cemeteries and isolated tombs. However, a decent number of these tombs have been looted and contain almost no grave goods, which is why only 33 tombs were included in this study. An illustration of the MH III-LH IIIA1 Mycenaean mortuary landscape is discussed below.

The MH III-LH IA period is also known as the Shaft Grave Era, and it is characterized by the sudden appearance of the wealthy shaft graves in Grave Circles A and B at Mycenae (Voutsaki 1995: 58; 1997: 41; 1999: 44). The graves themselves contain multiple interments, and a wealthy grave assemblage that included exotic and lavish grave goods, metal vessels, and a large number of bronze weapons (Voutsaki 1997: 42-43). The remaining mortuary landscape at and around Mycenae is characterized by poorer pit and cist graves (Voutsaki 1995: 58). The mortuary landscape changes in LH II when the distribution of wealth became more spread out across the Argolid (Voutsaki 1995: 58; 1997: 45; Fitzsimons 2011: 89). In the LH II-IIIA1 period we see the abandonment of the shaft graves and the development of a new type of funerary architecture, the tholos tomb, which represents a unique mainland development (Figure 4.18) (Wace et al. 1921-23: 393-397; Fitzsimons 2011: 89). There is also the development of rich single-chamber tombs with long keyhole dromoi, and multiple interments

(Voutsaki 1995: 58; Cavanagh and Mee 1998: 54-55). The next section describes the different cemeteries in use during MH III-LH IIIA1 that were included in this study.

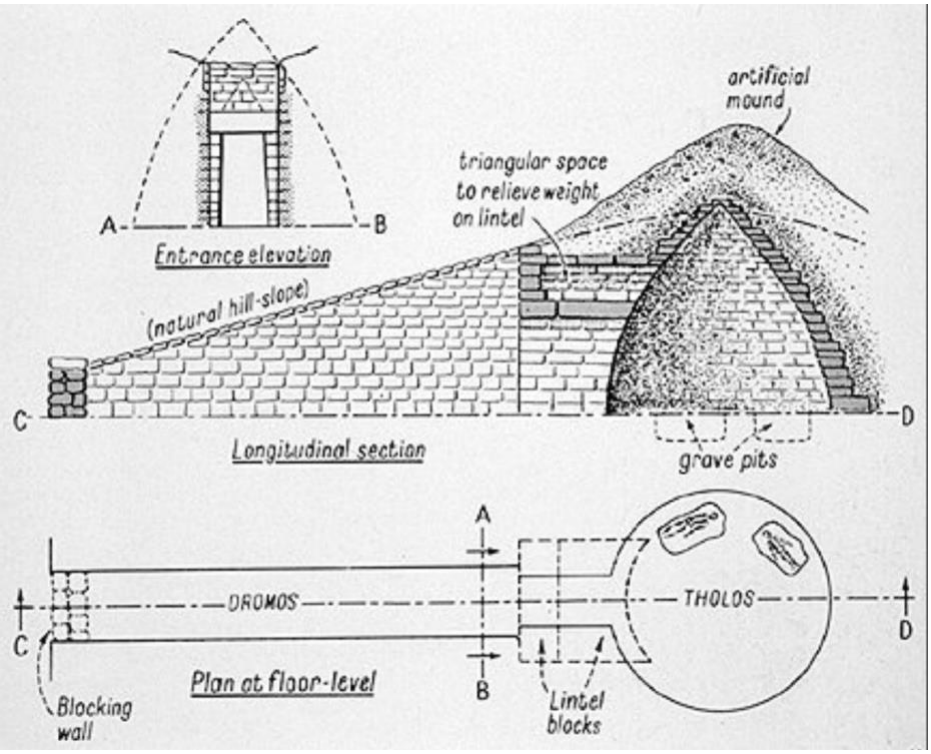

Figure 4.18: Plan and section of a tholos tomb (Brown University).

3rd km Cemetery (LH IIIA1) (1921)

In 1899 Christos Tsountas located a cemetery on the east side of the Panagia ridge in the general area of the 3rd km marker on the carriage road, just south of the Treasury of Atreus (Figure 4.19) (Wace 1932: 3; Shelton 1993: 204). It is named so because of the nearby location to the 3rd km marker. Tsountas discovered three rock-cut chamber tombs on the west side of the carriage road, and Alan J. Wace later discovered three more chamber tombs during his excavation of Mycenae in 1921 (Wace 1932: 3-18). These six tombs all date to the early LH IIIA1 period, but only one tomb, discovered and published by Wace (1932), was used for this study. The other two tombs discovered by Wace did not contain enough variables, and, although Kim Shelton did publish the location of the

three tombs discovered by Tsountas (Shelton 1993: 204), their finds were never published. The 3rd km cemetery provides a good example of an LH IIIA1 Mycenaean chamber tomb, which offered a fair comparison with burials from Final Palatial Knossos.

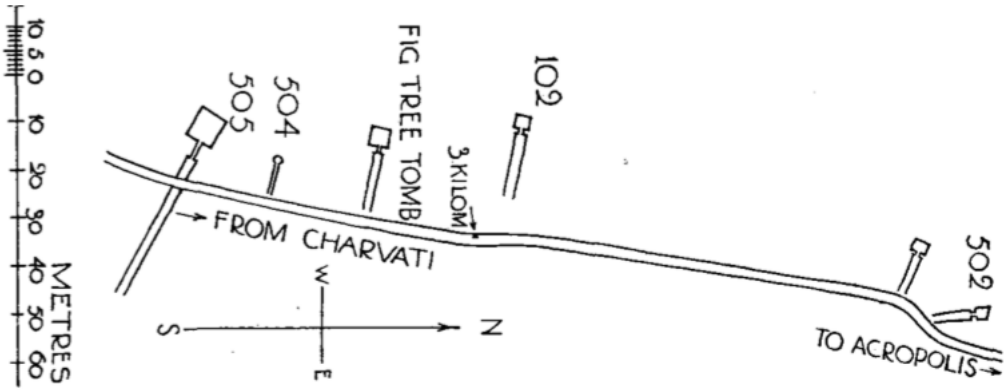

Figure 4.19: Plan of the 3rd km cemetery (Wace 1923: 3, fig. 1).

Prehistoric Cemetery (Early MH – Early LH) (1920-1923)

The Prehistoric Cemetery is located on the hillside outside the Cyclopean Walls and north-west of the Lion Gate (Figure 4.20) (Pakenham-Walsh and Wace 1955), although its exact borders have not been fully established (Fitzsimons 2006: 28). The cemetery was excavated by Schliemann, Tsountas, Wace, and Stamatakis and Papadimitriou while they were excavating Mycenae as new burials within the area were constantly being discovered (Fitzsimons 2006: 28). Several burials were discovered within the Prehistoric Cemetery, including: four cist graves in the area of the Ramp House (Wace et al. 1921-23d: 76, 78, 118; 1949: 61, 65; 1950: 206; 1955b: 190; Mylonas 1957: 124; 1966: 96); a single burial found under the South House (Wace et al. 1921-23d: 94; 1949: 66; 1950: 206; 1955b: 190; Mylonas 1957: 124; 1966: 96); sixteen beneath Rooms 48 and 50 in the House of the Warrior Vase (Wace 1949: 61; 1950: 207; 1951: 254; Mylonas 1957: 124; 1966: 96); a Shaft Grave beneath Room 15 in the Granary

(Wace et al. 1921-23d: 55-58; 1949: 58; 1950: 206; Mylonas 1957: 124; 1966: 96); four cist graves cut into the bedrock under Grave Circle A (Wace 1949: 61; 1950: 206; Wace and Stubbings 1954: 247; Mylonas 1957: 113; 1966: 96); an unspecified number of similar burials discovered around the area of Grave Circle A (Mylonas 1966: 96); thirty-nine pit, cist, and pithos burials comprising the western extension of the cemetery (Wace et al. 1921-23d: 45; 1950: 208-220; 1953: 7-9; Wace et al. 1957); four burials near the Lion Gate (Wace 1956: 106-107); and eight cist graves within the wall encircling Grave Circle B (Mylonas 1966: 98; Fitzsimons 2006: 27-31). Out of all these tombs only one chamber tomb, published by Wace in 1950, was used for this study because it was the only tomb that contained enough variables. Like the previous tomb, it was included as it provides a good representation of an early LH Mycenaean chamber tomb.

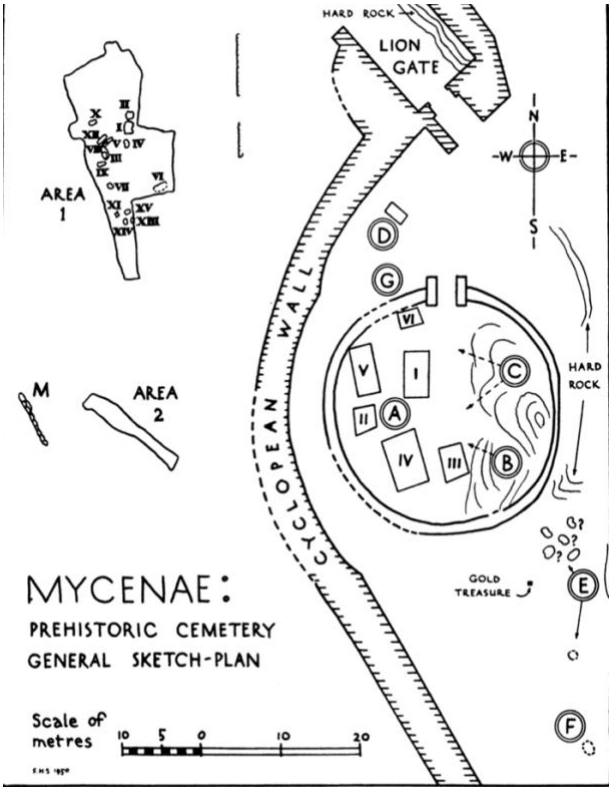

Figure 4.20: Plan of the Prehistoric cemetery, indicating the location of the Lion's Gate, the Cyclopean walls, the Granary, the Grave Circles, and houses (Wace 1950: 205, fig. 1).

Kalkani Cemetery (LH I – LH IIIA1) (1920's)

The Kalkani cemetery (Figure 4.21) consists of two groups of tombs situated on two different ridges that are separated by a small ravine (Wace 1932: 21). Wace and his excavation team decided to group all these tombs together under one single cemetery for the sake of convenience and to avoid the repetition of the tomb names (Wace 1932: 21). The first group of tombs is located on the north bank of the ravine on the ridge called Phourno Diaselo (Wace 1932: 21). The ridge was first explored by Tsountas (Shelton 1993: 205-207), who discovered a small, plundered chamber tomb and two tombs nearby (Wace 1932: 21; Shelton 1993: 205-207). It was later excavated by Wace (1932: 21-120) in 1921, when a total of six LH chamber tombs were found. Wace's attention then turned to the southern ridge called Kalkani, where he discovered fourteen LH chamber tombs. Of these twenty tombs, eighteen were used in the current study; the other two were omitted because they lacked a sufficient number of variables. The Kalkani graves represent a rich chamber tomb cemetery that was in use from as early as LH I until LH IIIA1. These tombs provide a comparison with the Knossian tombs and allow similarities and differences between the burial customs to arise. Some of these tombs also contain a large number of weapons and made for a fair comparison to the so-called Knossian 'warrior graves.'

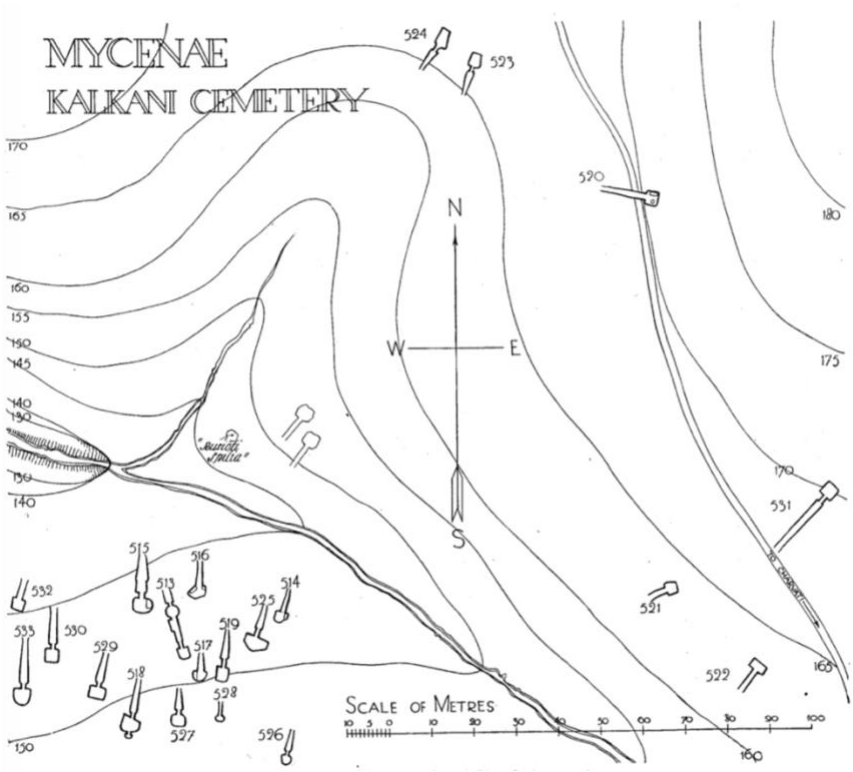

Figure 4.21: Plan of the LH II – IIIA1 Kalkani cemetery including both the North and South ridges (Wace 1932: 20, fig. 9).

Tholos Tombs

The tholos tomb was a new, unique style of burial that started to be in use at Mycenae in the early LH II period, after the abandonment of the shaft graves (Voutsaki 1995: 58; 1997: 45; Fitzsimons 2011: 89). There are a total of nine tholoi located at Mycenae: three are clustered near the entrance to the Acropolis; the Tomb of the Treasury of Atreus, is located near the main road to the citadel; and the remaining five are situated on the opposite side of the Kalkani ridge (Figure 4.22) (Wace et al. 1921-1923: 283). The first six tombs were spotted by early travellers such as Lord Sligo and Lord Elgin (Wace 1921-1922: 283) and were later excavated in the 1870's by Heinrich Schliemann, his wife, and Panagiotis Stamatakis (Wace et al. 1921-23: 282). The remaining three tholoi were found and excavated in 1886, 1887, and 1892 by Tsountas. Of these nine tholos

tombs, only the Cyclopean Tomb (Figure 4.23) and the Tomb of Aegisthus (Figure 4.24) were used for this study because they met all the proper criteria. The remaining seven either do not contain enough variables, or are dated past the period of study. These two tholos tombs were used to compare traditional mainland tholoi with the Kephala tholos tomb at Knossos in order to uncover new ways to understand Mycenaean and Knossian tholos tombs together without attempting to determine which culture built the first tholos tomb and influenced the other could be devised.

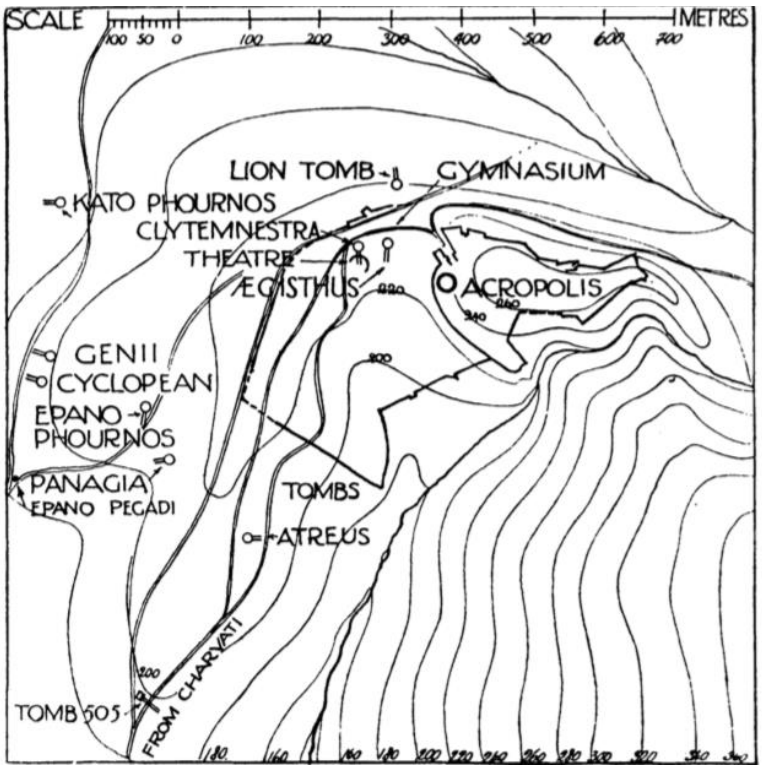

Figure 4.22: Map of the Mycenae area, showing the location of all nine tholos tombs (Wace 1932: 285, fig. 49).

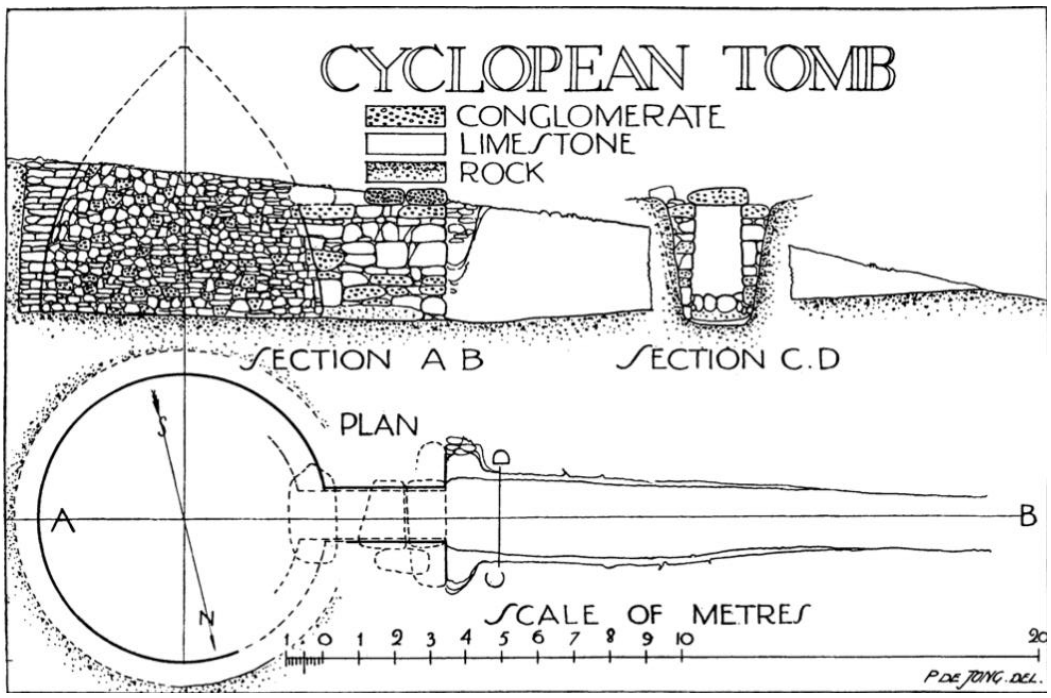

Figure 4.23: Plan and section of the LH II Cyclopean tholos tomb at Mycenae (Wace 1921/22: 288, fig. 50).

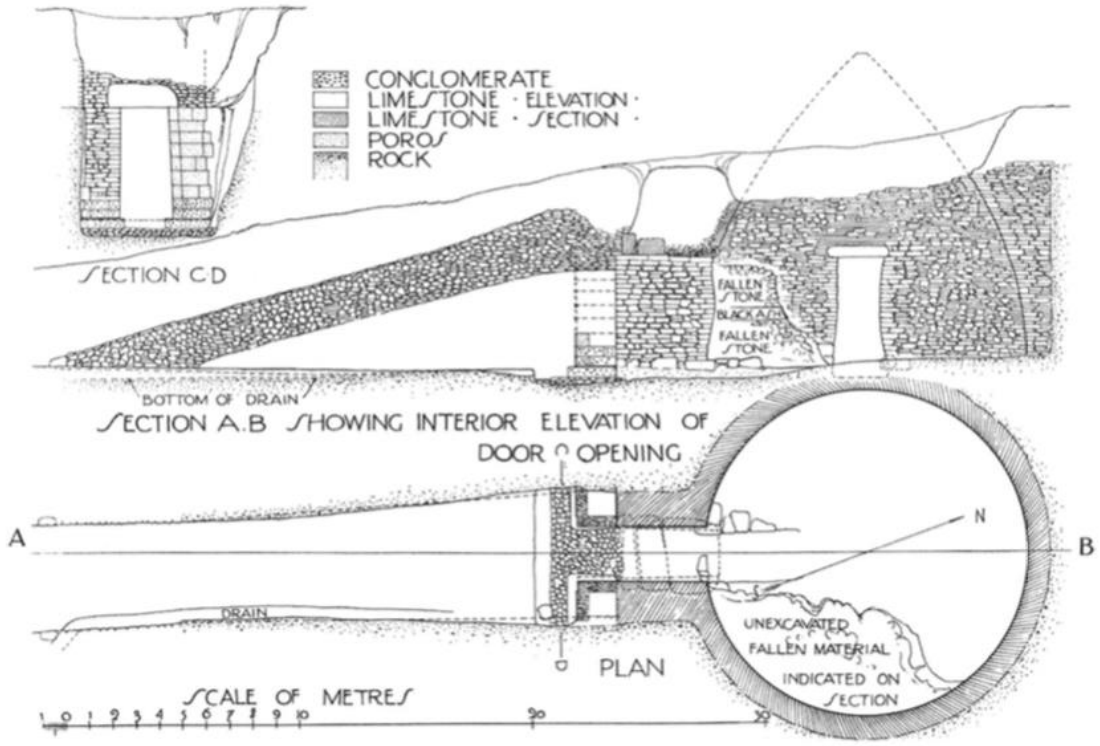

Figure 4.24: Plan and section of the Aegisthus tholos tomb (Galanakis 2007:241, fig. 1).

Grave Circle B (MH III – LH I) (1952)

Grave Circle B (Figure 4.25) is a part of the prehistoric cemetery and lies about 130 m west of the Lion Gate and beside the modern road (Mylonas and Papademetriou 1955: 43; Dickinson 1970: 178). The Grave Circle was enclosed in a wall, which still remains partially intact, that separates it clearly from the rest of the burial area (Dickinson 1970: 177). Grave Circle B was discovered in 1951 when a funerary stele was unearthed during restoration work on the Tomb of Clytemnestra being done by Anastasios Orlandos and E. Stikas (Fitzsimons 2006: 37). Underneath the stele was a shaft grave quite similar to the ones discovered and excavated in Grave Circle A by Henrich Schliemann and Panagiotis Stamatakis in 1876, and so work commenced in the area to find more shaft graves (Mylonas and Papadimitriou 1952: 195; Dickinson 1970: 177; Fitzsimons 2006: 37-40). The burials were excavated from 1952 to 1954 by Georgios Mylonas and Ioannis Papadimitriou, who unearthed a total of twenty-four tombs, of which fourteen were shaft graves and ten were smaller cist graves (Mylonas and Papadimitriou 1952: 200; 1955: 43). Of these twenty-four tombs, only ten were used for this study because they met all the proper criteria; the remaining fourteen contained too few grave goods to be included. An original publication of the finds could not be accessed; therefore, the publication by Søren Dietz (1991) was used, which provided a detailed description of each grave including the number of interments and their placement within the tombs. Grave Circle B was chosen because it contains monumental, wealthy burials and preserves practices that were new and unique to Mycenae in the MH III period (Mylonas and Papademetriou 1952: 200; 1955; Voutsaki 1995; 1997). The Knossian ‘warrior graves’ have been compared to the shaft graves of Grave Circle B because of their wealth and the large number of weapons found in the grave assemblage. Therefore, the inclusion of these

burials was intended to allow for a comparison between mainland and Knossian burials with weapons to see whether the patterns that emerge suggest different interpretations for the ‘warrior graves’.

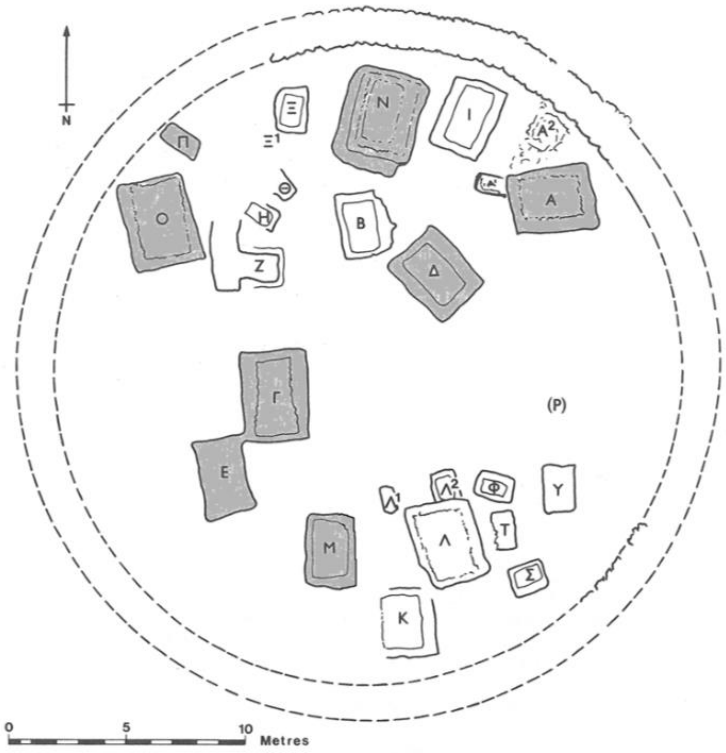

Figure 4.25: Plan of Grave Circle B at Mycenae (Fitzsimons 2011: 89, fig. 5.7).

4.5: Pylos Cemeteries

Pylos is located in the region of Messenia on the hill of Ano Englianos, which is situated nine km northeast of the Bay of Pylos (Figure 4.26) (Blegen and Kourouniotis 1939: 558). Pylos is an important site because of both the longest lived and best-preserved palace, dubbed the Palace of Nestor after the Greek King Nestor from Homer’s poems, and the large number of Linear B documents it contained (Blegen and Kourouniotis 1939: 558; Murphy 2014: 215). It is also the only palace with cemeteries nearby that have been thoroughly excavated using modern methods (Murphy 2014: 209).

Unfortunately, the Pylian burials face a similar issue to those of Final Palatial Knossos, where their burial customs are considered to have been contemporary with Mycenaean burial customs (Murphy 2014: 210). This has led to the problem of the Pylian burials being frequently studied in regard to what they can tell us about Mycenae and its burial customs rather than what they can tell us about the region of Pylos itself (Murphy 2014: 209; Murphy et al 2020: 27). This study aimed at discovering differences between the Mycenaean and the Pylian burial customs in order to elucidate how Pylos established themselves individually from Mycenae through their burial customs.

The MH III-LH IA Pylian mortuary landscape is characterized by the introduction of rich tholos tombs and the appearance of the first poor chamber tombs on the mainland (Voutsaki 1998: 51; Bennet and Galanakis 2005: 2-3). There is also a grave circle present at Pylos that is almost as wealthy as Grave Circles A and B at Mycenae (Murphy et al. 2020: 30). There were no complete pottery vessels found in the grave assemblages but there were several metal vessels and an abundance of bronze weapons and armour. The LH II period is characterized by the appearance of single-chamber tombs containing multiple interments and wealthy grave assemblages (Murphey et al. 2020: 33). There were eleven tombs discovered at Pylos by Carl Blegen and his team in the 1930s, 1950s, and the 1960s, including two tholos tombs, a grave circle, and eight chamber tombs (Blegen et al. 1973). The next section describes each tomb and why they were included in this study.

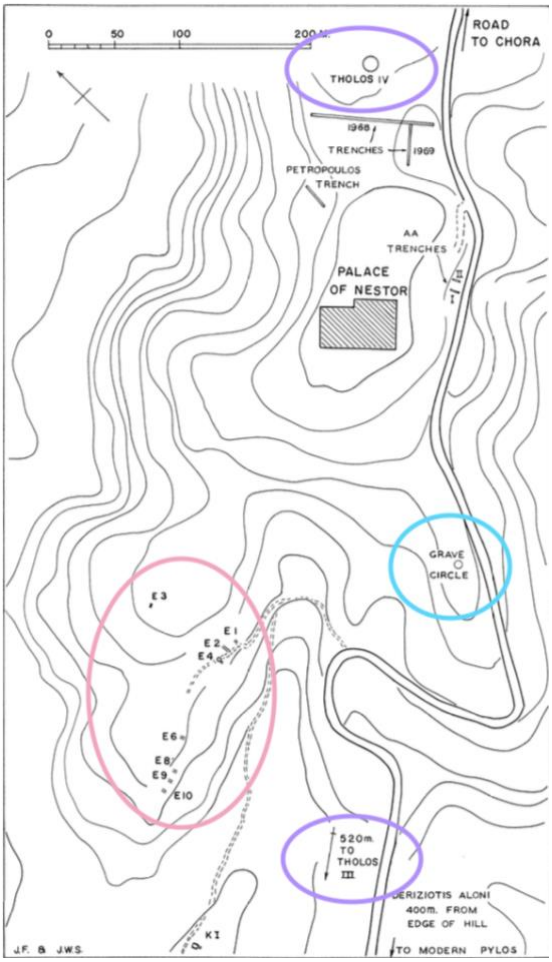

Figure 4.26: Map of the Pylos area showing all the known excavated cemeteries from the MH III – LH IIIA1 periods. The cemeteries that are focused on in this study are circled (after Murphy, Stocker, Davis and Schepartz 2020: 28, fig. 2.1).

Tholos Tombs (MH III – LH IIIA1) (1907, 1950, 1960)

Two tholos tombs have been discovered at Pylos. Tholos III (Figure 4.27) is located about one km southwest of the acropolis of Englianos, the hill on which the Palace of Nestor is located. Tholos IV is located about 145 meters northeast of the Palace and about 70 meters away from the edge of the hill (Figure 4.28) (Blegen et al. 1973: 95). These two tombs were discovered and briefly excavated in 1907 by Wilhelm Dörpfeld and Konstantinos Kourouniotis (Kourouniotis and Blegen 1939: 557). They were later excavated in 1939 by Carl Blegen, his wife Elizabeth Blegen, and Konstantinos

Kourouniotis, but excavations had to be stopped when World War II began (Kourouniotis and Blegen 1939: 557). In the 1950s and 1960s the tholos tombs were finally fully excavated by Carl Blegen, Elizabeth Blegen and Lord William Taylour on behalf of the University of Cincinnati (Blegen et al. 1973: 71-95). Both tholoi were in use beginning in MH III continuing on until LH IIIA and both contained a large number of rich grave goods. These tombs were included in the present study because they provide a good representation of MH II-LH IIIA1 Pylian tombs, and they offer a comparison with both Knossian and Mycenaean tholos tombs. The expectation was that differences between the mainland tholos tombs would arise, implying that those at Pylos were treated differently from those at Mycenae.

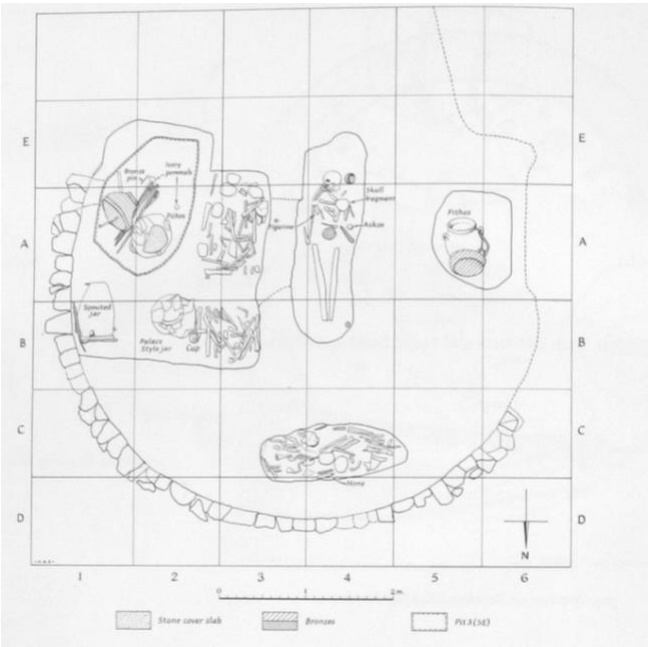

Figure 4.27: Plan of the Grave Circle at Pylos (Blegen et al. 1973, fig. 327).

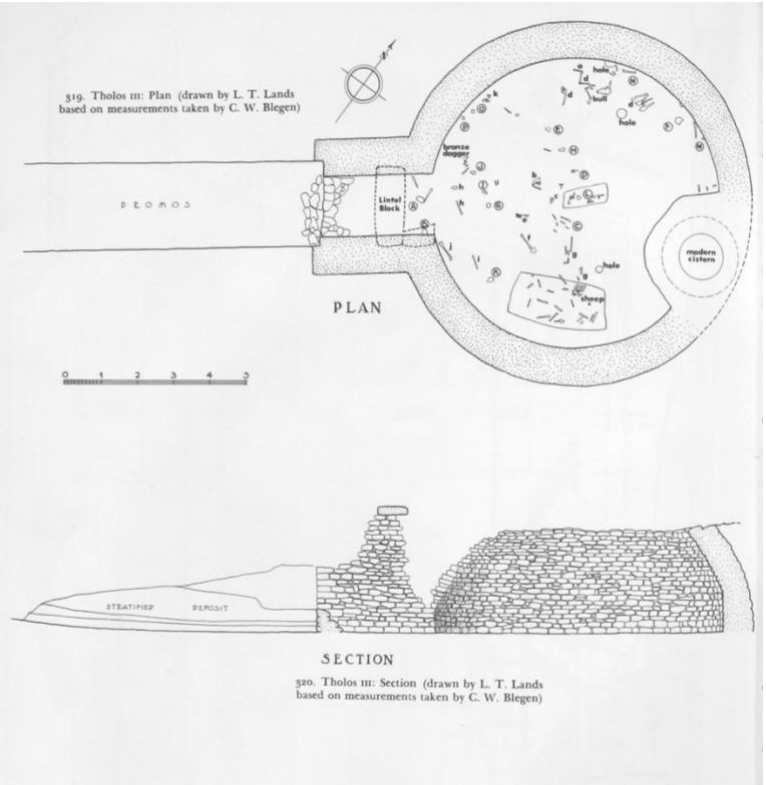

Figure 4.28: Plan and section of Tholos Tomb III at Pylos (Blegen et al. 1973, fig. 319 and 320).

Grave Circle (MH III – LH IIIA1) (1957)

The grave circle is located about 145 meters to the south of the palace and has a nice view of the Bay of Navarino and the island of Sphakteria (Blegen et al. 1973: 134). The grave circle was excavated from May 25th to July 13th in 1957 by Lord William Taylour under the direction of Carl Blegen and the University of Cincinnati (Blegen et al. 1973: 134-176). Four grave-pits were dug and excavated in the circle (Figure 4.29), all of which were included in this study as each yielded a large amount of variables. The Grave Circle pits, much like the tholos tombs, were in use from MH III until LH IIIA. These tombs provide a good example of MH III-LH IIIA mainland burials that can be used for comparison with the Knossian burials. They were also included because they have been

compared to those from Grave Circles A and B at Mycenae based on their wealthy grave assemblages (Murphy 2014) and were then selected as a way to study the similarities and differences between the Grave Circles.

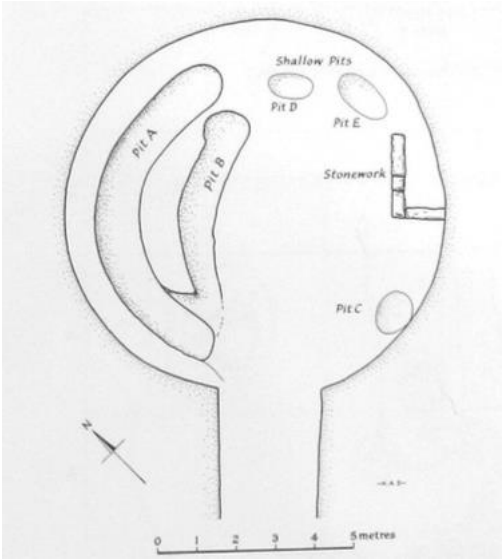

Figure 4.29: Plan of the Pylian Grave Circle pits at Pylos (Blegen et al. 1973, fig. 323).

Chamber Tombs (LH II – III) (1950's and 1960's)

A total of eight chamber tombs were discovered on the south slope of the Englianos hill that formed a sort of cemetery (Blegen et al. 1973: 176-215). These tombs were excavated in the late 1950's and the mid 1960's by William P. Donovan and Lord William Taylour, under the supervision of the University of Cincinnati. Of these eight tombs, Tombs E1 and E2 were not actually complete chamber tombs; they just had a built dromos but had no actual chamber attached. Of the remaining six chamber tombs, only Tombs E8 and E9 (Figures 4.30 and 4.31) were used for this study as they met the proper criteria. Tombs E3 and E10 dated to a time outside of the period of study, and the dates of Tombs E4 and E6 remain questionable. Blegen suggests that they date to the LH III period, but that is far too vague to confidently use for this study (Blegen et al. 1973: 176-

215). As is the case with all other Pylian tombs, the inclusion of these two chamber tombs was intended to provide further comparison between mainland and Knossian burials. It was also used as a way to compare mainland chamber tombs to uncover the similarities or differences between their burial customs.

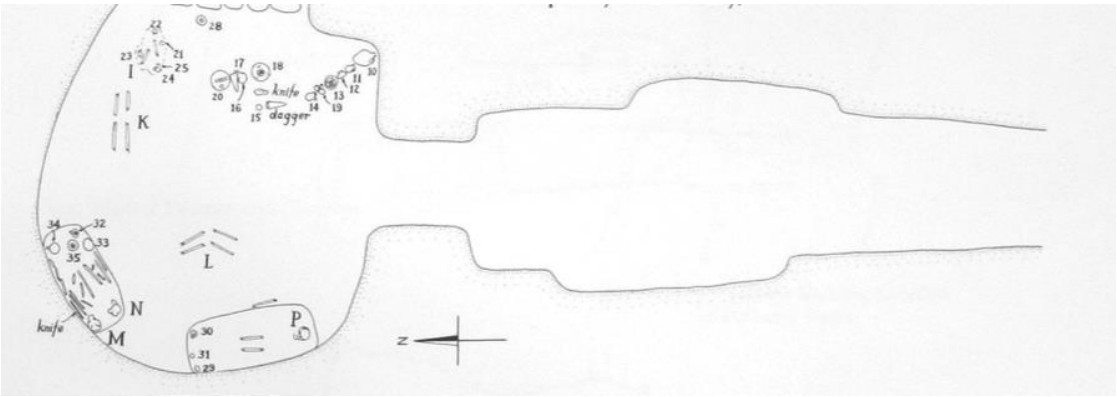

Figure 4.30: Plan of Chamber Tomb E8 at Pylos (Blegen et al. 1973, fig. 340).

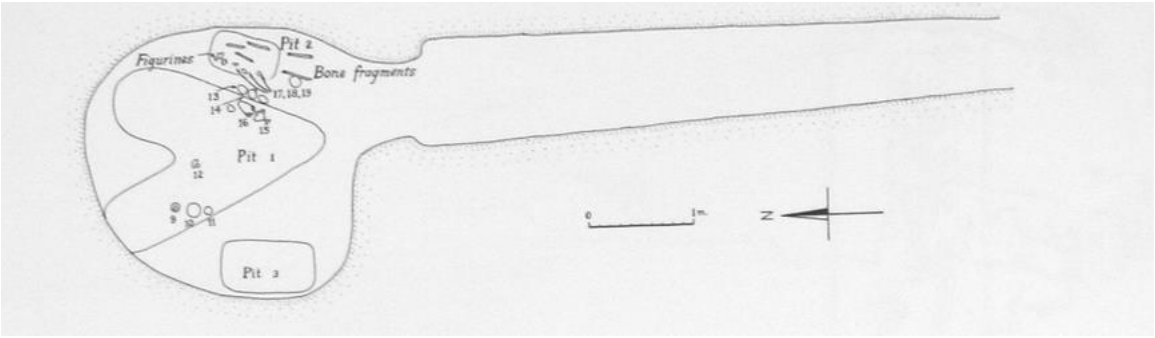

Figure 4.31: Plan of Chamber Tomb E9 at Pylos (Blegen et al. 1973, fig. 341).

4.6: The Data

Once the cemeteries and tombs were selected, the criteria were then applied to the tombs and the data was gathered. Tombs that contained fewer than four variables were omitted in order to reduce the number of outliers. The data table was then created (Table 4.1) and it is made up of two categories, the mortuary context and the variables. The mortuary context is represented by the individual tombs selected from each cemetery, and the variables are the ten different categories that were created to group the grave goods

together. The categories were developed based on the function and use of the artifacts most commonly found in the grave assemblage.

The Mortuary Context

The data used from this study comes from a total of 98 tombs from Knossos, Mycenae, and Pylos (Table 4.1), and includes a mixture of chamber tombs, tholos tombs, shaft graves, and pit-caves. Chamber tombs were used because they were the most popular form of burial starting in LH II on the mainland (Voutsaki 1995: 59; 1997: 44). In the MM III-LM IB period, chamber tombs are the only archaeologically visible burials that were used. Their use continued into LM II-IIIA1, and while they were the most popular form of burial there is more diversity in burial style seen in the Final Palatial period including tholos tombs, and shaft graves. The shaft graves and pit-caves were included in this analysis because they were found in the Grave Circles at both Mycenae and Pylos and were relatively rich and unique in regard to style. These types of burials also appeared in the Zafer Papoura cemetery at Knossos and have been compared to those at Mycenae. Therefore, their inclusion in this study was important in order to see if there were similarities between the types of burials. Tholos tombs at both Knossos and the mainland were included because the style of tomb is commonly used as evidence of Mycenaean influence at Knossos (Brogan, Smith, and Soles 2002; Preston 2005: 68). The true origins of the tholos tombs are unknown, but they did become popular and spread rapidly throughout the mainland during the early LH II period (Voutsaki 1995: 58; Fitzsimons 2011: 89). While using multiple tomb styles may have made the study less comprehensive, as opposed to only focusing on one tomb style, I believe that it was

necessary in order to accurately represent and compare the mortuary spheres of Knossos, Pylos, and Mycenae.

Table 4.1: The Mortuary Context (Tombs Used for the Study)

Cemetery Site	Number of Tombs used in this Study	Number of Tombs in Total
Mavro Spelio	10	22
Poros	3	7
Katsambas	6	8
Kephala Tholos Tomb	1	1
Hutchinson's Tomb	1	1
Gypsades	1	19
Ayios Ioannis	2	2
New Hospital Site	3	5
Isopata	9	11
Zafer Papoura	20	100
Sellopoulo	2	5
3rd km Cemetery	1	6
Kalkani North Bank	6	6
Kalkani South Bank	12	15
Prehistoric Cemetery	1	15
Grave Circle B	10	19
Tholos Tombs	2	9
Pylos	8	14

Total	**98**	**262**

The Variables

There were ten variable categories created for this analysis and they are as listed in Table 4.2. Placing the grave goods into these ten categories was necessary because too many variables can cause the CA to produce problematic results and patterns, an example of which can be seen in Chapter Four by Bølvken et al. (1982) with the Late Stone Age Sites near Iversfjord in Finmark. The categories were chosen based on the grave goods that represent the most common artifacts found in both mainland and Knossian burials and they are discussed below.

There were some issues that arose with selecting different variable categories as some had to be omitted because there was not enough data from all of the tombs and too many absences were produced. For example, the categories of vessels (drinking and pouring, storage, special, and feasting and serving) were originally going to be further separated based on their material (clay, metal, and stone). However, too few tombs contain any vessels made out of stone or metal, which led to the CA results being skewed, with no accurate hypotheses able to be formulated. Another issue that arose was the original separation of the vessels based on their purpose (e.g., drinking vessels, pouring vessels etc.). However, there was not enough of each vessel type present in the assemblages and it caused too many absences and outliers to appear. Therefore, the categories were condensed based on their frequent use.

Table 4.2: List of Variable Categories and their Grave Goods

Category	Grave Goods
Weapons	Arrows, Blades, Daggers, Knives, Spearheads, Swords
Armour	Boar's Tusks Helmets, Figure of eight shield
Figurines	Terracotta Females and Animals
Grooming	Combs, Mirror, Razors, Tweezers
Ornaments and Objects of Personal Adornment	Belts, Bracelets, Earrings, Fibulae/Pins, Foil, Gems, Hair Spirals, Necklaces, Pendants, Rings, Sealstones
Items of Manufacture	Needles, Spindle Whorls, Spools
Special Vessels	Askoi, Bird's Nest Bowls, Braziers, Censers, Incense Burners, Lamps, Rhyta,
Drinking and Pouring Vessels	Bridge-Spouted Jars, Conical Cups, Cups, Deep Bowls, Ephyraean Goblet, Ewer's, Flasks, Goblets, Krater, Kylix
Feasting and Serving Vessels	Basins, Bowls, Cauldrons, Saucers, Ladles, Spoons, Tripods
Storage Vessels	Alabastra, Amphora, Hydriae, Pithoi, Stirrup Jars

Weapons

This category includes typical 'warrior' weapons such as swords and spearheads, arrowheads, and knives, whose purpose and function remains unclear but were most likely related to hunting (Driessen and Macdonald 1984: 56). In some tombs only parts of weapons were uncovered, such as pommels and blades; these items have been included

because they still provide evidence that weapons were present in the tomb (Wace 1932: 187 and 220). The presence of a large number of weapons is often used to determine whether a burial is a so-called 'warrior grave' or not. At Knossos, these types of burials are often argued to represent mainland customs and their assemblages are compared to those elite warrior graves seen in the early shaft graves at Mycenae (Hood 1956: 81; Preston 1999: 132; Nafplioti 2008: 2308). However, these weapons may have been used in the mortuary sphere for other purposes such as the expression of prestige and status (Wace 1932: 142; Harrell 2014: 15).

Armour

This category includes boar's tusks, which would have been used as a part of boar's tusk helmets with leather straps, and figure-of-eight shields, which are only present in one or two tombs used in this study (Georganas 2012: 3). Armour was typically found in the wealthy tombs alongside weapons. It has been suggested that they were used by elites who wanted to portray a warrior ideology (Härke 1990: 25; Georganas 2018: 191).

Figurines

This category is made up of figurines of females and animals mostly made out of terracotta clay. These are the most common types of figurines and were first made known by Henrich Schliemann while he was excavating Mycenae (Wace 1932: 215). Figurines were mostly found at Mycenae and Tsountas noted that they were mainly found in the poorer tombs (French 1971: 107). Interpretations as to the use of these figurines varies: Blegen, who excavated Prosymna and found a number of female figurines, thought them

to be representations of nurses who cared for the children or toys, because they were mostly found in children's burials (Blegen 1937: 55, 256). Mylonas (1966: 114) further observed the correlations between children's burials and figurines, but he insisted that the female figurines had a strictly religious purpose and that they, along with animals, were placed in children's graves to protect them (French 1971: 108). Votive offerings and objects with religious meanings are also popular explanations offered for the presence of figurines in burials, especially at Knossos, where these figurines were infrequently found in graves (Olsen 1998: 387). They were possibly used as a way to designate ritual sites, such as peak sanctuaries, because the female figurine is thought to represent a goddess who was worshipped on Crete (French 1971; Adams 2004: 32).

Grooming

This category includes items that are used for grooming and self-image, including mirrors, combs, razors, and tweezers. These items were used for bodily modifications as part of the preparation of the corpse ritual (Boyd 2002: 73). In social terms these grave goods express the high status of the deceased (Paschalidis 2012: 548). Some grooming items, particularly mirrors, have also been linked to the deposition of females (Paschalidis 2012: 552).

Ornaments and Objects of Personal Adornment

This category includes any object that is associated with personal and bodily adornment. Jewelry, such as necklaces, earrings, and bracelets, which were often worn on the body, and parts of clothing, such as belts, fibulae, and ornaments for the head such as

gold diadems. Sealstones have also been included in the jewelry category because they were sometimes worn on the wrists and as rings, as suggested by frescoes (Molloy 2012: 100; Verduci and Davis 2015: 59). While this category is split into groups of functional and personal ornaments, they are all different forms of adornment of the body. Jewelry and clothing adorned both the male and female body and were used to accentuate and obscure certain body parts (Adams 2013: 3 and 16). These objects may represent the process of preparing the corpse for burial by dressing and adorning the body (Boyd 2002: 31), or they may be a way of displaying wealth and status (Younger 1992: 268).

Manufacture

Items used for the manufacturing of clothes and textiles includes needles, spindle whorls, and pins (Nosch 2012: 43). These items were typically found in both male and female burials, as both men and women participated in the production of textiles either at home or in the palace-organized centre (Gleba 2009; Nosch 2012: 50). These items may be determinant of the deceased's profession in life, or they may have been offerings given to the deceased to use in the afterlife (Gleba 2009).

Special Vessels

This category includes items and vessels that may have been used for other rituals or were rare within the mortuary sphere. First there are lamps, braziers, and incense burners, which may have been used as sources of light in the tomb or in a ritual of cleansing the tomb before a new interment was deposited (Georgiou 1979: 435). However, not all or even the majority of the burials with multiple interments contain

remnants of burning vessels. This has led some to believe that they were religious object, and that since the objects used for burning were left in the tomb, they must have been intended for use in the afterlife as new objects (Georgiou 1979: 435). Rhyta are also a part of this category as they are considered to have been ritual vessels, such as the bull's head rhyton in Tomb 2 at Isopata (Stubbings 1947: 55), where it may have been an element of Cretan cult paraphernalia (Preston 1999: 137). The askos, which is a closed globular jar with an oblique spout to one side and a handle attached (Stubbings 1947: 52), has been included because it is a vessel that is rare among Minoan and Mycenaean pottery. Censers have also been included for the same reason.

Drinking and Pouring Vessels

These two categories have been combined because they often are found together and supposedly functioned together during the performance of a drinking ritual (Hamilakis 1998: 313; Boyd 2002: 79). Vessels in this category include cups, goblets, and kylikes, whose use was intended for the drinking of liquids (Tournavitou 1992: 210). Pouring vessels included jugs and jars, whose use was for temporarily storing liquids and then pouring them into the drinking vessels (Tournavitou 1992: 210). Both types of pottery are quite commonly found in the funerary landscape and could represent drinking rituals that took place before or after the burial (Boyd 2002: 79).

Feasting and Serving Vessels

This category combines vessels used for serving and those used for preparing food together, which includes bowls, but not deep bowls, as those were used more for drinking

and eating out of (Tournavitou 1992: 199), tripod cauldrons, saucers, ladles, and basins. The placement of these vessels in tombs suggests that feasting rituals may have occurred either before or after the burial (Boyd 2002: 30). Dabney, Halstead, and Thomas (2004: 202) suggest that oftentimes drinking and feasting vessels appear in the grave assemblage together and that vessels such as cups and kylikes were a part of these feasting rituals. Of course this may not always be the case which is why these categories are separate.

Storage Vessels

This category includes vessels such as stirrup jars, amphorae, hydriae, and alabastra. These vessels were used to hold these goods for both trade and transport, and domestic use (Tournavitou 1992: 210). In funerary context these vessels may have held wine which could have been drunk during a ceremony for the deceased (Boyd 2002: 76; Tournavitou 1992: 210).

4.7: Summary

This chapter presented the completed database which is made up of two columns: mortuary contexts and variables. The mortuary context consists of the 98 tombs from Knossos, Pylos, and Mycenae that were chosen because they met all the criteria listed at the beginning of this chapter: the tombs were in use during the period of study (MM/MH III-LM/LH IIIA1); and their grave assemblages contains four or more variables so as to avoid outliers. The variables consist of the most commonly found grave goods and were organized into ten categories to avoid any outliers. The following chapters applies the CA to this data table and analyzes and discusses the results that were produced.

Chapter Five

Results of the Correspondence Analysis and the Chi-Square Test

The purpose of this chapter is to discuss the results that were produced by the CA and the chi-square tests. The CA analysis was implemented in R version 2.4 using the function 'ca' in the package 'FactoMineR' and was run using the contingency table that is comprised of the mortuary context (tombs) and variables created in Chapter 4 (Table 4.2). The first section outlines and discusses the three different factor maps produced by the CA: the map relating to the mortuary context, the map relating to the variables, and the superimposed map that plotted all the points together onto a two-dimensional plane. The next section outlines the two hypotheses that were generated based on the patterns that emerged from the factor maps, followed by the results of the chi-square tests and a discussion of the significance of both hypotheses.

5.1: CA Factor Maps

As previously mentioned in Chapter 3, CA works by reducing a data table into two factor maps. The first map represents the mortuary context, which in this case are the 98 tombs that were selected for this study, and the second map represents the ten variable categories that were created based on the grave goods most likely to appear in the grave assemblages (Baxter and Cool 2010: 212). These two maps are then superimposed and viewed together on a two-dimensional plane where clusters and hidden patterns emerge based on the correspondence between the tomb and variable points (Clause 1999: 97; Baxter and Cool 2010: 212). In order to understand how the points correspond to one

another and how clusters and hypotheses were generated, all three Factor Maps are discussed independently below, beginning with the mortuary context.

Factor Maps – Mortuary Context (Tombs)

Chart 1, which plots the mortuary data, presents a total of fourteen different clusters was created in R version 2.4 using the function 'HCPC' in the package 'FactoMineR'. This is a complementary analysis known as Hierarchical Clustering (HC from now on) (Greenacre 2004: 25). HC creates a hierarchy of clusters based on the successive clustering and reclustering of data points and presents the data in an easy-to-read dendrogram or tree diagram (Bailey 1975: 76-77; Boehmke and Greenwell 2020). There are two methods of HC: agglomerative clustering (HAC) and divisive clustering (HDC). HAC, also known as the top-down method, starts by treating each data point as a single cluster and at each iteration, the two most similar clusters are joined together until one large group containing all data points remains (Figure 5.1) (Kassambara 2019; Kumar 2020). HDC, or the bottom-up method, is the inverse of HAC, where all the data points start in one large group and at each iteration the most diverse cluster is divided into two separate clusters, until all the data points are in their own individual clusters (Figure 5.1) (Kassambara 2019; Kumar 2020). In other words, HAC merges the data points together into one group, while HDC splits them up into individual groups. HAC was used for this study because it is the most common and least complex method of the two (Kassambara 2019). Both methods produce results in the form of a dendrogram; however, HC does not determine how many clusters there will be. Therefore, it is up to the user to cut the tree into appropriate sub-groups that best explain and organize the data being analyzed (Kimes

et al. 2017: 812; Kassambara 2019; Boehmke and Greenwell 2020). The dendrogram for this study illustrated in Charts 2 and 3 was cut in a way that identified a total of fourteen clusters.

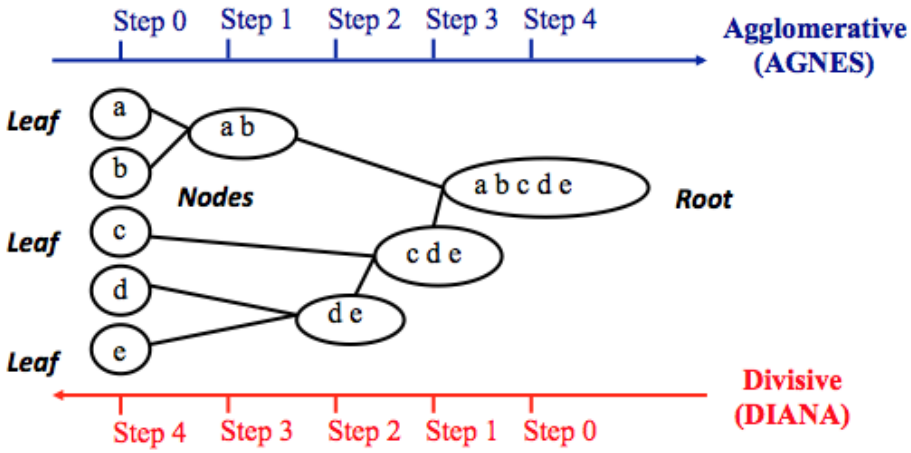

Figure 5.1: An illustration showing how HAC and HDC work to create clusters. HAC follows the blue steps, and illustrates the nodes starting out as individual groups and ending in one giant cluster. On the other hand, HDC follows the red steps and illustrates the nodes starting out in one whole group and ending in individual clusters.

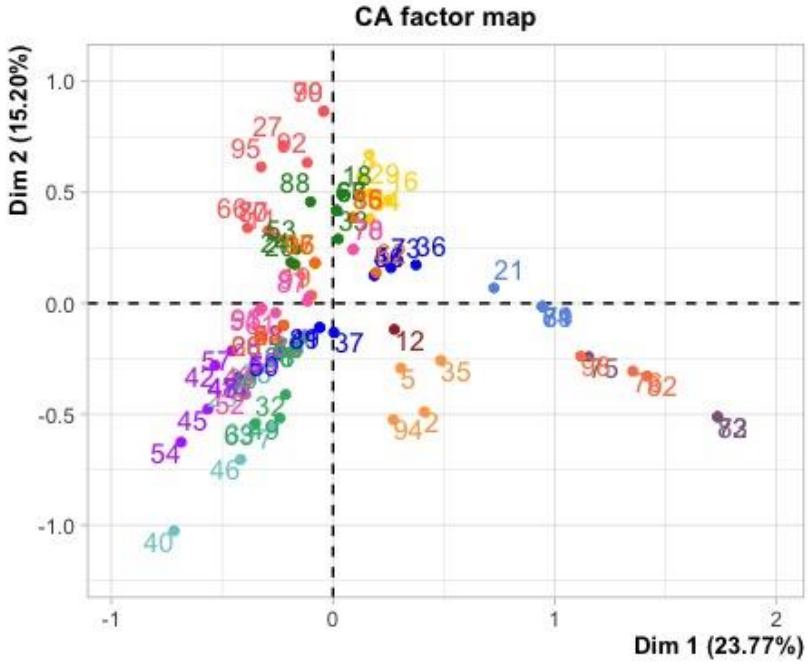

Chart 1: A colour coded factor map showing only the tombs used for the Correspondence Analysis. Each colour signifies a different cluster out of the 14 that formed (see the legend on Chart 6). The location of the points (tombs) on the map was determined by the presence/absence of variables in the individual tombs. The numbers presented on the map indicate the unit number found in Appendix I and not the actual tomb number.

These fourteen clusters formed based on the presence and absence of the ten variable categories within each tomb's grave assemblage. However, the variables alone are not enough to explain why the tombs clustered the way that they did. External factors such as the tomb style and architecture, the wealth of the grave assemblages, the tomb's date of use, and the region and location of the cemetery were all taken into consideration. The number of interments within a tomb was occasionally considered; however, this information is not available for all the tombs used in this study, particularly the tombs from the Isopata cemetery, and thus, could not always be included. All other external factors mentioned above were considered along with the presence and absence of the ten variables.

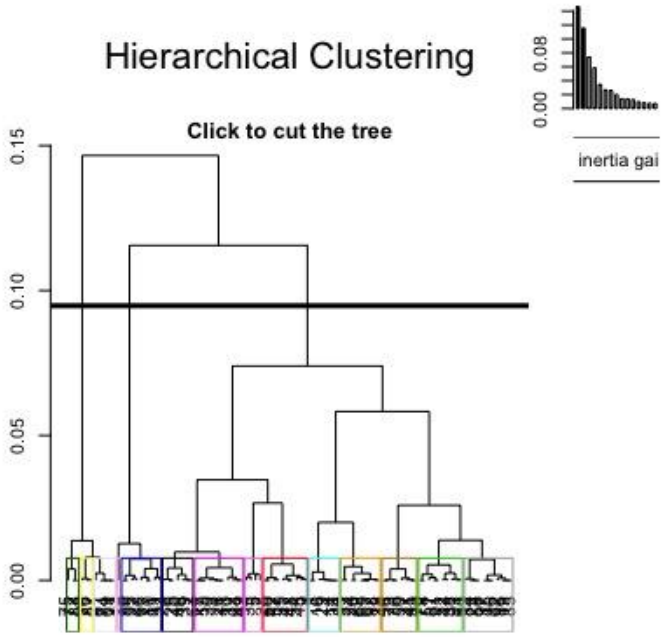

Chart 2: Chart showing the Hierarchical Agglomerative Clustering of the tombs in this study. The clusters on this tree are the same ones that are presented on the Chart 1 factor map. The coloured boxes represent the 14 different clusters that formed, with Cluster 1 on the far left hand side and Cluster 14 on the far right hand side (see legend).

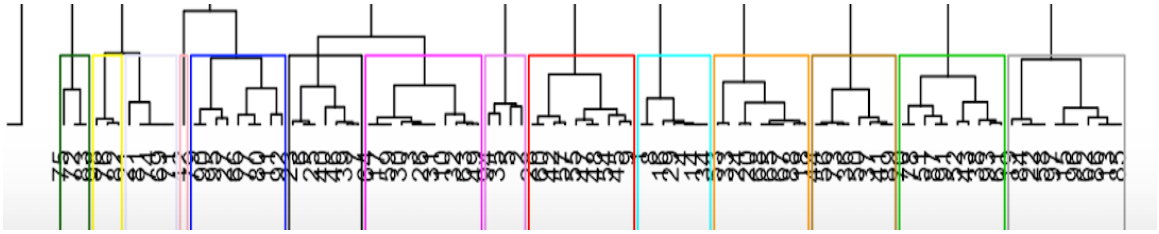

Chart 3: A closer look at the clusters that formed through HAC, where each number in a cluster corresponds to the tomb unit.

Cluster 1 is composed of three LH II-LH IIIA1 Mycenaean single-chamber tombs: KN 522, KN 531, and KS 527, which are all located in the Kalkani cemetery. These tombs have multiple interments, a long narrow dromos, and a pit or cist cut into the floor of the tomb. Their grave assemblages contain drinking and pouring vessels, storage vessels, and terracotta figurines, with Tomb KN 531 containing an ox figurine, and Tombs KN 522 and KS 527 containing both oxen and female figurines. The figurines may have been deposited in these LH II-IIIA1 Kalkani chamber tombs because according to Tsountas (1888: 167), figurines were more commonly found in the poorer tombs, which he describes as ones only containing pottery vessels, like these three tombs. There are several theories suggesting what the deposition of figurines could represent, that were briefly discussed in Chapter 4. The first theory, suggested by Blegen (1937: 255-6) and Mylonas (1966: 115), was that figurines were buried with children as either toys or as a form of protection (French 1971: 108). However, this theory may not apply to these particular tombs, because none of them contain any skeletal remains. It has also been suggested that figurines had religious connotations and may have acted as votive offerings representing deities deposited in the tombs to guide the deceased safely to the afterlife (Persson 1931: 255; Picard 1948; French 1971:108). These tombs and their

inclusion of figurines may represent a mainland burial custom that became more common around LH II.

Cluster 2 is composed of the LH II -IIIA1 mainland Tombs Pyl E9, KS 513, and KS 525. These are single-chamber tombs with multiple interments, and long keyhole shaped dromoi. Like the previous cluster, the grave assemblages contain drinking and pouring vessels, storage vessels, and figurines. However, unlike Cluster 1, these tombs also contain items of manufacture, such as stone buttons and spindle whorls, and Tombs KS 513 and Pyl E9 contain ornaments such as seals, rings, and necklaces. The figurines in these tombs may also represent religious offerings that were left by mourners to act as guardians to the afterlife (French 1971). It is unlikely that these figurines represent children's burials because no burial contains skeletal remains (Wace 1932: 45-48, 89-92; Blegen et al 1973: 201-207).

Cluster 3 is composed of five tombs: Tomb Gyp XVIII, a Neopalatial Knossian tomb; three LH II-IIIA1 Mycenaean tombs, KS 519, KN 524, and KN 521; and an LH Mycenaean tomb, KM 502. The Mycenaean tombs are all single-chamber tombs with multiple interments and long keyhole shaped dromoi, whereas Tomb Gyp XVIII is a multi-chamber tomb with no dromos. The grave assemblages contain drinking and pouring vessels, storage vessels, special vessels (e.g. lamps, askoi and rhyta), ornaments, items of manufacture, and both female and animal figurines. These tombs were not grouped with either of the previous clusters because their grave assemblages contain more diverse pottery styles. It is likely that these figurines found in the tombs had religious meaning rather than representing a child's burial because again, no skeletal evidence was found. These first three clusters indicate that the deposition of figurines was a mainland

burial custom that was traditionally more common at Mycenae, since the majority of the figurines were found in their burials, especially those in the Kalkani cemetery.

Cluster 4 only contains Tomb P1, a rich Neopalatial, single-chamber tomb located at the Knossian harbour site of Poros (Dimopoulou 1999: 27). The grave assemblage of this tomb includes several plain drinking and pouring vessels, armour, weapons, and numerous silver and bronze ornaments. It is likely that Tomb P1 clustered alone because it does not share a similar grave assemblage with any of the other tombs based on the presence and absence of variables. Overall, this tomb does not provide much significant information regarding the Knossian, Pylian, and Mycenaean burial customs.

Cluster 5 is composed of nine tombs: Tomb Pyl 3 (a pit-grave); Tombs Pyl IV and AEG (tholos tombs); Tomb GC N (shaft grave); and Tombs KS 517, KS 515, KS 518, NH III, and PO 5 (single-chamber tombs). The grave assemblages contain drinking and pouring vessels, storage vessels and weapons, but most importantly, Tombs NH III, GC N, KS 515, PO 5, and KS 518 contain grooming items as well as weapons. Final Palatial Knossian tombs that contain a large number of weapons, such as NH III are frequently considered to have been ‘warrior graves’ and to have housed elite Mycenaean warriors based on the similarities between their grave assemblages and those from Grave Circles A and B at Mycenae (Hood and de Jong 1952: 249-250; Preston 2000: 156; Nafplioti 2008: 2308). However, the appearance of grooming items and weapons together in the grave assemblages suggests that weapons may have been deposited in burials as a symbol of status and prestige. Ornaments, which are other grave goods used to display status, have also been deposited with the weapons in these tombs (Younger 1992: 268; Boyd 2002: 31), indicating that the presence of ornaments and weapons together may also suggest that

weapons were used to symbolize status and prestige. Cluster 5 is one of many clusters to exhibits this different interpretation of the so-called ‘warrior graves.’

Cluster 6 is composed of the MM III-LM IIIA1 Knossian Tombs AI I, MS IX, NH I, ZP 10, ZP 64, ZP 67, and MS XV. In this cluster there is a mixture of several tomb styles including three single-chamber tombs (AI 1, MS XV, NH I); a multi-chamber tomb (MS IX); and three pit-caves (ZP 10, ZP 64, ZP 67). The grave assemblages contain drinking and pouring vessels, grooming items, and weapons, with the exception of Tomb MS XV. Similar to Cluster 5, the grave assemblages illustrate that the deposition of weapons and grooming items suggests a different purpose of the presence of weapons. It is interesting that the Knossian burials with weapons do not cluster with Mycenaean burials with weapons, despite the fact that they were supposedly influenced by these mainland burial customs. Instead, it appears that the occupants of Final Palatial Knossian burials used the deposition of weapons as a way to represent their own unique burial customs and ideals.

Cluster 7 is composed of Tombs GC L, KE, GC B, IS 1A, MS V, NH II, IS 2, MS XX, IS 3, GC I, and ZP 76. Again we have a combination of tomb styles including a pit-cave (ZP 76); four shaft graves (MS XX, GC L, GC B, GC I); five single-chamber tombs with long and narrow dromoi (NH II, KE, IS 1A, IS 2, IS 3); and a triple-chamber tomb with a short dromos (MS V). The grave assemblages contain drinking and pouring vessels, storage vessels, and weapons, but only Tombs MS V, NH I, IS 2, MS XX, IS 3, GC I, and ZP 76 contain grooming items. The remaining four tombs, GC L, KE, GC B, and IS 1A contain ornaments. Cluster 7 further demonstrates the strong relationship that exists between weapons and grooming items, as well as the existence of a relationship between weapons and ornaments, although it is not nearly as strong. The majority of

tombs, aside from Tombs GC L and GC B, are located at Knossos, illustrating that the practice of displaying status through the deposition of weapons and other grave goods was more prominent at Knossos than on the mainland.

Cluster 8 is composed of four tombs: Tomb Pyl 2, a Pylos pit-cave; Tombs IS 6 and MS VII, Knossian single-chamber tombs; and a Knossian double-chamber tomb, Tomb MS III. The grave assemblages contain grooming items, figurines, feasting and serving vessels, and special vessels (e.g. askoi, ritual vessels, and braziers). All tombs except for Tomb IS 6 contain at least one weapon, a single bronze knife. While Cluster 8 does illustrate a strong relationship between weapons and grooming items, it does not contribute to the new interpretation of burials with weapons seeing as none of these tombs are considered to have been 'warrior graves'. Figurines are present in all the tombs despite the fact that they were rarely found at Knossos and when they were it is mostly in places of religious worship such as peak sanctuaries, domestic shrines, and cave sanctuaries. Their deposition may represent a rarer religious custom or a Mycenaean influence based on the unusual features and poses that were not repeated anywhere in Minoan iconography (Olsen 1998: 389-390). The special vessels, like the braziers in Tombs MS VII and MS III, and the ritual vessels in Tomb IS 6 had ritualistic purposes, as braziers were a form of incense burners used to cleanse tombs before an interment, or to light the path to the underworld (Georgiou 1979: 434).

Cluster 9 is composed of Tombs GC G, IS RT, ZP 14, S3, ZP 99, ZP 66, ZP 67, ZP 98, ZP 36, and MS XVIII. There is a mixture of tomb styles including: two shaft graves (GC G and ZP 36); two pit-caves (ZP 66 and ZP 67); four single-chamber tombs with long, narrow dromoi (ZP 14, S3, ZP 99 and ZP 98); a multi-chamber tomb with multiple interments (MS XVIII); and the Isopata Royal Tomb, a tomb with a large

quadrangular chamber (Evans 1905: 136-172). The grave assemblages contain a large number of drinking and pouring vessels, storage vessels, and feasting and serving vessels, and Tomb S3 contains a special vessel (lamp) as well. All the tombs contain grooming items, and all except for Tombs ZP 99, ZP 66, and ZP 67 contain weapons, emphasizing the strong relationship that exists between these two variables. Cluster 9 also illustrates the deposition of mainland-derived vessels (e.g. the Kylix, the Squat Alabastron, the Ephyraean Goblet, and metal vessels) which are found in Tombs IS R, GC G, ZP 14, S3, ZP 99 and ZP 36. These vessel shapes were introduced into the Knossian mortuary sphere around LM II - IIIA1 and have often been used as evidence of a Mycenaean presence at Knossos (Popham 1994: 94; Preston 2000: 143).

Cluster 10 is composed of the Knossian single-chamber tombs, MS I, MS XVI, KD, IS 1, MS VI, and KA, and one double-chamber tomb, IS 5, which all range in use from MM III to LM IIIA1. Their grave assemblages include drinking and pouring vessels, except for Tomb IS 1, and special vessels, except for Tomb MS VI. These tombs likely cluster together because of their lack of grave goods, as the grave assemblages only contain pottery vessels, apart from Tombs IS 1, MS VI, KA and IS 5, which contain at least one item of jewelry. No mainland tombs are included in this cluster, thus illustrating the lack of similarity between the mainland and Knossian grave assemblages.

Cluster 11 is composed of single-chamber tombs with long, narrow dromoi, (Tombs ZP 96, IS 4, AI II, LM II, and KZ); shaft graves (Tombs GC O, GC M, and GC X); and the MH chamber tomb with a short dromos, Pre III. These grave assemblages contain drinking and pouring vessels, storage vessels, feasting and serving vessels, and special vessels. Only Tombs LM II and AI II contain weapons but neither contain grooming items or ornaments suggesting that the deposition of weapons was used for

multiple purposes depending on the society and their burial customs. Tombs IS 4, LM, GC X, and KZ also possess mainland-derived vessels signifying the existence of a mainland influence in the LM II period.

Cluster 12 is composed of Tombs ZP 35, ZP 100, KN 523, IS 7, ZP 81, ZP 1, ZP 12, and CTT. There is a mixture of tomb styles including: single-chamber tombs (Tombs ZP 35, ZP 100, ZP 81, ZP 12, KN 523, IS 7); a double shaft grave (Tomb ZP 1); and a Mycenaean tholos tomb (Tomb CTT). All the tombs except for Tombs ZP 81 and CTT contain drinking and pouring vessels, Tombs CTT, ZP 12, ZP 1, and KN 523 contain storage vessels, and Tomb ZP 100 contains feasting and serving vessels. These tombs, except for Tomb IS 7, contain ornaments, with the latter containing a loom weight. Tombs ZP 81, ZP 1, ZP 12, and CTT all contain bronze knives with ornaments. Cluster 12 displays the relationship between weapons and ornaments and suggests that weapons were used to symbolize status when deposited with ornaments.

Cluster 13 is composed of Tombs KN 520, KS 516, ZP 92, KS 533, Pyl III, ZP 95, ZP 21, ZP 6, Pyl 1, and GC D. This cluster encompasses a mixture of: single-chamber tombs (Tombs ZP 92, ZP 95, ZP 21, KN 520, KS 516, KS 533); a tholos tomb (Tomb Pyl III); a shaft grave (Tomb GC D); and two grave circle pits (Tombs ZP 6, Pyl 1). The grave assemblages contain drinking and pouring vessels, storage vessels, and feasting and serving vessels, and one of ornaments, items of manufacture, or grooming items. Tombs KS 533, Pyl III, ZP 95, Pyl 1, GC D, and ZP 92 contain at least one weapon, but only the latter contains a grooming item. These tombs likely clustered together because of their similar grave assemblages, which contain a majority of pottery vessels.

Cluster 14 is composed of KH, KS 529, Kephala, S4, Pyl E8, KB, Pyl 4, GC E, KS 532, PLi, and KS 530. As with the previous cluster, there is a mixture of mainland

and Knossian burials, specifically tombs from LM IIIA1. Their grave assemblages contain drinking and pouring vessels and storage vessels, with Tombs KS 529, Kephala, S4, Pyl E8, KB, and Pyl 4 containing weapons, but only Tombs KS 529, Kephala, and S4 containing grooming items. The remaining tombs contain either ornaments or items of manufacture. Cluster 14 implies that the occupants of Mycenaean tombs may have used the deposition of weapons in the Kalkani cemetery for different purposes in comparison to the burials in the shaft graves and at Knossos. All the tombs, save for Tomb PLi contain mainland-derived pottery styles again indicating a mainland and potential Mycenaean influence in the LM II and LM IIIA1 periods.

Factor Maps – Variables

Chart 4 presents the ten variable categories which formed four different groups based on the variables and their correspondence with one another. The groups are as follows: variables that were least likely to appear in the grave assemblage, variables that appeared frequently together, variables that represented the most commonly found items, and variables that were less common but still appeared frequently in tombs and may have had religious or ritualistic purposes.

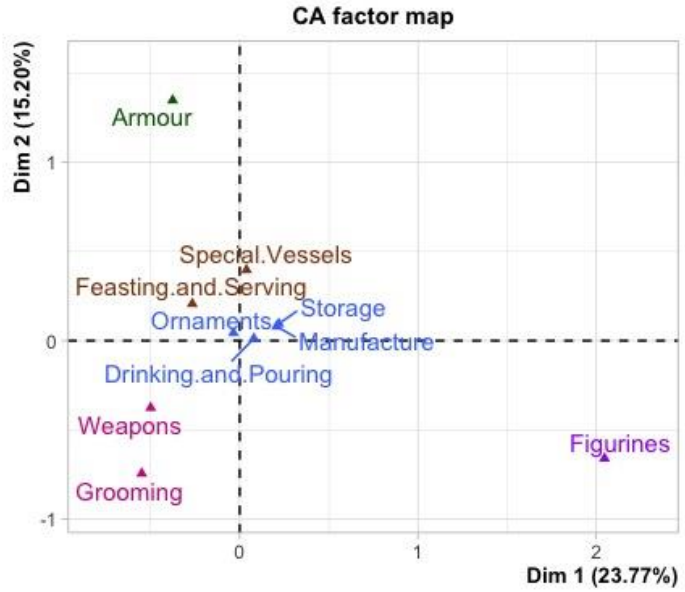

Chart 4: A colour coded factor map showing only the variable groupings from the Correspondence Analysis. Each colour represents a particular grouping of variables (see legend). Their placement on the factor map is based on their presence/absence in the tombs.

Group 1 is comprised of figurines and armour, which are the least likely to appear in the grave assemblages based on their far location from the centre of the map. Out of all 98 tombs, figurines only appear in sixteen of them, and armour appears in only ten (see Table 5.1). Because these items are rarely found, they represent the less common grave goods, and illustrate rare burial customs. Figurines are frequently interpreted as religious votive offerings and their presence implies that some form of religious ritual may have taken place before or after the interment of the body (French 1971: 108). At Knossos, these figurines were often placed at religious sites, such as peak sanctuaries and cave sanctuaries, and their presence in burials is considered to have been uncommon (N. Marinatos 1993: 116; 124; Olsen 1998: 389-390; Adams 2004: 32). There are a few Knossian tombs that contain figurines, including Tombs PO 11, MS VII, MS III, and IS 6. However, they are thought to have been used by an intrusive mainland population

because of the new poses that are not seen anywhere else on Crete (Olsen 1998: 389-390). On the mainland, figurines held a more prominent role. They were often deposited in burials for protection or as a guide to the afterlife, they may have been buried with children, or they represented the everyday female or the concept of motherhood (French 1971: 106; Olsen 1998: 389). Armour, on the other hand, represents the existence of an elite society whose members utilized grave goods to display a high status warrior ideology (Georganas 2018: 194). While studying the warrior burials of England in the 7th and 8th century AD, Heinrich Härke discovered that helmets, mail corsets and other pieces of armour were found in only a handful of extremely rich burials, including the 'royal' burial at Sutton Hoo. The deposition of armour signifies that displaying rank and status was more important than the actual role of war (Härke 1990: 25-26). The same logic can be applied to the mainland and Knossian burials, where armour reflects the wealthiest of elites, such as those from Poros, S4, and the shaft graves.

Group 2 is comprised of weapons and grooming items which appear frequently together in the grave assemblage. Grooming items include mirrors, razors, tweezers and combs. They were used to modify the body before interment in order to display a sense of embodiment and elite social status (Preston 2000: 149; Boyd 2002: 73; Adams 2013: 8). Weapons include swords, daggers, arrowheads and spearheads. Their presence in the grave assemblage, particularly in large numbers, has frequently been interpreted as reflecting the existence of elites conforming to a high status 'Mycenaean' warrior ideology (Hood and de Jong 1952: 243; Preston 2000: 148; Molloy 2012: 119). However, because of the frequent appearance of grooming items and weapons together different interpretations of these burials with weapons have come to light. Rather than exclusively advertising a military identity, such as the elite Mycenaean warriors, the deposition of

weapons may have actually been used as a physical aesthetic utilized by the occupants to express social status (Molloy 2012: 88; Whitley 2002: 222; Georganas 2018: 191).

Group 3 represents the most commonly found variables within the grave assemblages based on their position near the centre of the map and their appearance in nearly every tomb (see Table 5.1). These variables include drinking and pouring vessels, storage vessels, ornaments, and items of manufacture. Because of their position on the map these variables have absolutely nothing in common. With CA, points that cluster close together near the centre of the map are often indistinct and contribute very little to the solution (Bock 2017). Therefore, no correspondence between these variables exists despite their appearance together in the majority of tombs.

Group 4 is comprised of feasting and serving vessels and special vessels, all of which are located close to the centre and appear in a large number of tombs but not enough to be categorized with Group 3 (see Table 5.1). Rather, these variables consist of items used for ritualistic purposes. Feasting and serving vessels include tripods, basins, and bowls and reflect feasting rituals that took place before or after the internment of the deceased (Hamilakis 1998: 119-120; Boyd 2002: 30). Special vessels include rhyta, incense burners, braziers, lamps, and askoi. Incense burners, braziers, and lamps were all used as either sources of light when entering the tomb or for rituals of cleansing before the burial of another interment (Marinatos 1927-1928; Georgiou 1979: 434). The rhyta is a less common libation vessel, often found in religious sanctuaries, and may have been used for unknown rituals (Stubbings 1947: 55; N. Marinatos 1993: 5). The askos was a vessel rarely found in burials and was not common before the early LM/LH IIIA1 period (Stubbings 1947: 52; 72). Group 4 is associated with less conventional vessels that held

religious and/or ritualistic purposes, as well as newly introduced vessels to the mortuary sphere.

Table 5.1: Frequency of Variables within the Tombs

Variables	Number found in Tombs	Percentage found in Tombs
Weapons	52	53%
Armor	10	10%
Figurines	16	16%
Grooming Items	40	41%
Ornaments	78	80%
Items of Manufacture	50	51%
Special Vessels	52	53%
Drinking and Pouring Vessels	85	87%
Feasting and Serving Vessels	51	52%
Storage Vessels	76	78%

5.2: Correspondence Analysis Map

The superimposed CA map seen on Chart 5 plotted the two factor maps together onto a two-dimensional plane and expressed how the points correspond with one another (Clouse 1996: 96; Baxter and Cool 2010: 212). The CA map represented 39% of the total variance of the data, where the variance is a percentage of the total variance explained by each of the nine dimensions. The first dimension accounted for 23.8% of the total variance and the second dimension accounted for 15.2% (Doey and Kurta 2011: 11).

The total variance does not equal 100% because there are seven other dimensions that are unaccounted for (Doey and Kurta 2011: 11; Bock 2017). However, the first two dimensions generated by R 1.2.5033 make up 39% of the total variance which is still considered to be an accurate portrayal of the data and therefore, the other dimensions do not need to be included (Doey and Kurta 2011: 11; Bock 2017).

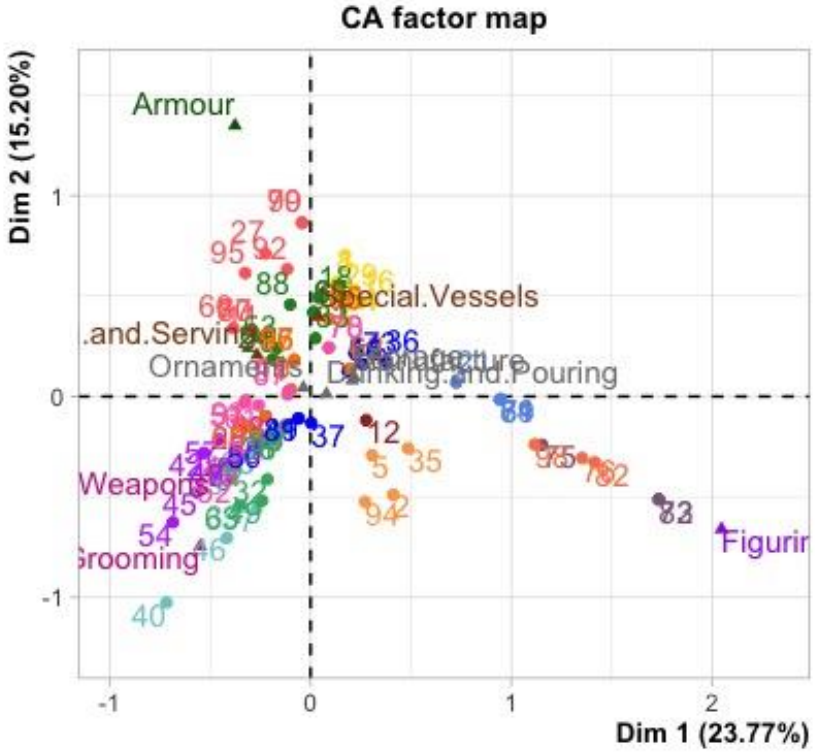

Chart 5: The colour coded superimposed Correspondence Analysis map showing both the variables and tombs and how they correspond to each other. Each cluster is colour coded based on their clusters which can be determined according to the legend in Chart 6.

The inertia of each point was considered in order to better understand the superimposed map. Inertia quantifies a point's distance from the centre of the map, where points with a high inertia are located furthest from the centre and are often considered to be outliers, while points with a low inertia are closer to the centre of the map and tend to have more in common with the group as a whole (Deschamps 2017). In this case figurines, armour, and all the tombs clustered nearby have a high inertia as they are the

furthest from the centre, whereas variables such as drinking and pouring vessels, ornaments, storage vessels, and items of manufacture have a low inertia as they are closest to the centre of the map (Deschamps 2017). Both the inertia and total variance were considered when interpreting the CA map in order to understand how much data was accurately being portrayed, whether the CA was a fair representation of the data, and why each point was located where it is due to its inertia.

When the map is colour-coded, as it is in Chart 5, a clearer image of the correspondence between the tombs and the variables can be understood. For example, Cluster 13 is spread out along the centre of the map because all the tombs contain a large number of pottery vessels, ornaments and items of manufacture. However, the points are all spread across different axes. Tombs KN 520 and KS 517 (points 70 and 78) are located on the top right quadrant of the map because they contain only pottery vessels and ornaments. Tombs KS 533 and Pyl III (points 87 and 91), on the other hand, are located on the left quadrant, close to the bottom, because these tombs contain a number weapons and are being pulled slightly downwards towards the weapons variable. The same can be said for Tombs Pyl I, GC D, ZP 92, and ZP 6 (points 93, 61, 51, and 38), which are all being pulled in a slightly downward direction. The real difference can be seen in the placement of Tombs ZP 21 and ZP 95 (points 43 and 52), which are both located far down on the bottom left quadrant. These tombs contained next to no pottery, but they did contain a few weapons and at least one grooming item, which explains their placement near those two variables. It is clear that the presence and absence of the ten different variables within the grave assemblages explains how the clusters are dispersed throughout the map and why they do not actually form perfect clusters.

Once the entire map is considered, patterns begin to further emerge along the x- (horizontal) and y- (vertical) axes. The x-axis represents the concept of social construct and the use of grave goods to display a prestige ideology. Clusters 5, 6, 7, 9, and most of 14 are located on the negative x-axis (the left side of the map) and they are variables, such as weapons, grooming items and ornaments that are used to portray social status. The remaining tombs and clusters on the positive side of the x-axis (the right side of the map) contain mostly pottery vessels and items of manufacture, nothing ostentatious that could symbolize status. Only Cluster 11 is located on the positive side of the x-axis because the grave assemblages contain all pottery vessels. There are some tombs, such as Pyl 2, MS VII, and MS III that are located on the positive side of the axis that did contain weapons, but they also included figurines and a large number of pottery vessels. Based on what was said above, these tombs had a low inertia and were located at the bottom right quadrant, close to the x-axis, right in-between weapons and grooming items, and figurines.

The y-axis on the other hand, appears to separate variables that could be used to identify the age or gender of tomb occupants. On the negative side of the axis (bottom half of the map) there are figurines, weapons, and grooming items. Figurines were suggested to have been linked to children's burials, acting as toys, mother figures, or object of protection (French 1971: 108; Blegen 1937: 55, 256). Although this hypothesis is not always true, as is the case with the tombs in Clusters 1, 2, and 3, they are still associated with age. Weapons are often associated with male burials, based on the known sexed burials of Grave Circle B, where the majority of the weapons belonged to males (Mylonas 1973: 269; Kilian-Dirlmeier 1988; Preston 2000: 159). The presence of both weapons and grooming items together has also been associated with male burials. In Treherne's study of elite warriors during the LBA phenomenon in central Europe, he

found that these articles were exclusively male funerary goods and even comprised the main male status items in graves in some regions (Kristiansen 1992a; Treherne 1995: 111; Preston 2000: 159). The positive side of the y-axis (the top half of the map) is made up of variables that are not used to determine age or gender. These variables include types of pottery vessels, items of manufacture, ornaments, and armour. Armour is located on the positive side of the axis although it should be on the negative side as armour is often found together with weapons and can be used to distinguish male warriors. However, it is considered to be an outlier based on its high inertia, which is why armour is situated on the opposite side of the axis. Ornaments are placed on the bodies of both males, females, and children before interment and cannot specifically be used to identify one single gender or age (Younger 1992; Verduci and Davis 2015). The same can be said for items of manufacture, which are deposited with both males and females, and occasionally even with children (Nordquist 1997; Nixon 1999: 565; Gleba 2009; Rahmstorf 2015). While these identifiers are not always correct, they are still commonly used to determine the sex and/or gender the tombs where no osteological evidence is present.

The superimposed CA map revealed patterns of social concepts that appeared to be divided by the x- and y-axes. The x-axis separates tombs that used grave goods to symbolize status against those that did not, while the y-axis differentiates between variables that were used to identify the gender and/or age of interments versus those commonly found in burials of all gender or age. Both patterns along the axes show how the material artifacts and burial customs can be used for different purposes such as the portrayal of age, sex, or wealth and status.

5.3: Hypotheses

Based on the results of the CA and the HAC the following two hypotheses were generated.

Hypothesis 1 (H_1): Based on the patterns that emerged from Clusters 5, 6, 7, 9, and 14, it is hypothesized that weapons and grooming items appear together frequently in the grave assemblages. This hypothesis may provide different interpretations of the deposition of weapons that challenges the traditional 'warrior grave' interpretation of these 'warrior graves', particularly those located at Final Palatial Knossos, which have often been used as evidence of a Mycenaean presence during the Final Palatial period (Driessen 1990: 124-125; Nafplioti 2008: 2308; Wiener 2015: 132-134). If the first hypothesis is found to be significant, these two variables instead represent the use of weapons as symbols of status or signify the presence of female warriors (Harrell 2012: 5-6; Paschalidis 2012: 552). The null hypothesis states that weapons and grooming items have no association. H_1 was also tested using ornaments instead of grooming items because they also appear alongside weapons. The significance of the results can either strengthen the argument that weapons were used as symbols of status or would indicate that grooming items and weapons had a far stronger and more personal connection that extends beyond warrior ideals and social identity.

Hypothesis 2 (H_2): The second hypothesis proposes that the appearance of the mainland-derived vessels in burials was dependent on the date the tombs were in use. This hypothesis is important because the Final Palatial Knossian mortuary sphere has been described as having been strongly influenced by the mainland burial customs, particularly those from Mycenae, based on the introduction of new tomb styles,

architecture, and grave goods (Driessen and Macdonald 1984: 66; Preston 2000: 122; Nafplioti 2008: 2308; Wiener 2008: 132). These grave goods include metal vessels, the Kylix, the Squat Alabastron, and the Ephyraean Goblet (Popham et al. 1974: 253; Preston 2000: 122), whose presence can be seen in Clusters 1, 5, 6, 7, 9, and 14. If the hypothesis is found to be significant it supports the existence of a mainland influence in the Final Palatial Knossian grave assemblage. The null hypothesis claims that there is no relationship between mainland-derived vessels and the date of use of the tombs.

5.4: Chi-Square Test Results

The chi-square tests were implemented using R version 2.4 using the function 'chisq.test' in the package 'stats'. In Chapter 3 it was briefly discussed that the chi-square test works by comparing observed and expected values and determining a p value that is either higher or lower than the set p (Kent State University). For both tests the p value was set at $p < 0.05$. In order for the hypotheses to be considered significant, the calculated p value needed to be less than the set 0.05, meaning that there is less than a 5% chance of the null hypothesis being accurate. Using $p < 0.05$ is the most common value for the chi-square test, but $p < 0.01$ can also be used if you want more concise results (Kent State University). If the p value is lower than 0.01 it means the relationship is extremely significant as there is a less than 1% chance of the null hypothesis being accurate. Both hypotheses use a contingency table that was generated based on the number of variables being tested. H_1 uses a 2x2 table because only two variables (weapons and grooming items) are being compared and both the rows and columns have two classifications of the variable (weapons/no weapons and grooming items/no grooming items) (stats direct).

H_2 uses a 2x4 contingency table, where the column has two classifications of variables (with mainland-derived artifacts/ without mainland-derived artifacts) and the rows have four classifications based on the four different periods being tested (MM III-LM IB, LM II-LM IIIA1, MH III-LH IB and LH II-LH IIIA1).

The Results of H_1

H_1 was tested to see if grooming items and weapons were dependent on one another and appeared frequently together within the grave assemblages. The data table used was organized into four categories: tombs with weapons and grooming items, tombs with weapons and without grooming items, tombs without weapons and with grooming items, and tombs without weapons or grooming items (Tables 5.2 and 5.3). The p value was set to 0.05 and the null hypothesis claims that there is no relationship between weapons and grooming items.

Table 5.2: Observed Values: Weapons and Grooming Items

	With Grooming	Without Grooming	Total
With Weapons	31	21	52
Without Weapons	9	37	46
Total	40	58	98

Table 5.3: Expected Values: Weapons and Grooming Items

	With Grooming	Without Grooming	Total
With Weapons	21.22	30.78	52.00
Without Weapons	18.78	27.22	46.00
Total	40.00	58.00	98.00

DF (Degree of Freedom) = 1 X_2 = 16.2072 P = 0.000057

The results of the first hypothesis are significant because p = 0.000057 and is less than the set 0.05 value. It is also less than if p were set to 0.01, implying that there is an extremely strong relationship that exists between these two variables. The null hypothesis is therefore rejected, and weapons and grooming items were found to be dependent. These results led to a new interpretation of burials with weapons, one that challenges the traditional 'warrior graves' explanation of Final Palatial Knossian burials (Popham 1994: 93; Nafplioti 2008: 2308). The deposition of both variables could indicate that weapons were not used as a sign of military status, but rather to symbolize the social status and prestige of the deceased (Târlea 2004: 125, 137; Harrel 2012: 5-6; Molloy 2012: 88; Georganas 2018: 189). Grooming items were seen as tools used for altering the bodily appearance to create a social identity (Shanks and Tilley 1982: 126; Treherne 1995: 114) and their presence in the grave assemblages has often been associated with the concept of 'prestige ideology', where prestige ideology is the creation and manipulation of the idealized image of the deceased (Randsborg and Chapman 1981; Parker Pearson 1982; Shanks and Tilley 1982; Kristiansen 1984a; Treherne 1995: 121). H_1 claims that weapons were used in a similar way to help create this 'prestige ideology' when deposited with

grooming items. The swords buried within these graves are a good example of prestige ideology as they were elaborately crafted with golden hilts and other precious materials. The blades and grips were even gold-plated with gold and silver rivets, equipped with ivory, agate, or rock crystal pommels, and were considered to be of great beauty, especially those found in Grave Circle A of Mycenae (Târlea 2004:138). The swords were so elaborately crafted that they rendered the weapon impractical and inefficient in battle (Treherne 1995: 121; Harrell 2012: 6; Georganas 2018: 191). The osteological evidence also supported these results. The remains found within some of the burials with weapons at Knossos and Mycenae, were either too young to have participated in battle, such as the child found in grave 3 of S4, or the bones showed no signs of any weapon inflicted injuries, although this is a rare occurrence (Popham, Catling, and Catling 1974: 226-229; Dickinson et al 2012: 181; Georganas 2018: 191). The use of weapons as symbols of status was also a common theme in other scholarly studies. When analyzing Aegean Late Bronze Age and Early Iron Age warrior graves, James Whitley (2002: 222) argues that the swords were used as a way to ascribe the status of 'warrior' rather than the occupant actually having lived said identity. Ioannis Georganas (2018: 191) argues that the weapons were buried for their owners as symbols of authority and status that was re-enforced by the presence of these grooming artifacts. Therefore, this hypothesis suggests that instead of elite Mycenaean warriors, these burials housed members of society who utilized the deposition of weapons and grooming items as a way to portray a message of status and prestige.

Another interpretation that can be proposed based on these results is that weapons were buried with female occupants, and not just males. The term 'warrior grave' has often come to be associated with male burials because of the existence of a gender bias that

insists that weapons are only found with a certain class of male warrior (Hood and de Jong 1952: 249-250; Jordon 2009: 95; Leith 2013: 110; Harrell 2014: 99, 101). The osteological evidence can on occasion support these claims, for example in Grave Circle B, where 64 weapons were associated with adult male burials and 5 with elderly male burials (Mylonas 1973: 269; Preston 2000: 159; Leith 2013: 110). However, in the absence of skeletal evidence Konstantinidi-Syvridi (2001) has claimed that male burials are difficult to distinguish unless they are furnished with weapons (Paschalidis 2012: 551). H_1 instead suggests that burials containing both weapons with grooming items, especially mirrors, may house elite females who utilized weapons to portray status. Mirrors were deposited amongst both males and females but their presence in burials containing weapons, such as Sellopoulo Tomb 4 and Mavro Spelio Tomb 18, have been thought to house wealthy male warriors (Popham and Catling 1974: 200-202; Paschalidis 2012: 551). The number of female burials with mirrors at Mycenae and Knossos is far larger, with the ratio of male to female burials with mirrors at Mycenae being 1:5, with 15 recorded in male burials and 71 in female burials (Paschalidis 2012: 552; Leith 2013: 117). This could suggest that wealthy burials containing weapons and mirrors may be associated with elite females who wished to portray their own status using grave goods. The deposition of weapons with females is not uncommon, for example in Grave Circle B, two of the four adult female burials were associated with weaponry and nine of the sixteen male burials were associated with weaponry, indicating that females were just as likely as males to be buried with weapons (Leith 2013: 111) Tomb 2 of the Lefkandi Toumba also contained a female buried with a dagger beside her head and right shoulder (Harrell 2014b: 99). Unfortunately, because the deceased was female, she was considered to have been a sacrifice, and the dagger, was the instrument that slew her. She was

essentially written off as a grave good for the male (Langdon 2008: 287; Harrell 2014b: 100). The results of H_1 have proved that females as well as males were likely to use both weapons and grooming items to display status and prestige and that the gendering of weapons cannot be relied upon as it is not always accurate (Jordan 2009).

The same hypothesis was tested using ornaments, instead of grooming items, as these artifacts were also used to display social status, especially those made of gold and bronze metals, or with inscriptions, or imported from exotic locations such as Egypt (Preston 2000: 155; Haas-Lebegyev 2012: 431; Adams 2013: 15; Verduci and Davis 2015: 51). The purpose of running the second chi-square test was to see if weapons appeared frequently with other objects of status or if grooming items and weapons had a far greater connection. For this chi-square test the p value was set to 0.05 and the null hypothesis claims that weapons and ornaments were independent of one another.

Table 5.4: Observed Values: Ornaments and Weapons

	With Ornaments	Without Ornaments	Total
With Weapons	42	10	52
Without Weapons	36	10	46
Total	78	20	98

Table 5.5: Expected Values: Ornaments and Weapons

	With Ornaments	Without Ornaments	Total
With Weapons	41.39	10.61	52.00
Without Weapons	36.61	9.39	46.00

Total	78.00	20.00	98.00

DF (Degree of Freedom) = 1 X_2 = 0.0945 P = 0.758476

The results of the chi-square test were non-significant since the p value is greater than the set 0.05, meaning the null hypothesis is accepted and there is no correlation between weapons and ornaments. The idea that weapons were used to symbolize status was not strengthened but instead, these results support the idea that weapons and grooming items together were used to symbolize the prestigious ideology. While studying Bronze Age 'warrior graves' Georganas (2018: 191) argues that these inefficient, elaborate weapons were placed in grave assemblages as a symbol of status, which was strengthened by the presence of other artifacts, especially mirrors, tweezers, and razors, all of which fall within what he calls the 'warrior's package' (Treherne 1995; Molloy 2012: 90). The idea of a 'warrior package' could indicate that weapons only symbolize this prestige ideology when they were deposited with grooming items and that the presence of weapons on their own may symbolize a different type of burial custom that does not portray status. These results could also illustrate that grooming items, as mentioned by Treherne (1995), were actually a part of this 'warrior package' and if one wanted to identify a warrior burial then grooming items needed to be present on top of the large number of bronze weapons.

The connection between grooming items and weapons allowed for a different interpretation of these burials with weapons. The LM II-LM IIIA1 Knossian tombs no longer housed only elite swordsmen or 'Mycenaeans', but rather elites who used the deposition of grave goods together to symbolize a higher social status. These elites could be either male or female, based on the presence of grooming items, proving that the

gendering of tombs based on the grave goods present in the assemblages is not always accurate. Overall, the results of H_1 have shown that burials with weapons, especially those from Final Palatial Knossos need to be re-evaluated without any gender bias or preconceived notion of Mycenaean warrior burials. Instead, the grave assemblages as a whole needs to be taken into consideration before conclusions can be drawn.

The Results of H_2

H_2 focused on the placement of mainland-derived pottery vessels in the Final Palatial Knossian tombs. The purpose of this hypothesis was to test whether the presence of these pottery vessels was dependent on the date the tombs were in use. The p value was once again set to 0.05 and the null hypothesis claims that there was no relationship between the vessels and the tombs' date of use.

Table 5.6: Observed Mainland Derived Artifacts and Time Period of Tomb

	With Mainland Derived Items	Without Mainland Derived Items	Total
MM III – LM IA	1	13	14
LM II – LM IIIA1	21	23	44
MH III – LH IA	11	6	17
LH II – LH IIIA1	13	10	23
Total	46	52	98

Table 5.7: Expected Mainland Derived Artifacts and Time Period of Tomb

	With Mainland Derived Items	Without Mainland Derived Items	Total
MM III – LM IA	6.57	7.43	14.00
LM II – LM IIIA1	20.65	23.35	44.00
MH III – LH IA	7.98	9.02	17.00
LH II – LH IIIA1	10.80	12.20	23.00
Total	46.00	52.00	98.00

DF = 1 X_2 = 11.9158 P = 0.007677

Since the p value is lower than the set 0.05 value, the null hypothesis was rejected and the deposition of mainland-derived pottery vessels in burials was dependent on the date the tombs were in use. These results prove that the vessel shapes started gaining popularity in Knossian tombs starting in LM II and continued throughout LM IIIA1. There were almost no mainland-derived vessels found in the Neopalatial tombs, save for one Squat Alabastron in Tomb MS V. This vessel shape could have been placed in the tomb when it was reused in a later period. Based on larnax lids painted with common LM III patterns (e.g. spiral coils, alternate curve-hatchings, oval petals, and papyrus flowers), and other pottery fragments found within the tomb, which dated to LM II and LM III, MS V was likely reused later in the Final Palatial period (Forsdyke 1926/1927: 257-259). If that were the case then H_2 signified a strong mainland influence existing at Knossos starting in the Final Palatial period. However, the presence of these vessel shapes alone is not proof enough that the LM II and LH II period were synchronous (French 1997: 151). The styles of the vessel shapes actually differ on the mainland and Knossos. Unlike the

Mycenaean shape, the Knossian Ephyraean goblet and the Kylix have a hollow stem, but only some are of the deep mainland shape. Others are shallower, and the usage may have even been different (French 1997: 151-152). Despite the presence of these vessel shapes in the grave assemblages being dependent on the tomb's date of use it does not prove that Mycenaeans were present at Knossos or that these tombs belonged to elite Mycenaean rulers. The vessel shapes could have easily been passed on through trade or other relations, not necessarily brought over by invading Mycenaeans or mainlanders. All these results prove is that there was a greater influence of mainland goods that started in LM II and continued on into LM IIIA1.

5.5: Summary

The present study applied CA to MM/MH III-LM/LH IIIA1 Knossian, Pylian, and Mycenaean burials with the hope of discovering hidden patterns that indicate different interpretations of how the burial customs were used by these societies. Fourteen clusters formed from the CA and HAC and several patterns emerged based on the presence and absence of the variables in the grave assemblages. These patterns were then used to generate two hypothesis whose significance was tested using the chi-square test. Both hypotheses were found to be significant and it was discovered that weapons and grooming items were used together to symbolize elite social status, and that mainland-derived vessel shapes were a cause of mainland influence on Knossos beginning in LM II. The following chapter further analyzes the patterns and results and determines whether they answer the three research questions posed at the beginning of this study.

Chapter Six

Discussion of the Results and Findings

The purpose of this chapter is to analyze the results of the CA and the chi-square tests that were produced in the previous chapter and to discuss whether these results answer the three research questions that were outlined at the beginning of this study. The first section examines how both hypotheses and their significant results answer the first two research questions, and the second section discusses the patterns that emerged from the CA factor maps and what they can tell us about the manner in which the burial customs were used by mainland and Knossian societies. The chapter ends with a brief summary of the all the results that were produced.

6.1: The Results of the Chi-Square Tests

In Chapter 5 two hypotheses were generated based on the clusters and patterns that had emerged from the CA factor maps. The first hypothesis found that weapons and grooming items were frequently deposited together in the grave assemblages, and the second hypothesis found that the presence of mainland-derived vessel shapes (e.g. the Kylix, the Squat Alabastron, the Ephyraean Goblet, and metal vessels) in Knossian burials depended on the date the tombs were in use. The previous chapter ran the chi-square tests and proved both hypotheses to be significant and the results of their significance was discussed in detail. Therefore, the objective of this section is to interpret these results and determine whether they answer the first two research questions, where the first question asked whether the traditional explanations for Final Palatial burial

customs can be challenged and the second question asked if the nature of Final Palatial burial customs support the argument for a mainland invasion of Crete.

H_1: Weapons and Grooming Items used as Symbols of Status

The results of H_1 found that the deposition of weapons alongside grooming items, were used in a multitude of ways, they were used to symbolize prestige and illustrate how the occupants wanted to be portrayed in the afterlife, or how the family wished the deceased to be portrayed, and they also have been used to suggest the deposition of weapons with both male and female occupants. The latter discovery goes against the traditional gender biases that proposed that only elite male warriors are buried with weapons (Kilian-Dirlmeier 1988; Graziadio 1991; Voutsaki 2005; Leith 2013: 111) as female skeletons deposited with weapons have been discovered in several tombs including Grave Circle B, the Lefkandi Toumba (Harrell 2014), a burial in Sellopoulo Tomb 4 (Harrel 2012), and pit 2 in the Pylos Grave Circle (Blegen et al. 1973: 176-215). These results suggest that the gender bias is incorrect and the deposition of weapons and grooming items together may represent both male and female occupants utilizing these grave goods to symbolize their status and prestige.

The results of H_1, that were generated by Clusters 5, 6, 7, and 9, suggests the existence of different burial customs involving the deposition of weapons in the grave assemblages. The majority of the tombs in these clusters are from Final Palatial Knossos which can be interpreted as the symbolization of social status and prestige ideology through the use of grave goods being a more common burial custom at Knossos during this period. On the mainland, weapons were deposited without grooming items in

eighteen of the thirty-three tombs. The deposition of weapons could reflect a purpose beyond the symbolization of status through the use of prestigious goods. Kazimierz Lewartowski (1995) studied almost 1000 burials from mainland Greece and found that tombs with multiple burials that were accompanied by weapons were often linked to a society whose members were profoundly interested in expressing their affiliation to a family or a group (Lewartowski 1995: 107; Târlea 2004: 138). In this case, weapons were still used to represent the status of the deceased, but it was through public lineage rather than self-expression as it was at Knossos. There were four monumental burials in Grave Circle B that included grave goods used to display wealth and status, as can be illustrated by the elaborate swords and jewelry found in the grave assemblages. It then came as no surprise that these tombs not only clustered with those from Final Palatial Knossos, as seen in Clusters 7 and 11, but that they also contained both weapons and grooming items, showing that through the deposition of weapons and grooming items, the occupants of the Knossian tombs, as well as those of Grave Circle B, utilized their grave assemblages as a form of self-expression to display prestige and social status.

The results of H_1 managed to challenge the traditional explanations of the Final Palatial Knossian burials with weapons by showing that, despite the similarity in burial customs, the occupants of these burials were more than just these elite male warriors that appeared as a result of a Mycenaean presence or influence. Instead, the results proved that this new Final Palatial burial custom expressed different purposes based on the weapons appearance with the other grave goods and that the burials should not be considered 'warrior graves' because of the sole presence of weapons alone. Greater attention needs to be given to the grave assemblages as a whole in order to fully understand the purpose of the mortuary data (Georganas 2018: 195).

H_2: Mainland-Derived Vessels and Final Palatial Tombs

The results of the second hypothesis established that the presence of mainland-derived vessel shapes in Knossian burials was dependent on the tombs' date of use and these results show that a mainland influence did in fact exist at Knossos in the LM II period and continued on throughout LM IIIA1.

The chi-square table in Chapter 5 showed that mainland-derived vessel shapes were practically non-existent in the MM III-LM IA period, with only 7% of tombs containing any vessel shapes at all. These vessel shapes first appeared in the LM II period, where they were found in 56% of the tombs, and continued into LM IIIA1, appearing in 39% of the tombs, thus proving the existence of a mainland influence starting in LM II. However, these results do not prove that these vessel shapes were a direct result of a Mycenaean invasion; rather, they could have been a product of trade with the mainland, which had increased significantly in LM/LH II. These vessel shapes could have also been crafted by Knossian potters as an imitation of the mainland styles, which may explain why some of the vessels at Knossos differed from those from the mainland (French 1997:150).

The results of H_2 support Preston's argument that Final Palatial Knossos was a scene of competition and self-expression through the use and manipulation of outside cultural elements (Preston 1999: 131, 134, 143; Preston 2000: 113). In the LM II period the mortuary landscape had changed and became less focused on family and kinship, and more focused on the individual self and how the deceased and their family wished to be portrayed after death (Voutsaki 1995: 3). Preston argues that one way this new ideology was displayed is through the manipulation of outside cultural grave goods, including

mainland elements (Preston 1999: 143; 2000: 87). So, the introduction of these new vessel shapes beginning in the LM II period, and the fact that they sometimes differed from their mainland counterparts (French 1997: 150), indicates that they were used by the occupants to display prestige ideology and individual status rather than to portray a mainland invasion (Preston 1999: 143). These results also suggest that the 'Mycenaeanization' of Knossos was actually just a new form of mortuary experimentation that occurred through the use and manipulation of outside elements, including the mainland-derived vessel shapes.

The results of both H_1 and H_2 found that the Final Palatial Knossian mortuary landscape became a place for competition and self-expression, the act of displaying how you wanted to be portrayed in both a social and political sense, through the introduction of new burial customs and the deposition of particular grave goods (Preston 1999: 134). Both results have also proved that it is not possible to ascertain a mainland invasion through the introduction of these burial customs.

6.2: The Results of the CA and the HAC

The third research question asked what the patterns that emerged from the CA could inform us about the society and manners in which burial customs were used for social and political display at Knossos, Pylos, and Mycenae. In order to answer this question the patterns that emerged from the CA need to be analyzed.

The first pattern which emerged from Clusters 6, 8, 9, and 10 illustrated the frequent appearance of Neopalatial and Final Palatial tombs together. Based on the fact that the Final Palatial mortuary landscape had drastically transfigured from the

Neopalatial period (Driessen 1990; Dickinson 1996: 65; Wiener 2007; 2015) and the evidence used in support of the mainland invasion hypothesis (Driessen and Schoep 1995; Driessen and Farnoux 1997), it was expected that Final Palatial Knossian tombs and mainland tombs, especially those from Mycenae, would cluster together. Instead, through this pattern we see the clustering of Neopalatial and Final Palatial tombs which suggests that the Neopalatial mortuary landscape was actually a complex social arena in which individuals developed independent strategies for displaying status, and that both the Neopalatial and Final Palatial periods were times of experimentation, with an emphasis placed on expressing social identities through burial customs (Preston 2000: 110). The concept of expressing social identity can be seen in the Mavro Spelio cemetery where the grave assemblages include prestigious artifacts such as weaponry, jewels, grooming items and ornaments. The same concept can be seen in the Poros tombs through their use of foreign artifacts, armour, and elaborate weapons. The Poros burials include elements from the mainland that other Neopalatial Cretan cemeteries do not, thus indicating that the practice of communicating social identities in the Neopalatial period may have varied spatially on Crete (Preston 2000: 123). The Poros tombs represent a different Neopalatial population group whose members traded with the mainland during MM III-LM IB and used more diverse mortuary paraphernalia to display social and political status. This pattern illustrates that the LM II mortuary landscape did not drastically change after the LM IB destructions, but rather expanded on old Neopalatial ideals. Extensive changes in the burial customs may have still occurred in the LM II period, but they were not so completely different that they would have had to have been introduced by an invading force as suggested by the mainland invasion hypothesis (Preston 2000: 134). Finally, this pattern also suggests that the LM II period adopted previous Neopalatial elements as a

way of establishing and symbolizing prestige and individuality based on the clustering of Neopalatial and LM II tombs together.

The second pattern which emerged from Clusters 8, 9, 12, 13, and 14 illustrates that tombs from the LM IIIA1 period were more likely to cluster with mainland tombs than those from the LM II period. For reference, twenty tombs that were in use in LM IIIA1 clustered with mainland tombs, and only ten from LM II clustered with mainland tombs. The results of this pattern support Preston's argument that the LM II and LM IIIA1 burials need to be studied independently from one another, as their use of burial customs may have differed. While this does not prove that mainland and Final Palatial Knossian burial customs were identical, it does prove that the LM IIIA1 period may have borne a greater influence from the mainland. Since the LM IIIA1 burials did still cluster with some LM II tombs, it is clear that both periods reflect similar manners of use of their burial customs such as the display of wealth, and social and political status through the introduction of external ideas and cultural symbolism. It appears that the LM IIIA1 period witnessed a more coherent and comprehensive idea of prestige ideology because of the unified LM IIIA1 grave assemblages containing pottery for feasting and drinking, ornaments, and weapons (Preston 2000: 147). The LM II burials, on the other hand, contain a large number of weapons, special vessels and the sporadic uses of other grave goods including ornaments and items of manufacture. The pattern that emerged confirms that in both these periods burial customs were used to express social and political status; however, it was done so through different methods and grave goods, which is why both period needs to be studied separately and not bracketed together as one continuous period.

The third pattern that emerged was the clustering of mainland tombs based on the changes in burial customs that occurred throughout the MH III-LH IIIA1 periods. In

Clusters 7 and 11 we see the grouping of the rich MH III-LH IB Grave Circle B burials and the Prehistoric cemetery tomb based on the deposition of elaborately crafted weapons and grooming items that were used to symbolize elite status; Clusters 1, 2, and 3 comprise the grouping of the LH II-IIIA1 rich chamber tombs from the Kalkani cemetery and the 3rd km cemetery where the grave assemblages contain figures which may symbolize a new religious burial custom that was introduced in the LH II period; and Clusters 13 and 14 include the grouping of the poorer LH II-LH IIIA1 Kalkani chamber tombs that only contain strictly pottery vessels, signifying a decline in the wealth of burials in the later LH IIIA1 period. These clusters represent Mycenaean tombs from the same period of use grouping together based on the similarity of their grave assemblages, thus providing an accurate characterization of the changes that occurred throughout the mainland burial customs as described by Voutsaki (1999). Through these clusters it can be observed that the Early Mycenaean Period began as a time of concentrated wealthy burials with only the Grave Circles containing elaborate and ostentatious grave goods, and then transitions to a period where wealth becomes more evenly spread out across the other tombs at Mycenae and eventually declined later in the LH III period. It becomes clear that the manner in which these burial customs were used in Mycenaean society constantly changed over time to reflect the uneven competition that arose amongst elites, especially throughout the LH II-LH IIIA1 period.

The final pattern that emerged from Clusters 2, 5, 13, and 14 was the grouping of Pylian tombs together with the Mycenaean tombs. This pattern was expected to emerge because of the fact that the Pylian burial customs are frequently compared to Mycenaean burial customs and studied in regard to what they can tell us about Mycenaean society. Because of this it was believed that Pylian and Mycenaean burial customs would be

similar (Baumbach 1981; Galaty and Parkinson 2007; Murphy 2014: 210). Based on the way that Pylian tombs clustered, there were indeed similarities between the two societies but despite these similarities this pattern does not prove that the inhabitants of Pylos and Mycenae utilized their burial customs in the same manner. Where the LH II Mycenaean mortuary landscape is characterized by constant changes in wealth throughout the periods, with the extremely wealthy Grave Circle B burials in MH III, the wealthy chamber tombs of LH II, and then the poorer LH IIIA1 chamber tombs, the mortuary strategies illustrated by the Pylian burials sees the same constant level of wealth throughout, with the exception of the LH IIIA1 period as Pylian tombs went out of use during this time. As Joanne Murphy argues (Murphy 2014: 212) the lack of increased investment of wealth shows that, unlike Mycenae, the tombs of Pylos were not used for elite status competition. Another interesting point is that the Pylos tombs (PYL 2, PYL III, and PYL E8) clustered with the wealthy LM IIIA1 Final Palatial Knossian burials, showing that like the LM IIIA1 tombs, Pylos may have had a more uniform idea of prestige ideology. Overall, it is important to note that just because there are similarities between the Pylian and Mycenaean burials, they each had different uses of their burial customs that can be reflected through their mortuary data. Much like the LM II and LM IIIA1 burials, both need to be studied separately in order to determine the manner in which the Pylian society utilized their burial customs.

6.3: Summary

Chapter 6 has analyzed and interpreted the results and patterns that were produced by both the CA and the chi-square tests. The results have proven that a mainland

influence existed at Knossos in LM II and LM IIIA1 and that the deposition of weapons in Final Palatial burials was used for different purposes such as symbolizing status or portraying a female warrior, rather than symbolizing supposed elite Mycenaean warriors. These results answered the first two research questions and have shown that the Final Palatial mortuary landscape was a time of competition and self-expression through the use of their burial customs and the deposition of grave goods. The fourteen clusters that formed through HAC answered the third research question by providing different interpretations of the Knossian and mainland MM/MH III-LM/LH IIIA1 burial customs. The final chapter summarizes the results and discusses the significance of this study and avenues for potential future research.

Chapter Seven

Conclusion

This thesis examined the burial customs of Knossian, Pylian, and Mycenaean societies using correspondence analysis and the chi-square test in order to address the three main research questions that were outlined in Chapter 1. First, can the traditional explanations for Final Palatial burial customs be challenged? Second, does the nature of Final Palatial burial customs support the theory for a mainland invasion of Crete, and lastly, can the CA patterns inform us about the society and the manners in which burials were used for social and political display. By answering these questions, the present study produced a more accurate examination of the Knossian and mainland societies in an effort to understand how these cultures used and manipulated their burial customs to display themes of social prestige and status in greater depth. The following section summarizes the results that were produced and analysed in Chapters 5 and 6 and summarizes whether or not the research questions were answered. The chapter concludes with a discussion of the significance of this study and ends with an exploration of future areas of research.

7.1: Research Questions

Can the traditional explanations for Final Palatial burial customs be challenged?

The first research question focused primarily on the traditional warrior burial interpretation which claims that burials with weapons, which were introduced on Knossos around the LM II period, housed elite Mycenaean warriors, and were often used as evidence in support of the mainland invasion theory. The results of the first hypothesis (H_1) found that the deposition of these weapons had other purposes aside from

symbolizing elite warriors, especially when deposited in conjunction with grooming items (mirrors, razors, and tweezers). The deposition of both artifact types in the grave assemblages suggests that the occupants used weapons as a way to portray social and political status. Weapons are commonly associated with strictly male burials, however, based on the fact that grooming items, particularly mirrors, are commonly found with both genders, and the evidence of female skeletons having been buried with weapons in some of the Knossian and mainland burials, it is altogether possible that, when deposited in company with grooming items, these weapons were being used by both genders to display social and political status. The appearance of this particular pair of grave goods also illustrates the ideologies that the deceased wished to portray, such as prestige and social status. A few of the weapons, mainly those from Grave Circle B and Sellopoulo Tomb 4, were far too elaborately crafted to have been used in battle, and some of the skeletons buried with the weapons were either too young to have been warriors or did not exhibit any signs of injury, thus suggesting that they were not actually warriors, but rather elites attempting to display a warrior ideology as a symbol of status, through the use of grave goods. The results of H_1 have challenged the traditional explanations of the so-called 'warrior graves' and allowed for more viable interpretations of the Final Palatial burials with weapons to come forth, where the deposition of weapons and grooming items represents a diverse way for both males and females to symbolize their status. The results have established that these burials need to stop being referred to as 'warrior graves' simply because of the large number of weapons found in the grave assemblages, as, based on these results, their presence likely held different meaning, particularly when found with grooming items.

Does the nature of Final Palatial burial customs support the argument for a mainland invasion of Crete?

The second research question asked whether it was possible that the nature of the Final Palatial burial customs supported the mainland invasion hypothesis. This question was based on the argument that the new Final Palatial grave assemblages, which included weapons, bronzes, and mainland-derived vessel shapes, were contemporary with Mycenaean burial customs (Preston 2000: 115-117; Wiener 2015: 132-134). These newly introduced grave goods have been used as evidence that a Mycenaean presence existed at Knossos starting in LM II. The results of the second hypothesis (H_2) found that the placement of mainland-derived vessel shapes (e.g. the Squat Alabastron, the Kylix, the Ephyraean Goblet, and metal vessels) in the grave assemblages began to appear in tombs around LM II and continued to be present throughout LM IIIA1. The appearance of these vessel shapes confirms that a mainland influence did exist, beginning in the LM II period when Knossos saw the first adaption of these mainland-derived pottery styles that came about through trade or migration. While the appearance of these vessel shapes in Final Palatial Knossian burials does prove the existence of some form of mainland influence, their presence cannot be used to determine whether a mainland invasion occurred on the island of Crete. Therefore, the second research question was only partially answered as these mainland-derived vessel shapes do not fully support the invasion hypothesis. Instead, their presence may represent the use of mainland-derived elements as a part of the grave assemblages as a way for the occupants to display their status and prestige.

Can these patterns inform us about the Knossian, Pylian, and Mycenaean society and the manners in which burial customs were used for social and political display?

The third research question inquired as to what the patterns that emerged from the CA maps could tell us about the Knossian, Pylian, and Mycenaean society and their use of burial customs to display social and political status. In order to answer this question, the patterns that were analyzed in Chapter 6 need to be summarized.

The first pattern revealed that much like the Final Palatial period, Neopalatial burial customs were actually used as a form of experimentation and that despite the changes that occurred between the mortuary landscape (discussed in Chapter 4), both the Neopalatial and Final Palatial burial customs were used as a means to display themes of prestige, and social status. During the Neopalatial period different areas across the island developed unique strategies for creating and expressing social identities (Preston 2000: 110). The best example comes from the Poros tombs, which are the only Neopalatial burials to incorporate foreign Mycenaean elements such as armour, as a way of displaying status, whereas the Mavro Spelio cemetery utilized different burial customs often linked with status which included the deposition of weapons and grooming items. Based on the clustering of Neopalatial and LM II tombs together this pattern also supports Preston's (1999) argument that the Final Palatial burials, particularly those from LM II, adopted previous Neopalatial elements as a way of establishing and symbolizing prestige and individuality.

The second pattern offered a different interpretation of the Final Palatial Knossian burial customs after revealing that LM IIIA1 tombs were more likely to cluster with themselves and mainland tombs, rather than with tombs from the LM II period. This pattern indicates that the LM II and LM IIIA1 burials used different burial customs to

display themes of social and political status. Where the LM II burials saw a mixture of old Neopalatial elements and new mainland-derived elements, the LM IIIA1 burials saw the use of consistent grave goods to display social and political status. This pattern suggests that the LM II and LM IIIA1 burial customs actually differ from one another and once again supports an argument made by Preston (1999) that the Final Palatial period should be broken up and studied independently in order to fully understand the way burial practices were utilized for social and political display by the Knossian society.

The third pattern found that the Mycenaean tombs clustered together based on their period of use. Beginning in the MH III-LH I period, the rich shaft graves from Grave Circle B cluster together because of their deposition of elaborate grave goods used to display wealth and social status. Following this are the LH II rich single-chamber tombs at Kalkani and the 3rd km cemetery, finally, in LH II-LH IIIA1, we have the clustering of the poorer chamber tombs that contain a large amount of pottery vessels. This pattern confirms that the Mycenaean society was an uneven time of competition amongst the elites based on the constantly changing burial customs that were used to display social and political status.

The final pattern to emerge shows the clustering of Pylian and Mycenaean tombs together. Unfortunately, this pattern does not provide any new interpretations regarding the Pylian or Mycenaean societies since it was expected that their burials would cluster together. However, it did reveal that Pylian burial customs were not exactly the same as those at Mycenae. Unlike the Mycenaean tombs, discussed above, the Pylian tombs did not cluster together based on their period of use as they are all fairly wealthy tombs whose burial customs staid relatively static throughout the MH III-LH IIIA1 periods, meaning that, like the LM IIIA1 tombs, they may have had a consistent set of grave goods

that they deposited to display prestige and social status. Their wealth and artifacts do not frequently change throughout the different periods, demonstrating that the Mycenaean burial customs changed over the years to express competition among elites, while at Pylos there remained a consistent set of grave goods used to display social and political status throughout the MH III-LHIIIA1 periods.

The patterns that emerged from the correspondence analysis provide different interpretations of the Knossian, Pylian, and Mycenaean societies and the manners in which their burial customs were used for social and political displays. Therefore, the third research question was answered because of the significant evidence provided by each pattern.

7.2: Significance of the Research

This study was the first of its kind to apply correspondence analysis to the mainland and Knossian mortuary landscapes and has shown that CA can be a practical tool for studying and comparing tombs throughout the Late Bronze Age Aegean in order to understand the various ways in which Knossian, Pylian, and Mycenaean societies each utilized their burial practices to display themes of political and social status.

Through the use of CA, this study has analyzed the similarities and differences between MM/MH III-LM/LH IIIA1 mainland Greece and Knossian mortuary practices and has examined themes of prestige and social status as they are represented through the burial customs. The results of this study are significant because they not only provide different viewpoints of the Knossian and mainland burial customs and the manner in which they are used, they also contribute to the discussion of Final Palatial Knossos and

the mainland invasion theory. The present study has found diverse approaches for understanding the new burial customs that were introduced in the Final Palatial period such as burials with weapons which are often used as concrete evidence for a Mycenaean invasion, but based on these results the practice of depositing weapons was actually used as a way to symbolize status. The study has also shown that the grave goods deposited in LM II and LM IIIA1 burials were used in different ways for social and political display and, as Preston suggests, both periods should be studied independently of each other in order to properly comprehend Final Palatial burial customs. Finally, this study has shown the difference between the Pylian and Mycenaean burial customs and how the Pylian burial customs were more consistent while Mycenaean customs was more sporadic and constantly changing throughout the periods, thus proving that Pylos needs to be studied individually without any preconceived notion of Mycenaean influence.

Overall, this thesis has paved the way for future Late Bronze Age Aegean mortuary studies with the use of CA and has set the tone for the study of further new interpretations of Final Palatial Knossian and Pylian burial customs to arise without any preconceived notion of a Mycenaean influence.

7.3: Potential for Future Research

The patterns that emerged from this study provide a natural guideline for future research to expand upon. For example, few interpretations were made regarding the mainland burial customs; therefore, future research can apply this correspondence analysis to a larger dataset of specifically mainland sites, including areas such as Dendra and Prosymna, in order to see what sort of patterns emerge and what they can tell us

about the mainland burial customs. Similarly, further studies can also expand on the patterns discovered in the Knossian mortuary landscape by applying the same CA to the rest of the island of Crete in order to see if similar patterns emerge or if new patterns emerge entirely giving us an entirely new outlook on the Cretan burial customs. The results of either of these studies would provide the opportunity to discover more diverse and significant interpretations of the Cretan and mainland mortuary landscape and the use of their burial customs.

Other avenues of potential research include further study of how burial customs were used. This thesis, and most of the other research done on the mainland and at Knossos, focused solely on how the society's burial customs were used to display themes of wealth, prestige, and social status. However, Tarlow (1992) in his study of 19th – 20th century AD English mortuary customs emphasizes that there are other social concerns that drive the creation of new mortuary practices (Preston 2000: 82). Studying the mortuary landscape offers a chance to explore not only power strategies but other themes such as selfhood and identity, responses to dealing with death, changing social conditions, and traditions. Through the use of correspondence analysis, future research can use different sets of variables in an attempt to understand how these other factors affected the Knossian, Pylian, and Mycenaean societies and the manner in which they used their burial customs.

Bibliography

Abdi, Hervé and Dominique Valentin
2007 Multiple Correspondence Analysis. In *Encyclopedia of Measurement and Statistics*, edited by Neil J. Salkind, 1-13, Sage Publications, California.

Adams, Ellen
2004 Power Relations in Minoan Palatial Towns: An Analysis of Neopalatial Knossos and Malia. *Journal of Mediterranean Archaeology* 17(2): 191-222.

Adams, Ellen
2006 Social Strategies and Spatial Dynamics in Neopalatial Crete: An Analysis of the North-Central Area. *American Journal of Archaeology* 110(1): 1-36.

Adams, Ellen
2013 Representing, Objectifying, and Framing the Body at Late Bronze Age Knossos. *Bulletin of the Institute of Classical Studies* 56: 1-25.

Alberti, Gianmarco
2013 Making Sense of Contingency Tables in Archaeology: the Aid of Correspondence Analysis to Intra-Site Activity Areas Research. *Journal of Data Science* 11: 479-499.

Alberti, Lucia
2004 The Late Minoan II-IIIA1 Warrior Graves at Knossos: The Burial Assemblages. In *Knossos: Palace, City, State: Proceedings of the Conference in Herakleion Organised by the Classical Antiquities of Herakleion in November 2000, for the Centenary of Sir Arthur Evans's Excavations at Knossos*, edited by Gerald Cadogan, Eleni Hatzaki, and Adonis Vasilakis, pp. 127-136. The British School at Athens, London.

Alexiou, Stylianos
1968 Apxatötntcg xat μvrlμsia Kpijc. *ADelt Chronika* 20: 309-316.

Bailey, Kenneth D.
1975 Cluster Analysis. *Sociological Methodology* 6: 59-128.

Barth, Fredrik
1969 Ecological Relationships of Ethnic Groups in Swat, North Pakistan. In *Environment and Cultural Behaviour – Ecological Studies in Cultural Anthropology*, edited by Andrew P. Vayda, pp. 362-376. University of Texas Press, Austin.

Baumbach, Lydia
1981 Evidence for a State of Emergency at Pylos. In *Res Mycenaeae. Akten des VII. Internationalen Mykenologischen Colloquiums in Nürnberg vom 6-10*

April 1981, edited by Alfred Heubeck and Günter Neumann, pp. 28-40. Vandenhoeck&Ruprecht, Göttingen

Baxter, Michael J. and Hilary H. Cool
2010 Correspondence Analysis in R for Archaeologists: An Educational Account. *Archeologia e Calcolatori* 21: 211-228.

Bennet, John
1985 The Structure of the Linear B Administration at Knossos. *American Journal of Archaeology* 89(2): 231-249.

Bennet, John
1990 Knossos in Context: Comparative Perspectives on the Linear B Administration of LM II-III Crete. *American Journal of Archaeology* 94(2): 193-211.

Bennet, John
1999 Pylos: The Expansion of a Mycenaean Palatial Center. In *Rethinking Mycenaean Palaces II,* edited by Michael Galaty and William Parkinson, pp. 9-18. The Cotsen Institute of Archaeology, Los Angeles.

Bennet, John and Ioannis Galanakis
2005 Parallels and Contrasts: Early Mycenaean Mortuary traditions in Messenia and Laconia. In *AUTOCHTHON: Papers Presented to O.T.P.K. Dickinson on the Occasion of his Retirement,* edited by Anastasia Dakouri-Hild and Susan Sherratt, pp. 144-155. British Archaeological Reports. Oxford.

Benzécri, Jean Paul
1969 Statistical Analysis as a tool to make patterns emerge from data. In *Methodologies of Pattern Recognition,* edited by Shinzo Watanabe, pp. 35-74. Academic Press, New York.

Betancourt, Philip P.
1998 The Chronology of the Argean Late Bronze Age: Unanswered Questions. In *Sardinian and Aegean Chronology: Towards the Resolution of Relative and Absolute Dating in the Mediterranean: Proceedings of the International Colloquium "Sardinian Stratigraphy and Mediterranean Chronology," Tufts University, Medford, Massachusetts, March 17-19, 1995,* edited by Miriam S. Balmuth and Robert H. Tykot, pp. 291-296. Oxbow Books, Oxford.

Binford, Lewis R.
1971 Mortuary Practices: Their Study and Their Potential. In *Approaches to the Social Dimensions of Mortuary Practices,* edited by James A. Brown, pp. 6-29. Memoirs 25. Society for American Archaeology, New York.

Blasius, Jörg

2011 *International Encylopedia of Statistics.* Springer, Heidelberg and Berlin.

Blegen, Carl W.
1937 *Prosymna: The Helladic Settlement Preceding the Argive Heraeum.* Cambridge University Press, Cambridge.

Blegen, Carl W., Marion Rawson
1966 *The Palace of Nestor at Pylos in Western Messenia. Vol. I. The Buildings and their Contents.* Princeton University Press, Princeton.

Blegen, Carl W., Marion Rawson, William Taylour, and William P. Donovan
1973 *The Palace of Nestor at Pylos in Western Messenia. Vol. III. Acropolis and Lower Town, Tholoi, Grave Circles and Chamber Tombs, Discoveries Outside the Citadel.* Princeton University Press, Princeton.

Bock, Tim
2017 Correspondence Analysis versus Multiple Correspondence Analysis: Which to use and When. *DisplayR* (blog), May 22. https://www.displayr.com/correspondence-analysis-versus-multiple-correspondence-analysis-use/, Accessed September 13, 2020.

Bock, Tim
2017 How to Interpret Correspondence Analysis. *DisplayR* (blog), May 19. https://www.displayr.com/interpret-correspondence-analysis-plots-probably-isnt-way-think/, Accessed September 14, 2020.

Bølvken, Erik, Ericka Helskog, Knut Helskog, Inger Marie Holm-Olsen, Leiv Solheim and Reidar Bertelsen
1982 Correspondence Analysis: An Alternative to principle Components. *World Archaeology* 14: 41-60.

Boyd, Michael J.
2002 *Middle Helladic and Early Mycenaean Mortuary Practices in the Southern and Western Peloponnese.* British Archaeological Reports International Series 1009, Archaeopress: Oxford.

Brogan Thomas M., R. Angus K. Smith and Jeffrey S. Soles
2002 Mycenaeans at Mochlos? Exploring Culture and Identity in the Late Minoan IB to IIIA1 Transition. *Aegean Archaeology* 6: 89-118.

Broodbank, Cyprian
2004 Minoanisation. *Proceedings of the Cambridge Philological Society* 50: 46-91.

Broodbank, Cyprian and Evangelia Kiriatzi

2007 The First 'Minoans' of Kythera Revisited: Technology, Demography, and Landscape in the Prepalatial Aegean. *American Journal of Archaeology* 111(2): 241-274.

Carr, Christopher
1995 Mortuary Practices: Their Social, Philisophical-Religious, Circumstantial, and Physical Determinants. *Journal of Archaeological Method and Theory* 2(2): 105-200.

Caskey, John L.
1972 Investigations in Keos. Part II: A Conspectus of the Pottery. *Hesperia* 41: 357-401.

Cavanagh, William and Christopher Mee
1998 *A Private Place: Death in Prehistoric Greece.* Vol. 25. Coronet Books Inc., London.

Chapin, Anne P.
2004 Power, Privilege, and Landscape in Minoan Art. In *XAPIΣ Essays in Honor of Sara A. Immerwahr*, edited by Anne P. Chapin, pp. 47-64. Hesperia Supplements 33. The American School of Classical Studies at Athens, Athens.

Cherry, John F.
1986 Polities and Palaces: Some problems in Minoan state formation. In *Peer Polity Interaction and Socio-Political Change,* edited by Colin Renfrew and John F. Cherry, pp. 19-45. Cambridge University Press, Cambridge.

Cherubini, Paolo, Turi Humbel, Hans Beeckman, Holger Gärtner, David Mannes, Charlotte Pearson, Wener Schoch, Roberto Tognetti, and Simcha Lev-Yadun
2014 The Olive-Branch Dating of the Santorini Eruption. *Antiquity* 88: 267-273.

Cline, Eric H.
1997 A Wrinkle in Time: Orientalia and the Mycenaean Occupation(s) of Crete. In *Ancient Egypt, the Aegean, and the Near East: Studies in Honour of Martha Rhodes Bell*, edited by Jackie Phillips, Lanny Bell, and B.B. Williams, pp. 163-167. Van Siclen Publications, San Antonio.

Cline, Eric H.
1999 The Nature of the Economic Relations of Crete with Egypt and the Near East during the Late Bronze Age. In *From Minoan Farmers to Roman Traders: Sidelights on the Economy of Ancient Crete*, edited by Louise Shaler, James Cowey, and Oliver Hoover, pp. 115-144. Franz Steiner Verlag, Stuggart.

Clouse, Robert A.

1996 *Fort Snelling, Minnesota: Intrasite Variability at a Nineteenth Century Military Post.* PhD. dissertation, Department of Anthropology, University of Illinois-Urbana. Ann Arbor.

Cook, John and John Boardman
1954 Archaeology in Greece, 1953. *Journal of Hellenic Studies* 74: 142-169.

Cosmopoulos, Michael B.
2006 The Political Landscape of Mycenaean States: A-pu_2 and the Hither Province of Pylos. *American Journal of Archaeology* 110(2): 205-228

Cutler, Joanne and Todd Whitelaw
2019 Neopalatial and Mycenaean Knossos: Urban Expansion and Collapse. In *Proceedings of the 12th International Cretological Congress,* Vol. 12. Society of Cretan Historical Studies.

Dabney, Mary K., Paul Halstead, and Patrick Thomas
2004 Mycenaean Feasting on Tsoungiza at Ancient Nemea. *Hesperia* 73: 197-215.

Darwin, Charles
1859 *The Origin of Species by Means of Natural Selection or the Preservation of Favoured Races in the Struggle for Life.* John Murray, London.

Davis, Brent
2006 Trade in Goods between Crete and Egypt in the Minoan Palace Period (ca. 1950 – ca. 1490 BCE). MA Thesis, School of Art History, Cinema, Classics, and Archaeology, The University of Melbourne, Melbourne.

Davis, Jack L.
2008 Minoan Crete and the Aegean Islands. In *The Cambridge Companion to the Aegean Bronze Age,* edited by Cynthia W. Shelmerdine, pp. 1-18. Cambridge University Press, Cambridge.

Day, Peter M., Anno Hein, Eleftheria Kardamaki, Joseph Maran, Marta Tenconi, and Paula Waiman-Barak
2020 Maritime Commodity Trade from the Near East to the Mycenaean Heartland: Canaanite jars in Final Palatial Tiryns. *Jahrbuch des Deutschen Archäologischen Instituts* 135: 1-99.

De Leeuw, Jan
1973 Canonical Analysis of Categorical Data. PhD dissertation, University of Leiden, Leiden.
De Leeuw, Jan
2013 *Correspondence Analysis of Archaeological Abundance Matrices.* UCLA: Department of Statistics, Los Angeles

DeCorse, Christopher R.
1989 Material Aspects of Limba, Yalunka, and Kuranko Ethnicity: Archaeological Research in Northeastern Sierra Leone. In *Archaeological Approaches to Cultural Identity,* edited by Sierra Leone, pp. 125-140. Unwin Hyman, London.

Deschamps, Ryan
2017 Correspondence Analysis for Historical Research with R. *The Programming Historian* (blog), September 13. https://programminghistorian.org/en/lessons/correspondence-analysis-in-R, accessed September 28 2020.

Dickinson, Oliver T.P.K.
1970 *The Origins and Development of Early Mycenaean Culture.* PhD dissertation, University of Oxford, Oxford.

Dickinson, Oliver T.P.K.
1977 *The Origins of Mycenaean Civilisation.* SIMA XLIX. Götenborg, Paul Åströms Förlag.

Dickinson, Oliver T.P.K.
1994 *The Aegean Bronze Age.* Cambridge University Press, Cambridge.

Dickinson, Oliver T.P.K.
1996 Minoans in Mainland Greece, Mycenaeans in Crete? *Cretan Studies* 5: 63-71.

Dickinson, Oliver T.P.K., Lena Papazoglou-Manioudaki, Argyro Nafplioti, and A.J.N.W. Prag
2012 Mycenae Revisited Part 4: Assessing the New Data. *The Annual of the British School at Athens* 107: 161-188.

Dietz, Søren
1991 *The Argolid at the Transition to the Mycenaean Age: Studies in the Chronology and Cultural Development in the Shaft Grave Period*. National Museum of Denmark, Copenhagen.

Dimopoulou, Nota
1999 The Neopalatial Cemetery of the Knossian harbour-town at Poros: Mortuary behaviour and social ranking. In *Eliten in der Bronzezeit,* pp. 27-36. Römische-Germanisches Zentralmuseum Monographien 43:1, Mainz.

Doey, Laura and Jessica Kurta
2011 Correspondence Analysis applied to psychological research. *Tutorials in Quantitative Methods for Psychology* 7(1): 5-14.

Doumas, Christos C.

2010 Crete and the Cyclades in the Early Bronze Age: A view from the North. In *Cretan Offerings: Studies in honour of Peter Warren*, edited by O. Krzyszkowska, pp. 101-105. BSA Studies 18. The British School at Athens, London.

Driessen, Jan
1990 The room of the Chariot Tablets reconsidered. *Proceedings of the 6th Cretological Congress, 24-30 August 1986.* Pp. 267-275. Ministry of Culture, Athens.

Driessen, Jan
2002 'The King Must Die': Some Observations on the Use of Minoan Court Compounds. In *Monuments of Minos. Rethinking the Minoan Palaces. Proceedings of the International Workshop "Crete of the hundred Palaces?" Université Catholique de Louvain, Louvain-la-Neuve, 14-15 December 2001*, edited by Jan Driessen, Isle Schoep, and Robert Laffineur, pp. 1-14. *Aegaeum* 23. Université de Liège, Liège.

Driessen, Jan
2007 IIB or not IIB: on the beginnings of Minoan monument building. In *Public Architecture in the Bronze Age Near East and Aegean*, edited by J. Bretschneider, J. Driessen, and K. van Lerberghe, pp. 73-92. Peeters: Leuven.

Driessen, Jan
2019 The Santorini Eruption. An Archaeological Investigation of its distal impacts on Minoan Crete. *Ouaternary International* 499: 195-204.

Driessen, Jan and Alexandre Farnoux
1994 Mycenaeans at Malia? *Aegean Archaeology* 1: 54-64.

Driessen, Jan and Alexandre Farnoux (editors)
1997 *La Crète Mycénienne: actes de la table ronde international organisée par l'Ecole française d'Athènes* (BCH Supplement 30). EFA, Paris.

Driessen, Jan and Colin Macdonald
1984 Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C. *The Annual of the British School at Athens* 79: 49-74.

Driessen, Jan and Isle Schoep
1995 The Architect and the Scribe. Political Implications of the Architectural and Administrative Changes on MM II-LM IIIA Crete. In *Politeia: Society and State in the Aegean Bronze Age* , edited by Robert Laffineur and Wolf-Dietrich Niemeier, pp. 649-664. *Aegaeum* 12. Kliemo SA, Eupen.

Emberling, Geoff

1997 Ethnicity in Complex Societies: Archaeological Perspectives. *Journal of Archaeological Research* 5(4): 295-344.

Eriksen, Thomas H.
1993 *Ethnicity and Nationalism: Anthropological Perspectives.* Pluto Press, London.

Evans, Arthur
1905 *The Prehistoric Tombs of Knossos.* Archaeologia, London.

Evans, Arthur
1914 *The Tomb of the Double Axes and Associated Group and Pillar Rooms and Ritual Vessels of the 'Little Palace' at Knossos.* Archaeologia, London.

Evans, Arthur
1921 *The Palace of Minos,* Vol. 1. MacMillan and Co. Limited, London.

Falconer, Christa
2014 An Examination of the Funerary Offerings Placed in Mycenaean Chamber Tombs during the Palatial and Postpalatial Periods in the Aegean. M.A. Thesis, Department of Anthropology, Trent University.

Feuer, Bryan
2011 Being Mycenaean: A View from the Periphery. *American Journal of Archaeology* 115(4): 507-536.

Fisher, Robert A.
1940 The Precision of Discriminant Functions. *Annals of Eugenics* 10: 422-429.

Fitzsimons, Rodney D.
2006 Monuments of Power and the Power of Monuments: The Evolution of Elite Architectural Styles at Bronze Age Mycenae. PhD dissertation, Department of Classics, University of Cincinnati, Cincinnati.

Fitzsimons, Rodney D.
2011 Monumental Architecture and the Construction of the Mycenaean State. In *State Formation in Italy and Greece: Questioning the Neoevolutionist Paradigm,* edited by Nicola Terrenato and Donald C. Haggis, pp. 75-118. Oxbow Books, Oxford.

Forsdyke, Edgar J.
1926/1927 The Mavro Spelio Cemetery at Knossos. *The Annual of the British School at Athens* 28: 243-296.

French, Elizabeth
1971 The Development of Mycenaean Terracotta Figurines. *Annual of the British School at Athens* 66: 101-187.

French, Elizabeth
1997 Ephyraean Goblets at Knossos: The Chicken or the Egg. In *La Crète mycénienne. Actes de la Table ronde international organisée par l'École française d'Athènes 26-28 mars 1991,* edited by Jan Driessen and Alexandre Farnoux, pp. 149-152. Ecole français d'Athènes, Athènes.

Friedrich, Walter L., Bernd Kromer, Michael Friedrich, Han Heinemeier, Tom Pfeiffer, and Sahra Talamo
2014 The Olive Branch Chronology Stands Irrespective of Tree-Ring Counting. *Antiquity* 88: 274-276.

Furumark, Arne
1972 *Mycenaean Pottery II: Chronology.* Svenska Institutet I Athen, Stolkholm.

Georganas, Ioannis
2018 'Warrior Graves; vs. Warrior Graves in the Bronze Age Aegean. In *Warfare in Bronze Age Society,* edited by Christian Horn and Kristian Kristiansen, pp. 189-197. Cambridge University Press, Cambridge.

Georgiou, Hara S.
1979 Late Minoan Incense Burners. *American Journal of Archaeology* 83: 427-435.

Gifi, Albert
1990 *Nonlinear Multivariate Analysis.* Wiley-Blackwell, Hoboken.

Gleba, Margarita
2009 Textile Tools and Specialization in Early Iron Age Female Burials. In *Gender Identities in Italy in the First Millennium BC,* edited by Edward Herring and Kathryn Lomas, pp. 69-78. Archaeopress, Oxford.

Gluckman, Max
1937 Mortuary customs and the belief in survival after death among the southeastern Bantu. *Bantu Studies* 11: 117-136.

Graziadio, Giampaolo
1991 The Process of Social Stratification at Mycenae in the Shaft Grave Period: A Comparative Examination of the Evidence. *American Journal of Archaeology* 95(3): 403-440.

Greenacre, Michael
1984 *Theory and Applications of Correspondence Analysis.* Academic Press, London.

Greenacre, Michael

2004 *The Use of Correspondence Analysis in the Exploration of Health Survey Data.* Fundaction BBVA, Bilbao.

Greenacre, Michael and Jörg Blasius (editors)
2006 *Multiple Correspondence Analysis and Related Methods.* Chapman and Hall/CRC Press, Boca Raton, Florida.

Greenwell, Brandon M. and Bradley C. Boehmke
2020 Variable Importance Plots – An Introduction to the VIP Package. *R Journal* 12(1): 343-366

Guttman, Louis
1941 The Quantification of a Class of Attributes: A Theory and Method for Scale Construction. In *The Prediction of Personal Adjustment,* edited by Paul Horst, Social Science Research Council, New York.

Haas-Lebegyev, Judit
2012 Constructions of Gendered Identity through Jewellery in Early Mycenaean Greece. In *Kosmos: Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/ 13e Recontre égéenne international, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21-26 April 2010,* edited by Marie-Louise Nosch and Robert Laffineur, pp. 425-432. *Aegaeum* 33. Peeters Publishers, Leuven.

Hallager, Erik
1977 *The Mycenaean Palace at Knossos: Evidence for the final destruction in the IIIB period. Vol 1.* Medelhavsmuseet, Stockholm.

Hallager, Birgitta and Erik Hallager
1985 The Knossian bull – Political propaganda in Neopalatial Crete? In *Politeia: Society and State in the Aegean Bronze Age*, edited by Robert Laffineur and Wolf-Dietrich Niemeier, pp. 547-556. *Aegaeum* 12. Kliemo SA, Eupen.

Hallager, Erik
1988 Final Palatial Crete. An Essay in Minoan Chronology. In *Damsgaard-Madsen, Studies in Ancient History and Numismatics presented to Rudi Thomsen,* edited by A. Christiansen and E. Hallager, pp. 11-21. Aarhus University Press, Aarhus.

Hallager, Erik
1996 *The Minoan Roundel and Other Sealed Documents in the Neopalatial Linear A Administration.* Aegaeum 14. Peeters Publishers and Booksellers, Leuven.

Hamilakis, Yannis

1998 Eating the Dead: Mortuary Feasting and the Politics of Memory in the Aegean Bronze Age Societies. In *Cemetery and Society in the Aegean Bronze Age*, edited by Keith Branigan, pp. 115-132. Sheffield Academic Press, Sheffield.

Hamilakis, Yannis

2002 Too many Chiefs? Factional Competition in Neopalatial Crete. In *Monuments of Minos. Rethinking the Minoan Palaces. Proceedings of the International Workshop "Crete of the hundred Palaces?" held at the Université Catholique de Louvain, Louvain-la-Neuve, 14-15 December 2001*, edited by Jan Driessen, Isle Schoep, and Robert Laffineur, pp. 1-14. *Aegaeum 23.* University of Liège, Liège.

Härke, Heinrich

1990 "Warrior Graves"? The Background of the Anglo-Saxon Weapon Burial Rite. *Oxford University Press on behalf of The Past and Present Society* 126: 22-43.

Harrell, Katherine

2012 The Weapon's Beauty: A Reconsideration of the Ornamentation of the Shaft Grave Swords. In *Kosmos: Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/* 13*e Recontre égéenne international, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21-26 April 2010,* edited by Marie-Louise Nosch and Robert Laffineur, pp. 799-804. *Aegaeum* 33. Peeters Publishers, Leuven.

Harrell, Katherine

2014 Man/Woman, Warrior/Maiden: The Lefkandi Toumba Female Burial Reconsidered. In *AΘYPMATA: Critical Essays on the Archaology of the Eastern Mediterranean in Honour of E.S. Sherratt,* edited by Ioannis Galanakis, Toby Wilkinson, and John Bennet, pp. 99-104. Archaeopress, Oxford.

Hatzaki, Eleni

2012 Mortuary Practices and Ideology in Bronze Age and Early Iron Age Crete. In *Parallel Lives: Ancient Island Societies in Crete and Cyprus,* edited by G. Cadogan, M. Iacovou, K. Kopaka and J. Whitley, pp. 307-313. BSA Studies 20. The British School at Athens, London.

Hess, Aaron S. and John R. Hess

2017 Understanding tests of the Association of Categorical Variables: The Pearson Chi-Square Test and Fisher's exact test. *Transfusion* 57: 877-879.

Hirschfeld, Herman O.

1935 A Connection Between Correlation and Contingency. *Mathematical Proceedings of the Cambridge Philosophical Society* 31(4): 520-524.

Hogarth, David G.
1900 Early Towns and Cemeteries. *The Annual of the British School at Athens* 6: 70-93.

Hood, Sinclair
1956 Another Warrior Grave at Ayios Ioannis near Knossos. *The Annual of the British School at Athens* 51: 81-99.

Hood, Sinclair, George Huxley, Nancy Sandars, and Alfred E. Werner
1958/1959 A Minoan Cemetery on Upper Gypsades (Knossos Survey 156). *The Annual of the British School at Athens* 53/54: 194-262.

Hood, Sinclair and John N. Coldstream,
1968 A Late Minoan Tomb at Ayios Ioannis near Knossos. *The Annual of the British School at Athens* 63: 205-218.

Hood, Sinclair and David Smyth
1981 Archaeological Survey of the Knossos area. *The British School at Athens Supplementary Volumes* 14: i-69, British School at Athens, London.

Hood, Sinclair
1983 The 'Country-House' and Minoan Society. In *Minoan Society: Proceedings of the Cambridge Colloquium 1981,* edited by O. Krzyszkowska and L. Nixon, pp. 129-135. Bristol Classical Press, Bristol.

Hood, Sinclair
1985 Warlike Destructions in Crete c. 1450 B.C. *Proceedings of the 5th Cretological Congress (Vol. A).* pp. 170-178. Ministry of Culture, Athens.

Hood, Sinclair and Piet de Jong
1952 Late Minoan Warrior-Graves from Ayios Ioannis and the New Hospital Site at Knossos. *The Annual of the British School at Athens* 47: 243-277.

Hunt, Alice M. W.
2017 *The Oxford Handbook of Archaeological Ceramic Analysis.* Oxford University Press, Oxford.

Hutchinson, R. W.
1956a A Late Minoan Tomb at Knossos. *The Annual of the British School at Athens* 51: 68-73.

Hutchinson, R. W.
1956b A Tholos Tomb on the Kephala. *The Annual of the British School at Athens* 51: 74-80.

Isaakidou, Valasia, Amy Styring, Paul Halstead, Erika Nitsch, Elizabeth Stroud, Petrus le Roux, Julia Lee-Thorp, and Amy Bogaard
2019 From Texts to Teeth: A Multi-Isotope Study of Sheep and Goat Herding practices in the Late Bronze Age ('Mycenaean') polity of Knossos, Crete. *Journal of Archaeological Science: Reports* 23: 36-56.

Jensen, Claus Kjeld and Karen Høilund Nielsen
1997 Burial Data and Correspondence Analysis. In *Burial and Society: The Chronological and Social Analysis of Archaeological Burial Data.* Aarhus University Press, Aarhus.

Joliffe, Ian T.
1986 *Principal Component Analysis.* Springer-Verlad, New York.

Jones, Siân
1997 *The Archaeology of Ethnicity: Constructing identities in the past and present.* Psychology Press, London.

Jordan, Alexis
2009 I am no Man: A Study of Warrior Women in the Archaeological Record. *Field Notes: A Journal of Collegiate Anthropology* 1(7): 94-111.

Karadimas, Nektarios and Nicoletta Momigliano
2004 On the term 'Minoan' before Evans's work in Crete (1894). *Studi micenei ed egeo-anatolici* 46(2): 243-258.

Kassabaum, Megan C.
2011 Looking Beyond the Obvious: Identifying Patterns in Coles Creek Mortuary Data. *Southeastern Archaeology* 30(2): 215-225.

Kassambara, Alboukadel
2019 Agglomerative Hierarchical Clustering. Electronic document. https://www.datanovia.com/en/lessons/agglomerative-hierarchical-clustering/. Accessed July 2021.

Kassambara, Alboukadel
2019 Diversive Hierarchical Clustering. Electronic document. https://www.datanovia.com/en/lessons/agglomerative-hierarchical-clustering/. Accessed July 2021.

Kent State University Library
2021 SPSS Tutorials: Chi-Square Test of Independence. Electronic document. https://libguides.library.kent.edu/spss/chisquare. Accessed August 2021.

Kerr, Heather K.

2012 Mortuary Variability in the Final Palatial Period on Crete: Investigating Regionality, Status, and "Mycenaean" Identity. M.A. Thesis, Department of Anthropology, Georgia State University, Atlanta.

Kilian, Klaus
1988 The Emergence of a *Wanax* Ideology in the Mycenaean Palaces. *Oxford Journal of Archaeology* 7: 291-302.

Kimes, Patrick K., Yufeng Liu, David Neil Hayes and James Stephen Marron
2017 Statistical Significance for Hierarchical Clustering. *Biometrics* 73: 811-821.

Klecka, William R.
1980 *Discriminant Analysis.* Sage Publications, Newbury Park.

Konstantinidi, Eleni M.
2001 *Jewellery revealed in the burial contexts of the Greek Bronze Age.* British Archaeological Reports, Oxford.

Kourouniotis, Konstantinos and Carl W. Blegen
1939 Excavations at Pylos, 1939. *American Journal of Archaeology* 43(4): 557-576.

Kristiansen, Kristian
1984 Ideology and Material Culture: An Archaeological Perspective. In *Marxist Perspectives in Archaeology,* edited by Matthew Spriggs, pp. 72-100. Cambridge University Press, Cambridge.

Kristiansen, Kristian
1992 Chiefdoms, States, and Systems of Social Evolution. In *Chiefdoms: Power, Economy and Ideology,* edited by Timothy K. Earle, pp. 16-43. Cambridge University Press, Cambridge.

Kroeber, Alfred L.
1927 Disposal of the Dead. *American Anthropologist* 29(3): 308-315.

Kumar, Satyam
2020 Hierarchical Clustering: Agglomerative and Divisive – Explained. *Towards data science* (blog), August 2. https://towardsdatascience.com/hierarchical-clustering-agglomerative-and-divisive-explained-342e6b20d710, accessed May 12, 2021.

Lacher, David A. and Edward D. O'Donnell
1988 Comparison of Multidimensional Scaling and Principal Component Analysis of Interspecific Variation in Bacteria. *Annals of Clinical and Laboratory Science* 18(6): 455-462.

Langdon, Susan

2008 *Art and Identity in Dark Age Greece, 1100-700 B.C.E.* Cambridge University Press, Cambridge.

Lebart, Ludovic, Alain Morineau, and Kenneth M. Warwick
1984 *Multivariate Descriptive Statistical Analysis.* John Wiley, New York.

Leith, Kristin Elizabeth
2013 Expressions of Gender in Mortuary Behaviour from Middle Helladic and Mycenaean Burial Samples in the Aegean. PhD dissertation, Institute of Archaeology, University College London, London.

Lewartowski, Kazimierz
1995 Mycenaean Social Structure: A view from simple graves. In In *Politeia: Society and State in the Aegean Bronze Age* , edited by Robert Laffineur and Wolf-Dietrich Niemeier, pp. 103-114. *Aegaeum* 12. Kliemo SA, Eupen.

Lucy, Sam
2005 Ethnic and Cultural Identities. In *The Archaeology of Identity: Approaches to gender, age, status, ethnicity and religion,* edited by Margarita Díaz-Andreu, Sam Lucy, Stasa Babic, and David N. Edwards, pp. 86-109. Routeledge, London.

Mac Sweeney, Naoíse
2008 The Meaning of 'Mycenaean'. In *SOMA 2005: Proceedings of the IX Symposium on Mediterranean Archaeology, Chieti (Italy), 24-26 February 2005*, edited by O. Menozzi, M.L. di Marzio, and D. Fossataro, pp. 105-110. *BAR International Series* 1739. British Archaeological Reports, Oxford.

Mac Sweeney, Naoíse
2009 Beyond Ethnicity: The Overlooked Diversity of Group Identities. *Journal of Mediterranean Archaeology* 22(1): 101-126.

Mackenzie, Duncan
1903 The Pottery of Knossos. *Journal of Hellenic Studies* 23: 157-205.

Manning, Stuart W., Christopher Bronk Ramsey, Walter Kutschera, Thomas Higham, Bernd Kromer, Peter Steier, and Eva M. Wild
2006 Chronology for the Aegean Late Bronze Age 1700-1400 BC. *Science* 312(5773): 565-569.

Manning, Stuart W., Felix Höflmayer, Nadine Moeller, Michael W. Dee, Christopher Bronk Ramsey, Dominik Fleitmann, Thomas Higham, Walter Kutschera, and Eva M. Wild
2014 Dating the Thera (Santorini) Eruption: Archaeological and Scientific Evidence Supporting a High Chronology. *Antiquity* 88: 1164-1179.

Manning, Stuart W.
2010 Chronology and Terminology. In *The Oxford Handbook of the Bronze Age Aegean (ca. 3000-1000 BC)*, edited by Eric Cline, pp. 11-28. Oxford University Press, Oxford.

Marinatos, Spyridon
1927-1928 Isterominoikos laxeutos taphos en Kartero, Kritis. *Deltion* 11

Marinatos, Spyridon
1939 The Volcanic Destruction of Minoan Crete. *Antiquity* 13(52): 425-439

Marinatos, Nanno
1993 *Minoan Religion. Ritual, Image and Symbol.* University of South Carolina Press, Columbia.

McEnroe, John C.
2010 *Architecture of Minoan Crete: Constructing Identity in the Aegean Bronze Age.* University of Texas Press, Austin

McHugh, Mary L.
2013 The Chi-square test of independence. *Biochemia Medica* 23(2): 143-149.

McNeal, R.A.
1973 The Legacy of Arthur Evans. *California Studies in Classical Antiquity* 6: 205-220.

Megarry, William
2012 Experiencing the Mountain in Minoan Crete: Exploring the Evolution of a Bronze Age Sacred Landscape using GIS. PhD Thesis, Department of Philosophy, Queen's University, Belfast.

Merousis, Nikos
2002 Changes in the Economic and Administrative Organization of Crete in the Late Minoan II-III Period: A new proposal. *The Annual of the British School at Athens* 97: 163-169.

Molloy, Barry P. C.
2012 Martial Minoans? War as a Social Process, Practice and Event in Bronze Age Crete. *The Annual of the British School at Athens* 107: 87-142.

Morgan, Lewis
1877 *Ancient Society.* Henry Holt and Co., New York.

Muhly, James D.
1973 Tin Trade Routes of the Bronze Age: New Evidence and New Techniques aid in the Study of Metal Sources of the Ancient World. *American Scientist* 61(4): 404-413.

Murphy, Joanne M.A.
2014 The Varying Place of the Dead in Pylos. In *KE-RA-ME-JA: Studies Presented to Cynthia W. Shelmerdine,* edited by Dimitri Nakassis, Joann Gulizio, and S.A. James, pp. 209-221. INSTAP Academic Press, Philadelphia.

Murphy, Joanne M.A., Sharon R. Stocker, Jack L. Davis, and Lynne A. Schepartz
2020 Late Bronze Age Tombs at the Palace of Nestor, Pylos. In *Death in Late Bronze Age Greece: Variations on a Theme,* edited by Joanne M.A. Murphy, pp. 26-44. Oxford University Press, Oxford.

Mylonas, George E. and John K. Papademetriou
1952 The New Shaft Graves of Mycenae. *Archaeology* 5(4): 194-200.

Mylonas, George E. and John K. Papademetriou
1955 The New Grave Circle of Mycenae. *Archaeology* 8(1): 43-50.

Mylonas, George E.
1957 *Ancient Mycenae: The Capital City of Agamemnon.* Princeton University Press, Princeton.

Mylonas, George E.
1966 *Mycenae and the Mycenaean Age.* Princeton University Press, Princeton.

Mylonas, George E.
1973 *Mycenae: A Guide to its Ruins and its History.* Ekdotiki Hellados, Athens.

Nafplioti, Argyro
2008 "Mycenaean" Political Domination of Knossos following the Late Minoan IB Destructions on Crete: Negative Evidence from Strontium Isotope Ratio Analysis ($^{87}Sr/^{86}Sr$). *Journal of Archaeological Science* 35: 2307-2317.

Nafplioti, Argyro
2012 Late Minoan IB Destructions and Cultural Upheaval of Crete: A Bioarchaeological Perspective. In *Population Dynamics in Prehistory and Early History: New Approaches using Stable Isotopes and Genetics,* edited by Elke Kaiser, Joachim Burger, and Wolfram Schier, pp. 241-263. De Gruyter, Berlin.

Nakassis, Dimitri, William A. Parkinson, and Michael L. Galaty
2011 Redistribution in Aegean Palatial Societies. Redistributive Economies from a Theoretical and Cross-Cultural Perspective. *American Journal of Archaeology* 115(2): 177-184).

Namuth-Covert, Deana M., Heather L. Merk, and Courtney Haines

2012 Chi-Square Test for Goodness of Fit in a Plant Breeding Example. *Journal of natural resources and life sciences education* 14(1): 22.

Nesbitt, Joseph Edward
1966 *Chi Square.* Manchester University Press, Manchester.

Niemeier, Wolf-Dietrich
1983 The Character of the Knossian Palace Society in the second half of the fifteenth century B.C.: Mycenaean or Minoan? In *Minoan Society. Proceedings of the Cambridge Colloquium 1981,* edited by Olga Krzyszkowska and Lucia Nixon, pp. 217-236. Bristol Classical Press, Bristol.

Niemeier, Wolf-Dietrich
1985 The Archaeological Dating of the Knossian Linear B tablets reconsidered. In *Proceedings of the 5th Cretological Congress (Vol. A),* pp. 259-263. Ministry of Culture, Athens.

Niemeier, Wolf-Dietrich
1994 Knossos in the New Palace Period (MM III-LMIB). In *Knossos, A Labyrinth of History: Papers presented in honour of Sinclair Hood,* edited by D. Evely, H. Hughes-Brock, and N. Momigliano, pp. 71-88. British School at Athens, Athens.

Niemeier, Wolf-Dietrich
2004 When Minos ruled the waves: Knossian power overseas. In *Knossos: Palace, City, State: Proceedings of the Conference in Herakleion Organised by the Classical Antiquities of Herakleion in November 2000, for the Centenary of Sir Arthur Evans's Excavations at Knossos,* edited by Gerald Cadogan, Eleni Hatzaki, and Adonis Vasilakis, pp. 393-398. The British School at Athens, London.

Niemeier, Wolf-Dietrich
2009 'Minoanisation' versus 'Minoan thalassocrassy' – an introduction. In *Minoans in the central, eastern and northern Aegean: new evidence: acts of a Minoan seminar 22-23 January 2005 in collaboration with the Danish Institute at Athens and the German Archaeological Institute at Athens: Monographs of the Danish Institute at Athens v. 8.,* edited by Colin F. Macdonald, Erik Hallager, and Wolf-Dietrich Niemeier, pp. 11-29. Danish Institute at Athens, Athens.

Nishisato, Shizuhiko
1980 Dual scaling of successive categories data. *Japanese Psychological Research* 22(3): 134-143.

Nikolakopoulou, Irene
2013 Middle Minoan III beyond Crete: the evidence from Thera. In *Intermezzo: Intermediacy and Regeneration in Middle Minoan III Palatial Crete,*

edited by C. F. McDonald and C. Knappett, pp. 213-219. BSA Studies 21. The British School at Athens, London.

Nikolakopoulou, Irene and Carl Knappett
2016 Mobilities in the Neopalatial Southern Aegean: The Case of Minoanisation. In *Human Mobility and Technology Transfer in the Prehistoric Mediterranean,* edited by Evangelia Kiriatzi and Carl Knappett, pp. 102-115. Cambridge University Press, Cambridge.

Nikolakopoulou, Irene
2020 Minoan and Minoanising Imagery: Myths and Realities. In *Current Approaches and New Perspectives in Aegean Iconography,* edited by Fritz Blakolmer, pp. 273-292. Presses Universitaires de Louvain, Leuven.

Nixon, Lucia
1999 Women, Children and Weaving. In *Meletemata Studies in Aegean Archaeology Presented to Malcolm H. Wiener as he enters his 65th year,* edited by Paul Betancourt, Vassos Karageorghis, Robert Laffineur, and Wolf-Dietrich Niemeier, pp. 561-567. University of Liège, Liège.

Nordquist, Gullög
1997 Male Craft and Female Industry. In *TEXNH. Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age,* edited by Robert Laffineur and Paul Betancourt, pp. 533-537. University of Liège, Liège.

Nosch, Marie-Louise
2012 From Texts to Textiles in the Aegean Bronze Age. In *Kosmos: Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/* 13*e Recontre égéenne international, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21-26 April 2010,* edited by Marie-Louise Nosch and Robert Laffineur, pp. 43-53. *Aegaeum* 33. Peeters Publishers, Leuven.

Olsen, Barbara A.
1998 Women, Children and Family in the Late Aegean Bronze Age: Differences in Minoan and Mycenaean Constructions of Gender. *World Archaeology* 29(3): 380-392.

Owens, Gareth
1998 Late Minoan II Knossos; Minoan and/or Mycenaean? *Talanta XXX/XXXI 1999:* 147-154.

Pakenham-Walsh, Marigold and Alan J. B. Wace
1955 Mycenae 1939-1954: Part II. The Prehistoric Cemetery: Graves Below the House of the Warrior Vase. *The Annual of the British School at Athens* 50: 190-193.

Panagiotopoulos, Diamantis

2012 *Minoan Realities: Approaches to Images, Architecture, and Society in the Aegean Bronze Age.* Presses universitaires de Louvain, Louvain la-Neuve.

Parkinson, William A. and Michael L. Galaty
2007 Secondary States in Perspective: An Integrated Approach to State Formation in the Prehistoric Aegean. *America Anthropologist* 109: 113-129.

Paschalidis, Constantinos
2012 Reflections of Eternal Beauty. The Unpublished Context of a Wealthy Female Burial from Koukaki, Athens and the Occurrence of Mirrors in Mycenaean Tombs. In *Kosmos: Jewellery, Adornment and Textiles in the Aegean Bronze Age. Proceedings of the 13th International Aegean Conference/* 13e *Recontre égéenne international, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21-26 April 2010,* edited by Marie-Louise Nosch and Robert Laffineur, pp. 547-557. *Aegaeum* 33. Peeters Publishers, Leuven.

Pearson, Michael P.
1982 Mortuary practices, society and ideology: An ethnoarchaeological study. In *Symbolix and Structural Archaeology,* edited by Ian Hodder, pp. 99-114. Cambridge University Press: Cambridge.

Perna, Massimo
2014 The birth of Administration and Writing in Minoan Crete: Some Thoughts on Hieroglyphics and Linear A. In *KE-RA-ME-JA: Studies Presented to Cynthia W. Shelmerdine,* edited by Dimitri Nakassis, Joann Gulizio, and Sarah A. James, pp. 251-260. INSTAP Academic Press, Philadelphia.

Persson, Axel W.
1931 *The Royal Tombs at Dendra near Midea.* C.W.K. Gleerup, Lund.

Picard, Charles
1948 *Les Religions Préheléniques (Crète et Mycènes).* Presses Universitaires de France, Paris.

Platon, Nikolaos
1966 *Crete.* World Publishing Company, New York.

Popham, Mervyn R.
1994 Late Minoan II to the end of the Bronze Age. In *Knossos: A Labyrinth of History. Papers Presented in Honour of Sinclair Hood, British School at Athens,* edited by D. Evely, Helen Hughes-Brock, and Nicoletta Momigliano, pp. 89-103. Oxbow Books, Oxford.

Popham, Mervyn R., E.A. Catling, and Hector W. Catling
1974 Sellopoulo Tombs 3 and 4, Two Late Minoan Graves near Knossos. *The Annual of the British School of Athens* 69: 195-257.

Preston, Laura
1999 Mortuary Practices and the Negotiations of Social Identities at LM II Knossos. *The Annual of the British School at Athens* 94: 131-143.

Preston, Laura
2000 A Mortuary Approach to Cultural Interaction and Political Dynamics on Late Minoan II-IIIB Crete. PhD dissertation, Institute of Archaeology, University College London, London.

Preston, Laura
2004 A Mortuary Perspective on Political Changes in Late Minoan II-IIIB Crete. *American Journal of Archaeology* 108(3): 321-348.

Preston, Laura
2005 The Kephala Tholos at Knossos: A Study in the Reuse of the Past. *The Annual of the British School at Athens* 100: 61-123.

Preston, Laura
2007 The Isopata Cemetery at Knossos. *The Annual of the British School at Athens* 102: 257-314.

Preston, Laura
2008 A Mortuary Perspective on Political Changes in Late Minoan II-IIIB Crete. *American Journal of Archaeology* 108(3): 321-348.

Preston, Laura
2013 The Middle Minoan III Funerary Landscape at Knossos. In *Intermezzo: Intermediacy and Regeneration in Middle Minoan III Palatial Crete,* edited by C.F. McDonald and C. Knappett, pp. 57-70. BSA Studies 21. The British School at Athens, London

Rahmstorf, Lorenz
2015 An Introduction to the investigation of Archaeological Textile Tools. In *Tools, Textiles and Contexts. Investigating Textile Production in the Aegean and Eastern Mediterranean Bronze Age,* edited by Eva Andersson Strand and Maria-Louise Nosch, pp. 1-23. Ancient Textiles Series 8, Oxbow Books, Oxford.

Rakita, Gordon F. M., Jane E. Buikstra, Lane A. Beck, and Sloan R. Williams (editors)
2005 *Interacting with the Dead: Perspectives on Mortuary Archaeology for the New Millennium.* University Press of Florida, Gainesville.

Randsborg Klavs and Robert Chapman
1981 Approaches to the Archaeology of Death. In *The Archaeology of Death,* edited by Robert Chapman, Ian Kinnes, and Klavs Randsborg, pp. 1-24. Cambridge University Press, Cambridge.

Rehak, Paul
1997 Aegean Art Before and After the LM IB Cretan Destructions. In *Techne: Craftsmen, Craftswomen and Craftsmanship in the Aegean Bronze Age: Proceedings of the 6th International Aegean Conference, 18-21 April 1996*, edited by Robert Laffineur and Paul Betancourt. Pp. 51-66. *Aegaeum* 16. University of Liège, Liège.

Rehak, Paul and John G. Younger
1998 Review of Aegean Prehistory VII: Neopalatial, Final Palatial, and Postpalatial Crete. *American Journal of Archaeology* 102(1): 91-173.

Ringrose, Trevor
1988 Correspondence Analysis for Stratigraphic Abundance Data. In *Computer and Quantitative Methods in Archaeology 1987*, edited by Clive L.N. Ruggles and Sebastian P.Q. Rahtz, pp. 3-14. BAR International Series 393, Oxford.

Rutter, Jeremy
2021 Aegean Prehistoric Archaeology. Electronic document. https://sites.dartmouth.edu/aegean-prehistory/. Accessed August 2021.

Saxe, Arthur
1970 Social Dimensions of Mortuary Practices. PhD dissertation, Department of Anthropology, University of Michigan, Ann Arbor.

Schoep, Ilse
1999 Tablets and Territories? Reconstructing Late Minoan IB Political Geography through Undeciphered Documents. *American Journal of Archaeology* 103(2): 201-221.

Schoep, Ilse
2004 The socio-economic context of seal use and administration at Knossos. In *Knossos: Palace, City, State: Proceedings of the Conference in Herakleion Organised by the Classical Antiquities of Herakleion in November 2000, for the Centenary of Sir Arthur Evans's Excavations at Knossos,* edited by Gerald Cadogan, Eleni Hatzaki, and Adonis Vasilakis, pp. 283-293. The British School at Athens, London.

Schoep, Ilse
2006 Looking beyond the First Palaces: elites and the agency of power in EM III-MM II Crete. *AJA* 110: 37-64.

Shanks, Michael and Tilley, Christopher
1982 Ideology, Symbolic Power and Ritual Communication: A Reinterpretation of Neolithic Mortuary Practices. In *Symbolic and Structural Archaeology,*

edited by Ian Hodder, pp. 129-154. Cambridge University Press, Cambridge.

Shaw, Joseph W.
2015 *Elite Minoan Architecture: Its Development at Knossos, Phaistos, and Malia.* INSTAP Academic Press, Philidelphia.

Shelmerdine, Cynthia
2008 Background Sources and Methods. In *The Cambridge Companion to the Aegean Bronze Age*, edited by Cynthia W. Shelmerdine, pp. 1-18. Cambridge University Press, Cambridge.

Shelton, Kim S.
1993 Tsountas' Chamber Tombs at Mycenae. *Archaiologike Ephemeris*: 187-210.

Shelton, Kim S.
2000 Four Chamber Tomb Cemeteries at Mycenae. *Archaiologike Ephemeris*: 27-64.

Sourial, Nadia, Christina Wolfson, Bin Zhu, Jacqueline Quail, John Fletcher, Sathya Karunananthan, Karen Bandeen-Roche, François Béland and Howard Bergman
2010 Correspondence Analysis is a Useful Tool to Uncover the Relationships Among Categorical Variables. *Journal of Clinical Epidemiology* 63: 638-646.

Steel, Louise
1998 The Social Impact of Mycenaean Imported Pottery in Cyprus. *The Annual of the British School at Athens* 93: 285-296.

Stratton, Susan
2016 "Seek and you Shall Find". How the Analysis of Gendered Patterns in Archaeology can Create False Binaries: A Case Study from Durankulak. *Journal of Archaeological Method and Theory* 23(3): 854-869.

Stubbings, Frank H.
1947 The Mycenaean Pottery of Attica. *The Annual of the British School at Athens* 42: 1-75

Tainter, Joseph
1978 Mortuary Practices and the Study of Prehistoric Social Systems. *Advances in Archaeological Method and Theory* 1: 105-141.

Târlea, Alexandra
2004 Playing by the Rules: Swords and Swordfighters in the Mycenaean Society. *Dacia* 48(9): 125-150.

Tartaron, Thomas
2007 Aegean Prehistory as World Archaeology: Recent Trends in the Archaeology of Bronze Age Greece. *Journal of Archaeological Research* 16: 83-161.

Tomkins, Peter
2012 Beyond the Horizon: Reconsidering the Genesis and Function of the 'First Palace' at Knossos (Final Neolithic IV-Middle Minoan IB). In *Back to the Beginning: Reassesing social and political complexity on Crete during the Early and Middle Bronze Age,* edited by Ilse Schoep, Peter Tomkins, and Jan Driessen, pp 32-80. Oxbow Books: Oxford.

Tournavitou, Iphigeneia
1992 Practical Use and Social Function: A Neglected Aspect of Mycenaean Pottery. *The Annual of the British School at Athens* 87: 181-210

Treherne, Paul
1995 The Warrior's Beauty: The Masculine Body and Self-Identity in Bronze-Age Europe. *Journal of European Archaeology* 3(1): 105-144.

Tylor, Edward
1871 *Primitive Culture.* John Murray, London.

Tylor, Edward
1881 *Anthropology an Introduction to the Study of Man and Civilization.* MacMillan and Co., London.

Vaughan, Liwen
2001 *Statistical Methods for the Information Professional: A Practical, Painless Approach to understanding, using, and interpreting Statistics.* Vol. 367. Information Today Inc., Medford.

Verduci, Josephine and Brent Davis
2015 Adornment, Ritual and Identity: Inscribed Minoan Jewellery. *The Annual of the British School at Athens* 110: 51-70.

Voutsaki, Sofia
1995 Social and Political Processes in the Mycenaean Argolid: The Evidence from the Mortuary Practices. In *Politeia: Society and State in the Aegean Bronze Age. Proceedings of the 5th International Aegean Conference, University of Heidelberg, Archäologisches Institut 10-13 April 1994,* edited by Robert Laffineur and Wolf-Dietrich Niemeier, pp. 55-66. *Aegaeum* 12. Université de Liège, Liège.

Voutsaki, Sofia
1997 The Creation of Value and Prestige in the Aegean Late Bronze Age. *Journal of European Archaeology Archives* 5(2): 34-52.

Voutsaki, Sofia
1998 Mortuary Evidence, Symbolic Meanings and Social Change: A Comparison between Messenia and the Argolid in the Mycenaean Period. In *Cemetery and Society in the Aegean Bronze Age*, edited by Keith Branigan, pp. 41-58. Sheffield Studies in Aegean Archaeology 1. Sheffield Academic Press, Sheffield.

Voutsaki, Sofia
1999 Mortuary Display, Prestige and Identity in the Shaft Grave Era. In *Eliten in der Bronzezeit: Ergehnisse zweier Kolloquien in Mainz und Athen*, edited by Kilian-Dirlmeier and M. Egg, pp. 103-117. Mainz, Verlag des Römisch-Germanischep Zentralmuseums.

Voutsaki, Sofia
2012 From Value to Meaning, from Things to Persons: The Grave Circles of Mycenae Reconsidered. In *The Construction of Value in the Ancient World*, edited by Gary Urton and John K. Papadopoulos, pp. 160-185. Cotsen Institute of Archaeology, Los Angeles.

Wace, Alan J.B.
1949 *Mycenae: An Archaeological History and Guide.* Princeton University Press, Princeton.

Wace, Alan J.B.
1950 Excavations at Mycenae, 1939. *The Annual of the British School at Athens* 45: 203-228.

Wace, Alan J.B.
1951 Mycenae 1950. *Journal of Hellenic Studies* 71: 254-257.

Wace, Alan J.B.
1953 Mycenae 1939-1952. Part I. Preliminary Report on the Excavations of 1952. *The Annual of the British School at Athens* 48: 3-18.

Wace, Alan J.B.
1955 Mycenae 1939-1954. Part II. The Prehistoric Cemetery: Graves below the House of the Warrior Vase. *The Annual of the British School at Athens* 50: 190-191.

Wace, Alan J.B.
1956 Mycenae 1939-1955. Part I. Preliminary Report on the Excavations of 1955. *The Annual of the British School at Athens* 51: 103-122.

Wace, Alan J.B. et al.
1957 Mycenae 1939-1956, 1957. Part IV. Prehistoric Cemetery: A Deposit of LH III Pottery. *The Annual of the British School at Athens* 52: 207-219.

Wace, Alan and Frank H. Stubbings
1954 Mycenae 1939-1953. Part II. The Grave Circle. *The Annual of the British School at Athens* 49: 244-247.

Wace, Alan J.B. and Carl Blegen
1916/1917-1917/1918 The Pre-Mycenaean Pottery of the Mainland. *The Annual of the British School at Athens* 22: 175-189.

Wace, Alan J.B., Walter A. Heurtley, Winifred Lamb, Leicester B. Holland, and C.A. Boethius
1921/1922-1922/1923 The Report of the School Excavations at Mycenae, 1921-1923. *The Annual of the British School at Athens* 25: 1-434.

Wace, Alan J. B.
1932 *Chamber Tombs at Mycenae. Archaeologia LXXXII.* Society of Antiquities, Oxford.

Warren, Peter M. and Vrowny Hankey
1989 *Aegean Bronze Age Chronology.* Bristol Classical Press, Bristol.

Watrous, Livingston V.
1993 Cretan Relations with the Aegean in the Late Bronze Age. In *Wace and Blegen: Pottery as Evidence for Trade in the Aegean Bronze Age 1939-1989*, edited by C. Zerner, P. Zerner, and J. Winder, pp. 81-90. J.C. Grieben, Amsterdam.

Weingarten, Judith
1990 Three Upheavals in Minoan Sealing Administration: Evidence for Radical Change. In *Aegean Seals, Sealings and Administration: Proceedings of the NEH-Dickinson Conference of the Program in Aegean Scripts and Prehistory of the Department of Classics, University of Texas at Austin, 11-13 January 1989*, edited by T. Palaima, pp. 105-120. *Aegaeum* 5. University of Liège, Liège.

Whitelaw, Todd
2004 Estimating the Population of Neopalatial Knossos. In *Knossos: Palace, City, State: Proceedings of the Conference in Herakleion Organised by the Classical Antiquities of Herakleion in November 2000, for the Centenary of Sir Arthur Evans's Excavations at Knossos,* edited by Gerald Cadogan, Eleni Hatzaki, and Adonis Vasilakis, pp. 147-158. The British School at Athens, London.

Whitelaw, Todd
2005 A Tale of Three Cities: Chronology and Minoanisation at Phylakopi on Melos. In *AUTOCHTHON: Papers Presented to O.T.P.K. Dickinson on the Occasion of his Retirement,* edited by Anastasia Dakouri-Hild and Susan Sherratt, pp. 37-69. British Archaeological Reports. Oxford.

Whitelaw, Todd
2011 The Urbanisation of Prehistoric Crete: Settlement Perspectives on Minoan State Formation. In *Back to the Beginning: Reassessing Social and Political Complexity on Crete during the Early and Middle Bronze Age,* edited by Ilse Schoep, Peter Tomkins, and Jan Driessen, pp. 114-176. Oxbow Books, Oxford.

Whitley, James
2002 Objects with Attitude: Biographical Facts and Fallacies in the Study of Late Bronze Age and Early Iron Age Warrior Graves. *Cambridge Archaeological Journal* 12: 217-232.

Whittlesey, Stephanie M. and J, Jefferson Reid
2001 Mortuary Ritual and Organizational Inferences at Grasshopper Pueblo, Arizona. In *Ancient Burial Practices in the American Southwest: Archaeology, Physical Anthropology, and Native American Perspectives,* edited by Douglas R. Mitchell and Judy L. Brunson-Hadley, pp. 68-96. University of New Mexico Press, Albuquerque.

Wiener, Malcolm H.
1987 Trade and rule in Palatial Crete. In *The Function of the Minoan Palaces: Proceedings of the 4th international symposium at the Swedish Institute in Athens 10-16 June 1984,* edited by R. Hägg and N. Marinatos, pp. 261-267. Paul Åströms Förlag, Stockholm.

Wiener, Malcolm
1990 Round-Table Comments. In *Aegean Seals, Sealings and Administration, Proceedings of the NEH-Dickinson Conference of the Program in Aegean Scripts and Prehistory of the Department of Classics, University of Texas at Austin, 11-13 January 1989,* edited by Thomas G. Palaima, pp. 236-239. *Aegaeum* 5, University of Liège, Liège.

Wiener, Malcolm
2007 Neopalatial Knossos: Rule and Role. In *Krinoi Kai Limenes: Studies in Honor of Joseph and Maria Shaw,* edited by Philip P. Betancourt, Michael C. Nelson, and Hector Williams, pp. 231-242. INSTAP Academic Press, Philadelphia.

Wiener, Malcolm
2010 A point in time. In *Cretan Offerings: Studies in honour of Peter Warren,* edited by O. Krzyszkowska, pp. 367-394. BSA Studies 18. The British School at Athens, London.

Wiener, Malcolm
2013 Realities of Power: The Minoan Thalassocracy in Historical Perspective. In *AMILLA: The Quest for Excellence. Studies Presented to Guenter*

Koncke in Celebration of his 75th Birthday, edited by R.B. Koehl, pp. 149-173. INSTAP Academic Press, Philadelphia.

Wiener, Malcolm
2015 The Mycenaean Conquest of Minoan Crete. In *The Great Islands: Studies of Crete and Cyprus Presented to Gerald Cadogan*, edited by Colin F. Macdonald, Eleni Hatzaki and Stelios Andreou, pp. 131-143. Kapon Editions, Athens.

Wright, James C.
1987 Death and Power at Mycenae: Changing Symbols in Mortuary Practice. In *Thanatos: Les coutumes funéraires en Egée à l'âge du Bronze. Actes du colloque de Liège, 21-23 avril 1986*, edited by Robert Laffineur, pp. 171-184. *Aegaeum* 1. University of Liège, Liège.

Younger, John G.
1992 Representations of Minoan – Mycenaean Jewelry. In *Eikon: Aegean Bronze Age Iconography: Shaping a Methodology: Proceedings of the 4th International Aegean Conference, University of Tasmania, Hobart, Australia, 6-9 April 1992*, edited by Robert Laffineur and Janice L. Crowley, pp. 257-293. University of Michigan, Ann Arbor.

Zach
2021 The Four Assumptions of a Chi-Square Test. Electronic document, https://www.statology.org/chi-square-test-assumptions/, accessed March 9, 2022.

Appendix I

Data used for the Correspondence Analysis

Site Key:

MS: Mavro Spelio
GYP: Gypsades
PO: Poros
K: Katsambas
AI: Ayios Ioannis
NH: New Hospital
IS: Isopata
ZP: Zafer Papoura
S: Sellopoulo
KE: Kephala Tholos Tomb
LM: LM Tombs
GC: Grave Circle
KN: Kalkani North
KS: Kalkani South
PYL: Pylos
CTT: Cyclopean Tholos Tomb
ATT: Aegisthus Tholos Tomb
PRE: Prehistoric Cemetery
3rd KM: 3rd KM Cemetery

Sites	Weapons	Armour	Figurines	Grooming	Ornaments	Manufacture	Special Vessels	Drinking /Pouring	Feasting /Serving	Storage
MS Tomb I	0	0	0	0	0	0	1	1	0	0
MS Tomb III	1	0	1	1	1	0	1	1	0	1
MS Tomb V	1	0	0	1	1	1	1	1	0	1
MS Tomb VI	0	0	0	0	1	0	1	1	0	1
MS Tomb VII	1	0	1	1	1	1	1	1	1	1
MS Tomb IX	1	0	0	1	1	0	1	1	0	1
MS Tomb XV	0	0	0	1	1	0	0	0	0	1

MS Tomb XVI	0	0	0	0	0	0	1	1	0	0
MS Tomb XVII	1	0	0	1	1	0	0	1	1	1
MS Tomb XX	1	0	0	1	1	1	1	0	0	0
P Tomb 5 OP	1	1	0	1	1	1	1	1	0	1
P Tomb 1 OT	1	1	1	1	1	1	0	1	0	0
P Tomb LI	0	0	0	0	1	1	1	1	1	1
K Tomb A	0	0	0	0	1	0	1	1	0	1
K Tomb B	1	0	0	0	1	1	1	1	1	1
K Tomb Delta	0	0	0	0	0	0	1	1	0	1
K Tomb E	1	0	0	0	1	0	0	1	0	1
K Tomb Z	0	0	0	0	0	0	1	1	1	1
K Tomb H	0	0	0	1	1	1	1	1	1	1
LM Tomb	1	0	0	0	1	0	1	1	1	1
GYP XVIII	0	0	1	0	1	1	1	1	1	1
KE Tholos	1	0	0	1	1	1	1	1	1	1
AI Tomb I	1	0	0	1	1	0	1	1	0	0

AI	1	0	0	0	0	0	1	1	1	1
Tomb II										
NH I	0	0	0	1	1	0	1	1	0	1
NH III	1	0	0	1	1	1	1	1	0	1
NH V	1	1	0	0	1	1	1	0	1	1
IS	1	0	0	1	1	0	1	1	1	1
Royal Tomb										
IS I	0	0	0	0	1	0	1	0	0	1
IS IA	1	0	0	0	1	0	0	1	0	0
IS 2	1	0	0	1	1	1	1	1	0	1
IS 3	1	0	0	1	1	1	0	1	0	1
IS 4	0	0	0	0	0	0	0	1	1	1
IS 5	0	0	0	0	1	0	1	1	0	1
IS 6	0	0	1	1	1	0	1	1	1	1
IS 7	0	0	0	0	0	1	0	1	0	1
ZP 1	1	0	0	0	0	1	0	1	0	1
ZP 6	0	0	0	1	1	1	0	1	1	1
ZP 7	1	0	0	1	1	0	0	1	0	1
ZP 10	1	0	0	1	0	0	0	1	0	0
ZP 12	1	0	0	0	1	1	0	0	0	1
ZP 14	1	0	0	1	0	0	1	1	1	0
ZP 21	0	0	0	1	1	1	0	0	1	0
ZP 35	0	0	0	0	1	1	0	1	0	0
ZP 36	1	0	0	1	1	0	0	1	1	0
ZP 64	1	0	0	1	0	0	0	1	0	1
ZP 66	0	0	0	1	1	0	0	1	1	0
ZP 67	0	0	0	1	1	0	0	1	1	0
ZP 76	1	0	0	1	0	1	0	1	0	1
ZP 81	1	0	0	0	1	1	0	0	0	0
ZP 92	1	0	0	0	1	1	0	0	1	0
ZP 95	1	0	0	1	0	1	0	0	1	1
ZP 96	0	0	0	0	1	0	0	1	1	0
ZP 98	1	0	0	1	0	0	0	1	1	0
ZP 99	0	0	0	1	1	0	0	1	1	1
ZP 100	0	0	0	0	1	1	0	1	0	0
S 3	1	0	0	1	1	0	1	1	1	0
S 4	1	0	0	1	1	1	1	1	1	1
GC BETA	1	0	0	0	1	0	0	1	0	1
GC GAMMA	1	0	0	1	1	0	1	1	1	1

GC DELTA	1	0	0	0	0	0	0	1	1	1
GC EPSILON	0	0	0	0	1	0	0	1	0	1
GC IOTA	1	0	0	1	1	1	0	1	0	0
GC LAMBDA	1	0	0	0	1	0	0	1	0	1
GC MU	0	0	0	0	1	0	1	1	1	1
GC NU	1	1	0	1	1	0	1	1	1	1
GC XI	0	0	0	0	1	0	1	1	1	1
GC OMICRON	0	0	0	0	1	0	1	1	1	1
3RDKM502	0	0	1	0	1	1	1	1	0	1
KN 520	0	0	0	0	1	1	0	1	1	1
KN 521	0	0	1	0	1	1	1	1	0	1
KN 522	0	0	1	0	0	0	0	1	0	1
KN 523	0	0	0	0	1	1	0	1	0	1
KN 524	0	0	1	0	1	1	1	1	0	1
KN 531	0	0	1	0	0	0	0	1	1	1
KS 513	0	0	1	0	1	1	0	0	0	1
KS 515	1	1	0	1	1	1	1	1	1	1
KS 516	0	0	0	0	1	1	0	1	1	1
KS 517	0	1	0	0	1	1	1	1	1	1
KS 518	1	1	0	1	1	1	1	1	1	1
KS 519	0	0	1	0	1	1	1	1	0	1
KS 525	0	0	1	0	0	1	0	1	0	1
KS 527	0	0	1	0	0	0	0	1	0	1
KS 529	1	0	0	1	1	1	1	1	1	1
KS 530	0	0	0	0	1	1	1	1	1	1
KS 532	0	0	0	0	1	1	1	1	1	1
KS 533	1	0	0	0	0	1	0	1	1	1
PRE III	0	0	0	0	1	0	1	1	1	0
CTT	1	0	0	0	1	1	0	0	0	1
ATT	0	1	0	0	1	1	1	1	1	1
PYL III	1	0	0	0	1	1	0	1	1	1
PYL IV	1	1	0	0	1	1	1	1	0	1
PYL 1	1	0	0	0	1	0	0	0	1	1
PYL 2	1	0	1	1	1	0	1	0	1	0
PYL 3	1	1	0	0	1	0	0	1	1	1

PYL 4	1	0	0	0	1	1	1	1	1	1
PYL E8	1	0	0	0	1	1	1	1	1	1
PYL E9	0	0	1	0	1	1	0	1	0	1

Appendix II

Factor Maps that were produced by the Correspondence Analysis

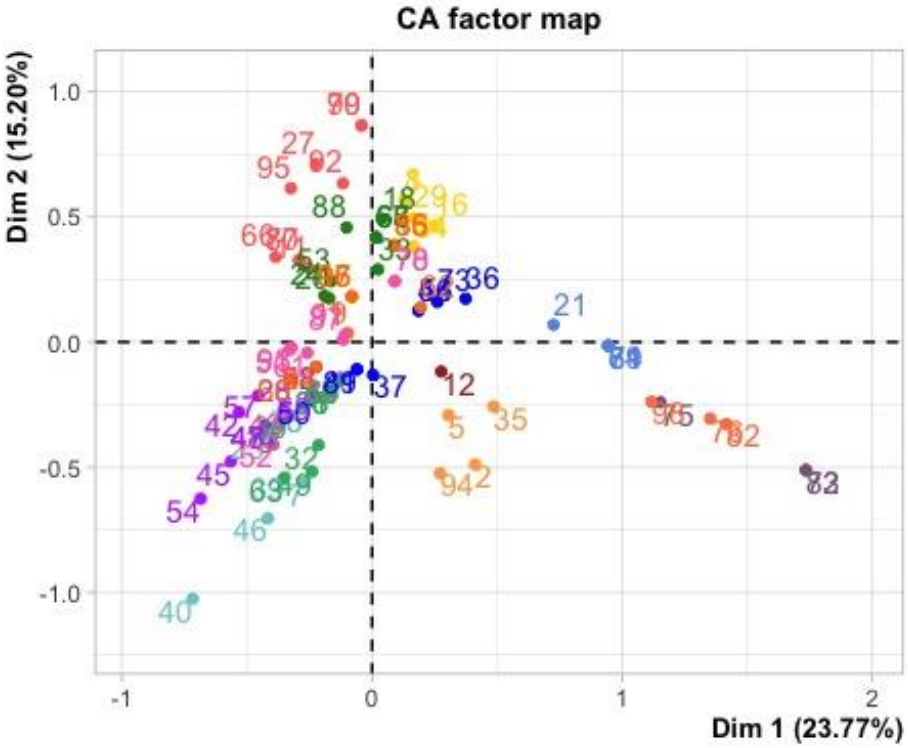

Chart 1: A colour coded factor map showing only the tombs used for the Correspondence Analysis. Each colour signifies a different cluster out of the 14 that formed (see the legend on Chart 6). The location of the points (tombs) on the map was determined by the presence/absence of variables in the individual tombs. The numbers presented on the map indicate the unit number found in Appendix I and not the actual tomb number.

Created using the code:

```
install.packages (“FactoMineR”)
install.packages (“factoextra”)
library (FactoMineR)
library (factoextra)
dataset ← read.csv (‘data.csv’, header = T, sep = ‘,’)
r = CA (dataset)
plot (r, repel = TRUE, col.row = c ('gold', 'tan1', 'mediumseagreen', 'gold', 'tan1',
'darkslategray3', 'darkslategray3', 'gold', 'darkorchid1', 'mediumseagreen', 'indianred1',
'brown', 'darkorange1', 'gold', 'darkorange1', 'gold', 'mediumseagreen', 'forestgreen',
'darkorange1', 'forestgreen', 'cornflowerblue', 'darkorange1', 'darkslategray3', 'forestgreen',
'darkslategray3', 'mediumseagreen', 'indianred1', 'darkorchid1', 'gold', 'mediumseagreen',
'mediumseagreen', 'mediumseagreen', 'forestgreen', 'gold', 'tan1', 'blue', 'blue', 'hotpink',
'darkslategray3', 'darkslategray3', 'blue', 'darkorchid1', 'hotpink', 'blue', 'darkorchid1',
'darkslategray3', 'darkorchid1', 'darkorchid1', 'mediumseagreen', 'blue', 'hotpink', 'hotpink',
'forestgreen', 'darkorchid1', 'darkorchid1', 'blue', 'darkorchid1', 'darkorchid1',
'mediumseagreen', 'darkorange1', 'hotpink', 'darkorange1', 'mediumseagreen',
'mediumseagreen', 'forestgreen', 'indianred1', 'forestgreen', 'forestgreen', 'cornflowerblue',
'hotpink', 'cornflowerblue', 'plum4', 'blue', 'cornflowerblue', 'plum4', 'coral', 'indianred1',
'hotpink', 'indianred1', 'indianred1', 'cornflowerblue', 'coral', 'plum4', 'darkorange1',
'darkorange1', 'darkorange1', 'hotpink', 'forestgreen', 'blue', 'indianred1', 'hotpink',
'indianred1', 'hotpink', 'tan1', 'indianred1', 'darkorange1', 'darkorange1', 'coral'))
```

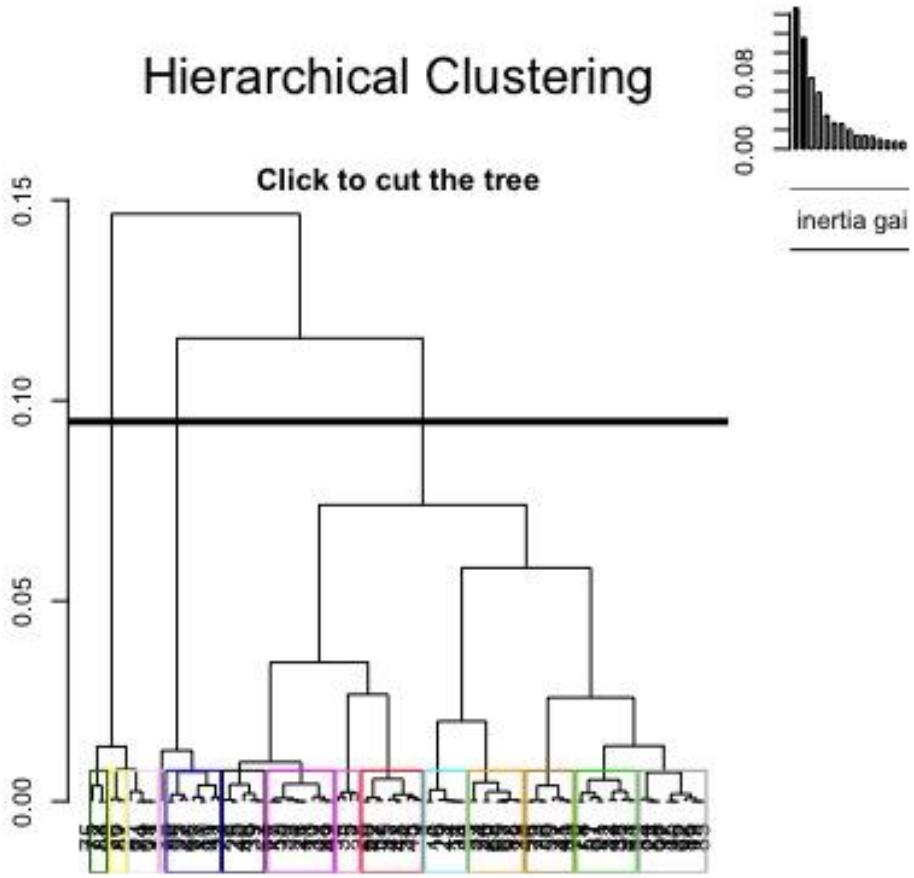

Chart 2: Chart showing the Hierarchical Agglomerative Clustering of the tombs in this study. The clusters on this tree are the same ones that are presented on the Chart 1 factor map. The coloured boxes represent the 14 different clusters that formed, with Cluster 1 on the far left hand side and Cluster 14 on the far right hand side (see legend).

Created using the code:

```
install.packages (“FactoMineR”)
install.packages (“factoextra”)
library (FactoMineR)
library (factoextra)
dataset ← read.csv (‘data.csv’, header = T, sep = ‘,’)
r = CA (dataset)
res.hc = HCPC (r)
```

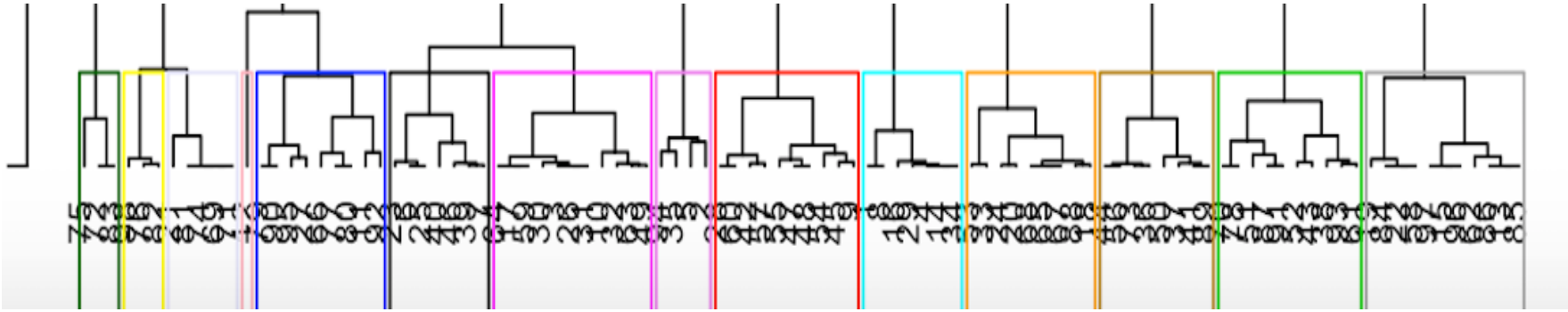

Chart 3: A closer look at the clusters that formed through HAC, where each number in a cluster corresponds to the tomb unit number seen on Chart I.

Created using the code:

```
install.packages (“FactoMineR”)
install.packages (“factoextra”)
library (FactoMineR)
library (factoextra)
dataset ← read.csv (‘data.csv’, header = T, sep = ‘,’)
r = CA (dataset)
res.hc = HCPC (r)
```

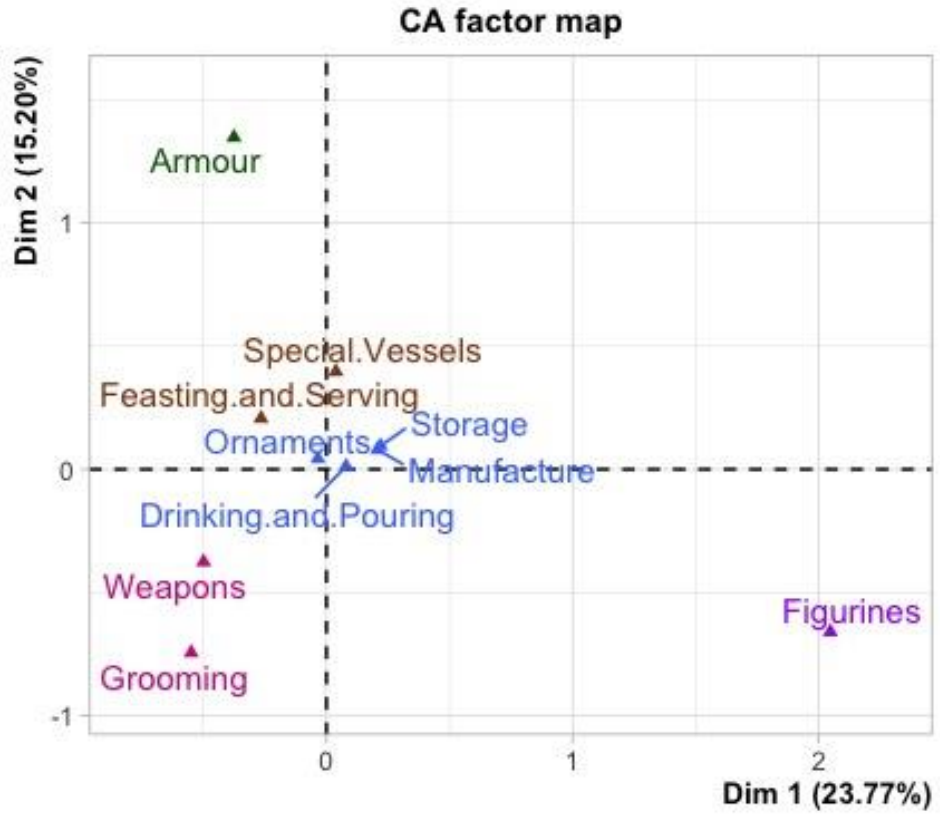

Chart 4: A colour coded factor map showing only the variable groupings from the Correspondence Analysis. Each colour represents a particular grouping of variables (see legend). Their placement on the factor map is based on their presence/absence in the tombs.

Created using the code:

```
install.packages (“FactoMineR”)
install.packages (“factoextra”)
library (FactoMineR)
library (factoextra)

dataset ← read.csv (‘data.csv’, header = T, sep = ‘,’)
r = CA (dataset)
plot (r, repel = TRUE, col.col = c ('maroon3', 'darkgreen', 'purple', 'maroon3', 'cornflowerblue', 'cornflowerblue', 'chocolate4',
'cornflowerblue', 'chocolate4', 'cornflowerblue'))
```

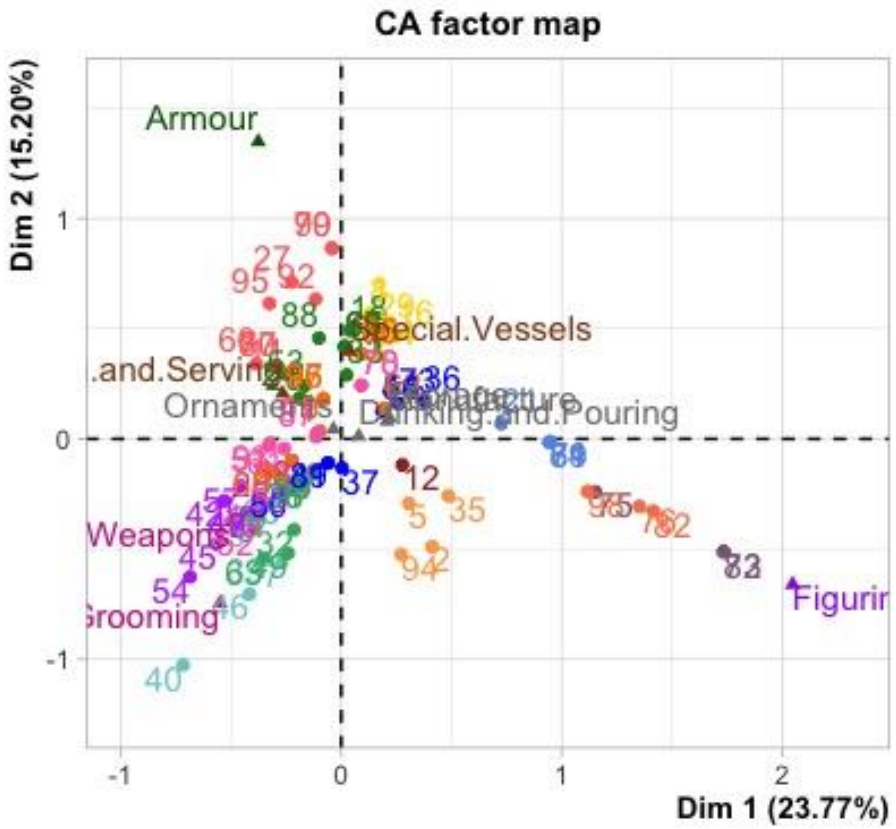

Chart 5: The colour coded superimposed Correspondence Analysis map showing both the variables and tombs and how they correspond to each other. Each cluster is colour coded based on their clusters which can be determined according to the legend in Chart 6.

Created using the code:

```
install.packages (“FactoMineR”)
install.packages (“factoextra”)
library (FactoMineR)
library (factoextra)
dataset ← read.csv (‘data.csv’, header = T, sep = ‘,’)
r = CA (dataset)
plot (r, repel = TRUE, col.row = c ('gold', 'tan1', 'mediumseagreen', 'gold', 'tan1', 'darkslategray3', 'darkslategray3', 'gold',
'darkorchid1', 'mediumseagreen', 'indianred1', 'brown', 'darkorange1', 'gold', 'darkorange1', 'gold', 'mediumseagreen',
'forestgreen', 'darkorange1', 'forestgreen', 'cornflowerblue', 'darkorange1', 'darkslategray3', 'forestgreen', 'darkslategray3',
'mediumseagreen', 'indianred1', 'darkorchid1', 'gold', 'mediumseagreen', 'mediumseagreen', 'mediumseagreen', 'forestgreen',
'gold', 'tan1', 'blue', 'blue', 'hotpink', 'darkslategray3', 'darkslategray3', 'blue', 'darkorchid1', 'hotpink', 'blue', 'darkorchid1',
'darkslategray3', 'darkorchid1', 'darkorchid1', 'mediumseagreen', 'blue', 'hotpink', 'hotpink', 'forestgreen', 'darkorchid1',
'darkorchid1', 'blue', 'darkorchid1', 'darkorchid1', 'mediumseagreen', 'darkorange1', 'hotpink', 'darkorange1', 'mediumseagreen',
'mediumseagreen', 'forestgreen', 'indianred1', 'forestgreen', 'forestgreen', 'cornflowerblue', 'hotpink', 'cornflowerblue', 'plum4',
'blue', 'cornflowerblue', 'plum4', 'coral', 'indianred1', 'hotpink', 'indianred1', 'indianred1', 'cornflowerblue', 'coral', 'plum4',
'darkorange1', 'darkorange1', 'darkorange1', 'hotpink', 'forestgreen', 'blue', 'indianred1', 'hotpink', 'indianred1', 'hotpink', 'tan1',
'indianred1', 'darkorange1', 'darkorange1', 'coral'), col.col = c ('maroon3', 'darkgreen', 'purple', 'maroon3', ‘gray49’, ‘gray49’,
'chocolate4', ‘gray49’, 'chocolate4', ‘gray49’))
```

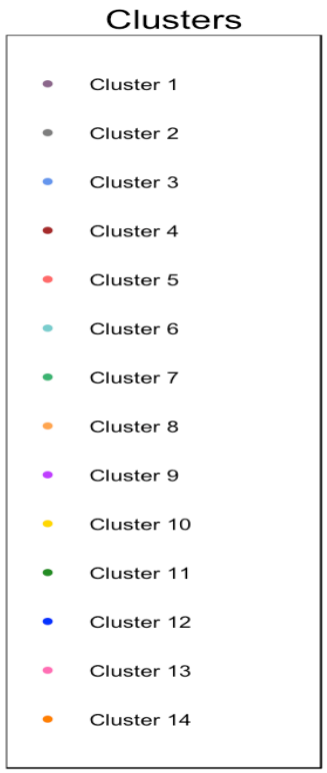

Chart 6: A legend created to help understand the colour coded factor maps in Charts 1 and 5. This legend shows all of the fourteen clusters and their corresponding colour they are associated with.

Created using the code:
plot (NULL, xaxt = ‘n’, yaxt = ‘n’, bty = ‘n’, ylab = ‘’, xlab = ‘’, xlim = 0:1, ylim = 0:1)
legend (‘topleft’, legend = c (‘Cluster 1’, ‘Cluster 2’, ‘Cluster 3’, ‘Cluster 4’, ‘Cluster 5’, ‘Cluster 6’, ‘Cluster 7’, ‘Cluster 8’, ‘Cluster 9’, ‘Cluster 10’, ‘Cluster 11’, ‘Cluster 12’, ‘Cluster 13’, ‘Cluster 14’), pch = 16, col = c (‘ (‘plum4’, ‘gray 49’, ‘cornflowerblue’, brown’, ‘indianred1’, ‘darkslategray3’, ‘mediumseagreen’, ‘tan1’, ‘darkorchid’, ‘gold’, ‘forestgreen’, ‘blue’, ‘hotpink1’, ‘darkorange’), cex = 0.6)

Appendix III

Correspondence Analysis Data organized by Hierarchical Agglomerative Clusters

Sites	Point	Weapons	Armour	Figurines	Grooming	Ornaments	Manufacture	Special Vessels	Drinking/Pouring	Feasting/Serving	Storage
Cluster 1											
KN 531	75	0	0	1	0	0	0	0	1	1	1
KN 522	72	0	0	1	0	0	0	0	1	0	1
KS 527	83	0	0	1	0	0	0	0	1	0	1
Cluster 2											
PYL E9	98	0	0	1	0	1	1	0	1	0	1
KS 513	76	0	0	1	0	1	1	0	0	0	1
KS 525	82	0	0	1	0	0	1	0	1	0	1
Cluster 3											
GYP XVIII	21	0	0	1	0	1	1	1	1	1	1
KS 519	81	0	0	1	0	1	1	1	1	0	1
KN 524	74	0	0	1	0	1	1	1	1	0	1
3rd KM 502	69	0	0	1	0	1	1	1	1	0	1
KN 521	71	0	0	1	0	1	1	1	1	0	1
Cluster 4											
PO 1	12	1	1	1	1	1	1	0	1	0	0
Cluster 5											
KS 517	79	0	1	0	0	1	1	1	1	1	1
ATT	90	0	1	0	0	1	1	1	1	1	1
PYL 3	95	1	1	0	0	1	0	0	1	1	1
NH V	27	1	1	0	0	1	1	1	0	1	1
GC Nu	66	1	1	0	1	1	0	1	1	1	1
KS 515	77	1	1	0	1	1	1	1	1	1	1
KS 518	80	1	1	0	1	1	1	1	1	1	1
PO 5	11	1	1	0	1	1	1	1	1	0	1
PYL IV	92	1	1	0	0	1	1	1	1	0	1
Cluster 6											
AI I	23	1	0	0	1	1	0	1	1	0	0

MS IX	6	1	0	0	1	1	0	1	1	0	1
NH I	25	0	0	0	1	1	0	1	1	0	1
ZP 10	40	1	0	0	1	0	0	0	1	0	0
ZP 64	46	1	0	0	1	0	0	0	1	0	1
ZP 7	39	1	0	0	1	1	0	0	1	0	1
MS XV	7	0	0	0	1	1	0	0	0	0	1
Cluster 7											
GC L	64	1	0	0	0	1	0	0	1	0	1
K E	17	1	0	0	0	1	0	0	1	0	1
GC B	59	1	0	0	0	1	0	0	1	0	1
IS IA	30	1	0	0	0	1	0	0	1	0	0
MS V	3	1	0	0	1	1	1	1	1	0	1
NH III	26	1	0	0	1	1	1	1	1	0	1
IS 2	31	1	0	0	1	1	1	1	1	0	1
MS XX	10	1	0	0	1	1	1	1	0	0	0
IS 3	32	1	0	0	1	1	1	0	1	0	1
GC I	63	1	0	0	1	1	1	0	1	0	0
ZP 76	49	1	0	0	1	0	1	0	1	0	1
Cluster 8											
PYL 2	94	1	0	1	1	1	0	1	0	1	0
IS 6	35	0	0	1	1	1	0	1	1	1	1
MS VII	5	1	0	1	1	1	1	1	1	1	1
MS III	2	1	0	1	1	1	0	1	1	0	1
Cluster 9											
IS RT	28	1	0	0	1	1	0	1	1	1	1
GC G	60	1	0	0	1	1	0	1	1	1	1
ZP 14	42	1	0	0	1	0	0	1	1	1	0
S3	57	1	0	0	1	1	0	1	1	1	0
ZP 99	55	0	0	0	1	1	0	0	1	1	1
ZP 66	47	0	0	0	1	1	0	0	1	1	0
ZP 67	48	0	0	0	1	1	0	0	1	1	0
ZP 98	54	1	0	0	1	0	0	0	1	1	0
ZP 36	45	1	0	0	1	1	0	0	1	1	0
MS XVII	9	1	0	0	1	1	0	0	1	1	1
Cluster 10											
MS I	1	0	0	0	0	0	0	1	1	0	0
MS XVI	8	0	0	0	0	0	0	1	1	0	0
KD	16	0	0	0	0	0	0	1	1	0	1
IS 1	29	0	0	0	0	1	0	1	0	0	1
MS VI	4	0	0	0	0	1	0	1	1	0	1
KA	14	0	0	0	0	1	0	1	1	0	1
IS 5	34	0	0	0	0	1	0	1	1	0	1

Cluster 11											
ZP 96	53	0	0	0	0	1	0	0	1	1	0
IS 4	33	0	0	0	0	0	0	0	1	1	1
AI II	24	1	0	0	0	0	0	1	1	1	1
LM	20	1	0	0	0	1	0	1	1	1	1
GC O	68	0	0	0	0	1	0	1	1	1	1
GC Mu	65	0	0	0	0	1	0	1	1	1	1
GC Xi	67	0	0	0	0	1	0	1	1	1	1
Pre III	88	0	0	0	0	1	0	1	1	1	0
KZ	18	0	0	0	0	0	0	1	1	1	1
Cluster 12											
ZP 35	44	0	0	0	0	1	1	0	1	0	0
ZP 100	56	0	0	0	0	1	1	0	1	0	0
KN 523	73	0	0	0	0	1	1	0	1	0	1
IS 7	36	0	0	0	0	0	1	0	1	0	1
ZP 81	50	1	0	0	0	1	1	0	0	0	0
ZP 1	37	1	0	0	0	0	1	0	1	0	1
ZP 12	41	1	0	0	0	1	1	0	0	0	1
CTT	89	1	0	0	0	1	1	0	0	0	1
Cluster 13											
KN 520	70	0	0	0	0	1	1	0	1	1	1
KS 516	78	0	0	0	0	1	1	0	1	1	1
ZP 92	51	1	0	0	0	1	1	0	0	1	0
KS 533	87	1	0	0	0	0	1	0	1	1	1
PYL III	91	1	0	0	0	1	1	0	1	1	1
ZP 95	52	1	0	0	1	0	1	0	0	1	1
ZP 21	43	0	0	0	1	1	1	0	0	1	0
ZP 6	38	0	0	0	1	1	1	0	1	1	1
PYL 1	93	1	0	0	0	1	0	0	0	1	1
GC D	61	1	0	0	0	0	0	0	1	1	1
Cluster 14											
KH	19	0	0	0	1	1	1	1	1	1	1
KS 529	84	1	0	0	1	1	1	1	1	1	1
KE	22	1	0	0	1	1	1	1	1	1	1
S4	58	1	0	0	1	1	1	1	1	1	1
PYL E8	97	1	0	0	0	1	1	1	1	1	1
KB	15	1	0	0	0	1	1	1	1	1	1
PYL 4	96	1	0	0	0	1	1	1	1	1	1
GC E	62	0	0	0	0	1	0	0	1	0	1
KS 532	86	0	0	0	0	1	1	1	1	1	1
PO Li	13	0	0	0	0	1	1	1	1	1	1
KS 530	85	0	0	0	0	1	1	1	1	1	1

Appendix IV

A Full List of the Tomb Clusters and the Grave Goods they possess

Cluster 1

75 Kalkani North 531	Tell-el-amarna style clay stirrup vase, globular clay stirrup vases, terracotta figurine ox, clay kylix, clay shallow bowl
72 Kalkani North 522	Clay kylikes, clay jugs with cutaway neck, clay deep bowls/kraters, clay cup, clay stirrup vase, terracotta figurine of ox and women
83 Kalkani South 527	Minyan ware clay jug, clay feeding bottle, tell-el-amarna style stirrup vase, clay alabastron, clay jug with horizontal lip, clay vase, terracotta ox and woman, clay jugs, clay three-handled amphora, clay stirrup vase, clay three-handled jugs, more figurines

Cluster 2

98 Pylos Chamber Tomb E9	Kylix, seals, beads, jug, stirrup vase, conical cup, alabastron, goblet, pithoid, shallow cup, pithoid jar, alabastron, mini jug, cup, terracotta female figurine, stone button, conical cup
76 Kalkani South 513	Three-handled amphora clay, clay jug, terracotta figurines of ox and man, discs, sealstones, gold ring, necklace, spindle whorls
82 Kalkani South 525	Clay jug with cutaway neck, clay three-handled amphora, clay two-handled amphora of yellow minyan style, tell-el-amarna style stirrup vase made of clay, clay deep bowl/krater, clay jug with horizontal lip in yellow minyan style, clay jug, clay kylikes, terracotta figurine of woman, bronze awl, spindle whorls

Cluster 3

21 Gypsades XVIII	Clay bowls, clay juglets, clay mini handleless cups, sealstone lentoid, earrings of silver, bronze staple, necklace (beads), clay oval-mouthed amphora, clay cups with strap handles, clay small shallow bowls, clay mini vase, figurine of animal, figurines of unknown sex, stone lamp, large vases, these are all orange clay
81 Kalkani South 519	Clay stirrup vase globular squat, clay three-handled amphora, clay jug with horizontal lip, clay askos, terracotta figurine female and ox, discs of ivory, bone pin, necklace (beads)
74 Kalkani North 524	Rhyton duck of clay, clay squat stirrup vase, clay three-handled jug, clay askos, clay feeding bottle, clay tea-cups, clay jugs with horizontal lips, clay three-handled amphora, globular clay stirrup vase, rhyton duck clay, clay basket shaped vase, clay alabastron, spindle whorls, terracotta figurines of females, beads, bone pin, necklace ornaments
69 3rd KM Tomb 502	Clay kylikes, terracotta female figurine, spindle whorl, clay amphora with two-handles, clay jugs with horizontal lips, clay askos ring-shaped, clay stirrup vase, clay jars, three-handled amphora clay, clay feeding bottle, clay incense burners, clay shallow cups, clay deep bowls painted, kylix unpainted, gold disc, necklace (beads)
71 Kalkani North 521	Clay kylix, clay jugs with horizontal lips, clay handleless cups, clay askos painted, clay three-handled jugs, clay globular stirrup vase, terracotta figurine women, necklace (beads), clay jug with stirrup handles, spindle whorls, bone pin

Cluster 4

12 Poros Tomb 1	Jugs, cups, silver earrings, silver bead, small bronze shields, rock crystal, necklace, bronze tools, small dagger, spearhead, tweezers, boar's tusk helmet, sealstones, finger-ring, ritual stone hammer-axe,

Cluster 5

79 Kalkani South 517	Clay tea cup, clay cup, clay goblets, clay cup of Vaphio shape, clay alabastron, clay jar of ovoid type, rhyton ovoid, clay shallow saucer, clay vases, necklace (beads), tell-el-amarna style clay stirrup vase, clay jug with horizontal lip, clay jug with bridge spouted jar, clay handleless cup
90 Aegisthus Tholos	Boar's tusk from helmet, pendant, obsidian arrow-heads, necklace/beads, gold nails, gold foil and leaf, bone awl, clay narrow necked jars, clay tea-cup, clay cups of Vaphio shape, rhyton funnel, clay goblets of yellow minyan style, clay bridge-spouted jars, clay shallow spouted bowls, clay marine style amphora large, clay floral amphora, clay alabastra, small clay saucers
95 Pylos Grace Circle Pit 3	Silver cup, bronze rapiers, knife, pins, cauldron, short sword, dagger, short dagger, knife, hone, beads, flint arrowheads, obsidian arrowheads, pommels, pin, boar's tusk, pithos, rapiers, knife, dagger, spouted jar, deep cup, rivets, palace style jar, shallow cup
27 New Hospital III	Clay stemmed goblets with 2 handles, clay large jugs, clay bridge-spouted jars, clay large stirrup vase, clay three-handled amphora, clay alabastron, clay lamp, bronze spear-head, bronze tweezers, seals,
66 Grave Circle Nu	Clay hydria, clay cycladic jar, clay ovoid jar, clay globular/conical jar, long sword, dagger, pommels, tweezers bronze, gold diadem, knife, spearhead, bronze jug, gold cup, gold button, gold sheet, boar tusks,

	beak spouted jug clay, clay askos, clay cycladic amphora
77 Kalkani South 515	Clay three-handled amphora, clay alabastron, clay askos, clay kylix unpainted, coarse clay ladle, dipper, spindle whorls, bronze knives, bronze awl, bronze scale pan, silver, boar's tusks, arrowheads bronze, gold leaf and stud, necklace (beads), sealstones, bronze plate, tell-el-amarna globular clay stirrup vase, clay cups of tea-cup shape, clay shallow bowls, clay jar, clay deep bowl of granary type, clay jugs, bronze tweezers, silver pin, bronze pin, arrow-head flint, ivory, minyan ware clay goblet, marble saucer, gold disc, ornaments of glass
80 Kalkani South 518	Clay jug with cutaway neck, clay beaked jug, clay jug with horizontal lip, clay jar hole-mouthed, clay jar, clay three-handled amphora, clay squat jug, clay dish, clay goblet of yellow minyan style, clay deep bowl, coarse clay ladle or scoop, clay handleless cup, clay alabastrons, clay rhyton ovoid ostrich egg, clay cup of Vaphio, clay tea-cup, clay shallow saucer, clay feeding bottle, clay brazier, clay lamps, bronze dagger, bronze knife, obsidian arrow-head, porphyry bowl, ivory comb, boar's tusks, spindle whorls, sealstone, necklace (beads), gold ring, gold pendant, gold necklaces
11 Poros Tomb 5	Seals, glass, scarab, jewelry, figurines, comb, faience cup, weapons, razor, incense, juglets, discs, rosettes, amphoriskos, flask, handleless and one-handled cups, gold ring, knife, sword, nails, spear-heads, figure-eight shield, boar's tusk helmet, 90 plain vases
92 Pylos Tholos IV	Gold leaf, disk, rosette, coil, blade of dagger, lamp, beads, button, jug, arrowhead bronze, wire, lamp stone, flint arrowhead, obsidian, pin, signet ring, rings, pendant, spacer bead, earrings, gold foil, owls?, rivets, silver ring, silver jug, bronze rings, bronze pins, bronze coils, bronze dagger, bronze rivet, bronze knife, bronze arrowhead, bronze spearhead, seals

	stone, pommels, whorl or button, figure of eight shield ivory, boar's tusk helmet, whorl or loomweight, amphora, jug
Cluster 6	
23 Ayios Ioannis I	Gold cup, clay lamp, sealstones, sword, daggers, spearhead, small spearhead, rivet blade, leaf-shaped razor, arrowhead, copper or bronze wire, handle, hook
6 Mavro Spelio IX	Clay brazier, clay curved cup, clay cups, clay false-necked jar, gold foil, silver pin, faience beads, pinhead, gem, clay pithoi, clay conical cup, clay braziers, clay mini bowls, clay mini jug, clay jug, bronze pendant, bronze mirror, stone bird's nest bowl, larnax, gold signet rings, gold beads, bronze knife-blade, clay cups and jugs
25 New Hospital I	Clay stemmed goblet with 2 handles, clay large jugs, clay bridge-spouted jar, clay large stirrup vase, clay three-handled amphora, clay alabastron coarse, clay lamp, bronze spearhead small, bronze tweezers, lentoid seal
40 Zafer Papoura 10	Bronze razor, bronze knife, clay painted vase small, bronze arrow-heads
46 Zafer Papoura 64	Painted clay vase with single handle, clay stirrup vase, elongated bronze knife, bronze knife, leaf-shaped bronze razor
39 Zafer Papoura 7	Bronze knife, bronze mirror, gold necklace, gold-plated ring with bronze core, ivory boat, clay pedestalled cup with 1, 2 or 3 handles
7 Mavro Spelio XV	Bronze mirror, natural bivalve shell, whorl beads, larnax, clay false-necked jar
Cluster 7	
64 Grave Circle Lambda	One-edged knife, gold diadem, obsidian arrowhead, clay piriform cycladic jar, clay ovoid jug, clay ovoid cup, clay cup, clay jug, clay goblets, long sword type A,

	dagger, tongue shaped dagger, small knife, spearhead, gold ornaments, arrowheads, pommel, clay cycladic jar, clay straight sided cup
17 Katsambas Tomb E	Clay three-handled palace style jar, clay squat alabastron, clay handleless cup, bronze fibula, small bronze knife
59 Grave Circle Beta	Clay low goblet form, clay ovoid cycladic jar, clay bridge-spouted jar, two pieces of gold foil, flat band of electrum atop pelvis, tongue shaped dagger
30 Isopata IA	Gold pendant, gold beads, bronze arrowheads, clay jugs, clay bridge-spouted jar
3 Mavro Spelio V	Bronze arrowheads, bronze knife, bronze needle, bronze tweezers, bronze wire rings, beads, faience, flint arrowhead, whorl bead stone, larnax, clay braziers, clay tall alabastron, clay squat alabastron, clay shallow curved cup, clay wide carinated cup, clay false-necked jar, clay jar
26 New Hospital I	Clay stemmed goblet with 2 handles, clay jug, clay bridge-spouted jar, clay three-handled amphora, clay alabastron, clay large jar, clay lamps, bronze dagger, bronze spearhead, bronze razor, copper staples, bronze arrowheads, gold toggle, lentoid seals, three-sided prism, beads and lumps
31 Isopata 2	Bronze double axes, bronze studs, bronze razor, bronze knives, bronze arrowheads, sealstone, beads, clay jugs, clay palace style jar, clay squat alabastron, clay kylix, clay ritual vessels, bull-head rhyton clay, clay brazier coarse, coarse palace style jars clay, hone
10 Mavro Spelio XX	Bronze knife, bronze tweezers, bronze wire, natural shells, steatite whorl bead, larnax, clay brazier
32 Isopata 3	Bronze spearhead, bronze knives, bronze razor, bronze arrowheads, bronze mirror, mace head, clay squat alabastron, stone sealstones, beads or necklace, clay palace style jug/jar, bronze mirror
63 Grave Circle Iota	Clay amphora, clay ovoid jar, clay goblet, clay beak spouted jar, clay straight sided

	cup, clay shallow kantharos, silver cup, spindle whorl, clay high stemmed goblet, clay bridge spouted jar, clay jug, long sword type A, tongue shaped dagger, bronze tweezers, gold sheets at wrist, pommel
49 Zafer Papoura 76	Bronze chisel, bronze knife, whorls, clay stirrup vase painted, two-handled clay flask, clay small painted jug with 1 handle, bronze mirror
Cluster 8	
94. Pylos Grave Circle Pit 2	Bronze knife, mirror, bronze bowl, bronze scale pan, flint arrowhead, beads, terracotta female figurine, askos
35 Isopata 6	Clay kernos, clay squat alabastron, clay ritual vessels, clay figurines, gold rings, gold necklace, mirror, serpentine vase, clay goblets, clay cups, piriform jar clay, clay strainer
5 Mavro Spelio VII	Earrings, beads, finger-ring bronze, bronze ring, bronze pin, bronze tweezers, bronze knife, pendants, braziers, curved bowl clay, gems, terracotta idol, conical cup, mini alabastron, round-mouthed jug, disc, jug
2 Mavro Spelio III	Necklace, earrings, knives, razors, tweezers, mirror, scale-pans, lead weights, knife-pommel, oval libation vase, stone bird's nest bowls, stone conical cup, terracotta figurine woman, clay brazier, clay cup, clay flask
Cluster 9	
28 Isopata Royal Tomb	Stone bowls, stone vases, stone spouted vase, stone lamps, stone lids, hooked pins, serpentine vases, necklaces, pendants, beads, pommel, bronze mirror, silver cup, clay tripod, clay large amphora painted
60 Grave Circle Gamma	Long sword, pommel, dagger, tongue-shaped dagger, bronze cup, electrum bead, seal, gold cup, mask of electrum, swords, clay minoan jug, clay ovoid hydria, gold cup, clay amphoriskos, gold diadem, gold band, gold girdle, daggers, blade, bronze

	band, spearhead, ivory comb, clay alabastron, clay kantharos, clay cycladic jugs, clay beak spouted jugs, clay piriform, globular clay jars, amphoriskos clay, clay askos,, spouted bowl clay, semi-globular cup clay
42 Zafer Papoura 14	Plaster tripod hearth, bronze shallow bason, bronze pans, bronze lamp, bronze jug large, bronze bason, bronze pot, bronze cauldron, bronze cup, bronze pedestalled cup, bronze ladle, bronze lance-head, bronze knife, dagger, razor bronze
57 Sellopoulo 3	Clay large piriform jar, clay large jug, clay kylikes unpainted, rosettes, arrowheads, cleavers, razor, mirror, clay tripod cauldron, lekane, clay shallow bowl or box, clay lamp
55 Zafer Papoura 99	Necklace, gold finger rings, stone bason, blossom vase steatite, bronze two-handled bowl, bronze vase, bronze mirror, clay stirrup vases, clay one-handled cup, clay pot, clay mini vessels, clay low painted jar
47 Zafer Papoura 66	Necklace, gold ring, beads, faience, globular bottle, bronze mirror, clay cup with 1 handle, clay cup, clay two-handled bowl, clay bowl, clay cup, clay spouted vase
48 Zafer Papoura 67	Clay bowl two-handled, clay cups, plain clay cup, beads, bronze mirror
54 Zafer Papoura 98	Bronze sword, stone vase, clay chafing-pan, bronze razor
45 Zafer Papoura 36	Bronze ewer, bronze spouted pan, bronze frying pan, bronze mirror, bronze lance-head, bronze sword, short sword, gold necklace, beads
9 Mavro Spelio XVII	Bronze knife, bronze hair rings, beads, gem, steatite whorl, larnax, clay round-mouthed jug, clay cup, clay mini jug, clay open bowl, bronze wire ring, bronze tweezers, ivory comb, gems, clay side-spouted jar, faience, clay dishes, clay curved bowl, clay conical cup style, clay tripod pot, clay bridge-spouted jars, pithos clay, clay basins

Cluster 10

1 Mavro Spelio I	Marble bird's nest bowl, clay braziers, black-washed ware, shallow curved clay cup, clay conical cup
8 Mavro Spelio XVI	Stone bird's nest bowl, larnax, clay brazier, clay conical cups
16 Katsambas Tomb Delta	Clay bridge-spouted jar, clay three-handled palace style jar, clay Ephyraean goblet, clay squat alabastron, clay incense burner, clay jar
29 Isopata 1	Gold rosette beads, gold seal ring, sealstone, clay vessel sherds, clay braziers
4 Mavro Spelio VI	Gem, stone bird's nest bowl, clay round-mouthed jug, clay pinched-mouth jug, clay two-handled jar, clay conical cup, clay cup
14 Katsambas Tomb A	Clay three-handled palace style amphora, clay bridge-spouted jar, clay squat spherical jar, clay double vessels, clay Ephyraean goblet, clay kylix, clay squat alabastron, clay censers (2), bronze pin, bronze handle, bronze pieces
34 Isopata 5	Silver ring, clay squat alabastra, clay jug, clay ritual vessels, clay brazier, clay high spouted jug

Cluster 11

53 Zafer Papoura 96	Plain bronze wire bracelet, clay small spouted vase, clay bowl with 2 handles
33 Isopata 4	Clay palace style jars, clay squat alabastra, bronze pan, collared clay jug
24 Ayios Ioannis II	Clay stemmed goblet, clay alabastron, clay rivet of sword or dagger, clay lamp, clay plate
20 Hutchinson's LM Tomb	Clay kylix, clay cups, clay jugs with beaked spouts, clay strainer pot, clay three-handled amphora, clay squat jar, clay tall alabastron, clay bowl, clay lid, silver and gold cup, bronze sword, silver curved pin, anthropomorphic vase, clay jug with narrow neck, bowl, nest-shaped clay
68 Grave Circle Omicron	Bronze pin, gold diadems, star gold band, silver pin, beads, necklace, gold arm rings with spirals, gold rings, gold necklace, belt with electrum beads, clay globular jar,

	clay askos, clay kantharos, clay jar, clay bridge-spouted jar, clay amphoriskos, clay amphora, clay bowl with bird's head in rock, clay askos, clay jars, clay hydria, clay kitchen ware, clay goblet, beads, gold foil
65 Grave Circle Mu	Beads, stone seal, clay hydria, clay goblet, clay jug with horizontal spout, clay askos, clay cup, clay cup grey minyan style, clay spouted bowl, clay minoan askos, bone pins
67 Grave Circle XI	Faience beads, silver pin, gold diadem, gold bead, gold ring, gold band, clay goblet, clay jug, clay kitchen ware, clay kantharos, clay askos, clay amphora, silver bowl, clay ovoid jug
88 Prehistoric Tomb III	Clay cup or small bowl with duck head, clay goblet, clay askos, clay goblet, clay feeding bowl, clay jug, gold sheet, ornaments, beads/necklace
18 Katsambas Tomb Z	Clay three-handled palace style jar, clay jug, clay bridge-spouted jar, clay small hydria, clay squat alabastron, clay incense burners, clay squat alabastron, clay large alabastron, clay two-handled tripod jug, clay jug
Cluster 12	
44 Zafer Papoura 35	Small bronze jug with handle, grey clay serpentine vase, clay vase, steatite whorls, beads, natural quartz crystal
56 Zafer Papoura 100	Larnakes, bronze ring, bronze bracelet, beads, steatite whorl, clay cup and clay ladle
73 Kalkani North 523	Clay stirrup vase, clay jug with cutaway neck, clay three-handled amphora, clay tea-cup, clay shallow cup, clay jug with horizontal lip, sealstones, beads, ivory disc, bronze ring, spindle whorls
36 Isopata 7	Clay rounded cups, clay Ephyraean goblets, clay goblet/kylix unpainted, clay conical cup, clay palace style jar/jug, clay high-spouted jug, clay jug, loomweight
50 Zafer Papoura 81	Bronze knife, paste bead, beads, steatite whorl

37 Zafer Papoura 1	Plain clay ewer, clay stirrup vase, bronze knives small, gray stone
41 Zafer Papoura 12	Clay three-handled amphora, small bronze knife, steatite whorl, bronze pin
89 Cyclopean Tholos Tomb	Large bronze knife, ivory rod, gold foil pieces, obsidian arrowhead, button whorl, bronze stud, bronze ring, sealstone lentoid, clay palace style amphora
Cluster 13	
70 Kalkani North 520	Clay kylix unpainted, clay three-handled amphora, clay alabastron, clay small jug, clay jug with stirrup handle, clay kylikes, clay stirrup vases, clay shallow bowl, clay handleless cup, clay cups, clay bell-shaped cups, beads, spindle whorls, gold necklace, bronze pin, ornaments, gold signet ring, ivory lid and disc
78 Kalkani South 516	Clay cup of tea-cup shape, clay squat jug, clay jug with bridged spout, clay shallow saucer, beads, clay jug with stirrup handle, clay jug with horizontal lip, clay globular stirrup vase of tell-el-amarna style, spindle whorls, clay hole-mouthed jar
51 Zafer Papoura 92	Plain gold ring, spindle whorls, larger and smaller knife, plain clay bowl
87 Kalkani South 533	Clay cup of Vaphio, clay hole-mouthed jar, clay kylikes unpainted, clay deep bowl or krater, clay mugs, clay shallow saucer, bronze awl, obsidian arrowhead, clay goblets, clay handleless cups, clay jugs with horizontal lip, clay jug with beaked spout, clay jug with cutaway neck, clay globular tell-el-amarna style stirrup vase, clay alabastron, spindle whorls
91 Pylos Tholos Tomb III	Beads, rosette, pin fragment, circular disk, flint, obsidian, rivet heads, obsidian arrowhead, leaf-shaped ornaments, whorl or button, pendant, gold leaf, pin, sword or dagger, flanged tang, wire, seal, whetstone, plaques, boar's tusks (not helmet), shallow bowl, conical cup, one-handled cup, one-handled kylix, kylix, three-handled pithoid jar, krater-bowl, chalice or goblet, scoop, stirrup vase, pithos, alabastron

52 Zafer Papoura 95	Small clay stirrup vase, two whorls, bronze mirror, clay two-handled cup of champagne style, bronze dagger or short sword 37cm, clay chafing-pan, bronze mirror
43 Zafer Papoura 21	Clay painted bowl with handle, bronze razors, gold ring with bezel, steatite whorl
38 Zafer Papoura 6	Clay three-handled vase, clay beaked vase small, clay bowl, clay two-handled bowl, clay cup, bronze mirror small and large, bronze pins, spindle whorls stone, necklace (bead)
93 Pylos Grave Circle Pit 1	Wreath, silver ornaments, bronze cauldron, bronze knife and rapier, ivory pins, pommel, pithos
61 Grave Circle Delta	Short sword with silver nails, tongue shaped dagger, curved blade or knife, pommels, clay hydria, clay alabastron, clay one-handled broad rim bowl, bronze arrow-heads, knife, long sword, clay cycladic jar, clay ovoid jar, clay jugs, clay globular jug, grey minyan style clay goblet, clay straight-sided cup
Cluster 14	
19 Katsambas Tomb H	Clay larnax for kid, clay three-handled amphora palace style, clay stirrup jar, clay kylix, clay jug, clay handleless cup, clay one-handled cup, clay incense burners, clay pedestalled bowl, clay tripod altar, clay conical cups, clay shallow cup, clay lopas, clay cup, stone lid, stone vessel, bronze cleavers, gold leaves, gold rosette beads, faience animal figurine, plaster tripod, ivory comb, conical gaming pieces, necklaces, beads
84 Kalkani South 529	Clay tea-cup shape, clay three-handled amphora, clay askos patterned, clay shallow saucers, clay alabastron, clay stirrup vase of tell-el-amarna style, clay jug with horizontal lip, clay ladles, bronze knife, bronze tweezers, bronze dagger, bronze scale pans, bronze plate, pommel, ivory comb, beads, sealstone, spindle whorls, sea-shells

22 Kephala Tholos Tomb	Earring gold, ring, rosette leaf, bronze rivets, bronze tweezers, bronze tool, knife or sickle bronze, finger ring, large bronze pin, large pin, bronze copper plate, sealstone, spindle whorl, beads, clay conical cups, clay rounded cups, clay straight sided cups, clay bowls coarse, clay bridge-spouted jars, clay jugs, clay jars or basins, clay strainer, clay rhyton cup, clay ovoid pithos, clay goblet, clay palace style jar, clay jugs, clay kylix, clay champagne cup or bowl
58 Sellopoulo 4	Clay conical cup, clay undecorated kylikes, clay jug, clay shallow bowl, clay small piriform jar, clay jug, clay conical cups, clay stirrup jar, gold pendant, beads, silver vessel, gold ring, engraved gold ring, ring bezel, ring of coiled gold wire, bronze dish, necklace, lentoids, swords of class Di, spearhead, cleaver or razor, one-edged knife, fishing spear, fishing hook, mirror, clay tripod cauldron, clay stewpan, clay spouted lekane, clay basin, clay hydria, clay oinochoe, clay shallow cups, clay lamps, scale-pans clay
97 Pylos Chamber Tomb E8	Beads, alabastron, jug, jar, stirrup vases, alabastron, kylix, jug, dagger, knife, beads, jugs, alabastron, conical handleless cup, cup, rhyton, cylindrical cups, bowl, goblet, alabastron, whorl, jug, alabastron, beads, knife, button, shallow cups
15 Katsambas Tomb B	Clay jug, clay one-handled cup, clay handleless cup, clay censers, clay tripod altar, stone amphora, stone vessel, bronze knife, bronze handleless cup, bronze beads, silver pin, bronze disc, bronze handle
96 Pylos Grave Circle Pit 4	Diadem, knife, daggers, hone, rivets, balance beam, scale pans bronze, pin, pestle stone, button or whorl, seals, beads, flint arrowheads, obsidian arrowheads, button, whorl, shallow cup or saucer, jug, bowl, alabastron, cup, jar, alabastron, pedestaled dish, jar, kylix, beaked jug, alabastron, askos, alabastron, spouted cup, mini pothos, bowl, kylix

62 Grave Circle Epsilon	Bronze dish two-handled, gold diadem, half gold diadem, lancet gold bands, gold ornament, bronze jug, mainland jug clay, clay hydria, bronze krater, bronze hydria, bone pin, clay hydria, clay goblet, clay semi-ovoid cup, clay grey minyan amphoriskos, clay amphoriskos
86 Kalkani South 532	Clay squat jug, clay alabastron, clay goblets, clay deep cup, clay cup of Vaphio, clay hole-mouthed jar, clay stirrup vase post tell-el-amarna style, clay incense burners, clay feeding bottle, clay jug with stirrup handle, clay cup bell-shaped, clay kylix, clay jug with horizontal lip, spindle whorls, bone pin
13 Poros Tomb LI	Vases, gold signet ring, silver signet rings, gold rings, bronze ring, leaves of gold, silver and bronze earrings, silver pin, necklace beads, bones of small animals, jugs, cups, lamps, incense burners, strainers, double vases, amphora, loom-weight
85 Kalkani South 530	Clay tea-cup, clay cup of Vaphio shape, clay alabastron wheel patterned and regular, clay lamp, clay kylix unpainted, clay stirrup vase globular and tell-el-amarna style, clay three-handled amphora, clay kylix minyan ware, silver ring, beads, bronze rod, spindle whorls, lead wire