Style as Memory
A Cross-disciplinary Approach to the Knossian Kamares Style

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To Nunzia, Michele, Alessia, and especially Giulia, who gives me the strength to fight every day.

Abstract

In this thesis, I explore the archaeological notion of style focusing on the long-term development of the Minoan Kamares style from Knossos, Crete (ca. 1950-1700 BC). The major hypothesis is that style constitutes a distributed memory of technical skills and knowledge. I seek to understand how this style enabled artisans' technical skills and knowledge to continue over generations. Moreover, in approaching this style from a mnemonic perspective, I aim to develop additional insights into the dynamics that guided the openness and inventiveness of this pottery tradition.

In attempting to investigate this hypothesis, this thesis proposes a cross-disciplinary approach primarily grounded in the anthropology of art by Gell (1998) and the Material Engagement Theory (MET) of Malafouris (2013, 2019a). According to Gell's anthropological stance on art and agency, style can be reframed as a unique temporally and spatially distributed cognitive process responsible for the continuity and development of skills and knowledge. On the other hand, Malafouris' MET shows how things come to *constitute* cognition; its central premise is that we think *with* and *through* things (2018, 2019a).

It is proposed that, by grounding the re-examination of the Knossian Kamares pottery in the aforementioned anthropological and material-engagement approach, the notion of style comes to describe a transgenerational memory which enabled artisans to remember previously acquired ways of thinking and acting by engaging *with* and *through* things in the context of making novel Kamares decorations. Ultimately, this thesis proposes an alternative strategy for studying memory that accounts for the different timescales and sociomaterial contexts and can inform studies in archaeology, anthropology, and the cognitive sciences interested in investigating the relationship between memory and material culture.

Table of Contents

Abstract ..... *ii*

Table of Contents ..... *iii*

List of Figures ..... *vii*

List of Tables ..... *ix*

Acknowledgements ..... *xi*

Introduction: The Minoan Kamares Pottery *1*

1.1 - Characterising the Minoan Bronze Age **1**

1.1.2 - The Protopalatial period 7

1.1.3 - The Neopalatial Period 12

1.2 - The Kamares pottery style **15**

1.2.1 - The Character of Kamares 15

1.2.2 - Kamares an ambiguous pottery 17

1.2.3 – The Protopalatial deposits 20

1.2.4 - History of Studies 34

1.3 – Aims, hypothesis, and structure of the thesis **54**

Chapter 2 – The Notion of Style in Archaeology *58*

2.1 - The Origins of Style **58**

2.2 - Style and meaning **59**

2.2.1 - Style and communication 60

2.2.2 - Style and identification 62

2.2.3 - Style and language 64

2.2.4 – Style and Event 65

2.2.5 – Summary of style and meaning 67

2.3 - Style and doing **68**

2.3.1 – Connoisseurship and style in art history 69

2.3.2 – Isochrestic variation 72

2.3.3 – Choices and style 74
2.3.4 - Traditions and innovations in style 76
2.3.5 – Neo-Darwinian and evolutionary archaeology 79
2.3.6 - Summary on style and doing 80

2.4 - Style and time 80

2.4.1 - Style and agency 81
2.4.2 - The transgenerationality of style 86

Chapter 3 – An Anthropological Approach to Style 88

3.1. A critique of style 88

3.2 - Defining style 89

3.3 - The inter-artefactual domain 93

3.4 - Style as a distributed object 95

3.5 - Style and time 99

3.6 - Style and memory 101

3.7 – Summary of *Art and Agency* 104

3.8 - Style as transgenerational memory 105

Chapter 4 – Memory and Material Culture 108

4.1 – Anthropology and material mnemonics 108

4.1.1 - Commemorative practices 108
4.1.2 - Memory and Cultural Transmission 113

4.2 - Archaeology and material mnemonics 115

4.2.1 - The *past in the past* 116
4.2.2 - Memory practices 120
4.2.3 - Memory and time 126

Article 1 – Enacting Memories Through and With Things: Remembering as Material Engagement 134

A1.1 - Introduction 134

A.1.2 - Mainstream Accounts of Memory 136

A.1.3 - Memory and Things: A Troubled Relationship 138

A.1.4 - Objects as Proxies for Remembering 139

A.1.5. Things as Instantiations of Mental States 141

A.1.6. Material Engagement Theory: A Transactional Stance on Cognition 144

A.1.7. Think-ing as Thing-ing: An Extended, Enactive and Ecological Approach 144

A.1.8. Material Engagement and Enactive Signification 146

A.1.9. Material Engagement, Social Interactions, and Normativity 146

A.1.10 - A Material Engagement Perspective on Memory and Remembering 149

A.1.10.1 - Remembering as Material Engagement 149

A.1.10.2 - Things Are Memories 150

A.1.10.3 - Remembering is a Cognitive Becoming 152

A.1.10.4 - Remembering Ties Together Different Timescales 153

A.1.10.5 - Remembering is Material 154

A.1.11 - Some Concluding Remarks 154

Chapter 6 – Database and Analysis of the Knossian Kamares style 156

6.1 - Defining the Kamares style 156

6.2 - Sources of data and sampling strategy 157

6.3 - Devising the database 160

6.4 - The analysis of the Kamares style 168

6.4.1 - Pottery 169

6.4.2 - Geometric units 173

6.4.3 - Motifs 188

6.4.4 - Compositions 204

Article 2 – The Role of Aesthetics for Memory: A Material-Engagement Approach to the Making of Knossian Kamares Decorations 213

A2.1 - Introduction 213

A2.2 - The Kamares style **214**
A2.2.1 - Stylistic studies of Kamares 216
A2.3 - Aesthetics in anthropology and archaeology **217**
A2.3.1 - Sociomaterial practices 219
A2.4 - The Making of Knossian Kamares Decorations **220**
A2.4.1 - Geometric units as ways of thinking and acting 221
A2.4.2 Motifs as Memories of Sociocultural Practices 224
A2.5 – Final conclusions **229**
Article 3 – The Knossian Kamares style as Transgenerational Memory ***231***
A3.1 - Introduction **231**
A3.1 - Memory and Material Culture **233**
A3.1.1 – Localisationalism and representationalism 233
A3.1.2 - Symbols, Palimpsests, and Practices 235
A3.2 - Thinking *with* and *through* things **238**
A3.2.1 - The situatedness of cognition 239
A3.2.2 - Enactive signification 240
A3.2.3 - Constituting memory 241
A3.3 - Memory and Remembering in Middle Bronze Age Knossos **241**
A3.3.1 - Outline of the methodology 245
A3.3.2 - Style as transgenerational memory 248
A3.3.3 - Remembering as *re-enacting* 254
A4. Final discussion **259**
Conclusions ***263***
Future directions **276**
References ***278***

List of Figures

Figure 1 - Examples of Dark-on-Light ware from the "Upper East Well Group" (EM III) (after Momigliano, 1991, p. 19, 28, 43; Momigliano, 2007b, fig. 3.5)

Figure 2 - Example of Barbotine decoration from Knossos from the "Loomweight Area S. of Spiral Fresco" (MM IB) (KWM322). Photo by author, courtesy of the British School at Athens.

Figure 3 - Example of crater from Phaistos decorated with lilies (MM IIB) (AM 10578). Courtesy of the Heraklion Museum.

Figure 4 - Drawing of Kamares rounded cups (MM IIA-B) (after Mackenzie, 1903, pl. V).

Figure 5 - Sketches of two examples of Kamares style (called Middle Minoan by Dawkins and Leistner, 1913) from the Kamares Cave (after Dawkins & Laistner, 1913, p. X).

Figure 6 - Plan of Knossos with the hypothetical arrangements at the end of the Protopalatial period (after, Evans, 1921, fig. 152)

Figure 7 - Detail of one of the three Kouloures with remains of the EM III - MM IA houses. Photo by author, courtesy of the British School at Athens.

Figure 8 – Map of the palace of Phaistos (after Carinci, 2014, fig. 1).

Figure 9 - Selection of S-Spirals from the work of Walberg (after Walberg, 1976, fig. 3.7).

Figure 10 - List of types of Woven Style decoration on Kamares straight-sided cups (after MacGillivray, 1998, fig. 2.1). Reproduced with permission of the British School at Athens.

Figure 11 - Variation of !Xung San projectile points (after Wiessner, 1983, fig. 3).

Figure 12 - Ears and hands by Botticelli from Morelli's Italian Painters (1892, after Ginzburg 1980, fig. 7).

Figure 13 - Types of drinking pots from different Luo areas (after Dietler & Herbich, 1989, fig. 3).

Figure 14 - One of the stages of the *chaîne operatories*, the first shaping stage (after Gosselain, 1992, fig. 5-7).

Figure 15 - Battleship curves describing change over time of grave-stone motifs in various areas of New England (1700–1830) (after Shennan, 2002, fig. 6; as in Gosden, 2006, p. 432).

Figure 16 - Replica of the Snake Goddess figurine on display at the Ashmolean exhibition "Labyrinth: Knossos, Myth and Reality". Courtesy of the Ashmolean Museum.

Figure 17 – Classificatory scheme of Marquesan motif *etua* by von den Steinen (after Gell, 1998, fig. 8.7/1).

Figure 18 – Network of the Maori meeting houses distributed over time (after Gell, 1998, fig. 9.6/3).

Figure 19 – Husserl's diagram of internal time-consciousness (after Gell, 1998, fig. 9.4/2).

Figure 20 – Exterior of a Maori meeting house in 1881 (Hinemihi, Te Wairoa). Courtesy of the British Museum.

Figure 21 – The blue stones of Stonehenge. Photo by author.

Figure 22 - Roman dedication to Neptune on the altar of the church of Santiago at Padron, Spain (after Van Dyke, 2019, fig. 1).

Figure 23 - Example of one of the boxes from the KSM containing the Knossian Kamares material. Photo by author, courtesy of the British School at Athens.

Figure 24 - Layout of the table Analysis designed to have more flexibility in extracting data.

Figure 25 - Structure of the database devised for this research with detail of all tables and relationships.

Figure 26 - Layout of table Units containing data on geometric units.

Figure 27 - Layout of table Motifs with the data collected on the combination of geometric units.

Figure 28 - Layout of table Compositions containing data on the associations among motifs.

Figure 29 - Layout of table Pottery with all the data on the vases examined.

Figure 30 - Distribution over time of Knossian Kamares vases.

Figure 31 - Distribution over time of the pottery within each context of the palace.

Figure 32 - Total of the different shapes of pottery in the whole assemblage divided by date.

Figure 33 - Percentage of the geometric units documented in the assemblage.

Figure 34 - Composition *Spirals-W(hite)O(range) and two lines vertical thick-O(range)O(range)* (MM IIIA) (KWM087). Photo by author, courtesy of the British School at Athens.

Figure 35 - Percentage of the colours used to trace the geometric units.

Figure 36 - Comparison among the different types of geometric units divided by colour (red, orange, white).

Figure 37 - Percentage of geometric units for each period.

Figure 38 - Distribution of all geometric units in the MM period.

Figure 39 - Comparisons between the introduction of new and the overall numbers of geometric units.

Figure 40 - MM IB straight-sided cup from the "NW Kamares Area of the Polychrome Vase .03" (KWM528). Photo by author, courtesy of the British School at Athens.

Figure 41 - MM IIA bridge spouted jar from "W. OF W. Court Kouloura 3 House best sherds" (KWM181). Photo by author, courtesy of the British School at Athens.

Figure 42 – Fragmented rounded cup from the "W. Square East Kouloura (I) II.7" (KWM124). Photo by author, courtesy of the British School at Athens.

Figure 43 - Rounded cup KWM016 with motif *foliate band – thin W(hite)* from "Test Pit 11 - W. Square Kamares Area 1904" (MM IIB). Photo by author, courtesy of the British School at Athens.

Figure 44 - Comparison of the absolute frequency of the most common motifs occurring in each period.

Figure 45 - Distribution of all the motifs in the Middle Minoan period.

Figure 46 - Comparisons among overall motifs, new motifs, and overall number of pots for each period.

Figure 47 - Percentage of new motifs introduced in each period.

Figure 48 - Stacked bar chart confronting the overall number of compositions with the numbers of compositions counted only once in each period.

Figure 49 - Comparison between the numbers of new geometric units and motifs in relation to the trend of the new composition over time.

Figure 50 - Rounded bridge-spouted jar dated MM IIB (KWM083). Photo by author, courtesy of the British School at Athens.

Figure 51 - MM IIIA rounded bridge-spouted jar (KWM701). Photo by author, courtesy of the British School at Athens

List of Tables

Table 1 - Chronology of the Cretan Bronze Age with calibrated calendar dates.

Table 2 - List of all the different geometric units with numbers in the assemblage.

Table 3 - Overall number of geometric units and motifs in each MM phase.

Table 4 – Comparison between numbers of new geometric units and new motifs.

Table 5 – List of with all MM IA motifs observed in the Knossian Kamares assemblage.

Table 6 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IB.

Table 7 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IIA.

Table 8 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IIB.

Table 9 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IIIA.

Table 10 - List of the nine compositions that have more than 10 occurrences in the database. 183

Table A2.1 - Distribution of re-examined pots according to (Minoan) relative chronological periods.

Table A2.2 - Comparisons among overall motifs, new motifs, and overall number of pots for each period.

Table A2.3 - Multiple bar-chart presenting the commonest motifs associated with their temporal frequencies.

Table A3.1 - A list of all the polychrome compositions that occur more than nine times in the Protopalatial deposits of Knossos.

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Introduction: The Minoan Kamares Pottery

In this chapter, I review the archaeological literature on the Minoan Kamares pottery to introduce the debates surrounding the notion of style addressed in this thesis. In doing so, I identify the theoretical and methodological lacunae in studies of the Kamares pottery.

I first present a general overview of the Cretan Bronze Age (Section 1.1) and describe the long-term development of Minoan pottery from EM to the end of LM IA (see Table 1 for abbreviations and dates). The aim is to pinpoint the unicity and importance of the Kamares pottery style (or ware, as described below) in comparison to preceding and following ceramic traditions. I then introduce the pottery style used as a case study in this research (Section 1.2). I outline the scholarly debates surrounding the origins and uses of the term 'Kamares', followed by a thorough description of the archaeological contexts where this pottery style has been found, divided by periods (MM IB, IIA, IIB, IIIA). It follows a review of stylistic and technological studies (Section 1.2.4) aimed at highlighting the tension between change and stability in Kamares decorative forms and the gaps in studying this pottery from a purely taxonomic angle.

In the latter part of the chapter, I present a critical discussion on the themes reviewed during the chapter and outline the aims and structure of the thesis (Section 1.3).

1.1 - Characterising the Minoan Bronze Age

The Cretan Bronze Age spanned a period of approximately 2500 years, from 3500 BC to 1050 BC (Table 1). Since the first excavations in the 19th century, discoveries in Crete and the Aegean have advanced our understanding of the sociocultural dynamics of this phase and led to an increase in theories on the emergence of the Minoan society. [1] In general, this period is characterised by continuity in traditions of production and consumption of material culture, such as pottery,

[1] Nowadays, archaeologists generally agree that "the manifestation we call 'Minoan' is defined both in terms of its general material culture and in terms of its approach to visual symbolism (…) on seals, pottery, and other objects" (Betancourt, 1999, p. 33). For some scholars, this label is considered a remnant of the cultural-historical paradigm due to its attachment to objects and typologies, rather than "contexts, settlements, or landscapes" (Whitley, 2006, p. 63). For others, it has a cultural, racial, or ethnic component (Broodbank, 2004). In the absence of better alternatives, I use Minoan/Minoans to refer to the material culture and social groups who inhabited Crete in this period. However, in no way does my adoption of the term here define a racial or ethnic group. Instead, I use it as Evans did, who "did not use the term 'Minoan' in an ethnic sense" (Karadimas & Momigliano, 2004, p. 48).

metalwork, and stone vessels, as well as architectural features. Additionally, a similar writing system was used that predates the Greek Mycenaean script (for a review, see Schoep, 2012).

However, the purpose of this chapter is not to describe the historiography of the Cretan Bronze Age or theories of state emergence (although see Hamilakis, 2002; Schoep, 2012 for more information). Instead, the focus is on the fluctuations of pottery wares and styles, with the aim of contextualising the Kamares pottery that is the subject of this work.

Relative Phases	Pottery Phases	Calendar Dates (BC)
Prepalatial	EM (Early Minoan) I	3500–2900
	EM II	2900-2200
	EM I	2200-2100
	MM (Middle Minoan) IA	2100-1950
Protopalatial	MM IB	1950-1850
	MM II	1850-1700
Neopalatial	MMIII	1700-1600
	LM (Late Minoan) IA	1600-1500
	LM IB	1500-1425
Final Palatial	LM II	1425-1390
	LM IIIA1	1390-1370
Post palatial	LM IIIA2	1370-1330
	LM IIIB	1330-1200
	LM IIIC	1200-1050

Table 1 - Chronology of the Cretan Bronze Age with calibrated calendar dates.[2]

1.1.1 - The Prepalatial period

The Bronze Age of Crete was marked by a general increase in settlement expansion, new local subsistence practices such as farming, pottery production, and funerary activity. Some scholars

[2] Dating and chronology are still a source of debate (Hamilakis, 2002; Manning, 2012; Momigliano, 2007b). In this work, I follow the chronology based on Warren & Hankey (1989) because it is the most shared framework in use today.

speculate that these social and cultural developments were linked to the emergence of social inequalities (Tomkins, 2007; Wilson & Day, 1994).

Concerning settlement expansion, Phaistos, Malia, and Knossos expanded gradually from EM I to MM IA (Whitelaw, 2012). Gournia, Vasiliki, Fornou Koriphi, and Myrtos Pyrgos were established during EM II (Nowicki, 2010; Warren, 1972). Phaitos and Haghia Triada were probably already established in Mesara (Laviosa, 1972-1973). Knossos is the largest and long-lived site in the north (Hood & Cadogan, 2011; Tomkins, 2007). The actual occupation of Knossos in this period is documented under and near the palace and westward in the area of the Acropolis hill (Whitelaw, 2012). Recent publications by Whitelaw (2017, 2018) and Whitelaw and colleagues (2019) suggest that the EM III-MM IA period witnessed a significant population expansion in Knossos. The *Knossos Urban Landscape Project* documented a high quantity of pottery material in various areas around the palace during this period, indicating the presence of several communities around the Kephala hill. The estimated population of Knossos during this latter period of the Prepalatial is believed to be between 4,000-7,000 inhabitants who probably lived in small hamlets built in the valleys or on top of surrounding hills (Legarra Herrero, 2019). Recent studies suggest that some of these hamlets on the outskirts of Knossos could host artisanal activities such as pottery, as furnaces built on ridges were common in Crete until the last century to take advantage of the wind. The exceptional growth of Knossos at the end of the Protopalatial seems to be linked with the emergence of new forms of pottery production and consumption, such as the Kamares, and the ceremonies attested in the various deposits in the palace (Day & Wilson, 1998).

The growth of these sites seems to have brought with it a surge in creativity manifested in pottery production. These experiments, which will concretise in the Kamares pottery of the later period, possibly resulted from movements of different types of artisans that brought with them their skills and knowledge from other centres. New shapes, including but not limited to jugs with open or closed spouts, zoomorphic vases, or rarer pyxidies inspired by Cycladic prototypes, appear in the archaeological record (Betancourt, 1985, pp. 48-52; Wilson, 2007). Alongside the introduction of new shapes, novel forms of surface decoration also appear in various sites around the island.

The so-called Pyrgos Ware found in EM I contexts presents a new array of surface decorations. This pottery is characterised by a reduced grey to black surface decorated with combinations of

burnished horizontal, vertical, and diagonal lines contrasted with non-burnished areas (Betancourt, 1990, pp. 25-29). Examples of Pyrgos Ware were found in Knossos, the port of Poros-Katsambas, and in the Pyrgos Cave (Wilson, 2007; Wilson & Day, 2000). Painted wares are attested alongside burnished pottery types. Common in the Mesara is the Haghios Onouphrios Ware, which features a red-brown linear decoration on a buff ground that adapts and covers the whole surface of vessels (Betancourt, 1985, pp. 29-32). Local variations of these styles are reflected in the Lebena and Koumasa wares (EM IIA-IIB). The Lebena has a white-yellowish slip painted on top of a red surface, usually ornated by geometric decorations, mostly zigzag lines like those typical of Neolithic pottery (Betancourt, 1985, 2008). The Koumasa Ware is usually characterised by red or brown lines traced on a yellowish surface. In Knossos, examples of Koumasa have double axes motifs, triangles, and chevrons (Momigliano, 2007b). Other sites with examples of this ware are Phaistos (Levi, 1976) and the tombs of Agia Kyriaki (Blackman & Branigan, 1982). The shapes of these pottery types are "incredibly varied and creative" (Betancourt, 1985, p. 32), with conical cylinders, high-spouted jugs, various sizes of cups, and closed squared or elliptical boxes coexisting alongside more common shapes, such as askoi, pyxides, animal-shaped vessels, cups, and bowls. This openness in shapes might reflect the diversity in the groups that moved from smaller hamlets to bigger centres in this period.

The second half of the Prepalatial brought several changes. Only a few examples of Koumasa and Aghios Onouphrios can be found in archaeological contexts (Levi, 1976). Widespread in early EM II is the Fine Grey Ware pottery type, already attested in Knossos since at least EM IIA (Wilson et al., 2004). Possibly produced in the Mesara (Wilson & Day, 1994), this pottery has a uniform smooth grey slip obtained by wiping the surface of vessels with water. Some rare examples suggest that it might also have been incised before firing (Betancourt, 1985, p. 40). Common shapes were cups, bowls, and jars reminiscent of Neolithic forms. In the same period, a new monochrome ware, the Vasiliki Ware (Betancourt & Gaisser, 1979), became the most common pottery circulating in EM IIB around and beyond the island (Whitelaw et al., 1997). First discovered in the homonymous settlement in the Isthmus of Ierapetra, this pottery presents a mottled surface that was slipped, burnished, and fired to obtain red, brown, or black coloured patches (Betancourt, 1985, pp. 43-48). More rarely, barbotine or painted with dark paint on a light surface (Poursat & Knappett, 2022, pp. 77-78). Important to contextualise the later Protopalatial

pottery are the styles that emerged in the later EM phases, namely the White-on-Dark and Dark-on-White.



Figure 1 - Examples of Dark-on-Light ware from the "Upper East Well Group" (EM III) (after Momigliano, 1991, p. 19, 28, 43; Momigliano, 2007b, fig. 3.5)

The first examples of Dark-on-Light Ware make their first appearance in EM IIA (Wilson, 2007). This pottery generally featured a plain buff surface decorated with a butterfly motif or black bandings on rims, spouts, and necks (Figure 1). Decorations were chiefly composed of lines and triangles running around the body and over the spout of jugs, crisscrossed lines, festoons, or double axes motifs. Common shapes in this period were round spouted jugs, jars, zoomorphic vases, bowls, cups, pyxides, and, more rarely, eggcups (i.e., footed goblets). Tripods or previous shapes with added feet also became more common (Betancourt, 1985, pp. 55-61). More importantly for the arguments that I will move in later chapters on the Kamares is another important style, the White-on-Dark.

This ware occurs from EM IIA and continues until MM III alongside Vasiliki Ware and Koumasa Style (e.g., a tomb in Mochlos, Davaras, 1975; Poursat & Knappett, 2022, p. 78). This is the most typical style of this period and seems more common in eastern Crete (Andreou 1979, p. 57; Betancourt 1985, pp. 55–60). Crucially, this style partially wanes with the beginning of the Protopalatial, in late MM IA, when the first examples of Kamares make their appearance. Similarly to the later Kamares, this style is characterised by a dark brown or reddish slip covered by geometric decorations in white. The main difference is, as I will describe below, the lack of polychromy, which is the hallmark of the Kamares. As Betancourt (1985) noted, there is a lot of

variability in the White-on-Dark with varied techniques in terms of burnished and unburnished surfaces (p. 55). When it comes to shapes, bowls, cups, jugs, spouted jars are the most common ones. Anthropomorphic shapes are also attested (Betancourt, 1984, Fig. 4.E).

However, the most distinctive trait of the White-on-Dark in relation to earlier wares and styles is the variety of motifs. Several regional differences can be attested. In the central and western regions of Crete, decorations are schematic and geometric (something that seems to return also in later periods, see Floyd, 1997). Generally, chevrons, triangles, lozenges, and circles are all part of the decorative repertoire of this pottery. In the east, the decorations are more varied and include triglyphs and complex metope motifs alongside circles and joined semicircles (Betancourt, 1984, p. 21-34). Importantly for later developments in pottery decoration is the appearance in EM IIB deposits in the east (e.g., Gournia) of spiral motifs (Betancourt, 1985, p. 57). Rare depictions of the agrimi are also found (Betancourt, 1985, p. 57). It is important to note, as Walberg (1976) already pointed out, that some of these motifs return in the later Kamares pottery. Another important characteristic that will be later found in the Kamares style is the connected spirals. For the first time, artisans make use of lines and circles to connect spirals and create friezes that follow the shape of the vase. This will become a distinctive feature of the Kamares decorative syntax, which is an innovation that seems to come from the White-on-Dark. One last introduction that will become characteristic of later styles and wares is the use of torsional decoration, with oblique lines and concatenated s-shaped lines that will become typical of the Protopalatial (Betancourt, 1985, p. 59). In a way, the White-on-Dark could be seen as the most direct precursor of what would later be the Kamares pottery tradition. It is intriguing to connect the movements of populations around Crete with the emergence of the Kamares. In fact, one could suggest that several artisans moving around the Cretan landscape in this period might have given birth to the Kamares by bringing together their previous regional knowledge and traditions, such as the decorative repertoire of White-on-Dark motifs or the use of polychromy attested in the Vasiliki Ware.

The Prepalatial is characterised by movements of populations and changes in international trade routes (Andreou, 1978; Momigliano, 1991; Zois, 1968).[3] In the site of Knossos the ceramic

[3] It is worth noting that only recently there has been a consensus about the EM III. For several years, the so-called "EM III controversy" (Watrous, 2001, p. 214), as also discussed by Momigliano (2007), divided scholars into two groups: those who believed in a distinct EM III ceramic phase characterised by the absence of *Geometric Polychrome*; and those who rejected this idea because of the absence of similar deposits outside Knossos. In line with Momigliano's (2007) reassessment of the archaeological deposit excavated by Evans in the light of the recent work by Hood and

assemblages re-examined by Momigliano (1991, 2007) show that between EM III and MM IA there was:

"1) the virtual disappearance of Vasilike Ware; 2) the decrease in pottery decorated with a simple monochrome red or black surface; 3) the continuation of Dark-on-Light and Light-on-Dark ware, with an increase in curvilinear and torsional motifs; 4) the rare appearance of relief, barbotine, and incised decoration" (Momigliano, 2007b, p. 84).

Most pottery continues to be handmade. Semi-fine buff and greenish clays are now used only for finer wares. Rounded and conical cups and eggcups become the most common shape (Macdonald, 2010; Momigliano, 2007b). The cases of "*The Gournia North Trench"* (Hall, 1904; Soles, 1992) and "*The House Tomb 2"* at Petras (Tsipopoulou, 2012a) paint a similar picture. In Phaistos, the "cortile LXX" is the only deposit stratified above an EM II house (Levi, 1958). Regional differences can also be found in the absence of spiral and circle motifs in the Light-on-Dark from east Crete, motifs that seem to be characteristic of the Knossian area (Andreou, 1978; Betancourt, 1985).

The above shows that the Prepalatial period was a long phase of development characterised by substantial regional variations boosted by previously existing local traditions and contacts with the Cyclades (Watrous, 2021). Whilst these sparse communities manifested a rapid regional social and economic diversification, as shown by the local pottery styles, they seem to resist political integration (Haggis, 1999; Schoep, 2012; Whitelaw, 2004). This situation changes in EM III when the numbers of eggcups and jars increase. But, as we shall see below, it was during the Protopalatial that there was a surge in production and consumption practices around Crete.

1.1.2 - The Protopalatial period

The Protopalatial period spans from MM IB to MM IIB (approximately 1950 - 1700 BC) and overlaps with the Middle Bronze Age. This phase is characterised by the emergence of new trade routes with Egypt and the Near East, as suggested by the findings of obsidian, ivory, gold, silver, copper, and luxury items (such as Cycladic figurines and Egyptian scarabs) (Kemp et al., 1980;

Cadogan (2011), I here consider the EM III a distinct phase from the MM IA that is "a ceramic phase that marks the first regular appearance of polychrome ware" (Momigliano, 2007b, p. 80).

Branigan, 1998; Watrous, 2001; Wiener, 2013). Collective communal or family burials (i.e., tholoi and house tombs) continued to be used from the EM period (for a review, see Girella, 2016). Examples include Phourni at Archanes (MM IB-II) (Watrous, 2001), the Kamilari tholos in the Mesara (Girella, 2018), "House Tomb 2" at Petras (Tsipopoulou, 2017), and the funerary enclosure of Chrysolakkos (McEnroe, 2010; Soles, 1992). This period witnessed the construction of the first peak sanctuaries (such as Chamaizi or Iuktas; Lenuzza, 2011; Watrous, 2001, note 284).

However, the most prominent feature of this phase is the emergence of the so-called palaces: monumental architectural structures aggregating several buildings, generally considered centres of social, political, and economic power. Examples include Knossos (Hood & Smyth, 1981), Phaistos (Levi & Carinci, 1988; Todaro, 2013), Malia (Olivier et al., 1978; Poursat & Knappett, 2005), and Petras (Tsipopoulou et al., 2010; Haggis, 2012). Although discussions on the social and political nature of these centres are still debated (see, for example, Hamilakis, 2002; Schoep, 2010), the widespread assumption is that the palaces housed political and religious authority in charge of a hierarchically structured society (Evans, 1921; Cherry, 1984). Recent views suggest that some of the social, cultural, and economic developments that characterised the Protopalatial period were already in place in the Prepalatial period (Schoep, 2010). One of these, on which I will return when discussing the character of the Kamares, concerns pottery consumption practices (Day et al., 2006; Day & Wilson, 1998). It is worth mentioning that my use of the term palaces here refers to the physical monumental buildings but does not intend to provide any social and political characterisation of these complex architectural features of the Protopalatial. That said, I will now move on to describe the pottery of this period.

The use of red pigment is common in various contexts around Crete; however, most of the examples seem to originate from Phaistos (Caloi, 2009) and Knossos (MacGillivray, 2007; Momigliano, 2007b). The decorative repertoire of the Patrikes style includes lines, triangles, spirals, circles, and horizontal bands, which were distinctive motifs of the Dark-on-Light Ware (Momigliano, 2007b; Poursat & Knappett, 2022, p. 114). However, there is a significant difference that characterises the Kamares style: instead of combinations of single decorative motifs and patterns, one single motif is repeated, forming a linear register running vertically or horizontally around the vase (e.g., in Kommos, see Betancourt, 1990; for Phaistos, Caloi, 2009). Another technique introduced in EM III that gradually developed in MM IA and IB was the barbotine decoration, which involves protuberances obtained by brushing or pinching the clay surface of

unfired pots (Betancourt, 1985, pp. 83-85; Foster, 1982; Poursat & Knappett, 2022, pp. 116-117) (Figure 2). Although this technique was more common at Phaistos (Levi & Carinci, 1988; Caloi, 2009), examples were found in Knossos (MacGillivray, 2007; Momigliano, 2007b), Kommos (Betancourt, 1990), and Malia (Van Effenterre & Van Effenterre, 1976). This style arrived much later in eastern Crete but persisted until MM IIA (Betancourt, 1985).



Figure 2 - Example of Barbotine decoration from Knossos from the "Loomweight Area S. of Spiral Fresco"(MM IB) (KWM322). Photo by author, courtesy of the British School at Athens.

An important innovation that breaks with previous and successive styles is the emergence in MM IB of the so-called Kamares pottery style (or ware). An important innovation that departs from prior and subsequent styles is the emergence of the Kamares pottery style (or ware).[4] This distinctive style features a glossy black slip adorned with white, red, orange, and occasionally purple geometric or naturalistic ornaments (Levi & Carinci, 1988; Macdonald & Knappett, 2007; MacGillivray, 1989). The earliest Kamares decorative patterns harken back to those of earlier painted pottery styles and wares. In fact, lines, dots, spirals, and circles were all integral components of the Early Minoan and Middle Minoan IA decorative tradition. What set the Kamares apart was how artisans employed these earlier patterns to create more intricate geometric

[4] As I discuss in the following paragraph, one of the debates that surround this pottery style regards the use of the term *Kamares*. I clarify that my usage of the term *Kamares style* refers to those pots with a lustrous black slip, painted in white, red, orange, and sometimes, purple geometric and naturalistic ornaments. More details can be found in Section 1.3.2 and Chapter 6.

or naturalistic motifs, such as fish in examples from Phaistos, particularly in MM II (Betancourt, 1985, pp. 97-101; Walberg, 1978, pp. 126-127, 1983; Zois, 1968).

During this period, various regions in Crete witnessed an increase in pottery production and consumption. Likewise, improvements were noted in decoration-making techniques, tools, and the selection of raw materials, as evidenced by the surface decorative forms of Kamares pottery. In MM II, new pigments made their debut. Yellow, orange, purple, and light brown were adopted to create more visually appealing effects. Novel whirling and radiating motifs were integrated with previous pictorial representations in unconventional and distinctive ways (Walberg, 1976, pp. 54-57). Although more prevalent than before, floral patterns, petals, and marine animal motifs remained less abundant than geometric decorations. Characteristic of this style are curvilinear geometric embellishments, either alone or in combination with other decorative elements. In Phaistos and Knossos, barbotine decorations continued to be applied until the conclusion of the Protopalatial period. Additionally, applique decorations, typically in the form of shells or flowers, made their entrance. The crater from Phaistos adorned with lilies in Figure 3 is perhaps the most well-known example of Kamares pottery.



Figure 3 - Example of crater from Phaistos decorated with lilies (MM IIB) (AM 10578). Courtesy of the Heraklion Museum.

The complexity and creativity of Kamares decorative forms find parallels in the shapes. From MM IB onwards the potter's wheel seems to become more widely adopted around Crete (Knappett, 1999a). As Choleva (2012, 2020) discusses at length, the wheel was initially adopted to shape and thin the walls of coiled pots, rather than to throw the whole vessel; a technology that in MM IB was chiefly used for small shapes. Goblets and cups are the most common shapes in MM IB, followed by jugs, bowls, and plates (Betancourt, 1985, pp. 97-100). The gradual incorporation of technological techniques involving the use of the potter's wheel in MM II produces examples of Kamares that are both visually and technically more refined – although this observation is probably biased by our contemporary judgment. Yet, it would be difficult not to consider the case of a class of pottery featuring walls thinner than 1 mm, what Evans called Eggshell Ware, as technologically advanced and visually refined. A great deal of technological expertise was surely needed to produce a pottery style with walls thinner than 1 mm.

Besides the Kamares style, the Dark-on-Light continued throughout the Protopalatial period. Simple dark decorations reminiscent of EM ones are found in various Cretan regions (Betancourt, 1977, p. 85-89). Meanwhile, in eastern Crete, a new decorative tradition slowly emerged; one that

included zoomorphic and anthropomorphic motifs: the beginning of a practice that would become widespread after MM IIIA (Floyd, 1997).

I shall now describe how this tradition endured in the Neopalatial period, before moving to the study of the Kamares pottery style and outline the gaps existing in the scholarly literature.

1.1.3 - The Neopalatial period

The Neopalatial (MM III-LM IB, ca. 1700-1450 BC) was a period of "great *development* after the *emergence* of the palaces in the earlier 2nd millennium BC" (Macdonald & Knappett, 2013b, p. 1, emphasis in the original).

Linear A replaces the Cretan Hieroglyphic (Hallager, 1996). Luxury imports increased (Rehak & Younger, 2001). Novel artistic forms such as frescoes, ivories, and faïence were introduced. Whilst a seismic event in MM IIB seems to have damaged most centres during the final stages of the Protopalatial (e.g., Phaistos or Myrtos Pyrgos), new palatial sites are founded (e.g., Galatas; Rethemiotakis & Christakis, 2013). Knossos continued to grow, reaching over 40,000 inhabitants (Whitelaw, 2018). A significant introduction is the 'villas'*:* monumental households inspired by palatial architecture (McEnroe, 2010; Poursat & Knappett, 2022, ch. 20). It is from these estates that most of the pottery comes from (Rehak & Younger, 2001, p. 403).

As exemplified by Knossos (Hatzaki, 2007; Macdonald, 2013), defining this ceramic phase in stylistic terms presents quite a formidable challenge. There appears to be a considerable regional divergence on the island, marked by variations in settlement patterns (refer to contributions in Macdonald & Knappett, 2013a). In general, the pottery of MM III demonstrates a "surprising and still unexplained recession in style and technology" from the Protopalatial styles (Betancourt, 1985, p. 103). Most production and consumption practices can be traced back to Protopalatial and Prepalatial developments. Nevertheless, the fabrics are coarser, and the shapes and decorations are simpler than those of the Protopalatial period. Rhyta and straight-sided Vapheio cups, first observed in MM II, have become more prevalent (Poursat & Knappett, 2022, p. 243). Conical cups and pithoi are also more frequently found, indicating increased economic exchanges (Christakis, 2005).

In eastern Crete, the production of White-on-Dark Ware persisted until the Late Minoan IA period (Rehak & Younger, 2001). Of note is the Tortoise-Shell Ripple Ware, a lustrous pottery type with dark-on-light designs, which has been present since MM IIA in Knossos (Hatzaki, 2007).

Possibly influenced by the Kamares style, the decorations on cups, jars, jugs, bowls, and bridge-spouted jars consist of waves, horizontal bands, and irregular parallel lines. These features would go on to become characteristic of late LM pottery.

The painting techniques of this era appear to be less precise compared to those of the Protopalatial period, featuring broader brush strokes and, in some instances, pre-firing incisions (Betancourt, 1998, p. 109). Knappett and Poursat (2022) highlight the potential influence of frescoes on the development of naturalism and shifts in decorative techniques (also see Ch. 21; Rehak & Younger, 2001). There is an overall simplification in techniques, accompanied by the gradual emergence of pictorial and naturalistic decorations, drawing inspiration from the longstanding eastern Cretan traditions mentioned in the previous paragraph (Shank, 2001).

In LM IA reeds and floral bands began to appear in friezes alongside spirals, lines, and stamp decorations. Polychromy became much scarcer than in the Protopalatial period. Occasionally, brown-reddish dots were observed alongside dark-red horizontal bands, evoking memories of Kamares decorative forms. Illustrations of these trends can be found in the ceramics from the "Gypsades Well (Upper Deposit)" in Knossos (Hatzaki, 2007, pp. 180-181) and the LM deposits of Kommos (Watrous, 1992).

Late Minoan IB features two predominant styles: the "Standard Tradition" and the "Palatial Tradition" (Betancourt, 1985, pp. 155-158).

The Standard Tradition retained most of the decorative forms seen in Late Minoan IA and was primarily used for decorating utilitarian shapes. The techniques employed in this tradition were characterised by haste and imprecision, resulting in motifs that were poorly executed and sometimes disjointed, such as reed leaves being detached from the stem. Similar to previous examples from Late Minoan IA, the use of white and red to separate decorative registers persisted (Silverman, 1978). This trait, as we have seen, had its origins in Middle Minoan IB with the Kamares style.

On the other hand, the Palatial Tradition, which "shows narrow ties with wall painting, is inspired by metal or stone vessels, and includes new forms, such as rhyta or ewers" likely originated from workshops in Knossos (Poursat & Knappett, 2022, p. 248). Describing this tradition is a challenging task. While researchers have classified it into the Marine, Floral, Abstract-Geometric, and Alternate styles, some of their themes and the methods used to depict them are common to all these styles (Betancourt, 1985, pp. 154-158).

The Marine Style is characterised by depictions of octopuses and fishes within an underwater seascape featuring seaweeds, rocks, and corals (Shapland, 2019). The decorative techniques and the presence of spirals, petals, horizontal lines, and rosettes harken back to the earlier Kamares forms. In Late Minoan IA, the decorative themes were influenced by frescoes and clay reliefs (Betancourt, 1998, p. 144). As for shapes, they may have been inspired by contemporary stone vases. I argue that the novelty of this style does not lie in the decorative methods or figurative elements employed, but rather in how it adopts a distinct marine character that was only vaguely expressed in earlier works, with the Alternating Floral Style possibly serving as the most direct precursor (Floyd, 1997).

The Floral Style evokes most of the floral decorations from Middle Minoan and Late Minoan IA: rosettes, lilies, crocuses, palms, and reeds are found alongside innovations such as olive branches and the "sacral ivy" (Kantor, 1999, p. 316). Naturalistic friezes, foliate bands, and lines of petals and dots directly recall previous Kamares forms (for further details on motifs, refer to Chapter 6).

The Abstract-Geometric Style encompasses all non-naturalistic decorations, including festoons, horizontal lines, spirals, dots, petal-shaped motifs, and patterns imitating stone vessels. Additionally, bucrania and double axes, which were already present in Late Minoan IA, are also found in this style (Betancourt, 1985). These motifs exhibit a strong continuity with the Protopalatial and early Neopalatial periods, as highlighted by Poursat and Knappett (2022, pp. 248-249).

The Alternating Style signifies the conclusion of Late Minoan IB pottery production. This style combines abstract-geometric symbols with marine motifs and documents the earliest experiments that would later be employed in the Postpalatial period. It reflects the standardisation and stylisation of symbolic forms. Interestingly, the visual scheme of this style incorporates decorative elements derived from the Marine Style while departing from the *horror vacui,* and instead, it recovers the precision of the Floral Style to emphasise the religious symbols of the Abstract-Geometric Style.

It is within these styles that, during the final phases of the Minoan period, Knossian artisans introduced the "Palace Style" (Betancourt, 1985, pp. 155-158). This represented a modification of the preceding Palatial Tradition, primarily used to decorate large jars. The Palace Style is characterised by combinations of naturalistic and symbolic patterns, incorporating foreign

elements like a boar helmet. It succeeded in "synthesising various currents, between Minoan tradition and Helladic trends, assimilating artistic novelty into the Knossian art of this period" (Poursat & Knappett, 2022, p. 386).

1.2 - The Kamares pottery style

In the long-term description of the Cretan Bronze Age, I have highlighted the most significant changes and continuities in pottery making. The Kamares tradition has been significant in combining previous technical know-how with cutting-edge innovations, including but not limited to the wheel, during this time. Examples of continuation can be seen in the adoption of the red pigment first attested in the Prepalatial with the Patrikes Style or the continuity of White-on-Dark decorations from EM III and MM IA. However, the importance of the Kamares style is not restricted solely to the long-term history of Minoan pottery. There is something inherently unique about this pottery tradition that has captured the attention of past and recent scholars, something that makes it challenging to categorise this style: the uniqueness and inventiveness in how artisans combined decorations and shapes.

1.2.1 - The character of Kamares

Despite not being as common as other styles and wares, the Kamares pottery is considered the hallmark of the Protopalatial period because of its striking visual qualities (Betancourt, 1990; Carinci, 1997; Knappett, 2008; Levi & Carinci, 1988; Poursat & Knappett, 2022; Van de Moortel, 2006b; Walberg, 1976). In discussing this style, Betancourt (1985) remarked: "no complete catalogue for the Kamares Ware ornament can be visualized. Each large excavation adds hundreds of previously unrecorded examples many of them apparently unique. Creativity and the excitement of the unexpected are regular traits of this style" (p. 97).

Linear bands, parallel diagonal and vertical lines, zigzags, wavy lines, pendants, spirals, intersecting arcs, and naturalistic motifs such as petals, flowers, and trees are all part of the Kamares decorative repertoire (Figure 4). Whilst the most elaborate decorations are generally found on fine pots, this style's decorative features are not restricted to its finest examples. Red, orange, purple, and white decorative patterns can be found on pouring vessels such as cups or bridge-spouted jars, coarser storage shapes (e.g., jugs, amphorae), bowls, tripods, and pithoi

(Betancourt, 1985, pp. 97-100). But the inventiveness of Kamares is not restricted to the variability of surface decorations and the introduction of new shapes.



Figure 4 - Drawing of Kamares rounded cups (MM IIA-B) (after Mackenzie, 1903, pl. V).

Artisans' creativity manifests in applying different forming and decorating techniques, and in the selection and use of raw materials (e.g., clay or pigments). From MM IB onwards, potters embraced a wide range of technological strategies: handmade, wheel-shaped, or wheel-thrown techniques (Choleva, 2020; Knappett, 1999a). However, it would be incorrect to assume that the Kamares decorative and forming techniques were evenly spread around Crete. The previously described Alternating Floral Style, which appears to have been more prevalent in eastern Crete than in the north or south-central areas exemplifies these different regional traditions (Floyd, 1997). The MM IIA ceramics from the "Royal Pottery Stores" of Knossos (see below description of deposits) have incised, painted, or stamped decorations with tools such as sponges or stamps. Or, as for the case of Barbotine ware (Caloi, 2009; see Figure 2), they could have been made of clay appliqués. Ultimately, creativity in technical know-how and forms is also evident in how artisans used different pigments such as talc white, yellow, or purple (Faber et al., 2002; Day et al., 2006).

These characteristics have made this pottery popular among academics who are interested in exploring more about the social function, historical context, and chronology of the development of this tradition. However, as I will discuss below, the inventiveness of this ceramic tradition's decorations, shapes, techniques, and selection of raw materials has thus far spurned any classification, making this style challenging to study.

1.2.2 - Kamares an ambiguous pottery

The term *Kamares* (meaning *Chambers* in English) finds its origin in a cave on the southeastern slopes of the Idean Mountain range, where, in 1894, the Italian explorer Taramelli (1901) discovered twenty-four fragmented vessels and some sherds adorned with polychrome decorations (see Figure 5). This collection was subsequently documented and published by Mariani (1895) and Myres (1895). A few years later, an expedition from the British School at Athens, led by Dawkins and Laistner (1913), also explored this site.

Initially, the term *Kamares* was used to categorise all pottery styles found in this assemblage, which included Monochrome, White-on-Dark, and an intact Haghios Onouphrios jug (Van de Moortel, 2006b, p. 76). The discovery of polychrome pottery in later excavations led to debates regarding the chronology and nature of this style. The uncertainties surrounding published data and the absence of a reliable chronological framework due to the lack of stratigraphic excavations made it challenging to conduct a comprehensive study of the Kamares findings. Consequently, initially, the term *Kamares* encompassed all Middle Bronze Age pottery (Dawkins & Laistner, 1913), which included polychrome pottery and other ceramic materials characterised by "an equally mature monochrome style with designs in lustrous black varnish (usually) on a fine buff clay slip" (Mackenzie, 1903, p. 171).[5]

[5] A very common fabric in Knossos, pinkish outside and orange or purple inside.



Figure 5 - Sketches of two examples of Kamares style (called Middle Minoan by Dawkins and Leistner, 1913) from the Kamares Cave (after Dawkins & Laistner, 1913, p. X).

Grounded in an art historian background, Furumark (1939) was the first to adopt the term "Kamares style" to describe the finely decorated MM II pottery that he argued was "clearly separated from the preceding and the following styles" (p. 31). But it was only with Zois (1968) that the term *Kamares* was adopted to define a class of fine pottery characterised by the use of orange, red, yellow, or purple pigments alongside the white. A few years later, Walberg (1976) similarly used this term to describe vases decorated with white, orange, and red on a dark lustrous slip. However, in discussing the colours of Kamares motifs, she assumed the Dark-on-Light Ware to be part of the earliest stages of the Kamares style (i.e., Early Kamares); something on which I will discuss in detail below. She also restricted this term to the polychrome pottery from Knossos and Phaistos, considering similar examples from other areas "Provincial" (Walberg, 1983a).

Because of these studies, *Kamares* became an ambiguous label with little or no heuristic value, as MacGillivray (1986, 1998) and Carinci and Levi (1988) argued. To avoid these terminological

discussions and to distance themselves from studies of style that only consider the decorative aspect of pottery production, the scholarship has been recently referring to this style as Kamares Ware. This term has been used to describe "a characteristic technique of decorating pottery found in restricted contexts in Middle Minoan" (also Betancourt, 1985; Day & Wilson, 1998, p. 351) characterised by a dark slip with polychrome decorations. Recent researchers who sought to distance themselves from such discussions have used *polychrome* "only when the colours involved are red and white on a dark (usually black) slip" (Macdonald & Knappett, 2007, p. 36). In so doing, they distinguish the polychrome Kamares from White-on-Dark, Dark-on-Light, and Trichome Ware (Haggis, 2012; MacGillivray, 1998; but note that he uses 'Kamares Ware' in MacGillivray, 2007).

These various definitions of Kamares underscore the challenge of understanding the tension behind change and stability, as well as the creativity and continuity of this pottery tradition. Before delving into the in-depth analysis of Knossian Kamares pottery data in Section 6.1, I would like to present my stance on these terminological debates and my preliminary definition of *Kamares style*. In this work, I prefer to maintain the label *style* rather than employing the term *ware*, for two primary reasons.

Firstly, I contend that the term *style* carries with it a long history of uses in archaeology that can be traced back to art history and the cultural-historical approach. As I will elaborate on in the following chapter, style still plays a crucial role in archaeology. While it is often associated with the decorative aspects of pottery production, as early studies have suggested (Wobst, 1977), various scholars have also demonstrated that style is not in opposition to function. The visual appearance of pottery also influences the technological choices required to create it (Dietler & Herbich, 1989; Roux, 2019). More crucially, my interest in using the term *style* arises from its original purpose as a tool to make sense of changes in material culture over time. Styles of material culture have been employed to make sense and even visualise the passage of time. This temporal dimension associated with style has frequently been overlooked, as I will further discuss at the end of Chapter 2. Style carries a temporal aspect that the term *ware*, derived from technological studies of ceramics primarily focused on understanding various physical attributes of pottery (e.g., fabrics; see Rice, 1976), does not convey. This temporal aspect, integral to the original use of style in archaeology, is something I aim to emphasise in my re-examination of the Kamares.

This emphasis on the temporal aspect of style brings me to my second point. Indeed, I suggest using the term *Kamares style* in this work because, as I will extensively discuss in Chapter 3, I share Gell's (1988) intuition that styles are not fixed types produced solely based on their changing formal attributes over time. Instead, I will configure my argument for the Kamares style based on Gell's proposal that style is a collection of artefacts distributed across time and in space, each accumulating the collective history of all previously created artefacts made in accordance with the norms imposed by this stylistic tradition.

Therefore, from this point onward, I will adopt the term *Kamares style* to underscore the temporal dimension of this tradition. Specifically, with this term, I denote a pottery-making tradition that first emerged in the early MM IB and persisted until the start of the Neopalatial period (MM IIIA). This pottery is characterised by a black or reddish-brown slip that exhibits a lustrous or semi-lustrous quality and is adorned with motifs traced in white, along with at least one additional pigment, such as yellow, orange, red, or purple. This definition encompasses all vessels with these material qualities, decorative techniques, and forming methods, as they can be perceived through the senses, irrespective of their archaeological context.

Before critically reviewing stylistic and technological studies of Kamares, I describe the distribution of the Protopalatial deposits which contained examples of Kamares style published to date.

1.2.3 – The Middle Minoan deposits

In the description of archaeological contexts that follows, the reader will not find a complete list of all Middle Minoan excavations because my aim is to describe the locations where Kamares pottery has been documented.

1.2.3.1 - Knossos

Mackenzie (1901) refers to the discovery of Kamares at Knossos in the first of his unpublished excavation diaries (Momigliano, 1991). The "Upper East Well Group" was the first area which contained an admixture of EM and MM I pottery. Recently re-examined by Momigliano (1991, 2007), this area comprises the "Early Houses beneath the West Court" (MacGillivray, 1998, pp. 19-27), "East Wing," "South Front", and "Outside Area of later palace" (Momigliano, 2007b, pp. 81-83).

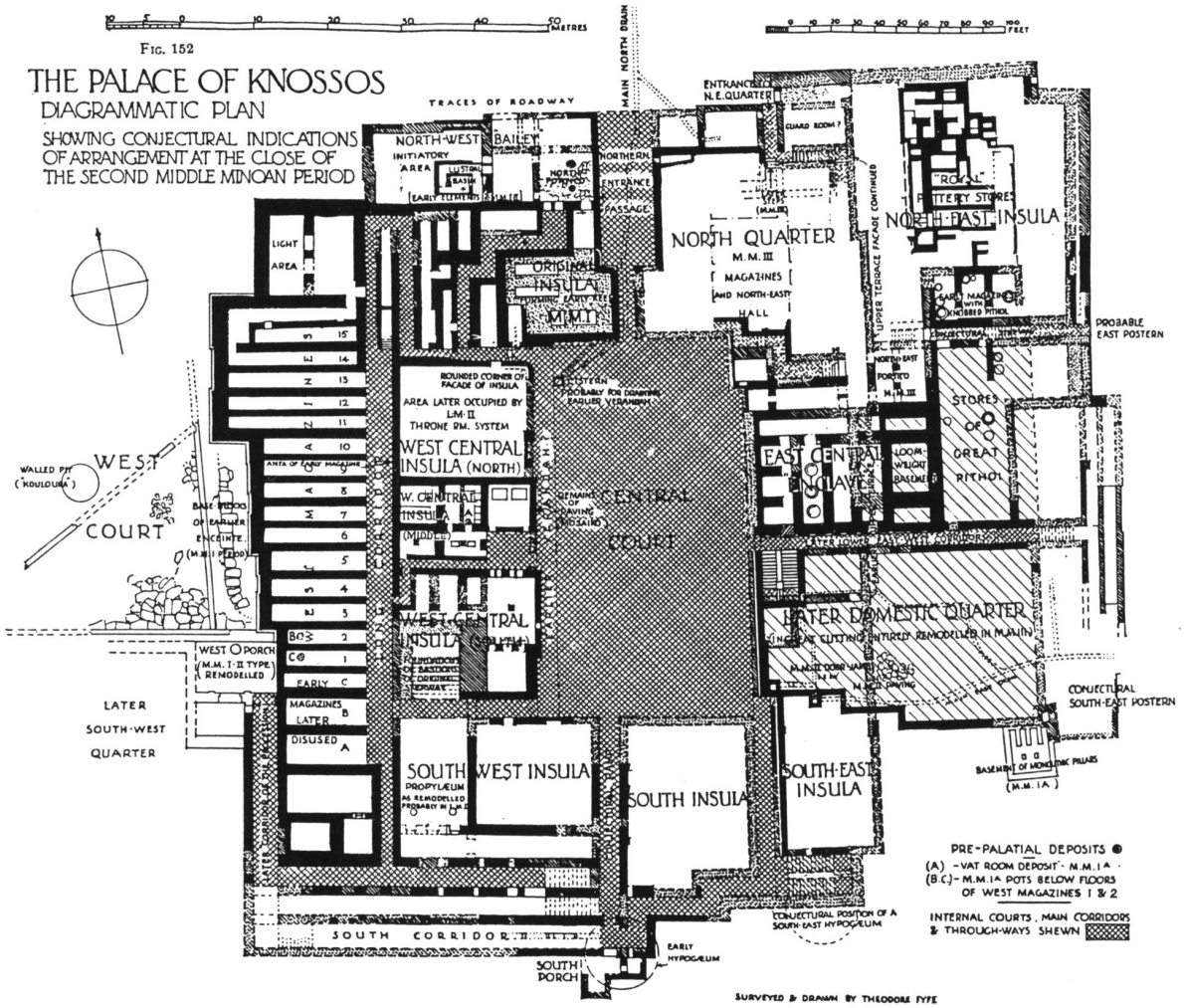


Figure 6 - Plan of Knossos with the hypothetical arrangements at the end of the Protopalatial period (after, Evans, 1921, fig. 152).

During the clearing of the "West Court" from 1900 to 1930, Evans and Mackenzie made several test pits (TPs) (Momigliano, 2007b). TP 1 revealed a few mixed EM and MM sherds. T3 and T11, fragments part of the "West Polychrome Deposits" dated MM IIB-IIIA (MacGillivray, 1998, pp. 19, 23). It is from these deposits that Evans excavated the first examples of polychrome MM IA pottery (Evans, 1921, p. 164; Momigliano, 1991, p. 151). However, crucial towards identifying the stylistic features and chronological differences of EM III and MM IA were the excavations of the "Royal Road Section" by Hood (1966) and the reinvestigations by Momigliano in the "House A", "House B", "House C" and the "Well to the north of House A" (see discussions in Momigliano,

2007b, pp. 79-81; 94-100) (Figure 7). These studies identified a distinctive MM IIIA pottery marked by a black slip, covered with red and white geometric decorations, possibly imported from the Mesara (Day et al., 2006).

The MM IB phase is chiefly described by the "Early Chamber beneath the West Court group" (MacGillivray, 1998, pp. 19-27; MacGillivray, 2007, pp. 107-122). Most of the material in this group was stratified over the MM IA "House C beneath the West Court" and the Koulouras (MacGillivray, 1998, pp. 30-31), the "Room of the Jars" from "Royal Pottery Stores", and the "Monolithic Pillar Basement" in the East Wing (MacGillivray, 2007, p. 108). In the West Wing, MM IB pottery was found in the "Vat Room Deposit," the "North Front", "West Façade", the so-called "Early Keep", the "early deposits of the West Magazines," and the "South-West Palace Angle" (MacGillivray, 1998, pp. 34-35; Momigliano, 1991, pp. 169-171). Equally part of the "Early Chamber beneath the West Court group" is the pottery excavated by Hood (1966) from the "Royal Road South". Two additional deposits dated to MM IB are respectively the "Deposit A", from the so-called "Early Magazine A", and "Deposit B" in the "South-West Houses", recently published by Macdonald and Knappett (2007).

MM IB is characterised by the presence of tumblers, rounded and footed goblets, carinated and broad straight-sided cups, and spouted-jars. Some of these vases were decorated with diagonal red, orange, and white lines or horizontal, diagonal, or vertical running floral or geometric motifs, such as petals, rosettes, dots, or wavy lines - MacGillivray's 'Woven Style' (1998; 2007).

MacGillivray (2007) has recently reorganised under the "Royal Pottery Stores group" several MM IIA deposits in the "West Polychrome deposits" (pp. 122-134): the "Area of the Polychrome Jug" and "Porcelain Deposit" in the West Court (MacGillivray, 1998, p. 28); the "South-west Room"; the "Area of the Lime Kiln" and the "Small East Rooms"; the "Loom-Weight Basement", and the "Early Floor beneath the Room of the Olive Press" (MacGillivray, 1998, pp. 35-44). The deposits C, D, and E in the area of the "South-west Houses" also held several Kamares vases dated to MM IIA (Macdonald & Knappett, 2007, pp. 9-21). Equally stratified under an MM IIB strata was the "Trial KV" (Popham et al., 1974). Tumblers, straight-sided cups and rounded or footed goblets persist from MM IB. Tall straight-sided cups, carinated and bridge-spouted jars in the Kamares style are typical in MM IIA. The alternated floral and polychrome geometric decorations with running spirals, dots, and S-shaped continue from previous periods.

The “Trial Group KV” consist of MM IIB deposits (MacGillivray, 1998; 2007, pp. 134-144): the “Trial KV” on the Acropolis slopes (Popham et al., 1974) and the “Loom-Weight Basement” (MacGillivray, 1998, pp. 41-42). Other smaller deposits stylistically dated MM IIB are the “Enamel Deposit”, located “North of the Area of the Spiral Fresco”, and the “Western Extension of the Royal Road (SEX)” (MacGillivray, 2007, pp. 134-135). The decorative structure seems more rigid, with two or three registers with horizontal bands, wavy lines, foliate bands, and possibly stylised sun motifs (MacGillivray, 2007, pp. 136-137). Spirals and other geometric decorations endure from previous phases. Wheelmade rounded cups, bridge-spouted jars, and straight-sided cups with a rounded profile are customary. The most common decoration is the *“Sunburst style”* found on Kamares examples (MacGillivray, 2007, pp. 138-140).



Figure 7 - Detail of one of the three Kouloures with remains of the EM III - MM IA houses. Photo by author, courtesy of the British School at Athens.

MM IIIA is primarily attested in the “West and South Polychrome deposits” (MacGillivray, 1998, pp. 33-34; 2007, pp. 144-149). The first of the three Kouloures on the West Court cleared in 1907 and further excavated by Pendlebury held some polychrome straight-sided cups with

"Heavy Spiral" decoration (MacGillivray, 1998, nos. 311, 332, 334; 2007, pp. 144-147). Mathioudaki's (2018) recent re-examination of the "House of the Fallen Blocks" and the "House of the Sacrificed Oxen" has shed light on early MM IIIA forms. One hemispherical cup decorated with MacGillivray's 'Wavy Lines' and two straight-sided cups, one with a rosette reminiscent of MM IIB and a second with a very stylised foliate band, are the last examples of Kamares style from Knossos.

1.2.3.2 – Phaistos

Since Levi's first debated chronological interpretations of the Phaistian deposits (Levi & Carinci, 1988), several studies from the Scuola Italiana di Archeologia ad Atene have reconstructed and re-assembled the stratigraphic data (Baldacci, 2017; Caloi, 2009; Carinci & La Rosa, 2007; La Rosa & Carinci, 2009). Nowadays, scholars maintain that Protopalatial Phaistos was a single phase characterised by the collapse of a three-storey building that happened at the end of MM IIB. Within this period, scholars have recognised several deposits, providing essential data for understanding the diachronic development of Kamares.

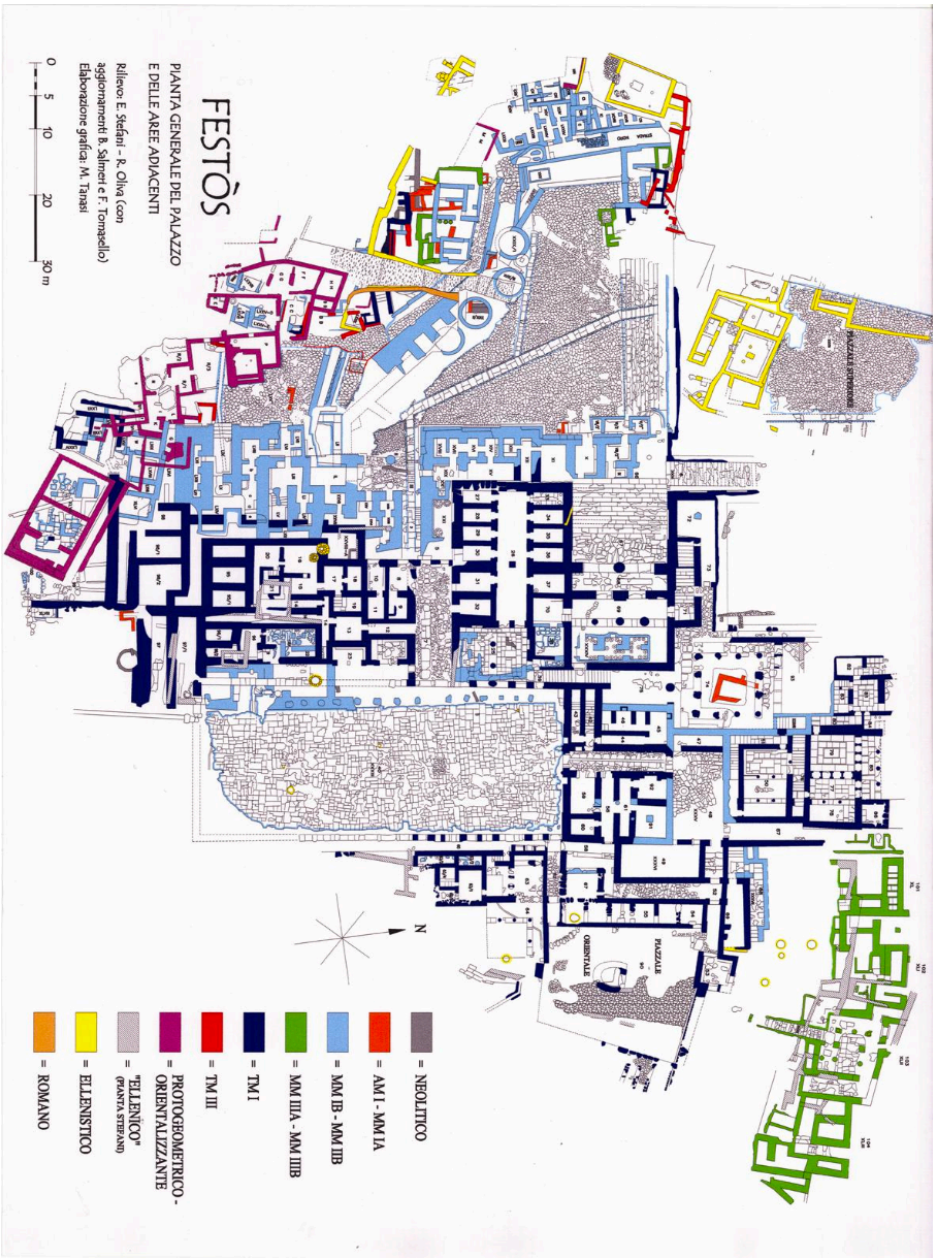


Figure 8 – Map of the palace of Phaistos (after Carinci, 2014, fig. 1).

Caloi (2009) has recently re-investigated the "West of the West Court" (Piazzale I) of Phaistos (rooms C, CI, CIII, ICα, ICβ) and compared other areas of the palace with what she recognised as three distinctive chronological periods: Phase A, B, and C. Phase A shows stylistic material in line with "Early MM IB" features (La Rosa, 2002, p. 735; as cited in Caloi, 2009): White-on-Dark, Kamares, Barbotine, Printed, Dark-on-Light and Crude ware. These pots are handmade globular beak and spouted jugs, handleless cups, globular-conical and open-spouted jars, and tumbler-

shaped cups. Parallels are Knossos (MacGillivray, 1998), Petras (Haggis, 2007), and Palaikastro (Knappett & Collar, 2007). The Kamares decorations of this period are mostly linear, such as lines and J-spirals traced with white and red-brown pigments (Caloi, 2009, p. 390). Parallels between Phaistos and Knossos are evident in cups decorated with Barbotine and Kamares decorations discovered in an MM IB fill beneath the "Early Paving of the South Front" in Knossos (Caloi, 2009, p. 397). Other materials with Knossian comparisons are squat globular jars with polychrome decorative motifs typical of MacGillivray's (1998) MM IB 'Woven Style'. At Kommos, "Building AA" has also produced material dated from MM IA to M IIA with globular jugs in Kamares style that closely resemble those of Phaistos (Van de Moortel, 2006b).

Phase B included Kamares, Barbotine, Printed, Stamped and Impressed, Monochrome, Dark-on-Light, Crude, and Cooking wares (Caloi, 2009, p. 401). Common shapes are handleless cups with an S-shaped profile, globular open-spouted jars, and beaked jugs. Most vessels are handmade, and only small cups are wheel-made. This fragmented material joins with those from other rooms, suggesting a common origin in the West Court. Similar deposits within Phaistos are "vano LXV", situated inside the "South-West building", and a fill in the "West of the West Court". The "vano XXV" and "vano XXVII" also have materials from MM IB and MM II (Pernier, 1935, pp. 139-150). The recently published "Fase costruttiva 1" and "Fase costruttiva 2" by Baldacci (2017) suggest that some of the materials from rooms CV and partially CVI in the "Acropoli Mediana" are also dated to Phase B. The Kamares of this period displays more naturalistic decorations. Examples are rosettes alternated with spirals, zigzag lines, or surrounded by dots and other flowers (Caloi, 2009, p. 403). Horizontal and vertical red or white parallel lines are more common, alone or alongside dots. Barbotine decorations were also more widespread than in Phase A. Regardless of the type of Barbotine decoration, these pots exhibit polychrome designs that recall the Kamares examples mentioned above. As Caloi (2009) notes: "Protuberances are often used to form geometric and curvilinear decorative motifs" (p. 407; see Figure 2). They are "simply set in horizontal, vertical or diagonal rows" as in painted decorations (p. 408). Similarities are found in Knossos, specifically the "Early Chamber beneath the West Court Group" (MM IB) (MacGillivray, 2007, p. 114; e.g., Fig. 4.6), the Kamares Cave (Van de Moortel, 2006b), and the tombs of Archanes (Sakellarakis & Sapouna-Sakellarakis, 1997, pp. 411-415). Tumblers from Palaikastro are comparable to those of Phase B (see below for full details) (Knappett & Collar, 2007).

The pottery of Phase C (MM IIA) had several examples of Kamares style vases. Most of the shapes, now largely wheel-shaped, do not present novel forms but elaborations of previous ones: open-spouted jars, carinated cups, squat rounded cups, and one three-handled jug (Caloi, 2009, p. 422). Orange and yellow are now part of the Kamares pigments repertoire. Yellow was used for rosettes and circular motifs, whilst orange for tracing vertical lines (Caloi, 2009, p. 422). New decorative motifs and schemes appear in this period. It becomes common to have two decorative motifs mirroring each other on two sides of the vase (Caloi, 2009, fig. 14e-f). Small white arches are now customary on the rims of vessels (Caloi, 2009, fig. 14g-i). Spirals are more common, *"*usually as terminating elements of geometric or curvilinear designs, or else they are displayed as running spirals*"* (Caloi, 2009, p. 423). Examples of polychromy on buff (i.e., dark-brown or reddish and white lines on black and untreated clay surfaces) are common (Caloi, 2009; 16g-j). Similar examples are found in Knossos (MacGillivray, 1998, nos. 209, 210, 243). Barbotine decorations, specifically thin and sharp rows called "prickles" are unique in MM IIA Phaistos (Caloi, 2009, p. 435). Comparisons with other Phaistians deposits are Room *β* at "Haghia Photeini" (i.e., northern slopes of the Palace). "Room IL" in the "South-West building" of the palace also had materials comparable to those of Phase C, as do the fills of the "Street to the North" and the "Grande Frana*"* (La Rosa, 2002). Similar Kamares pottery is attested in Kommos "Building AA" (Van de Moortel, 2006b) and the Knossian "Royal Pottery Stores" and "South West Houses" (Macdonald & Knappett, 2007; MacGillivray, 2007). A recent re-analysis of the Protopalatial building in the "Acropoli Mediana" (rooms CV-CVII) has revealed pottery materials from the end of the Protopalatial (MM IIB) (Baldacci, 2017). The several hemispheric cups with MacGillivray's (1998) *Sunrise*, *Starbust*, and *Wavy-line* styles found parallels in MM IIB deposits from Knossos (MacGillivray, 2007) and Archanes (Sakellarakis & Sapouna-Sakellarakis, 1997).

1.2.3.3 - Petras

As mentioned in the previous paragraph and as recently reported by Christakis (2020), ongoing excavations at Petras in the Siteia region present evidence for a continuity of use from EM IB to LM I (Tsipopoulou, 2012b). Concerning the Protopalatial deposits with Kamares style, the data comes from three areas: the "House Tomb 2" within the cemetery (Tsipopoulou, 2012a), the "Lakkos", and the east slope of "Hill I" (Haggis, 2007, 2012).

The “House Tomb 2” comprised eight rooms, two of which stored the vessels used during funerary ceremonies (Tsipopoulou, 2012a, p. 180). The ceramic material is dated from EM III to MM IB, possibly MM IIA. An MM IB handmade spouted jar with polychrome decorations (Tsipopoulou, 2012a, p. 183, no. 926, fig. 7a) shows interesting decorative parallels with Knossos (MacGillivray, 1998), Gournia (Hawes et al., 1908), and Mochlos (Seager, 1912). Typical MM IB and MM IIA Kamares style shapes are wheel-made carinated cups, bridge-spouted jugs, and tumblers (Haggis, 2007; Tsipopoulou, 2012a). Knossos and Phaistos share similar shapes (Levi & Carinci, 1988, pp. 179-183; MacGillivray, 1998, pp. 68-72).

The “Lakkos” is a large pit on a terrace outside the palace (Sector III) that contained remains of MM IB buildings, later covered by the construction of a court and building that occurred in MM IIA-B. This deposit mostly held fine drinking vessels, a few pithoi, and cooking pots (Haggis, 2007, 2012). The fine pottery consists of Kamares pots like other MM IB examples from Knossos, Phaistos, Malia’s “South Houses”, Mochlos, and Palaikastro (Haggis, 2007, pp. 724; 749-755). Haggis (2007, 2012) notes that most Kamares decorations are shared with White-on-Dark examples from the same deposit. Shapes are rounded cups, tumblers, bridge-spouted jars, and rounded jugs that find comparisons with examples from Knossos (Haggis, 2012) and Palaikastro (Knappett & Collar, 2007). Interestingly, Palaikastro’s deposit “H3 Level 9” mirrors “the Lakkos in virtually every detail” (Haggis, 2012, p. 194). Exemplary is the presence in both sites of tall S-shaped carinated cups, which does not figure elsewhere in Crete (Knappett & Collar, 2007, p. 170). Missing in Petras are the Barbotine ware and the hemispherical and straight-sided cups prevalent in Knossos (Macdonald & Knappett, 2007). The absence of these shapes might suggest different consumption habits in eastern Crete, where bevelled cups possibly played the role that the straight-sided cups had in Knossos (Caloi, 2009). Concerning the throwing techniques used to produce the fine Kamares vases, the “Lakkos” deposit shows that most pots were wheel-shaped, pretty much in line with other sites (for Knossos, see Knappett, 1999a; MacGillivray, 1998).

1.2.3.4 - Malia

Until the end of MM IIB, Malia was one of the biggest centres in Crete. The earliest material comes from the “Malia Town Group” located outside the palace (Andreou, 1978, p. 134). The “Quarter E” deposits revealed conical cups with rounded handles and carinated bodies. Only a few fragments document the use of red and white spirals and festoons, typical of MM IB in Palaikastro,

Phaistos, and Knossos (Poursat & Knappett, 2005, p. 194). In the area of the "Sanctuary" (Poursat, 1966), excavators found one fragment of Kamares globular bridge-spouted jug (Andreou, 1978, p. 134). Better preserved and studied deposits are those from "Quartier Mu".

This area consisted of two large buildings ("Bâtiments A and B"), their annexes ("Bâtiments E and D"), and the surrounding households and workshops: the "Ateliers des Sceaux", "de Potier", "de Fondeur", and "Bâtiment C". Most of the pottery of this period dates to MM II (Poursat & Knappett, 2005, p. 194). Compared to the other Protopalatial deposits, "Quartier Mu" presents a higher concentration of Kamares pottery. Conical goblets, hemispheric cups, straight-sided cups, globular bridge spouted-jars and jugs were decorated with white, red, orange-yellow, purple spirals, S-shaped, 'Wavy lines', and conjoined petals like examples from Knossos "Group E" (MacGillivray, 1998, pp. 33-34). Several exemplars bear floral decorations, such as ivy patterns, dotted rosettes, or red triangular floral borders with white or red designs. Also attested are "stone or sponge patterns flanked red and white bands bordering a zone of chevrons or red discs" (Andreou, 1978, p. 151). These decorations are generally separated by reddish horizontal lines or running dots (Poursat & Knappett, 2005, pp. 117-124). However, it seems that the people at Malia preferred Dark-on-Light pottery, whose decorative forms are more elaborated and pictorialised (e.g., fishes) (Poursat, 1997;). Elements that, as we mentioned above, might have originated the LM styles.

Worth mentioning is that "The North Trench" of the cemetery of Chryssolakos also held Kamares style pots similar to Phaistian and Knossian examples (Stürmer, 1993, fig. 16, no. 82).

1.2.3.5 - Gournia

The "North Trench" in Gournia enabled scholars to better frame the passage from the Pre- to Protopalatial. This EM deposit probably resulted from the accumulation of debris caused by the construction of Protopalatial buildings in the early town. Scattered pottery material from these deposits includes Kamares style Eggshell ware (Soles, 1979, p. 151, note 21). Some were located under the east slope, beneath "House Ff" and the "Palace court" (Hawes et al., 1908). Built in MM IB, the "Southeast Building" produced a sherd of early Kamares with geometric decorations (Watrous et al., 2015). A few scattered remains from the "North Trench" dated MM IB. Specifically, one fragment found under "wall X-X'" shows a red line on a dark background (Watrous et al., 2015, p. 419). In the "Northeast Area", excavations have "revealed several rooms

and an open court lying along a Protopalatial street" with MM IIB materials (Watrous et al., 2015, p. 421). The reinvestigations of "House AA" revealed several MM IIB carinated cups typical of this phase (Hawes et al., 1908). Among the first Kamares findings from Gournia (MM IB) are three vases from the "House Tomb 1" with red and white foliate decorations (Hawes et al., 1908).

1.2.3.6 - Kato Zakros

Excavations at "Building H" unearthed several rooms with Kamares pottery: a jar decorated with white discs, crosses, crescents, orange dots or small zigzag lines used as filling ornaments. This decoration has close parallels with a globular bridge-spouted jar from Phaistos and one globular kantharos with white and red stripes from Malia (Andreou, 1978, pp. 96-97). Stratified beneath MM III levels, rooms D II and D III of the "oblique building" contained several polychrome carinated cups (Andreou, 1978, pp. 100-101).

1.2.3.7 - Palaikastro

The situation of Protopalatial Palaikastro is difficult to understand because of the destructions and consequent reconstructions occurred in MM IB. A recent contribution by Knappett and Collar (2007) describes some of the unpublished MM IA to IIIA materials from "Room X1" and "Square H3". "Room X1" revealed MM IA handmade examples of Kamares style: a tumbler with red and white bands and rows of discs and dots, two rounded cups, and one rounded bridge-spouted jar with vertical red lines and white rosettes (Knappett, 2007; Knappett & Collar, 2007, pp. 157-162; e.g., 10, 16-17, 28). Similar MM IB decorations, especially red vertical lines and rosettes, can be found in Knossos (MacGillivray, 1998).

Various "Square H3" levels had deposits of handmade polychrome material dated MM IB. In the lower levels, excavators found one tumbler with floral decorations and two rounded bevelled cups (Knappett & Collar, 2007, pp. 170-173; e.g., 88, 95-96). The assemblage included several fragmented cups with typical MM IB Knossian polychrome lines (MacGillivray, 1998). MM II levels of H3 held several carinated cups with polychrome ornaments (Knappett & Collar, 2007, p. 178; Nos. 111-117).

Bosanquet and Dawkins (1923) described a later deposit not far from H3: a trench in square G3 that contained MM IB tumblers, bevelled and carinated cups with white and red geometric decorations (see Knappett & Collar, 2007). Bosanquet and Dawkins also described finding several

Kamares pots in “Room X18”, “Room B40”, “Gamma 22”, and “Delta 47” (Bosanquet & Dawkins, 1923; also, Andreou, 1978, p. 104). Knappett (2007) noted that there is no clear separation between MM IA and B in this deposit.

A relatively large corpus of Protopalatial pottery comes almost entirely from beneath “Building 6”, also called “Block M”. Polychromy spans the whole MM period, starting with some examples in MM IA and lasting until MM IIIB. A common style in MM IB and, albeit more rarely MM IIA, is the “Diagonal Red and White Style” (Knappett & Cunnigham, 2012, p. 105).[6] MM II styles are “the diagonal criss-cross lines, dots, and a flower rosette” (Knappett & Cunnigham, 2012, p. 105). Some of the pottery from MM IB strata display Floyd’s (1997) “Alternating Floral style” and the vertical red and white lines found in MM IB Knossos (MacGillivray, 1998) and Malia (Knappett, 2007). For MM IA, the shapes are all handmade and comprise small straight-sided cups, collared jars and pithoi, and tripod cooking pots (Knappett & Cunnigham, 2012, p. 94). There are only a few eggcups in earlier strata, in contrast to what we find in Knossos (see, for e.g., Macdonald & Knappett, 2007). Carinated cups abound in the MM IIA fills on the east side of the “Southeast Building”, although they are usually found in other sites in MM IB (for Knossos, MacGillivray, 2007). This observation might be biased by the lack of data concerning MM IB pottery on this site. In fact, as Knappett and Cunnigham report, only three pots can be dated with certainty to MM IB (Knappett & Cunnigham, 2012, p. 94). There are several examples of early MM IA and II straight-sided cups. These are characterised by concave bodies and are decorated with a black outer slip and polychrome geometric decorations (Knappett & Cunnigham, 2012, p. 95). Some examples of bevelled cups dated MM IIA are dark slipped and present polychrome designs (Knappett & Cunnigham, 2012, p. 95). Whilst not conspicuous in numbers as in other sites, especially Knossos, hemispherical cups are also long lived in Palaikastro, with examples dated from MM I to LM I. The few examples found are dark slipped with white-on-dark decorations. There is one case of late MM II (possibly MM IIIA) hemispheric pot with very thin walls covered with polychrome decorations that might have been an import from Knossos (Knappett & Cunnigham, 2012, p. 95). Bridge-spouted jars are very common in “Building M” from MM IA. They are usually covered

[6] The use of the term *style* in this context refers to a type, or category, of surface decorations. In Chapter 6 I discuss compositions, defined as the combinations among several motifs on the surface of a single pot. What Knappett and Cunnigham (2012) here refer to as a *style* is, according to this study, a *composition*. As I will describe below, *composition* highlights the diversity and creativity expressed by Minoan artisans in combining motifs according to the guidelines defined by previous pots in the Kamares style.

with a black slip, at times ornated with polychrome decorations (Knappett & Cunnigham, 2012, p. 98). The long-lasting shape bearing polychrome decorations (a red band with retorted spirals) is the rounded bowl Knappett & Cunnigham, 2012, p. 105.

Finally, it is worth noting that in "Building 7" are also attested some MM IIB sequences with tumblers and bevelled cups, but no straight-sided cups (Knappett, 2007).

1.2.3.8 - Kommos

Little is known of MM IA Kommos. Some examples of pottery stratified below a construction fill of "Building AA", the "Group X", have white and red bands (Van de Moortel, 2006b, no. 7). One jar with polychrome decorations was found in "Group Ja", one of the constructions fills in "Building AA" (Van de Moortel, 2006b, p. 316). Although these sherds were mixed with MM IB to MM IIB pottery, it is possible to trace some stylistic comparisons with pots from Knossos (Momigliano, 1991).

Twenty-six deposits dated from MM IB to IIB were found in decades of excavations on the "Central Hillside" and the "South Area" (Betancourt, 1990; Van de Moortel, 2006b). All these contexts were intentional fillings from the remains of the destroyed first palace (Van de Moortel, 2006b, p. 264). Whilst Betancourt (1990) initially recognised two stratigraphic sequences, Van de Moortel (2006b) recently concluded that the sequence located underneath spaces CH 35, 36, and in the trench east of the "Classical Round Building D" are part of the same early MM IIB context (p. 264). Additionally, "Group Y" is an MM IB-IIA fill south of the "Building AA", on top of which was stratified the MM IIA-B assemblage of "Group Z". These groups have improved our knowledge of how types of buff clays were used and unearthed new forms that compare with Phaistos and Knossos (Van de Moortel, 2006b, pp. 274-275).

Unscathed pottery in "Contexts 5-8" describes the MM IB phase (Betancourt, 1990). Aside from Coarse Red and Tempered Buff, Fine Buff was used to make bowls, jugs, bridge-spouted jars, and carinated cups, probably imported from south-central Crete (Betancourt, 1990). Motifs are derived from previous White-on-Dark but already show prototypes of those later found in MM IIB Kamares.

"Contexts 9-12" preserve some detail of Kommos in MM IIA. This period saw the introduction of wheel-shaped pottery, new refined shapes, and the increased use of polychromy at the expense of barbotine decorations (Betancourt, 1990, p. 30; as in Phaistos, Caloi, 2009). As in other Cretan

deposits small vessels were handmade. New decorated Fine Buff shapes are straight-sided, carinated, and globular cups with an S-shaped profile that finds parallels in cups from Knossos and Phaistos. The Kamares pottery pigments used in MM IIA included two types of whites, orange, red, and purple (see Section 1.3.4.2). Decorations now comprise floral motifs with petals, foliate bands, and rosettes. Lines, loops, and dot bands are combined and become more complex (Betancourt, 1990).

The "Central Hillside" area has produced mostly MM IIB pottery sherds, especially "Contexts 13-14". The shapes of Kamares are pretty much the same as in previous periods: straight-sided and carinated cups (Betancourt, 1990, pp. 34-35). Barbotine decorations were incorporated within Kamares motifs, echoing Phaistian, Knossian, and Malliote models (Caloi, 2009: Van de Moortel, 2006b). The number of motifs increased, including novel floral and geometric patterns (Betancourt, 1990).

MM IIIA shows a decline in Kamares. The Fine Buff fabric is not as soft as before. There is less variability in shapes, heavier sets of cups become more fashionable, and a general decline in polychromy (Betancourt, 1990, pp. 37-38). White and red are used more commonly and mainly for floral ornaments. Rounded geometric shapes, such as spirals, circles, or arched foliate bands, are the most prevalent polychrome motifs.

1.2.3.9 - Myrtos Pyrgos

The excavation of Myrtos Pyrgos took place in the 1970s under Cadogan's direction, with subsequent smaller campaigns in the 1980s and 1990s. The material evidence reveals a continuous human presence at the site, spanning from the Final Neolithic through the Neopalatial period (Day et al. 2005, p. 178-179; Cadogan, 2011). Regarding the Protopalatial period, it is observed that the Pyrgos IIc-d phase seems to correspond to MM IA-IB, while Pyrgos III aligns with MM II.

Myrtos Pyrgos has yielded deposits containing polychrome pottery associated with the early buildings of late MM IA. Cadogan (1977/1978) reports discoveries of polychrome ware dating to Pyrgos IIb in the area of the road and the court (p. 70). Stylistic similarities indicate that the MM IA polychrome materials appear to be more closely related to Knossos than to Phaistos (Cadogan, 2013, p. 107).

In Pyrgos III, the settlement takes on the character of a fortified village, featuring a Tower-bastion, a terraced wall, and a large plastered cistern. Adjacent to the settlement, there is a house

tomb that was constructed during the Prepalatial period and continued in use through the Neopalatial era (Cadogan, 2011, p. 47). Protopalatial pottery has primarily been recovered from these contexts and from an area with debris on the west side of the north slope, close to the tower (Knappett, 1999b, p. 626).

As reported by Cadogan (1977/1978, p. 74; 1996; 2011), the Protopalatial material from the site bears strong similarities to the pottery of Gournia and the Malia Town Group, particularly in the context of the "Quartier Mu". Andreou (1978) also observed correspondences among these sites and noted that, similar to Malia, polychrome pottery appears to be less prevalent in Pyrgos III than in Pyrgos II (p. 151). Knappett (1997) points out that "the fine tablewares exhibit precisely the same variations in technological profiles as the Quartier Mu" (p. 308). Common shapes include conical goblets, carinated cups, and hemispherical cups with a dark wash, which exhibit the typical characteristics of eastern Crete but may have been produced locally (Knappett, 1999b). Unusual shapes, such as a globular rhyton and a box with semi-circular decorations, have also been found. Additionally, there is a large Vapheio cup, a type typically associated with Malia (Cadogan, 1977/1978, p. 75). In general, Myrtos Pyrgos contains less Kamares style pottery compared to sites like Malia, Kommos, or Palaikastro.

1.2.4 - History of Studies

It is generally acknowledged that the Kamares style emerged in MM IB and gradually disappeared with the collapse of the first palaces in MM IIB (approximately 1900 - 1750 BC). Due to its visually striking qualities, most studies have connected this aesthetically striking pottery style to the emergence of the palaces and a hierarchically organised elite in charge of production and consumption patterns. Despite the limited data and excavations, scholars have considered the Kamares style to be a palatial creation controlled by a local elite (Cherry, 1984; Haggis, 2007); a narrative that, as I will show, has been partially challenged by recent technological studies. Because of its unique qualities of shape and decoration, stylistic and technological studies have focused on the Kamares style to better understand its chronology, places of production, and circulation. Below, I review these studies.

1.3.4.1 - Stylistic studies

The first systematic analyses of Kamares emerged with the 20th-century excavations of Knossos and Phaistos. Mackenzie (1903) was the first to analyse this polychrome pottery and chart a relative chronology based on three subsequent phases based on Evans's chronological framework (Evans, 1906; for a discussion, Hamilakis, 2002). Evans used a tripartite system, MM I, II and III, and later added sub-phases A and B to all three main periods to accommodate the findings made in subsequent discoveries. In Mackenzie's diaries, the MM I pottery material was initially called Kamares and, after 1905, "Geometric". Kamares was then adopted to describe all MM II pottery (Mackenzie, 1906; see also, Momigliano, 1991; 2000). The main difference between these two types of pottery was purely stylistic: based on the comparative analysis of the surface decorations among vases. *Geometric* described all pots painted with linear white and red decorative decorations, whilst *Kamares* referred to vases displaying the repetition of the same geometric or naturalistic polychrome motifs on the surface of a single pot. Although innovative for their time, Mackenzie and Evans's stylistic approach considered shape and decorations separate entities.

The first systematic analyses of Kamares pottery emerged during the 20th-century excavations at Knossos and Phaistos. In 1903, Mackenzie was the first to analyse this polychrome pottery and establish a relative chronology based on three subsequent phases within Evans's chronological framework (Evans, 1906; for a more in-depth discussion refer to Hamilakis, 2002). Evans employed a tripartite system, namely MM I, II, and III, and later introduced sub-phases A and B to all three primary periods to accommodate the findings from subsequent discoveries. In Mackenzie's diaries, the pottery material from MM I was initially referred to as Kamares. However, after 1905, it was termed *Geometric*. Kamares was then reserved for describing all the MM II pottery (Mackenzie, 1906; see also Momigliano, 1991; 2000). The primary distinction between these two pottery types was purely stylistic in nature, based on a comparative analysis of the surface decorations of these vases. The term *Geometric* was used for all pots adorned with both linear white and red decorations, while *Kamares* was applied to vases featuring the repetition of the same geometric or naturalistic polychrome motifs on the surface of a single pot. Although ground-breaking for their era, Mackenzie and Evans's stylistic approach tended to treat shape and decorations as distinct elements.

Furumark (1939) is credited with producing the first comprehensive stylistic study of the Kamares style, which aimed to reconstruct the evolutionary nature of Minoan pottery decoration

(pp. 13-17). His approach was firmly rooted in art historical methods, drawing inspiration from Matz's (1928) comparative stylistic study of Mediterranean seal decorations. Matz's study analysed the spatial relations between bi-dimensional pictorial decorations and the morphology of seals. Furumark (1939) adopted this approach to produce a structural grammar of the different combinations existing among decorative elements and their arrangement on the surface of a vessel. He documented how "decorative elements" such as lines, zigzags, triangles, lozenges, squares, semicircles, and spirals changed over time (Furumark, 1939, p. 18). For instance, he demonstrated how individual spirals, initially traced on specific areas of a pot's surface, were transformed by artisans into sequences of continuous, running spirals through a process he termed *torsional decoration* (Furumark, 1939, pp. 18-30). Furumark posited that this shift towards torsional decoration from MM I to II was characteristic of the Minoan artistic mind, a suggestion previously put forth by Matz in his analysis of Minoan glyptic art (1928). According to Furumark (1939), this torsional and radiating syntax, where decorations became more elaborated, was a defining feature of the "Kamares style" (p. 22).

In contrast to Furumark, Zois (1968) approached the study of Kamares decorations as expressions of technical movements rather than mathematical structures (pp. 322-342). He described decorative elements and their combinations in terms of artistic gestures. Nevertheless, Zois still considered both decorative elements and vase morphology as distinct and fixed entities, seen as *absolute entities:* generic referent types. This endeavour produced broad artistic tendencies homogenised to create easily readable patterns to be applied to all Kamares pottery from several periods and Cretan regions. He summarised these stylistic tendencies in three successive sequences: the Early Classical Period (MM I),[7] the Mature Classical Style,[8] and the Late Classical Phase (Zois, 1967).[9] Furthermore, he was the first scholar to conduct a comprehensive study of MM I, gathering the scattered excavation data of that time.[10]

Walberg (1976, 1978, 1983) continued this tradition of structural studies. Her work focused on developing a general analysis of the Kamares style rather than creating a complete inventory of Kamares pottery. She aimed to capture the fundamental qualities of the pottery's shapes,

[7] "Η πρώιμος κλαοαικη φάαιςί Γενικά" (original text).
[8] "Ωριμος κλασσικός ρυθμός" (original text).
[9] "Η υστέρα κλασσική φάσις" (original text).
[10] It is worth mentioning that Zois's work was crucial in addressing chronological questions, specifically concerning Levi's Protopalatial phases at Phaistos that have only recently been re-adjusted by new studies (Baldacci, 2017; Caloi, 2009; Carinci & La Rosa, 2007; Fiandra, 1980; Girella, 2010).

decorations, and syntactical combinations to establish general trends over time. Her methodology involved establishing abstract reference categories (i.e., types) based on observations of aesthetic similarities and variations among vases. She also differentiated between palatial and provincial contexts (Walberg, 1978, 1986; for the *provincial* Kamares, Walberg, 1983). Walberg categorised shapes based on their geometric forms or resemblances to everyday objects. For example, she grouped all bridge-spouted jugs or pithoid jars that shared a similar shape under "piriform shapes" (Walberg, 1976, pp. 25-27; 1983, pp. 17-18). In doing so, Walberg produced abstract geometric categories into which various Kamares shapes could be classified.

In line with this approach to shapes, she also created distinct reference categories for decorations. Walberg developed general types of decorations referred to as "motifs". These motifs represented specific design trends or concepts realised through design techniques (Walberg, 1976, p. 47). Examples of motifs included various types of spirals, such as C-, J-, and S-spirals (Figure 9). Her classification of decorative motifs is perhaps the most precise and detailed within Kamares studies. It is no surprise that later works continued to use her terminology to describe decorative motifs (e.g., MacGillivray, 1998).

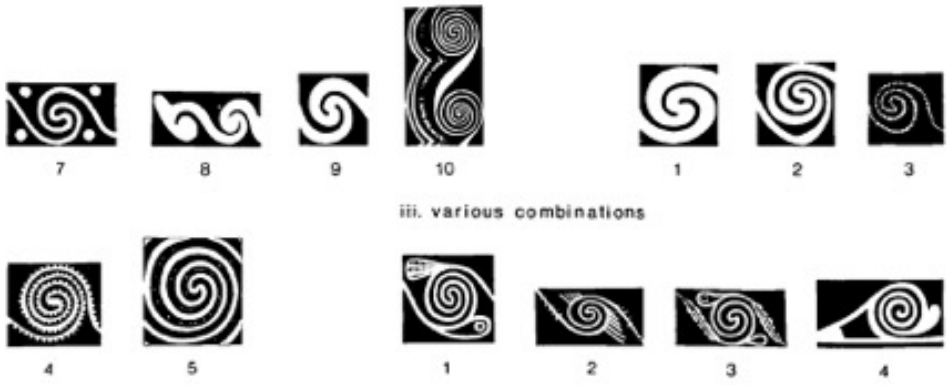


Figure 9 - Selection of S-Spirals from the work of Walberg (after Walberg, 1976, fig. 3.7).

As a result of her classification of shapes and motifs, Walberg assumed that all pots exhibiting similar stylistic tendencies belonged to the same categories and considered them to be chronologically contemporary due to these shared characteristics. Building upon these stylistic trends in Kamares pottery, Walberg (1976) proposed an alternative relative chronology and stylistic evolution divided into four periods: Pre-Kamares, Early Kamares, Classic Kamares, and Post-Kamares (pp. 96-125). These phases grouped the primary stylistic developments and

suggested an evolutionary path in which earlier, simpler Kamares forms gave way to more complex ones in later periods. According to her analysis, the latter two periods demonstrated a shift from linear and geometric decorations to more abstract, and thus more intricate, forms. The final phase, Post-Kamares, marked a period of increasing naturalistic tendencies and pictorialisation (more on pictorialisation in Walberg, 1976, pp. 126-127).

However, Walberg's stylistic study faced some criticism from Minoan scholars. Firstly, the lack of direct examination of pottery from both palatial and non-palatial contexts resulted in abstract stylistic typologies that failed to capture the local variations within this regional production. Secondly, the scarcity of documentation from sites beyond Phaistos and Knossos created a dichotomy between palatial and provincial contexts that oversimplified the regional diversity of Kamares pottery (MacGillivray, 1986). Thirdly, the chronological system she devised was deemed too rigid, as it did not accommodate inter-regional variations and comparisons and could hardly be extended to other contemporary styles (Levi & Carinci, 1988). As a result of these limitations, and in light of recent excavations in various regions across the island, recent publications have presented more refined stylistic classifications and chronological sequences for Kamares pottery. Works by Andreou (1978) and Levi and Carinci (1988) provided more nuanced stylistic typologies and chronological discussions based on the direct examination of pottery. MacGillivray's works (1998; 2007) also relied on the actual study of ceramic materials, particularly pottery from Knossos.

MacGillivray's (1998) primary objective was to "define the most common types, and the wares and styles in which they appear, in order to outline a ceramic sequence at Knossos alone" (p. 55). His aim was to connect these ceramics with specific Knossian deposits to establish a more precise chronology for the fragmented phases of the Protopalatial period. In alignment with contemporary studies in Minoan archaeology (e.g., Momigliano, 1991), he categorised pottery on the "basis of macroscopic observations of its fabric" from the finest "Fine Buff" to cruder forms (MacGillivray, 1998, p. 55). He then identified various types of wares based on "techniques in the manufacture and decoration of pottery", whilst "the content of designs or repeated use of similar motifs" were used as criteria for *styles* (MacGillivray, 1998, p. 56). For instance, MacGillivray (1998) defined Eggshell ware as "Fine Buff Ware" characterised by walls as thin as bird eggs bearing polychrome decoration (p. 56). He suggested that they could have been produced using the high-speed wheel (or moulds) and proposed that examples of this ware found in the "Royal Pottery Stores" date back

to MM II. The Sunrise Style, still part of the "Fine Buff" category, is primarily described in decorative terms as having a distinctive "white design composed of two concentric semicircles with upright petals or rays above, possibly representing a stylised sunrise" found in MM IIB contexts (MacGillivray, 1998, p. 59).

In doing so, MacGillivray divided the Kamares into several styles and wares, aiming to provide a better chronological sequence for Knossos rather than narrate the emergence of certain forms over others, as Walberg did. However, while he paid more attention than Walberg or Andreou to technological and stylistic differences among vases and was extremely precise in dating wares and styles, he still grouped vases exhibiting aesthetic similarities under the same referent type (i.e., a category) and placed them within a unilinear temporal trajectory. Even when he differentiated between wares and styles, these distinctions were more semantic than practical. The process by which MacGillivray discussed the qualities of Eggshell ware and Sunrise Style was identical: observing the macroscopic qualities of these pots and their association with other documented examples to establish a referent category under which all other similar vases fell. For him, wares and styles served the same purpose of providing a taxonomy of forms and decorations. Perhaps it would have been more helpful to restrict wares to observations on throwing technology and styles to describe decorative techniques and features. We find this reasoning in a recent publication on the "Early Magazine A" and "South-West Houses" by Macdonald and Knappett (2007). The authors used clay fabric as a general category that encompassed several types of wares, some of which were further divided into one or more styles. Under Fine Buff fabrics, there was, among other wares, the "Polychrome ware," or "what most Minoan archaeologists call Kamares ware," which in turn incorporated different decorative styles such as the "Woven style" (Figure 10) (Macdonald & Knappett, 2007, p. 35). As I will illustrate in Chapter 6, an alternative way to consider the difference between style and wares is to view them as various combinations of motifs created by artists coming together in compositions that endure or adapt over time.

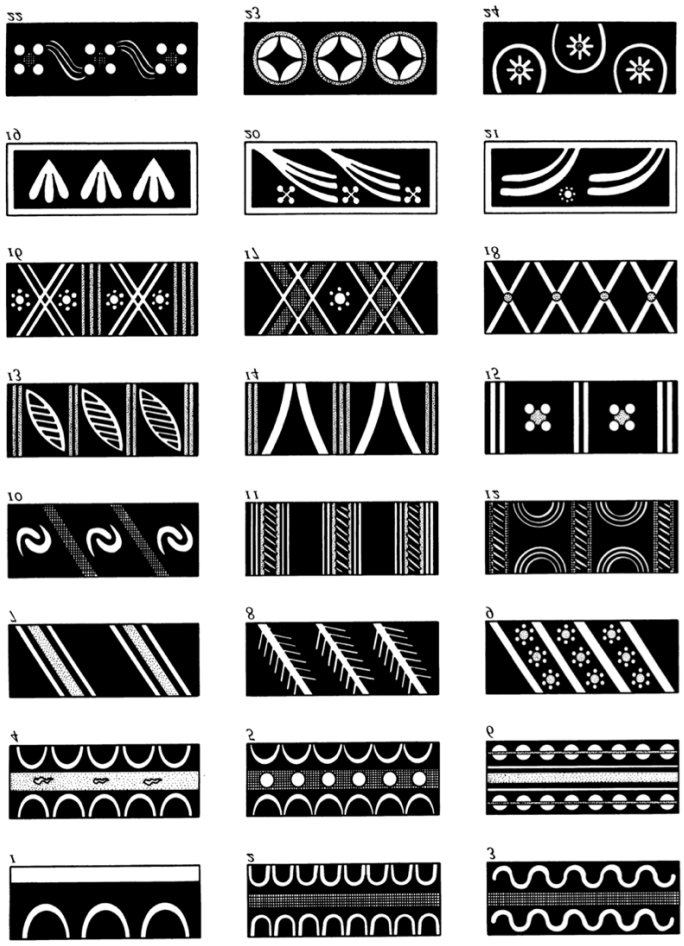


Figure 10 - List of types of *Woven Style* decoration on Kamares straight-sided cups (after MacGillivray, 1998, fig. 2.1). Reproduced with permission of the British School at Athens.

MacGillivray's in-depth re-examination of Protopalatial pottery represented a significant advancement in the study of Kamares. It contributed by providing a meticulous examination of Protopalatial contexts and a thorough description of their materials, aligning with studies such as Levi and Carinci (1988). It also revealed the abundant stylistic diversity within Knossian Protopalatial, particularly Kamares pottery. However, it follows a conventional stylistic approach focused on adjusting Protopalatial contexts and chronology at Knossos, and it falls short in exploring the technical skills and knowledge responsible for the continuity, change, or disappearance of styles and wares throughout the Protopalatial period.

However, it would be somewhat misleading, if not utterly mistaken, to attribute this major drawback to MacGillivray's contribution. This critique extends beyond MacGillivray's work and applies to all studies that considered style within mainstream archaeological parameters, aiming to

link people and objects to specific times and places — something on which I will return in the next chapter (Section 2.1). These studies of Kamares style, although helpful to answer questions of chronology and provenience, also present a significant drawback: they constrain investigations into why and how generations of artisans made choices such as adopting certain techniques, employing specific tools, selecting one pigment over another, or traced a J-spiral instead of a C-spiral (as defined by Walberg, 1979). Although the need for anchoring styles in time and place is evident, such studies impede efforts to delve deeper into the long-term processes underlying the development, alteration, emergence, or decline of the Kamares style that encompasses a wide range of technical skills and knowledge.

This perspective underscores the notion that material culture is the product of rigid rules imposed by social or cultural groups. Furthermore, the idea that there is a fixed set of predefined styles or wares arranged in a linear sequence, where one style invariably follows another in a predetermined temporal order, oversimplifies the intricate nature of the creative process. In essence, this perspective aligns with studies that consider the mind and matter as separate entities and view creativity as the result of a preconceived plan or idea formulated in the mind and then imposed on the material (Boden, 2004).

The idea that artists possess an internal plan stored in the mind for what they want to create is known as *hylomorphism*. This stance is rooted in philosophical discussions that trace back to Aristotle, who proposed that form (*morphe*) is distinct from the matter (*hyle*) from which it is crafted (Ingold, 2010; also, March, 2019). According to *hylomorphism*, the mind exists in a mental realm entirely detached from the environment, and creativity arises from internal representations rather than interactions with the external world (Malafouris, 2013; Gibson, 1979). This model of the mind is not only evident in stylistic studies but also influences how we investigate what styles are and how they develop over time. However, by shifting our analysis from viewing shapes and decorations as distinct entities to examining the ongoing process from which these entities emerge, a different perspective may emerge, as I will discuss in Sections 2.4 and 3.7.

Although not interested in breaking down this dichotomy between mind and matter, technological studies on Kamares attempted to overcome the old-fashioned take on style by seeking to explore continuity in technical skills over time. It is to these that I now turn my attention.

1.3.4.2 - Technological studies

In contrast to stylistic approaches, technological studies incorporate material analysis, socio-economic considerations, and ethnographic discussions. In this paragraph, I present technological studies of Kamares that have examined the slips, surface decorations, pigments, fabrics, and forming techniques. Furthermore, I illustrate, within each of these categories, the potential tools and techniques that Minoan artists might have employed to achieve their desired outcomes.

One distinctive feature that distinguishes the Kamares style from earlier and later pottery traditions is the lustrous black or brown-reddish slip. The technology involved in creating the black slip to achieve the "Glantzon-effect" used in the Kamares style was shared with the production of White-on-Dark pottery (Evely, 1993, pp. 263-264; 291-292; Betancourt et al., 1984; Noll, 1982; Noll et al., 1971). This term refers to the formation of an outer lustrous film that closely resembles a glaze (Stos-Fertner et al., 1979). Examples from eastern Crete indicate that the slip was produced by mixing clay with water, potentially with the addition of red siltstone, used for pigment preparation for textiles, as seen in the case of White-on-Dark examples from Gournia (Betancourt, 1984, p. 55). This slip formation process, involving the mixing of clay with water, is termed "levigation", which was employed to eliminate coarser clay particles and reduce vessel permeability (Evely, 1993, p. 289). The black slip used for the Kamares style consisted of an iron-rich silicate paint/slip with a potassium fluxing agent, aimed at lowering the vitrification temperature (Evely, 1993, p. 291-292; Noll, 1982). Faber and colleagues (2002) also support these findings, proposing that the black and brown-reddish slips utilised in the Kamares style contained iron-rich materials (p. 132). The black slip featured a fine-grained, non-calcareous, iron-rich clay layer, ranging from 10 to 40 microns in thickness. The brownish slip identified by the authors was similarly fine but included low levels of calcium, which, after firing, resulted in the reddish-black hue. A more recent study utilising a PIXE-alpha spectrometer on the black colour of samples from Phaistos, dating from MM I to MM III, conducted by Pappalardo and colleagues (2015), substantiates these observations. They also propose that there was a significant continuity in the tradition of producing the black pigment, as samples from all periods exhibit the same structure.

These studies also reveal that to achieve the lustrous effect, the kiln temperature reached a minimum of 950-1100°C, as indicated by the presence of protenstatite (Noll et al., 1971). The firing technique employed consisted of a three-stage Oxidation-Reduction-Oxidation process, which also promoted adhesion with the pigments (Faber et al., 2002, p. 132; Pappalardo et al.,

2015, p. 281). The vitrification of the slip occurred during the later oxidation stage, resulting in the lustrous surface (p. 133).

The technique used to apply the slips to the vessel's body required the pot to be partially wet. In the case of the Kamares style, there were likely three primary methods of application: vases were either dipped into a slip, had the slip poured onto them, or were applied using a sponge. According to Evely (1993), burnishing was often employed to prevent gases from altering the external slip layer during firing (p. 263). However, it appears that this technique was not as frequently used in the Kamares style. In general, the use of a slip is an effective means of improving surface texture and creating a canvas for painted decorations, which explains the proliferation of decorative motifs in White-on-Dark and Kamares style.

Another technique related to surface decoration is the *barbotine*, which is only displayed in a few examples in the catalogue. More commonly found in Phaistos than in Knossos, this type of surface decoration was utilised in the Kamares style in conjunction with painted decorations. Foster (1982) suggests three types of barbotine forms: irregular polygonal ridges, plain and crinkled ridges, and protuberances. The first two types of barbotine required a thick slip, while the last one involved clay pellets added to the surface. These decorations were applied when the vessel's surface was at a leather-hard stage, not when it was wet or too plastic. The plain and crinkled ridges type was achieved by using a paddle tool pressed onto the vase's surface and later pushed with a stick. The protuberances were created by individually placing clay pellets or by using a device with a nozzle to guide the clay onto the pot's surface (Evely, 1993, pp. 294-295). Additionally, as noted by Walberg (1976, p. 41), protuberances could also be created by pressing the clay from inside the vase.

The second unique characteristic of the Kamares style is the polychromy of its decorations. Paints are made from natural or artificially manufactured substances. They were produced by grinding raw materials, using spherical stone tools or stone pestles (Evely, 1993, pp. 108-119). The resulting powders were then mixed with a clay slip or water and, more rarely, with some organic fat working as a binding medium. Paints were applied once the slip was dry enough to avoid bleeding at the borders. Basic techniques attested all around Crete are dripping and pouring, with the vessel partially immersed or covered. Unfortunately, when it comes to tools, no brushes have been found. Hair, bristles, and fibres are all potential candidates for brushes (Evely, 1993, p. 292). As my initial observations of the Knossian Kamares surface decorations suggest, several

thicknesses and sizes were required to obtain the desired results. Sponges or stamps are also quite frequent tools used in the making of certain Kamares decorations. Interestingly, it seems that the wheel was adopted for producing precise banding (Evely, 1993, p. 292), which became more common in the MM IB Kamares forms, as suggested by the examination of the material in Chapter 6.

Regarding the study of paint compositions, one of the earliest investigations into Kamares pigments was conducted by Noll (1982) and colleagues (1971, 1975). Utilising X-ray diffraction and SEM, they determined that the decorations were achieved with a single firing in an oxidising atmosphere, with temperatures ranging between 950 and 1000°C. It is essential to note that the Kamares decorations' colours were applied before firing (Evely, 1993, p. 291). This may have limited the choice of colours available to artisans, as paints applied before firing have a more restricted range due to the combustion of most organic substances and the reaction of mineral substances with gases, altering their colours (Evely, 1993, p. 290). Concerning the white pigment, there is less consensus. Some authors suggest that whites were added after firing (Walberg, 1976), while others propose, based on White-on-Dark examples from Gournia, that the opposite was the case (Betancourt, et al. 1984, p. 71-74).

Several studies have attempted to explore the technological techniques used in producing the pigments for the Kamares style. Noll (1981) proposed that the red pigment resulted from the creation of an iron-rich compound, and the orange hue was achieved through the same mixture with the addition of white talc (p. 151). Faber and colleagues (2002) also noted that the red pigment was made from a coarse-grained, low-to-medium calcareous, iron-rich earth (also Pappalardo et al., 2015). They similarly suggest that the orange pigment was created in a similar manner. It consisted of a coarse-grained, low-to-medium calcareous, iron-rich earth, with the addition of magnesium and silicon-rich materials; an observation that aligns with recent analyses of Phaistian materials (Pappalardo et al., 2015). Both red and orange pigments did not undergo vitrification. Faber and colleagues also indicated that there was a shift in the production of orange pigments from the earliest stages of MM to later ones, with pigments appearing to be more finely crushed and mixed, making the talc more challenging to identify through petrographic studies (2002, p. 133). The purple pigment was also produced in a manner similar to red and orange pigments. It also had a composition of low-to-medium calcareous, iron-rich earth. The difference from the red

pigment might be due to a different firing atmosphere or iron compound mixed during its creation (Faber et al., 2002).

The study of white pigments has sparked various debates regarding their compositions and origins. Noll (1982) identified two primary white pigments, one based on a talc substance with calcium silicate and another composed of lime silicates (p. 151). Stos-Fertner and colleagues (1979) also proposed that one type of white pigment, the talc white, contained calcium silicate. They recognised a second white type, "huntite" white (p. 193). However, Betancourt and colleagues (1984) disagreed, suggesting that they might have been the same type of white pigment, as they both contained a magnesium-rich mineral. In a more recent study, Betancourt and Swann (1989) examined the white pigment of Kamares pots and reached results similar to those of Noll. Swann and colleagues (2000) used examples from Palaikastro to demonstrate that various white pigments based on calcium silicate were used by artisans in creating the Kamares. Specifically, they identified three white pigments used across EM and MM: one with high calcium and added iron, one with low calcium and iron, and one consisting of calcium silicate without iron. Through the use of neutron activation analysis, ceramic petrology, and SEM techniques, Faber and colleagues (2002) also studied the different white pigments used by Minoan artisans in creating Kamares pots. They identified a talc white and a fine calcite-based white pigment. The application of these two white pigments varied, with some pots displaying a thicker (15 to 35 microns) or thinner (5 to 15 microns) layer of paint (p. 133). These differences in the application of white pigments may be related to the intended use of the pot. In fact, Faber and colleagues noted that the calcitic pigment was used only for one type of fabric (Fabric C, which was very fine and had no inclusions), while on Fabric A and B (with sedimentary rock inclusions and inclusions of quartz, feldspar, or mica, respectively), both thicknesses were detected. These findings support those of Noll, Betancourt, Swan and colleagues, and have been corroborated by recent studies (Pappalardo et al., 2015).

The insights provided by these studies offer an intriguing perspective on the sociocultural context of pottery-making, which I will delve into in more detail in the next section. Noll and Swann et al. examined white pigments and suggested that the use of different types of whites might be linked to the existence of distinct workshops in various Cretan regions. Noll (1982) associated these differences with various palatial or non-palatial consumption centres. Betancourt and Swann (1989) argued that, due to a lack of data, it is difficult to suggest that variations in white pigment

usage indicate different production centres connected to provincial or palatial consumption contexts (p. 180).[11] For them, it seems more plausible that various workshops were producing Kamares style pottery intended for various consumption sites across the island. The study by Faber and colleagues (2002) explored the technological processes tied to the selection of specific materials and practices. They emphasised that within a tradition where technological skills and practices are learned within the social framework of learning (for a more recent perspective, see Roux, 2019), focusing solely on pigments might not provide a reliable means to differentiate between different production groups. Instead, by integrating the study of fabrics with that of pigments, they argued that there were at least two sources for the Kamares pots. This suggests the existence of "either a shared tradition of ceramic decoration or an exchange of knowledge about techniques of ceramic decoration between the two sources" (p. 134). This view is reinforced by the presence of technological similarities with materials from Phaistos (Pappalardo et al., 2015). Notably, recent petrographic analysis seems to confirm the notion of multiple production centres. In another study by Faber and colleagues (2009), the analysis of Palaikastro Knossian style fabrics provided clear evidence for the presence of a workshop located in east Crete that differed from those in central Crete (Day et al., 2006). This study also supports, in line with the analysis of the pigments conducted by Pappalardo and colleagues (2015), the idea that the Kamares style was a long-lived tradition involving the specific selection and manipulation of raw materials by artisans.

The studies conducted by Day and Wilson (1998; 2002) and Day and colleagues (2006) align with those recent investigations by Faber et al. (2002, 2009) and Pappalardo and colleagues (2015), both in their theoretical approach and their conclusions. They combined earlier stylistic studies with archaeometric approaches to present a comparative technological analysis of the thin sections of fine and coarse polychrome and non-polychrome pots from the Prepalatial and Protopalatial deposits in the Mesara (south-central Crete). In their initial study, Day and Wilson (1998) observed that: (i) a wide range of vessels, from coarser to finer, were produced in a few centres in the Mesara rather than in the palaces; (ii) there was a continuity "in the raw material sources and the paste recipes used by some potters in Central Crete from the Prepalatial period through the First Palace

[11] These discussions on provenience result from a tradition of earlier technological studies, quite well exemplified by Noll's works, for which technological studies are more interested in the evolution of techniques and chronological issues. This, because focussing solely on chemical analyses to ascertain the origins of production (see Fitton et al., 1998 for an example on Kamares) is limited by the limited samples, contexts of retrieval, and by geochemical differences that the Cretan geological situation presents in terms of different deposits of raw materials (Faber et al., 2002, p. 130).

periods and into the Late Bronze Age" (Day & Wilson, 1998, p. 355). In a subsequent paper, Day and colleagues (2006) further examined these diachronic patterns related to the selection, preparation, and use of clay and polychrome pigments. One striking example of the persistence of practices is the "layering" technique (pp. 46-48), where potters shaped pots using both coarse and fine fabrics. This specialised tradition persisted through the Protopalatial period and well into the Late Bronze Age and was employed in the production of high-quality vessels like the Prepalatial Fine-Painted Ware and the Protopalatial Kamares style. Consequently, production centres appeared to be located not in the palaces but in the Mesara region.

Additionally, Day and his colleagues (2006) provided evidence that this continuity in technical skills from the Protopalatial period extended to consumption practices, not just production. Protopalatial Knossian deposits reveal that the consumption of large quantities of Kamares pottery, used for communal purposes, was already established during the late Prepalatial period (Day & Wilson, 2002; MacGillivray, 2007). Moreover, comparisons between materials from Knossos and the Mesara region show that imported examples share the same types of fabrics (MacGillivray, 1998). Day and colleagues (2006) argue that traditions in the production and consumption of Kamares were rooted in the Mesara, dating back to at least the EM IIA period. This suggests that the production of fine pottery was not solely a palatial affair, contrary to what many scholars still suggest (Watrous, 2021). Instead, pottery making became specialised during the Prepalatial period, which encouraged the emergence of institutionalised craft production and communal consumption controlled by a growing elite (Day et al., 2006, p. 59).[12]

Information about the forming techniques is also crucial for contextualising the Kamares style and understanding its social and cultural dynamics, which I will discuss further in the next section. Research on the adoption of wheel-made pottery has linked the creation of pottery forms with social structures, the emergence of specialised craftsmanship, population growth, and changes in production dynamics (Knappett, 1999a). There is a consensus that the extensive use of this technology began in MM IB and continued into MM IIA and MM IIB. Various studies (Knappett 1999a, 2004; Jeffra 2013) have focused on deciphering technological indicators such as axial symmetry, rilling marks, and base striations resulting from the use of the wheel technique. These

[12] Although these studies challenged the narrative on the emergence of social complexity in the Protopalatial, they still consider the Kamares "to be symbolic of hierarchy and power in the Protopalatial period" because of their elaborate shapes and decoration (Day & Wilson, 1998, p. 351).

traces of wheel use have been the primary indicators of the adoption of rotational technologies since most sites did not yield actual wheel devices (although there are some exceptions, see Evely, 1993, pp. 265-286). For instance, studies by Knappett (1999a) and Jeffra (2013) on pottery from various Cretan sites aimed to determine if these materials were produced using the wheel alone or in conjunction with the coiling technique, commonly referred to as "wheel-coiling" or "wheel-shaping" (Knappett 1999a, 2004; Jeffra 2013; Choleva, 2012).[13]

Knappett (1999a; 2004) suggests that the introduction of the wheel to Crete resulted from connections with Egypt and the Levant, where the wheel was adopted earlier. In this context, the introduction of the wheel was essentially an imitation of a foreign technique, introduced during MM IB. The changing cultural and social landscape in Crete, following the MM IB period, indicates that the adoption of this technology became part of broader socioeconomic changes in various Cretan centres, such as Knossos, Malia, Palaikastro, and Myrtos Pyrgos (Knappett, 1999a, 2004; Jeffra, 2013; Roux and Jeffra, 2015). These studies reveal that the techniques employed were generally similar across all these sites, with artisans adopting the "wheel-shaping" technique. This means that technological innovation in various regions of Crete developed almost simultaneously (see Berg, 2015), possibly because of artisans sharing knowledge and technology within their community (perhaps during apprenticeship, see Roux 2017).

The emergence of the "wheel-shaping" technique at multiple sites suggests internal movements of people, specifically the mobility of artisans, which likely influenced production processes in various workshops (as discussed in the following section). These ideas are not entirely novel, as Berg (2015) recently suggested that potters not only transported their creations but may have temporarily relocated and settled in certain areas (p. 29). However, these observations emphasise the role of material culture, the pottery tradition that undoubtedly circulated around Crete as a secondary stage, placing technological changes mostly within the knowledge exchange among potters.

In conclusion, I contend that the technological studies discussed above are pivotal for gaining a deeper understanding of the development of the Kamares style in at least two significant ways. Firstly, they reveal that considering only the aesthetic qualities of Kamares, defined by its visually

[13] The distinction between wheel-coiling and wheel-shaping has also been a central point of inquiry in other studies from sites like the Levant (Roux, 2013). In the Levant, the spread of the wheel-coiling technique was found to be connected to cultural processes, including population movements and societal changes (Roux, 2013, p. 314).

striking decorative features, limits our ability to study social and cultural patterns. Secondly, beneath the apparent diversity of Kamares decorative forms, there is a strong continuity in choices and practices, at least in the Mesara and the Knossian areas. Essentially, technological studies suggest that the variability of Kamares is in tension with continuity in technological skills and knowledge. Therefore, these perspectives urge us to consider both things and the practices necessary for their creation when studying the Kamares style.

1.3.4.3 – The sociocultural context

The Kamares style existed within a broader social and cultural context where materials were not only produced but also circulated, utilised, and discarded in accordance with various traditions. In this section, I offer an overview of the sociocultural milieu during the Protopalatial period. The creative process behind the Kamares style, which I will explore in Chapter 6, was intricately connected to the wider social and cultural environment and was influenced by the dynamics of production and consumption. Before proceeding, it is worth noting that my primary focus in this work is not to investigate the sociocultural dynamics of the Protopalatial, attempting to understand what the political or economic system was. Nor do I intend to explore what meaning or values were associated with the Kamares style for its users or creators. Instead, I aim to describe the sociocultural dynamics of the Protopalatial period as they influenced how generations of artisans could learn, remember, and update the technical skills and knowledge related to the making of the Kamares style.

My intuition regarding the role of the sociomaterial context when Kamares was produced is that the circulation of products had an impact on how artisans could remember. In essence, their ability to continually produce new and creative Kamares vessels was facilitated by the presence of previous creations in their sociocultural contexts, as well as other forms of craftsmanship. This suggests a greater degree of flexibility in terms of shapes and techniques than has been previously recognised. However, I will return to these discussions after a detailed exploration of the processes involved in creating Knossian Kamares pottery in Chapter 6. Here, I will provide a general overview of the sociocultural systems to establish the context for my exploration of memory through the re-analysis of the Knossian Kamares style.

The sites of Middle and Late Bronze Age palaces, especially Phaistos, Malia, and Knossos, have been extensively studied as the primary sociocultural settings of the Minoan civilisation.

However, this traditional narrative has faced challenges from various scholars. The shift began with Renfrew and Cherry's (1986) study on peer polity interaction, which proposed that interactions between different social groups led to internal changes within these communities. More recently, new societal models from other global contexts have been adopted to better understand the Minoan situation (Haggis 1999; Schoep 2002).

Discussions about social inequality, long-distance trade, specialised craft production, urbanism, and settlement hierarchy have been re-examined by recent studies. These investigations have highlighted how sociocultural elements existed before MM IB (Wilson & Day, 1994; Whitelaw et al., 1997; Day et al., 1997; Knappett, 1999b; Schoep & Knappett, 2004; Schoep, 2006). For instance, researchers interested in revisiting early reconstructions of the first palaces have proposed that these structures were based on pre-existing architectural elements and shared key features with them. Notably, the "early court buildings" played a role in communal festivities commonly associated with Prepalatial societies, and these structures existed well before the Protopalatial period (McEnroe, 2010; Todaro, 2013). In Knossos, the central and west courts can be dated back to the Final Neolithic period, and these areas were later transformed into early court buildings, eventually leading to the construction of the "First Palace" during MM IA and IB (MacGillivray, 1994). Parallels can be found at Phaistos, where later monumental buildings were also used for communal gatherings (Todaro & Di Tonto, 2008). These discussions about the role of palaces are crucial for understanding the consumption practices that influenced users and producers of material culture, particularly pottery.

Evidence of communal consumption of food and drink dates to EM I-IIA. During these ceremonies, individuals used sets of vessels that implied consumption within household groups (Wilson & Day, 2000, pp. 59–60; Dietler, 2001). This type of consumption practice was observed at various centres across Crete, including Knossos and Phaistos, and it served a community or groups that recognised mutuality among their members. However, this pattern seemed to change during the Protopalatial period, marking the transition from the EM phase. This transition is evident with the introduction of the footed goblet (Wilson, 2007, p. 64). These goblets had a standardised size, suggesting a shift in consumption practices where larger groups were likely consuming fewer liquids or food (Wilson & Day, 2000). It has been suggested that stone or metal vessels, used by smaller groups, accompanied these ceremonies (Nakou, 2007). This implies the emergence of a more hierarchical system within the palaces, where certain classes of material

culture were considered more valuable than others and associated only with specific individuals or groups (Knappett, 2008, p. 125-126). A notable example of the sociomaterial context of pottery consumption involving the Kamares style can be seen in the MM IB deposit from Early Magazine in Knossos (Macdonald & Knappett 2007, p. 161-165).

The deposit unearthed more than 200 vessels made with various forming and finishing techniques. Macdonald and Knappett (2007) carefully catalogued these, including 36 handmade crude goblets, 20 wheel-made goblets featuring white-on-dark decoration, 10 handmade conical goblets adorned with polychrome decoration, and one large goblet in the Kamares style (eggshell ware) (p. 161). They identified a "a hierarchy of container value, which via commensality could have reproduced similarly asymmetrical relationships in people" (p. 161). This hierarchical system might also apply to other groups of materials within this deposit, as well as in other fragmented contexts found in different areas of Knossos. This example suggests that concerning consumption practices in the sociocultural context of MM Knossos, the population encountered a diversity of materials and practices. Even if some segments of the population were not directly involved in these restricted ceremonies, as might have been the case in the early stages of the EM period, people could still observe these materials (see also Knappett, 2008). If artisans resided closely to the palaces, a notion recently debated in technological studies, they would have been aware of the intended uses of the pots they were crafting. Therefore, when it comes to exploring consumption practices within the palaces, the consumers would have been surrounded by a complex sociocultural context comprised of various classes of material culture: pottery, including the Kamares style, metal or stone vessels, textiles, seals, and clay tablets stored in the different palace storage rooms (Branigan, 1987). Residents of centres like Knossos, undeniably hubs of interactions of both people and artifacts, would have had access to these various materials even if they were not directly involved in the ceremonies.

However, materials were not confined solely within the palaces. An extensive trade and contact network was established within Crete during the Protopalatial period (Betancourt, 2008). Studies have investigated the exchange patterns of material culture among sites across the island (Knappett, 1999b). Wilson and Day (1994, 1999) demonstrated that during the late Prepalatial period at Knossos, several ceramic imports originated from workshops in south-central Crete, including places like Myrtos Fournou Korifi (also Whitelaw et al. 1997). These imports included fine pottery used in communal events. As discussed earlier in various Protopalatial contexts, sites

such as Phaistos, Malia, and Palaikastro exhibited similarities in pottery production and potentially consumption. The site of Myrtos Pyrgos, for instance, yielded several materials with comparison with Malia (Cadogan, 1977/1978). Regionalism is also evident in the significant differences among sites, such as between Knossos and Malia (Knappett, 1999b). These movements of materials suggest that different segments of the population living outside the palaces or near them also had access to various materials and pottery styles. It is also conceivable that artisans, not just merchants and traders, might have moved seasonally along trade routes, facilitating the exchange of technical knowledge and skills.

One last aspect of the MM sociocultural context that I aim to explore is the production practices. The notion that palaces served as central hubs for producing and distributing the Kamares style pottery has faced substantial critique in scholarly literature. The petrographic analysis mentioned in the preceding section indicates that this pottery was crafted in locations far from the palaces, for instance in the Mesara region. This suggests that control over the Kamares production may not have been directly overseen by a centralised elite. Instead, it is proposed that palaces should be viewed more as centres of consumption, as discussed earlier, potentially driving innovation through luxury demand. So, what is the situation with workshops during this period? In Knossos, Evans identified a pottery and lapidary workshop in the east wing. However, in his re-evaluation of the Knossos context, MacGillivray (1987) did not find compelling evidence of Protopalatial kilns or signs of production at the site (though he suggests that there may have been workshops in the vicinity). The most convincing evidence we have comes from "Quartier Mu" at Malia. In this area, excavators unearthed several workshops where artisans crafted various high-quality items (Poursat, 1997). These small workshops, possibly dedicated to supplying Buildings A and B, produced pottery alongside seals, stone vases, bronze goods, and textiles (Poursat & Knappett, 2005; Poursat, 2013).

Unfortunately, it is challenging to determine whether this arrangement of workshops was typical in other regions of the island or representative of palatial centres. Assuming that Malia, with its distinctive features, functioned as a palace akin to Phaistos and Knossos, there is one key insight we can move: potters worked in proximity to other artisans and their creations. Those involved in crafting the Kamares style were not only exposed to their own products and those of other potters but were also influenced by different artisanal practices. Potters might have drawn inspiration from the techniques employed by artisans crafting stone vessels or the colourful

textiles, as it seems to be the case with the *Woven Style* decoration documented by MacGillivray (2007) in the Kamares style. Knappett has repeatedly suggested that *skeuomorphism* (the practice of designing something to resemble another form) played an increasing role in the production practices of Protopalatial artisans (Knappett, 2008, 2020). It is plausible to assume that artisans involved in crafting fine pottery, such as the Kamares style, engaged in constant interaction with other forms of production. This interaction could have facilitated the discovery of innovative ways to incorporate elements from earlier pottery-making traditions, resulting in the creation of ever more imaginative combinations. I will revisit this notion at the conclusion of this work after an in-depth examination of the Knossian Kamares materials. In summary, the sociomaterial context of consumption was marked by the diversity of material culture and artisanal practices. The fluidity in workshops may have played a significant role in nurturing the creativity that scholars have identified as one of the distinctive features of the Kamares style.

To summarise this paragraph, we can observe that the sociomaterial context when and where the Kamares style was produced was anything but static. Regarding consumption practices, which were likely influenced by emerging elites, this unique style appears to have played a central role in establishing a value system that manifested in the social status of those who used it. Given its evident significance in consumption practices, it was visible to various members of the population residing in the palatial areas. Furthermore, these luxury items featured in trade exchanges between different polities and palaces, indicating that numerous other members of society had exposure to them, not just the elites.

Production practices present a more challenging area of exploration due to the limited data available. However, insights from Malia suggest that artisans were exposed to diverse materials and constantly surrounded by raw materials, tools, and various resources. In a broader sense, the sociocultural context of the MM period is characterised by exchange and fluidity, with various members of society, including artisans, having access to the array of materials circulating during this era. This fluidity in artisanal forms, a hallmark of the sociomaterial context of the period, suggests that artisans might have possessed versatile technical skills, interacted with various raw materials, or collaborated closely with other artisans specialised in different artisanal activities (as observed in MM IIIA Phaistos with fresco- and vase-painting, Militello, 2013).

1.3 – Aims, hypothesis, and structure of the thesis

In this introductory chapter, it became evident that approaches to Kamares have emphasised the study of relative and absolute chronologies, descriptions of materials, and social narratives. However, technological studies have suggested a different view of the Kamares style and its sociocultural context. They indicate that behind the development of this style, there was technological continuity in the selection and manipulation of raw materials (clay and pigments), as well as in the techniques used to shape and decorate the pots. This continuity is reflected in the sociocultural context, which seems to indicate the circulation of materials and knowledge from one site or region to another. These studies, therefore, suggest that there is more to the diversity manifested in the combinations of shapes and decorations; there is a technological continuity that is a part of this style.

However, while stylistic and technological approaches to Kamares have been extremely helpful in gaining a better understanding of the temporal, spatial dynamics, and sociocultural coordinates of the Kamares style, I argue that explanations regarding the underlying processes driving the tension between change and continuity are still missing. Equally absent in the scholarly literature is an exploration of the dynamics by which inventiveness in shapes and decorations and stability in technological practices played out across generations. In other words, how, despite the creativity in forms documented by several studies on Kamares around Crete, shapes and decorations Minoan artisans could remember, learn, update, and pass on technical skills and knowledge on the making of Kamares.

A closely related issue that I wish to explore further with this work pertains to the role that material culture plays in memory and remembering. What I am keen on investigating, through a re-examination of Knossian Kamares pottery, is how this style influenced the thoughts and actions of artisans within the specific sociomaterial context of the MM period. Particularly, my interest is directed towards gaining a better understanding of the processes by which artisans could think and act in the creation of pottery over both developmental and transgenerational times. When referring to *transgenerational*, as I will discuss in Section 2.4.2, I mean the long-term temporality described by artefactual styles – something that the scholarly literature has only partially studied.

For most scholars in various academic disciplines, thinking is the product of internal representations located in the brain or mind, which are later externalised in the world. The different

referent types of Kamares developed by Minoan scholars align with this conceptualisation of the mind. According to these studies, each type represents a specific combination of shape and decoration and corresponds to a precise period, regardless of the variations documented in various deposits around the island. In doing so, style perpetuates the artificial separation between inside and outside, as discussed in Section 1.2.2.

We are confronted with two significant issues that need to be addressed if we are to delve into the dynamics behind the Kamares style and the role that material culture plays in shaping thinking and actions over developmental and transgenerational time. First, is the notion of style suitable, or should we reconsider this tool and adopt a more informative approach? The second major issue concerns the theoretical foundations used to explain the tension between creativity and stability in the Kamares style. How can we account for the creativity and diversity depicted in studies of Kamares while considering its technological continuity? Were vases made in this style the representational products of artisans' minds externalised in material culture, or did they play a role in how artisans recalled the necessary actions and choices to be made in the context of pottery making?

To shed light on these questions, I will conduct a re-examination of the Kamares style from Knossos with the aim of investigating the hypothesis that *style constitutes a transgenerational memory of technical skills and knowledge*. Focusing on the Knossian Kamares, I will attempt to understand the exact ways in which this style enabled artisans to remember, learn, and update their technological knowledge and, therefore, actions and thoughts over several generations. Specifically, the thesis will focus on the process of making, aiming to grasp the creative aspects of remembering and identifying the possible material traces of the various throwing and decorative techniques present in the archaeological assemblage under examination. Therefore, the central hypothesis explored in this work concerns the links between style and memory, aiming to understand the creative dimensions of the Kamares style.

My intuition is that the Kamares style, taken as a whole, was a continual memory process distributed in both things and people. This intuition leads to a different understanding of what remembering is and the role that material culture, specifically Kamares vessels, played in memory and remembering. As I will propose in Article 1, Chapter 6, and Article 3, the Kamares style would have enabled artisans to remember technical skills and practices by providing opportunities for future creations. Artisans had access to Kamares pots, both in the context of production and the

broader sociocultural context. As emphasised in Section 1.3.4.3, there appears to be a circulation of materials from workshops, possibly located outside the palaces, and areas of consumption (e.g., courts of the palaces). Even if they could not participate in the ceremonies, those residing in the palaces likely had the opportunity to see these highly valued materials displayed during communal events. For those working in workshops, skilled artisans would have created pots to meet the demands of these communal activities, producing vessels that apprentices and other artisans could see and learn to produce.

Moreover, the strong continuity in technological traditions highlighted by technological studies, along with the presence of pottery produced with similar, if not identical fabrics and pigments (e.g., whites), seem to suggest movements of pots as well as of artisans from various productive centres. This highlights the idea that potters or painters were in close contact with pottery materials and other artisanal forms, as suggested by the case of Malia. Why is this idea of the circulation of materials and people so important in understanding the way in which the Kamares style could enable artisans to remember? Because, in proposing that the Kamares style is a memory distributed in both objects and people, one of the hypotheses that I will develop in this work is that every single pot in this style contributed to how artisans remembered technological skills.

In Article 1 and Chapter 6, I will argue that Kamares pots served as *memory trace*s for artisans, enabling them to recall and acquire practices within the pottery-making context. By anchoring my theoretical and empirical framework in Malafouris's MET and Alfred Gell's anthropology of art, I will propose that these vessels were memories of the history of material engagements accumulated over developmental and transgenerational time. This suggestion for Kamares pots as material traces affects how we think of remembering. I will suggest that *remembering becomes a way of doing* that intertwine material culture, artisans' brains and bodies, and technological skills and knowledge within the context of making new Kamares pots. This perspective on remembering does not necessarily imply that artisans had Kamares materials directly in front of them when producing pots. Instead, I will suggest that artisans constructed a history of material engagements with these vessels, which was then (re)enacted in the creative process. Based on the data gathered and analysed in Chapter 6, my attempt will be to demonstrate that it was during the act of making a new Kamares pot along the lines of those previously experienced that enabled artisans to remember, learn, and adapt previous knowledge on what raw materials to use, how to manipulate them, the tools to employ, and which techniques were needed to produce a pot in this style.

To address these questions and explore my hypotheses regarding memory, remembering, and the role of material culture in the making, I have structured the main body of this thesis into four chapters and three articles, all closely aligned with the theoretical foundations and data gathered throughout this research. These articles should be considered the equivalent of traditional chapters, as they seamlessly complement and integrate with them.

To begin, I extensively examine how archaeology has historically approached the concept of style, aiming to identify the most suitable path for redefining style from a long-term and agential perspective (Chapter 2). I then offer a comprehensive exploration of the anthropological framework of style formulated by Gell (1998), from which I derive the concepts central to my discussions on memory, time, and the making (Chapter 3). After establishing Gell's perspectives on style as a spatially and temporally distributed object and as memory, I shifted my focus to the study of memory in anthropology and archaeology (Chapter 4). Discussions of memory in the cognitive sciences are left to the articles, in which I have devoted more attention to mainstream psychological studies. Following the concluding section of the preceding chapter, where I emphasise the need for cognitive studies capable of accommodating the continuity between mind and matter, I present in Article 1 the core concepts of Malafouris's MET. In this paper, I discuss my preliminary theoretical considerations on memory as a distributed, enactive, ecological, semiotic, and multi-temporal process. I also explore the concept of remembering as (re)enacting: a way of engaging *through* and *with* things in accordance with previously acquired sociocultural practices. Subsequently, I apply the insights developed on the Kamares style and the theoretical discussions to my data collection (Chapter 6), providing an overview of the methodology and analysis of the Knossian Kamares pottery. Following this, I utilise my interdisciplinary theoretical and methodological approach in Article 2 to explore more deeply some of the data derived from the data collection, as well as to assess the role of the aesthetic qualities of Kamares in shaping memories of sociocultural practices among Minoan artisans. Finally, in Article 3, I expound further on my proposal of the impact of material culture on memory and remembering.

Chapter 2 – The Notion of Style in Archaeology

In the preceding chapter, I presented the geographical and historical context of this study and provided a comprehensive description of the Minoan Kamares style. Within that context, I highlighted a crucial limitation in studies aimed at comprehending the long-term evolution of the Kamares style, specifically the delicate balance between its creative innovations and enduring patterns.

In this chapter, I delve into the origins of this style (Section 2.1) and explore three primary approaches to style within the field of archaeology, shedding light on their respective strengths and weaknesses: *style and meaning* (Section 2.2)*, style and doing* (Section 2.3.)*,* and *style and time* (Section 2.4). By conducting a thorough examination of these approaches, I arrive at the conclusion that the most promising path forward involves further development of this concept through the lens of Gell's (1998) anthropology of art.

2.1 - The origins of style

Style has been a foundational and most debated concept since the beginning of the archaeological discipline. In its common usage, style refers to the distinct or general characteristics of individuals, objects, or historical periods. For instance, think of clothing styles; the fashion of the 1980s brings to mind images of sweaters, puffer jackets, velvet blazers, trench coats, knee-length skirts, curly and flamboyant hair, and vibrant colours - all emblematic of that particular era. However, for archaeologists, style is not as straightforward. Its interpretations and applications have changed in response to emerging scholarship and contemporary intellectual currents both within and outside the realm of social sciences.

As demonstrated by numerous review articles and chapters in archaeological handbooks, archaeologists have continually revised, discarded, and discussed over the meanings and applications of style (Boast, 1997; Conkey & Hastorf, 1990; Cunningham, 2003; Gamble, 2001; Harris & Cipolla, 2017; Hegmon, 1992; Hodder, 1990; Hurt & Rakita, 2001; Wiessner, 1985; Wobst, 1977). This enduring interest in the concept has given rise to various conceptualisations employed to address archaeological inquiries related to identity formation (Binford, 1962, p. 220; Hodder, 1990; Plog, 1978; Wiessner, 1983), individual attribution (Deetz, 1967; Hill & Gunn, 1977; Neer, 2005), and technological change and cultural transmission (Gosselain, 1992, 2008;

Lemonnier, 1992; van der Leeuw, 1993). Nevertheless, debates that emerged towards the end of the 20th century have somewhat diminished the utility of this concept as an analytical tool for the study of the past. In the beginning of his article, Boast (1997) asserts that:

"The concept of style has dominated material culture studies for a very long time. It is that bit that we find most socially meaningful, the bit that is most human, added on beyond natural necessity. It is the bit that has most to do with the mind, with human intentions, with human communication. Style is seen as the key to the social" (p. 173).

Boast (1997) argued that style has grown into a confusing concept, a tool employed as a universal descriptor for various aspects of human production. Something that sets us apart from nature, other individuals, and cultures. It has been used to define social objects and as a marker of identity. Due to its pervasive and multifaceted nature, he contended that "we should abandon the style concept altogether" (p. 174). But what led Boast to such a radical conclusion?

To address this question, I explore two primary perspectives on the concept of style: *style and meaning* (Section 2.2) *and style and doing* (Section 2.3). These perspectives draw from cultural-historical, processual, and post-processual traditions rooted in Durkheimian social evolutionism (Harris & Cipolla, 2017, p. 24). These categories delineate the various applications of style. To maintain clarity, I do not strictly follow a chronological order but rather consolidate strands of thought recognised from an extensive examination of the archaeological literature.

2.2 - Style and meaning

The concept of style initially served as a taxonomic tool, whereby things sharing similar qualities of form and decoration were aggregated into types. Any non-functional aspects, like the shape of a vase, were considered by-products of human technological and functional development and were thus designated as stylistic (Wobst, 1977). These categories served as the basis for establishing both relative and absolute chronologies, for locating people and objects geographically, and for understanding cultural variations (Leroi-Gourhan, 1968; Plog, 1978).

This perception of style changed from a passive typology into a symbolic system for conveying social and cultural meanings. This transformation began within the cultural-historical framework when style replaced artefact *type*, which referred to specific types of things based on aesthetic

resemblances (Rouse, 1972; Willey & Phillips, 1958). According to this perspective, sequences of artefacts were organized chronologically and used to explore the interplay between similarities and differences, as well as change and continuity, within a particular sociocultural group. This taxonomic approach was already practised by scholars like Montelius, Pitt-Rivers, and, albeit later, Petrie (Sørensen, 1997). Even today, typologies continue to be valuable for pedagogical purposes, aiding in the visualisation of changes in artefacts over time (though they have faced criticism, Sørensen, 2015).

Due to these early studies, the concept of style became central to investigating the dynamics underlying changes in artefacts, infusing the tension between change and stability with a new significance: a social significance contextualised within a specific historical and cultural context (Binford, 1962; Hodder, 1990; Sackett, 1977; Wiessner, 1990). This significance was rooted in the realm of information exchange and cybernetics, defined as "the science of control and communication, in the animal and the machine" (Ashby, 1956, p. 1). In other words, style became a meaningful means of expressing social intentions, such as individual or group identity. This perspective on style as "that aspect of artifact form and structure which can be related to processes of information exchange" can be traced back to Wobst (1977, p. 335). Scholars like Binford (1962), Wiessner (1983), and Hodder (1990) developed their definitions of style along these lines.

2.2.1 - Style and communication

Building upon White's (1959) studies on the cultural evolution of human societies, Binford (1962, 1965) redefined style as a normative element and as an "extrasomatic means of adaptation" (1965, p. 205; from Cunningham, 2003, p. 24). In discussing his tripartite subsystem model based on cultural systems and general functional classes of artefacts (i.e., technomic, socio-technic, and ideo-technic; Binford, 1962, pp. 219-220), Binford defined culture and society as the interaction between people, things, and places. For him, variations in style types resulted from "changes in the socio-cultural systems" brought about by alterations in the environment where local processes were adapted (p. 220). Style was not just a category; it acquired a new dimension, becoming a way to cross-cut different systems of categorisation and a method of communication adopted by sociocultural groups to "reinforce beliefs, customs, and values" (Beals & Hoijer, 1955, p. 54; as cited by Binford, 1962, p. 220). With such informational and communicative qualities, artefacts became entangled in questions of identity. Essentially, they started to be considered a "pan-

systemic set of symbols" for recognizing social distinctiveness (Binford, 1962, p. 221). Binford (1962) argued that the artefacts of the Old Copper period found in the Great Lakes region served no technological purpose. These copper artefacts were found in burials and showed no signs of being retouched or used. Moreover, they were no more effective than stone tools and were not extensively used. Therefore, he continued, the Old Copper period tools were symbols used to alter the social status of the social group: they worked as ideological symbols of achieved status within their specific sociocultural context of use (p. 233). Wiessner later expanded on this idea that things are symbols for communicating sociocultural identity.

Wiessner (1983) argued that style is the "formal variation in material culture that transmits information about personal and social identity" (p. 256). She defined style as a "form of non-verbal communication through doing something in a certain way (...) communicates information about relative identity" (Wiessner, 1990, p. 107). She explicitly defined changes in the appearance of an artefact as what conveys the identity of an individual or group of persons. According to this view that links style with communication, artefactual variation is tied to sociocultural dynamics linked to formation and identity.

Contrary to this view was the one heralded by Sackett (1977, 1985, 1986), in which stylistic variation resides in the technical actions and choices of artisans. Specifically, on the behavioural attitude of "choosing specific lines of procedure from the nearly infinite arc of possibility and sticking to them" to produce an artifact in a desired style (Hegmon, 1992, p. 522), what Sackett defined as *isochrestic variation*. As discussed below, Sackett (1986) heavily criticised Binford's and Wiessner's approaches and the information exchange paradigm. For him, considering styles as symbols for information reduced the complexity of individual and social groups to the analysis of mere artefactual composition.

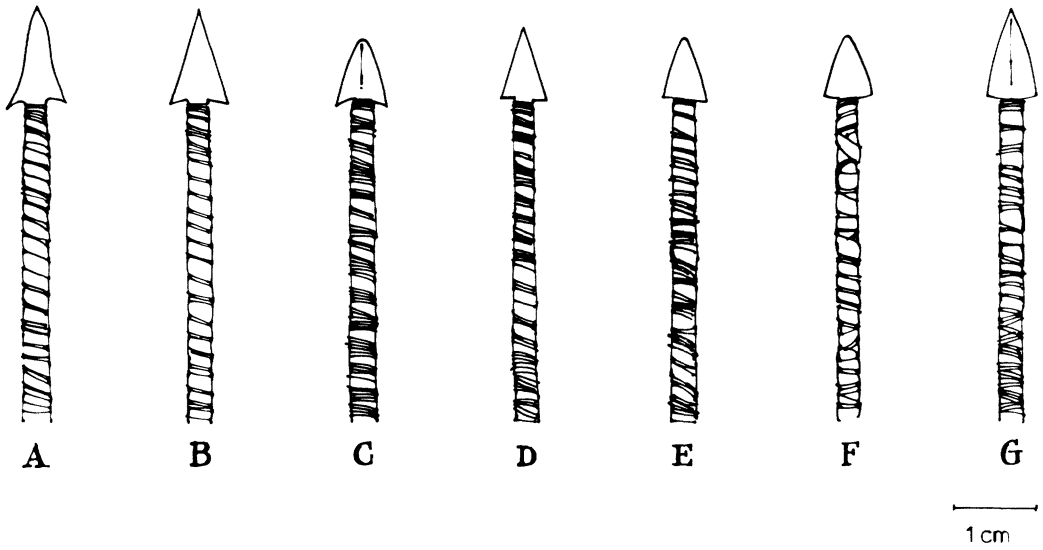


Figure 11 - Variation of *!Xung San* projectile points (after Wiessner, 1983, fig. 3).

In her debate with Sackett, Wiessner (1985, 1990) conceded that, in specific contexts, a style could be secondary to the cultural function of an artefact. However, decorations were not an adjunct to function for her but meaningful for transmitting information concerning social identity (Wiessner, 1985, p. 163). In the case of Kalahari San (Figure 11), the style of projectile points worked as linguistic signs do: to convey a specific socially shared meaning (see discussion on clothes in Sahlins, 1976; also, Connerton, 1989). With such an emphasis on information and communication, "meaning was seen as the primary aim of a style" (Hegmon, 1992, p. 521). Wiessner's conceptualisation of style considered artefactual variation as residing in the same message system. Hence, changes in the message about individual identity resulted in stylistic variation (Conkey, 1990, pp. 10-11). Being the vehicle through which to communicate specific social messages, the notion of style became a passive component of human action.

2.2.2 - Style and identification

Wiessner's (1984) insights introduced two novelties for studies on styles. First, style mediated social and cultural groups instead of being the by-product of artefactual variation. Second, she equated style to a cognitive process by which individuals could think about themselves or their identity within a social group (p. 191).

Antecedents of Wiessner's idea on the unity of style and cognition are found in several fields: Gibson (1950) and Arnheim (1967) in psychology, Wollheim (1973) or Gombrich (1960) in art history, and Munn (1973) in anthropology. Washburn (1977) was the first in archaeology and studies of style that wove together psychological, art historical, and anthropological literature and introduced the concept of "perception, categorization and structure" in material culture studies (p. 1). In describing the structural organisation of the ceramic design of the Upper Gila area in New Mexico, she linked the rising structuralist ideas in the social sciences with the notion of symbol, society, and the role of perception in ritual contexts (for a review of the current of thoughts in archaeology, see Hicks, 2010).

Wiessner (1984) further developed these ideas and explored how studies in social psychology (1974) considered social identity as part of the self-concepts that individuals produce when relating to others. She argued that the production of diverse artefacts in certain styles emerged from "the basic human cognitive process of identification via comparison" (p. 190). Specifically, she recognised two styles: *emblemic* and *assertive*. Whereas the emblemic style referred to a precise referent that carries information about groups and cultural boundaries, the assertive style had no distinct referent but carried messages about individual identity. Essentially, these two styles were seen as a "set of social processes (...) aimed at the promotion of group identity" (MacDonald, 1990, p. 53), which resulted in defining the social nature of individuals. This view of style encapsulated the notion of individuality, defined as aspects salient to a specific human being, such as personal tastes, ways of moving, intellectual concerns, and that of the group (e.g., wearing a tie, using pins or badges, adopting a specific slang). Social or personal identity was thus activated depending on the context and produced through comparison. Hence, the process of stylistic comparison mirrored that of social comparison. Therefore, individual and social identity were mediated through stylistic comparison: "one of many channels through which such a representation can be presented to others, either consciously or subconsciously" (Wiessner, 1984, p. 193). From this angle, novel relations among people produced new styles, social comparisons, and social relations. [14]

[14] It is worth noting that studies by Wiessner were expanded by Franklin (1986), who contrasted emblemic style with what she called stochastic style. Whilst the author never defined explicitly what stochastic style is, she noted that it "relates to the individual's perception of the world from a culturally-shaped perspective" that varied independently of ethnographic boundaries (p. 121).

Firmly grounded in information theory and the linguistic sign, this stance on style equated material culture with living cultures in establishing social identity and groups (Wiessner, 1984, p. 58). As such, style was a system of communication actively partaking in defining a specific society.

2.2.3 - Style and language

Similar conclusions were shared by David and colleagues (1988) in their now-classic study of Mafa and Bulahay pottery designs. They state that pottery designs, "far from being 'mere decoration,' art for art's sake, or messages consciously emblemic of ethnicity, are low-technology channels through which society implants its values in the individual every day at mealtimes" (David et al., 1988, p. 379). According to them, structural designs on the surface of pots were defined as essential elements used to compose a discourse aiming to convey a specific social meaning (also, Arnold, 1983; Bunzel, 1929; Lathrap, 1962; Roe, 1980). Working as a language or grammar system, decorations functioned as texts put together to produce a discourse. As for Wiessner, style was regarded as a medium of social communication: an index of identity working in non-verbal terms.

In suggesting that material culture is a structured sign system, Shanks and Tilley (1987) made a similar argument. For them, style (which they equated with art) participates in social production and is integral to a society's ideology. Tilley (1991) presented an even stronger argument for this semiotic dimension of material signs in his discussion on functional objects: that things work as texts to communicate ideas in the social groups to which they belong.

Essentially, for these early post-processual studies (for post-processualism, Hicks, 2010), style was equivalent to text for language; the social and cultural patina superimposed on things to give them a social meaning. So considered, style emerged in the archaeological theory of the late 20th century as a passive component of human action, being the medium by which the will of a human group in a specific social and historical context is transmitted. It is the adjunct of functional elements produced with specific actions. To put it more plainly, style was considered a semiophore, a term used in museum visual anthropology to define how things "considered of absolutely no use" are endowed with meanings when introduced within a specific context (Pomian, 1990, p. 30). According to this view, stylistic similarities became a vehicle adopted to construct and confront different identities. The earliest studies on Minoan Crete similarly produced several distinguished pottery styles, each associated with a specific period, region, and, usually, palace.

These styles were thus adopted to mark different geographical areas and separate social groups into clusters. With the distinction between palatial and provincial imposed *a priori* on the pottery excavated in Knossos and Phaistos (e.g., Walberg, 1976, 1983), the Kamares style exemplifies this endeavour of adopting ceramic styles to frame people and cultures in space and time.

It is this comparison between style as a social message, and material culture as text, that Boast challenges in the paper that I used to open this chapter. Boast (1997) condemns this idea that style is a language written on the surfaces of artefacts to be read, understood, and passed; a "social paint put on the material 'essence' of the world" (p. 174). As he asserts, regarding material culture as text "is useful not because material culture is like text, but because text is material culture" (p. 190). This idea of language reiterates one of the drawbacks in the study of Kamares that we discussed in the introduction: the hylomorphic view for which material culture is considered a system of symbols, whereas the pre-formed ideas and concepts are imposed over material culture.

In Sections 2.4.2, 3.8, and Article 2, I will return to discussing the importance of considering the role that the physical qualities of material culture have for human thinking when reviewing recent approaches to materiality and the long-term, as well as Gell's (1998) theory of art and agency.

2.2.4 – Style and event

In looking at how styles work as a system of symbols used to signal a group or individual identity, Hodder partially reworked Wiessner's intuitions on social comparison and style and Shanks and Tilley's take on material culture as a linguistic sign. His main argument is that things act as symbols that depend fully on the social context in which they are enmeshed (Hodder, 1990, 1991).

The role of style in signalling identities, rather than actively producing and channelling actions, became indexical of social action and identity: style is a system of symbols adopted by social groups to transmit ideas about society or individuals. Pretty much like Wiessner and Franklin, Hodder did not conceive of a separation between style and utilitarian functions. As he argued: "Both the social and utilitarian functions of an object have style" (Wiessner, 1990, p. 44). He challenged Wiessner's idea of style for being restricted only to social function and argued against the assumption that styles rule people's actions in the context of reproducing things to fit within specific styles. On the contrary, style always involves a choice. The extent to which those choices

are guided by style, and to what extent styles can be manipulated by people, is still unexplored (but see Section 2.3.4). Especially if we consider that stylistic changes occurring in an artefact, what typologies describe, have long temporal traditions that span well beyond that of a few human generations. But this long-term dimension of style was not Hodder's central concern. Instead, he was more interested in how societies and cultures used material culture to convey social meanings.

To explore this social and semiotic dimension of material culture, Hodder developed the notion of an event based on Whitehead's (1967) process philosophy.[15] In his interpretation of Whitehead, style is positioned at the interaction between the "referral of an individual event to a general way of doing" (Hodder, 1990, p. 45). Where the event is a moment when the interaction between objects and people produces an interpretation of the event itself and its components. It results that style is now disconnected from artisans' choices but associated with actions of "thinking, feeling, and being" that mediate the social in a precise sociomaterial context (Hodder, 1985, pp. 9-10). As such, style emerges as a social strategy that can be manipulated to foster certain actions over others, fix relationships, negotiate power, define boundaries, and produce social differences (1985, p. 10). This happens, Hodder (1990) argued, only when an event in which a set of actions unfolds can be related to other past events by means of differences and similarities (p. 45). In the case of the clothing style of the eighties, we can tell what this style is by making comparisons with, for example, the fashion in vogue in the early nineties. It is through the choice of dressing style that a style comes to define the individual and the social context.

The Kamares style can be similarly defined in Hodder's terms as an event that is repeated in every single pot and shows similarities with previous or contemporary pots that have certain qualities and a specific social ideology (i.e., that of Minoan palatial elites). According to this view of style, social actions and individual's principles take centre stage and define what a style is. As such, things are deprived of their power and become a passive medium waiting to be painted with social meanings. In other words, Hodder positioned himself in line with Binford and Wiessner, for

[15] With *process philosophy*, I refer to a current of thought that originated in the philosophy of the pre-Socratics and moved on Leibniz, Bergson, Peirce, James, Whitehead and, in archaeology, Gosden and Malafouris (2015). For this philosophical current, the *stuff* in the world can be best understood in terms of processes rather than static entities. For instance, this view assumes that, as was initially postulated by Heraclitus, "the river is not an object, but a continuing flow; the sun is not a thing, but an enduring fire. Everything is a matter of process, of activity, of change (*panta rhei*). Not stable things, but fundamental forces and the varied and fluctuating activities they manifest constitute the world" (Rescher, 2000, p. 7).

which style is a semiophore that carries meaning about someone's action. Where action resulted from a choice that "is 'read' by others" (Hodder, 1990, p. 50).

Before moving to characterisations of style as doing, it is important to mention that Hodder, while not directly interested in the long-term dynamics of stylistic change, also dealt with issues of temporality and style. He considered time to be part of a general event, not as intrinsic to style. The temporal axis on which styles develop is made evident only when changes in the physical qualities of groups of things can be recognised in archaeological assemblages (Hodder, 1990). Again, the ways in which humans act according to the rules imposed by their sociocultural group are seen as crucial in determining what an event is and what drives stylistic changes. Styles are the product of social groups, and, as such, their capacity to affect people's actions and thoughts is limited to the shorter temporality of human life. However, as I will argue in discussing the works of Gosden and Knappett, if there is something for which style is important, that is its capacity to outlive individuals and social groups (see Section 2.4).

2.2.5 – Summary of style and meaning

The prevalence of discussions involving the sociocultural contexts described in this section on style and meaning underlined the social dimension that the notion of style has in archaeology. Scholars interested in seeing style as a semiotic, language-like grammar where things are important for the meaning inscribed onto them have placed material culture in the background. It results that, for Binford, Wiessner, and Hodder, the world is pre-given by historically bounded sociocultural conventions.

Accordingly, things become passive entities or substances whose values, meanings, and uses are defined *a priori* by an existing sociocultural system made of ideas and beliefs. Therefore, the rules by which things are reproduced or used are determined by the social or cultural groups that produced or used them. Things assume their values according to the strategies that specific sociocultural groups have. This stance on style and, by reflection, material culture, is the result of what I will refer to henceforth, following van der Leeuw (2008, p. 218), as an *a priori* perspective on the making and use of things. This perspective emphasises the nature of things as already-made, fixed, and immutable entities. On the contrary, van der Leeuw (2008) suggests that we approach material culture from the making perspective; one that emphasises the capacity that material culture has to organize future possibilities and actions (see Section 2.3.5).

This critique is echoed by Cunningham (2003), who shows how these studies have linked the transmission of information to group formation and individual identity. Most importantly, he equally recognizes that for these studies, stylistic or functional elements of cultural patterns are defined *a priori*. However, he argues that these meanings are imposed by scholars, rather than past sociocultural groups (Cunningham, 2003, p. 24). In a way, the possible meanings that things might have possessed in the past are the result of contemporary interpretations of materials studied in the present (see Olivier, 2011).

Ultimately, such a stance in material culture and style puts aside discussions on change and continuity in forms and does not help in trying to explore the sociomaterial dynamics by which the Kamares style endured, albeit with its idiosyncratic forms, over several generations. For these studies, emphasis is placed on the *event* and the possible *semiotic* meanings that things in a certain style can have according to a specific sociocultural context, rather than on its underlying processes and the dynamics that these processes evidence among people and styles over time.

It is in looking for a way to explore these processes and interactional dynamics that I now move to review those studies that assume style to be something we do, rather than a means for transmitting meanings about a society or individuals.

2.3 - Style and doing

The following conceptualisations of style present a perspective linked with choices, actions, and ecological constraints. These approaches concentrate on the decision-making aspect of style, mostly developed under the agenda of "ceramic ethnoarchaeology" (Kramer, 1985). Studies on technology enter discussions on style because of functional and technological changes (Binford, 1962, pp. 199-203), or through sequences of artisanal actions (Sackett, 1986, p. 630). Their attention was directed at understanding how observations of contemporary practices in different world cultures provided archaeologists with novel insights into the study of past ways of doing. I focus here on the most common ceramic studies as my interest in this work lies in analysing the processes behind the long-term development of the Kamares style.

The tradition of studying ceramics, notably ceramic decorations, is one of the longest in archaeology. Debates on chronology, attribution, ethnicity, semiotics, and identity have been a central theme of archaeological studies on pottery decoration. Furumark's (1939, 1941) classification of Mycenaean pottery presents an interesting example of these views.

In line with the earliest stylistic studies and typological endeavours, he focused on the morphological and decorative aspects of pottery to better define chronological typologies, instead of regarding them as ethnic characteristics. Furumark's (1941) typological method was grounded in two main concepts: types, considered "the sum of the specific characteristics of a specimen, or of a group of specimens" (p. 4); and typological series, "an arrangement of a number of types belonging to the same morphological category, or categories, according to the degree of their mutual similarity" (p. 4). According to this typological endeavour, style was defined as "the quality that remains constant in spite of morphological differences and which forms the essential characteristic by the aid of which different series of development and different morphological classes are interconnected" (p. 6). The criterion on which the scientific rigour of those lists of things was based is the spatiotemporal correlate of each thing to another in the same *type* and *typology*. Decorations only partially affected these variations being them "a non-essential, secondary feature" (p. 1). Nonetheless, within a style, they are the "expression of personality" of an artisan: their "peculiar manner of execution" that remains constant regardless of the different classes of shapes or decorations (p. 6). Attitudes and choices were linked to the technical choices made by artisans to make sense of chronological aspects of typologies. Although Furumark (1941) was still entrenched in a cultural-historical tradition, his approach to style looked at something different from proponents of style as meaning: the "ethnic characteristics" or "psychological background" of a group of people, such as the Mycenaeans, as it was expressed by the repetition of certain stylistic features (p. 6). Hence, rather than looking at meanings or social values as customary in previously reviewed studies of style and meaning, with Furumark I explore the active dimension of style as an actual making practice.

2.3.1 – Connoisseurship and style in art history

The roots of Furumark's stylistic approach, as well as those by Matz (1928) before him, and Andreou (1978), Zois (1968), Walberg (1976, 1978), and the other stylistic studies of Kamares reviewed in Section 1.3.4.1, were firmly grounded in art history. Specifically, they are rooted in studies of attribution and connoisseurship that found their main proponents in Morelli (1982) and Beazley (1951, 1974; see also Neer, 2005; Wollheim, 1973).

Stylistic attribution is grounded in the appreciation of patterns of similarity and difference within aesthetically related artefacts. For these views, these shared aesthetic attributes are useful

to produce referent categories about individual styles, such as Rembrandt's *œuvre*, or general artistic movements like Cubism (Walton, 1970). This process of stylistic attribution and categorisation is well described in the works of Morelli (1892).



Figure 12 - Ears and hands by Botticelli from Morelli's Italian Painters (1892, after Ginzburg 1980, fig. 7).

Morelli looked at the *habitus of the artist* in the making of paintings to see whether it was possible to find out the psychological saliency in the whole corpus of artworks of an artist (Ginzburg, 1980; Wollheim, 1973). For example, he observed the small, recurrent details in paintings, such as hands, looking for the small details expressed by the traces left behind by a painter's action (Figure 12). The *habitus of the artist* refers to the set of actions and choices previously learnt and subsequently executed in making an artwork. This interest in style as a human psychological component of artistic technique had his most famous referent scholar in Beazley (1951).

Beazley's studies of Greek vase painting epitomise this stylistic approach to typological analyses in art history. He was able to recognise the hand of the painter, and not just the place of origin and the period of making as in main studies on connoisseurship. While we do not have any description of the method adopted, it is possible that he approached the identification of styles and attribution to potters like Morelli (Arrington, 2017, pp. 25-34). That is, by looking at the smallest details that could show the repetition of certain traits and, therefore, unmask the hand and the mind behind the figure (see Neer, 1997). In so doing, Beazley produced a classificatory system for which a vase was not just connected to a chronological period (e.g., Early or Late Helladic I) but was also linked to a person (Arrington, 2017): the psychological saliency of a painter (Wollheim, 1973). Such a way of looking at style is strongly intertwined with the action. It is a way of doing that is psychological as well as expressed through the material traces of past actions left behind as an

imprint on the surface of a pot or a painting. As Neer (2005) puts it, "connoisseurship is a form of *etiology*: the inference of an artifact's spatial and temporal point of origin on the basis of morphological ('stylistic') criteria" (p. 3; emphasis in the original). However, while focused on classification in its own right, Beazley's observations enabled comments on the development and distribution of artefact types in varied geographical and chronological contexts.

In fact, this endeavour is also shared by archaeologists and has formed the basis for the stylistic studies already described by Furumark. Neer (1997, 2005) has long commented on the art historical roots of attribution in archaeology. For him, archaeologists and art historians perform similar actions. While archaeologists adopt attribution to single-out styles in relation to specific chronological periods or regions, art historians use personal styles to connect artefacts with their makers. Despite these differences, the stylistic process underlying the identification of styles is the same. In both archaeological and art historian terms, attribution is the act of placing an artefact within a specific referent group of other similar ones. For instance, the physical qualities of a pottery sherd found in a dig are what an archaeologist uses to categorise a fragment as part of a precise style and attribute to it a place of origin and date. The presence of a black slip with white, red, and orange repeated floral decorations, in its uniqueness, is reminiscent of other similar pieces or vases in the Kamares style. The specific qualities of decorations are even more indicative of the period.

Arrington (2017) equally recognises, especially by analysing Beazley's works (p. 23), that connoisseurship is a process of consolidation and classification shared with archaeology. In fact, in a similar guise, archaeological materials were grouped by culture, period, and type, with place of origin and chronological dating being their primary concerns. This is also what Beazley provided to Greek and classical archaeology in general: a system of classification with a reliable chronological sequence based on the observation of human actions. Essentially the only difference is that archaeologists are less interested, when not openly afraid, in individual attributions, and thus adopt style to identify and create archaeological cultures or produce relative and absolute chronologies spanning individual sites or whole regions (e.g., Graves, 1998; Plog, 1980).

However, discussions on style, decorations, and attribution in archaeology are the focus of contributions in Hill and Gunn's volume (1977). The editors aimed to produce a unitary theory of style (and form) that accounted for the uniqueness of the individual (recently, Morris, 1993, 2006). The idea was based on the recognition that individuals have very specific motor habits that reveal

their distinctive style. An idea very similar to Morelli's. Style, thus, carried information on the actions of people in all the stages of the production of a specific artefact (Hill & Gunn, 1977, p. 3). An example from the same volume is the contribution by Hardin (1977), who presented variability in pottery decorative techniques of fifteen artisans from a Tarascan village. She recognised the importance of looking at the patterns of executions that refer to the skills and knowledge of the potters and the capacity tools and paints have in affecting the overall performance. Her study is interesting to see how the situated environment in which a potter works, the skills, and the habitual actions affect the variability of styles. Unfortunately, discussions on attribution in archaeology were quickly left aside for the impossibility of assessing their claims and the nature of the fragmented dataset. Yet, the idea of focusing on style in terms of ways of doing persisted in later studies.

Regardless of these archaeological discussions, art historical studies on attribution that follow Morelli and Beazley's method are extremely useful, perhaps more useful than archaeological approaches to styles developed until recent times in that they shift our focus to the physical qualities of objects and address questions directly related to their issues (Neer, 2005; Arrington, 2017). They not only help make sense of material culture, but as typological approaches in archaeology have also been done since the birth of the discipline. They suggest that we consider the careful details and look for patterns as they emerge from scrutinising the material. This does not mean that these observations should be directed at individual attribution. As Neer (1997, 2005) and Arrington (2017) have repeatedly demonstrated, and as I discussed above, Beazley, for instance, did not only attend to the psychological saliency of painters but also organised and laid the foundation for a chronological system that is still today the starting point of Classical studies.

As I will describe in Chapter 6, this is partially what I aimed to do in the direct observation and examination of the material traces of past actions left behind by the Minoan artisans in Knossos. My attempt went beyond connoisseurship and aimed to understand the mnemonic dimension of style.

2.3.2 – Isochrestic variation

In Section 2.2.1, I briefly mentioned how Binford and Wiessner's studies on style as meanings were partially challenged by Sackett (1985, 1986). I will now expand on these debates to shed light on his characterisation of style.

For Sackett, style was crucial in recognizing the centrality of artisanal choices in the context of making a novel vase. His studies gave rise to a novel archaeological sub-discipline, that of ceramic sociology (1977). While instrumental in providing ceramic studies with novel insights into the process of making and the role of choices, it was later overshadowed by the semiotic turn explored in the various approaches under style and meaning. To clarify this alternative stance on style, it's important to delve into the debates with Wiessner.

The discussion centred on the active or passive role of style in signalling identity through the *isochrestic* or *iconological* approach. Sackett defined the latter as "the symbolic expression of social information" (Sackett, 1982, p. 82), not far from Wiessner's and Hodder's concepts of style. In the exchanges with Wiessner, both recognised that isochrestic or iconological styles might coexist with social processes at diverse levels. However, Sackett emphasised that isochrestic variation refers to a specific way of doing something that results from the choices that artisans made among all the possible alternatives available to them (Sackett, 1982, pp. 113-115). He argued that it is "choices themselves which constitute the dimension of style," particularly those choices that result in the same functional end (Sackett, 1982, pp. 72-73). Moreover, choices were socially transmitted and learned among members of the same community. Therefore, the style of an artefact was embedded in its function and resided in the specific choices assumed by functional forms. Whereas function emerged as the purposes served by an artefact, the roles it played, and how it functioned as part of a cultural system (1977, p. 370). According to this view, stylistic variation had direct consequences for both social interactions and the historical context in which things in certain styles were produced. For instance, decorations were subject to human action and hence characterised by the specific sociocultural dynamics of a specific group—very much in line with Binford and Wobst. In such a context, identity results from the intention of a person acting in a specific way over another (Sackett, 1985).

As a passive transmission of knowledge and enculturation process, isochrestic style conveyed an idea of stylistic variations considered the secondary effect of a constant adaptation. Hence, it was not part of a system of meanings but a way of doing something in a specific way related to the choices guided by sociocultural or ecological constraints. The importance of the role of choices renders isochrestic variation interesting to underline the importance of the decision-making process in the concept of style.

This focus on the technical choices and the role of the sociocultural system in constraining or enabling certain actions over others is quite interesting in the context of the Kamares style. As we have seen, there appeared to be a certain degree of freedom and inventiveness in the making of polychrome decorations by Minoan artisans. It is in these choices that we might evaluate the evolving demands that objects impose on humans over time. This is why in this study, I emphasise the importance of examining how artisanal choices emerge in the context of Kamares pottery making.

2.3.3 – Choices and style

A good starting point for discussing the relationship between choices and style is the article by Dietler and Herbich (1989). They argued that the pottery decoration of the Luo, a Nilotic-speaking population in western Kenya, does not conform to informational theories of style. In opposition to both information exchange and the dichotomy between style and function, they claimed that style resides in the choices made at all stages of the *chaîne opératoire*, or "operational sequence of production" (p. 159).

Household production, mostly carried out by women, is contextualised within a broader societal system where potters engage in various activities simultaneously. The pottery of the small communities exhibits micro-styles. Micro-styles are defined as the technical and design choices, local traditions of manufacture conditioned by learning patterns within the community (p. 150). Interestingly, they noticed that, in the case of temper, the use of raw materials was not constrained by access to local resources but connected to cultural traditions. The nature of those traditions is, however, correlated to the social context of learning and information exchange (p. 151). The authors do not fully question or investigate the nature of these traditions and assume that they were transmitted within the community. The decorative motifs used and their arrangement into fields on the surfaces of pots display characteristic tendencies in small details of execution. These tendencies are recognisable even when identical tools or techniques are used to replicate intended features. Potters can identify which pots they made, suggesting the presence of an individual style (p. 154). However, the definition of style they present has little to do with personal styles and is more concerned with reviewing the shortcomings of Wobst's information exchange approach analysed in the previous section.

The Luo pottery, as Dietler and Herbich (1989) stated, "conveys very little information" about ethnic groups despite the presence of micro-styles among the scattered communities (p. 157). Even complex decorative designs did not convey any information about ethnic groups. As we have recognised above, for views of style and meanings, content is defined a priori to signal, among other things, social identity (Wobst, 1977, pp. 328-330). In such a context, style is defined as a secondary product of the function of an artefact that "requires more commitment on the part of the emitter" (p. 322). Therefore, it is considered part of variation not directly involved in the discourse of technology and production. Style is, therefore, a short-term historical phenomenon, the by-product of human technological and functional development that was applied only to the "most socially visible objects (...) that carry stylistic messages of group affiliation" (pp. 328-330).

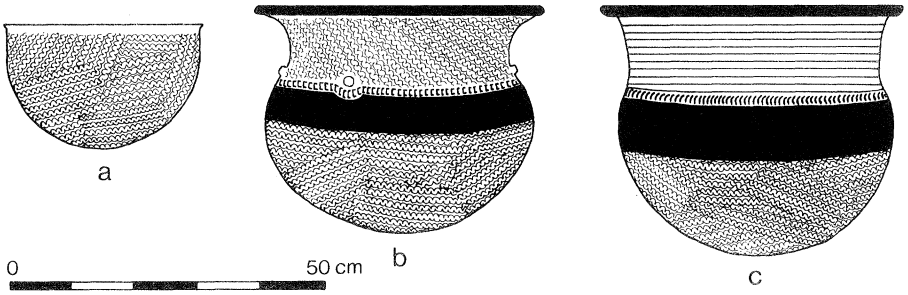


Figure 13 - Types of drinking pots from different Luo areas (after Dietler & Herbich, 1989, fig. 3).

The Luo pottery, with little deliberate information content regarding group identity or iconographic explanation, is not associated with social meanings. Even beer-drinking pots (Figure 13), the most socially visible vessels, did not have decorations or styles related to specific messages. What Dietler and Herbich (1989) argued, in opposition to both information exchange and the dichotomy between style and function, is that style resides in the choices artisans made in the selection, preparation, and use of raw materials in the context of pottery-making. Similar conclusions were reached by Schiffer and Skibo (1997) and Lemonnier (1993).

Schiffer and Skibo (1997) delved into the relationship between technological and environmental constraints through ethnographic and anthropological studies of technology by Lemonnier (1992) and Lechtman (1977). Specifically, Schiffer and Skibo (1997) examined the stylistic and functional variations resulting from the interactions occurring at various stages of a "chaîne opératoire" (also known as the "behavioral chain of activities," Schiffer, 1976, pp. 49-53).

For them, stylistic elements such as the decorations traced on a vase emerged from technological constraints and artisan choices. In line with previous views, Schiffer and Skibo (1997) argue that style is not a by-product of function but part of the choices made among different alternatives available in the context of production (similar to Sackett, 1982). Alongside previous approaches to style and practice, these authors pave the way to explore how the choices made by artisans are significant in understanding stylistic variations and, therefore, patterns of tradition and innovations over time.

2.3.4 - Traditions and innovations in style

A key topic of discussion regarding style is the debate between tradition and innovation, as briefly introduced in Dietler and Herbich (1989). Until recent times, the study of the long-term dynamics of innovation was largely overlooked in archaeology, especially concerning the long-term dynamics of cultural transmission and diffusion. This topic has been more extensively explored within anthropology (Barth, 2002; Ingold, 2011, p. 159; Marchand, 2010) and by evolutionary archaeologists who are concerned with cultural transmission theory (Aldenderfer, 1993; Boyd & Richerson, 1985; Eerkens & Lipo, 2007; Shennan, 2002). Here, my focus is on studies that approach innovation from an ethnographic and archaeological perspective, particularly the work of van Der Leeuw, Gosselain, and Roux.

Foundational research on tradition and innovation in pottery studies is provided by van Der Leeuw (1993, 2008) in his study with Torrence (1989) and Knappett (2014). These authors demonstrate that studying the process of innovation is crucial for understanding the meaning of style because it helps reveal the reasons behind alterations in patterns of choice and, consequently, comprehend trajectories of change in local manufacturing traditions (Leeuw & Torrence, 1989, p. 161). In general, the mechanisms behind changes in the making context are still not well understood and remain a topic of debate (as evidenced in recent discussions, such as the ARC on knowledge, Jürcke et al., 2021).



Figure 14 - One of the stages of the *chaîne operatories*, the first shaping stage (after Gosselain, 1992, fig. 5-7).

A perspective on cultural transmission that integrates style, innovation, and technical choices in the making context is advanced by Gosselain (1992, 2008). For him, style plays an essential role in the technological realm, acting as a bridge between artisanal behaviours and the technological choices and actions required to produce a specific product (Gosselain, 1992). Similar to Lemonnier's (1983) concept of a technological system, defined as "different ways of doing the same thing", Gosselain provides ethnographic observations of potters at work at various stages of specialised chaîne opératoires. This exploration delves into the role of styles, material constraints, technical choices, tools, and people, and how interactions among these factors originate, change, and transmit knowledge (Figure 14).

For example, Gosselain (1992) notes that the change in the colour of the pots to a clear beige signifies to the potters that the pots are ready to be fired. This change in colour guides their actions. These descriptions also suggest that cultural constraints shared among members of the same sociocultural group actively influence the style and are reflected in the production of artefacts (p. 561). Taboos and cultural beliefs are inextricably linked to the technological choices and actions required to produce something in a specific style, even if these choices aren't functional in technical or aesthetic terms. As an example, Gosselain discusses the use of *Bridelia ferruginea* by the Bafia of Cameroon, where the bark of this tree was used in a decoction to strengthen pots and ward off demons during firing (p. 575). While the technical choices made by potters are strictly functional, they are also closely connected to the cultural and social context of the making process.

In this context, style is no longer a social strategy but a way of doing that is passed through time among the members of the same sociocultural group. These observations are relevant to the discussion of the Kamares style, considering style as part of a broader system of choices and ways of doing shared within a specific community. Each vase in a specific style is both the result of a tradition shared within a specific sociocultural group and open to innovations that emerge from the situated context of making.

Similarly, Roux (2016, 2019) combines the concept of chaîne opératoire with technological innovation, ceramic studies, developmental trajectories, and a sociological approach. She suggests that technological evolution results from both continuous and discontinuous innovations. Her methodology is grounded in the observation of the "cognitive activity" of artisans, defined in terms of the choices they make regarding the selection, preparation, and use of raw materials among the possibilities offered by their environment. Her approach aligns with isochrestic variation but considers both the action and the context where the body, learned skills, raw materials, and tools are employed to produce innovation or stability.

Roux's analysis explores the interactions between all these factors from a bottom-up perspective, mixing more conservative approaches to chaîne opératoire with evolutionary studies in psychology. According to Roux (2019), styles are defined as the "shapes and decor of objects" and are linked to the process of production and demand, rather than being crucial aspects of the formation and innovation process. She emphasises that the process of pottery shaping and formation, assessed through the reconstruction of chaîne opératoires, is pivotal for understanding change and continuity in making traditions.

While both Gosselain's and Roux's perspectives offer valuable insights into style, I lean more towards Gosselain's argument for style and technical choices. However, Roux's work is equally valuable in showing that understanding innovation and stability in forms requires an examination of the social and technical processes across all production sequences. Following this approach, Roux analyses changes between micro and macro-evolutionary mechanisms of cultural evolution, aligning with arguments made by evolutionary archaeologists who advocate for similar transmission methods.

2.3.5 – Neo-Darwinian and evolutionary archaeology

In contrast to the perspectives described in Section 2.3.5, Neo-Darwinian archaeologists offer a different approach to the issues of style and function within the context of learning, both explicitly (Crown, 2001) and implicitly (Lemonnier, 1992) in cultural traditions.

Originally, evolutionary archaeology aimed to "explain change in the archaeological record without involving behavioral reconstruction, which is regarded as 'unscientific'" (Shennan & Wilkinson, 2001, p. 577). Proponents of this approach address questions of cultural lineages through evolutionary narratives based on biological frameworks applied to cultural phenomena (O'Brien & Shennan, 2010; Rogers & Ehrlich, 2008). They argue that changes in the making context can lead to variations at the population level through the process of selection.

Regarding style, evolutionary archaeologists categorise archaeological attributes as stylistic when they do not respond to selection, or as functional when they do (Steele et al., 2010, p. 3782). For most evolutionary archaeologists, the concepts of style and function are seen as necessary to understand processes of artefactual change over time (also, Shennan & Wilkinson, 2001). This approach isn't entirely new, as classic approaches have also addressed the concepts of type and typology. However, the main difference in evolutionary archaeology between style and function lies in how these categories are applied to produce explanations. While style is associated with social aspects, function is linked to technological developments related to the utility of classes of objects.

Additionally, as Gosselain (2008) notes when discussing evolutionary approaches to cultural transmission and innovation, for these studies, information is central to the transmission processes. Changes over time are not explained in terms of physical associations among materials or technical choices but in terms of the frequency or strength of information transmission. In this perspective, culture is disembodied from actions and detached from the sociomaterial context in which things are made. This approach differs from the conceptualisation of style that seems to emerge from discussions of the Kamares style, where techniques, material culture, and sociomaterial context appear essential in determining changes and continuities, as well as the creativity and stability of this ceramic tradition. On the other hand, Neo-Darwinian approaches emphasise that studies of long-term dynamics are helpful in shedding light on variations in material culture.

2.3.6 - Summary of style and doing

The decision to focus on the choices made by artisans as the locus for style within the context of production has enhanced our understanding of this enduring archaeological concept. This shift has transformed the concept of style from being primarily descriptive to one that is increasingly embedded within genealogies of practice. The chaîne opératoire is a means of examining the processes by which traditions of production are established (Gosselain, 1992; Lemonnier, 1992; Roux, 2019). These studies have delved into the processes of making, the variations in micro-regional styles, and the decision-making that underlies them (also, Stahl, 2009, pp. 251-254). This aspect of style that deals with decision-making, which has been partially developed in ethnoarchaeology and technology studies, holds promise for shedding light on the underlying dynamics of styles. However, as the approaches outlined above illustrate, this endeavour may not be sufficient. Recent studies in cognitive archaeology emphasise that it is nearly impossible to comprehend the dynamics of production without considering the embodied and material practices that link people, objects, and traditions of making (Gosden & Malafouris, 2015; Knappett, 2005, 2010, 2020; Malafouris, 2014a, 2019a).

The review provided above highlights the need for an alternative perspective on how choices, skills, and practices evolve over time and are transmitted from one generation to the next. This is especially crucial when dealing with an idiosyncratic and regionally diverse style like that of Kamares. However, this entails a more detailed exploration of alternative approaches to style that have engaged with long-term dynamics, in order to understand how we can make sense of change and stability from a perspective that accounts for the archaeological data's reality, free from *a priori categorisations* or impositions.

2.4 - Style and time

The debates surrounding style, as described earlier, under the categories of style as meaning and style as doing, offer valuable insights into how things come into existence and influence or are influenced by social structures. Taken separately, these perspectives help frame questions and provide insights about archaeological data. However, as Boast (1997) observed, they often depict a fixed reality characterised by physical and ideological boundaries. While Boast proposed discarding the concept of style as it had become somewhat empty, I argue that style remains a valuable tool. In particular, as highlighted by the discussions about the Kamares style, this notion

is instrumental in exploring the long-term processes through which change and stability, innovation and tradition unfold over many generations. This holds true for perspectives that prioritise society and take into serious consideration the role of material objects in structuring our ways of thinking and acting. In the preceding review, I highlighted studies that have explored this long-term dimension of style.

Among the various views on style as meaning, Hodder appears to be the only scholar who acknowledges the temporal dimension of styles. However, he tends to downplay discussions about the long-term, focusing more on the relationship between local events and a society's historical narrative. Consequently, style seems to have no inherent temporal designation beyond the socio-material coordinates where it is studied. This is the case even when views such as Walberg's and Furumark's paint a different picture: one that presents a narrative where the dynamics of change and stability are not solely confined to specific contexts where style serves as an adjunct to predetermined functions. Instead, sequences of similar objects suggest that there is a temporality that transcends human time.

Similarly, I discussed how views that emphasise the making dimension of style are generally concerned with technical processes and the transmission of knowledge, as seen in Roux (2019), or they present an evolutionary approach detached from the socio-material contexts where transmission occurs, as in Shennan and Wilkinson (2001). The dynamics that emerge from a study of style from a long-term perspective that considers not only social dynamics and information transmission remain primarily unexplored in archaeology. However, recent research by scholars such as Gosden (2005, 2006, 2012), Knappett (2005, 2010, 2012, 2020), and Joyce and Lopiparo (2005) offers alternative perspectives on style, the long-term, and agency.

2.4.1 - Style and agency

In a series of papers on style, Gosden (2005) looks at the "obligations objects place upon us when they are operating as a group" (p. 193). The main message that these papers convey is that things sharing the same combinations of forms and shapes influence how people reproduce and use things. Partially stemmed from discussions developed by Gell (1992, 1994, 1998) in his seminal work on art, style, agency, and aesthetics, Gosden reverses the notion of style. Instead of considering style a mere tool used by archaeologist to make sense of artefactual variation and social or ethnic boundaries, he argues that their characteristics of form and decoration define a

style as a discrete entity (also in Knappett, 2010). In being distinctive, Gosden continues, not only styles aggregate things displaying physical similarities. Those similarities place obligations on how people act and think when using or making them (also Gosden, 2001). For instance, Minoan artisans interested in producing a pot in the Kamares style had to use a black slip and at least one pigment other than white to trace decorations in a way that fitted with previously made Kamares vases. Artisans need to make certain choices and execute specific actions to produce something that fits within the corpus of previously made things. Therefore, styles impose specific actions and constrain how people think and act. This is because things exhibiting physical similarities "create stylistic universes which affect producers and users of new objects, bound by the canons of style" (Gosden, 2005, p. 193).

Recent discussions by Knappett (2005, 2010, 2012, 2020) grounded in Gell's (1998) *Anthropology of Art* help to understand the concept of stylistic universes. In an earlier paper, Knappett (2010) argues that whilst people usually directly engage with things, they also make indirect associations among them. These direct associations are based on our histories of previous engagements with similar things from which function can "*indirectly* perceived, and thus, consciously or otherwise, one artefact does tend to lead onto another in networks of association" (p. 82, emphasis added). For Knappett (2010), this network of association is not grounded in pre-existing sociocultural rules. Rather, our direct perception of things and bodily experience dictates our modes of interactions and produces "networks of association that radiate out from an object or thing, incorporating humans and non-humans in a web of connections" (p. 84).[16] These networks of association give rise to communities of things that are partially assimilable to stylistic typologies such as the Kamares style. I say partially because the difference that Knappett and Gosden move here by thinking in terms of networks and stylistic universes is not a static relationship among similar things, as the one described with traditional stylistic approaches in the case of Minoan archaeology. Rather, for them stylistic universes are spatially and temporally distributed assemblages of things that share similar qualities of form and decorations *alongside* the modes of thinking and practices of use possessed only by a specific style. The use of certain pigments to produce the characteristic polychromy of the Kamares surface decorations is unique only to this

[16] It is worth noting that Knappett's framework is partially developed on ideas from Peircean semiotics, for which meaning is not imposed *a priori* but emerges pragmatically in the context of action (see Knappett, 2022). This view pushes us away from Cartesian dualisms towards a more holistic take on material culture and cognition (Ilopoulos, 2016).

specific pottery style. Certainly, one could argue, other polychrome pottery styles around the world also share this feature. However, the Kamares style is distinct in its choice of raw materials, its preparation, and the execution of polychrome ornamentation in accordance with a technical tradition, such as the layering technique recognised by Day and colleagues (2006).

According to this definition of style and stylistic universes, it would be pointless to separate these visual qualities from the actual making practices which render this pottery style unique. Considering style as the product of social strategy or the passive transmission of information would be equally meaningless. Things sharing the same style acquire agential capacities. Hence, as Gosden (2005) puts it, things are not just the result of human actions but "behave in ways which do not derive simply from human intentions and in fact channel those intentions" (p. 195). The idea of stylistic universes is important as it suggests that real context for things is other things sharing the same style. When considering the temporality each style generates throughout time, it becomes increasingly clear that stylistic universes have the agential capacity to govern human actions and thoughts.

Another work by Gosden (2006) is significant in that it further clarifies the connections between artefactual traditions, long-term, and agency. In this paper, he specifically discusses how the so-called battleship curves show the emergence, development, and obsolescence of styles (Figure 15).

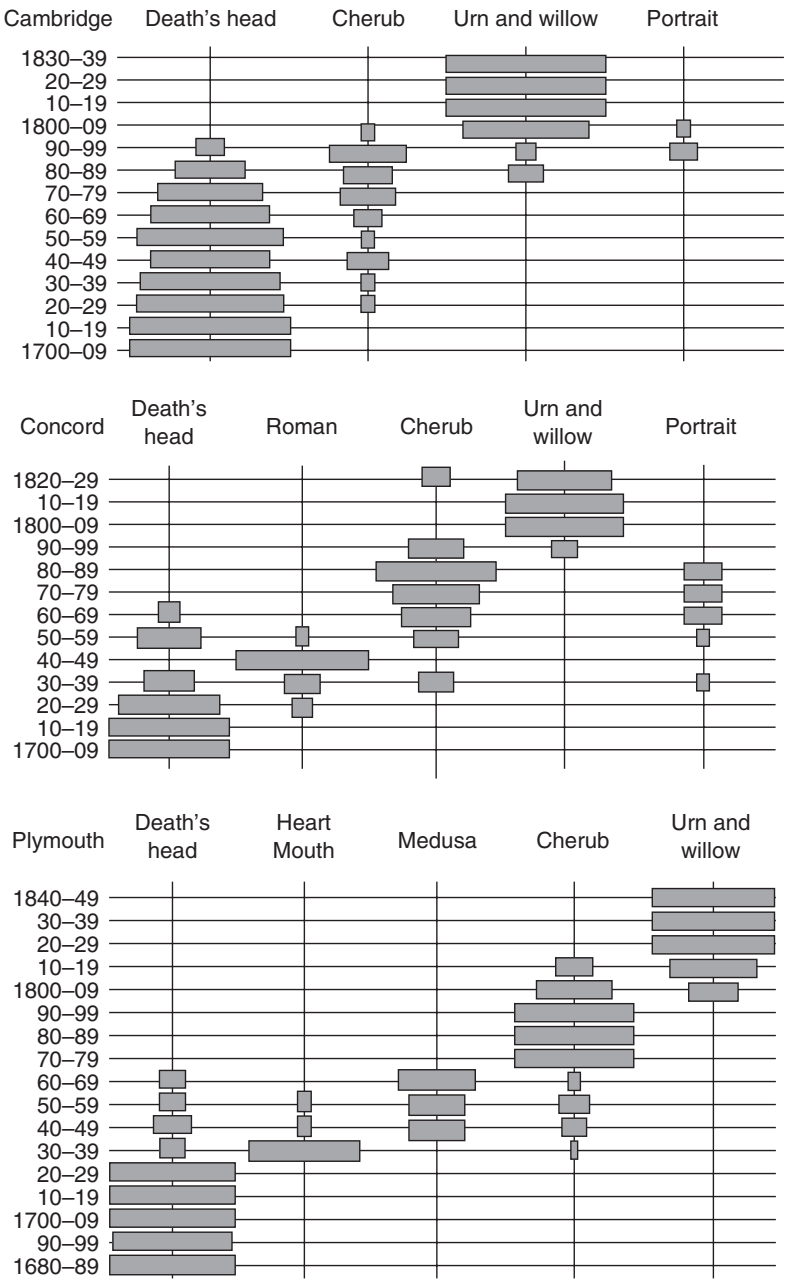


Figure 15 - Battleship curves describing change over time of grave-stone motifs in various areas of New England (1700–1830) (after Shennan, 2002, fig. 6; as in Gosden, 2006, p. 432).

In reviewing the study of colonial gravestones by Deetz and Dethlefsen (1966; Deetz, 1977), Gosden (2006) claims that grave decorations have their own trajectories that are influenced by the otherworldly beliefs of the period when they were made, but they also influenced how people perceived and thought about death (p. 433). The crucial point here lies in the temporality of gravestone decorative styles. As the durations of the battleship curves indicate, these styles lasted for around forty years; a period longer than that of a human generation, conventionally twenty-

five years. This means that, while from our archaeological perspective we observe continual patterns of change, for those who made and used things, stylistic change happened at a slower pace. Hence, it is at the intersection between the longer timescale of styles and the shorter timespan of human lives that people could socialise and produce meaning. As Gosden (2006) remarks: "The nature of intelligent action was refracted and made effective through material forms of some stability and durability" (p. 433). The permanency of the material world is what organises and makes it possible for people to think and act.

Joyce and Lopiparo (2005) put forth a similar view, according to which the material traces left behind by past people produce possibilities for future actions (also, Joyce & Hendon, 2000; Pauketat, 2001a; Pauketat & Alt, 2003). Building long-lasting monuments in the landscape leaves behind traces of past practices that, by standing the test of time, allow succeeding generations to think and act according to them, such as by constructing new structures associated with older ones to promote social group continuity (see Section 4.2.1). If archaeologists want to comprehend the dynamics by which things and practices change or endure through time, Joyce and Lopiparo (2005) contend that studies on agency necessitate them to look at the impact that recurrent practices with material culture have on people. To make their case, they cite the construction of new homes in the town of Cerro Palenque in the basin of the Ulua River as an illustration of repeated practices.

In building large compounds with a visual orientation towards a pre-existing abandoned hilltop settlement, local communities "ensured that residents of the many new house compounds in this uniquely large settlement would have experienced a coordinated sense of place, and specifically, of a place with history" (Joyce & Lopiparo, 2005, p. 370). Previously built houses re-structured subsequent actions, influencing later people's interactions with the landscape and producing a sense of its history that was continually mediated every time that a new house compound was built. The continuation of practices expressed through the construction of houses illustrates the importance of exploring how artefactual traditions and continuity in material culture place on people's "dispositions to act in certain ways" (Joyce & Lopiparo, 2005, p. 371). Transmission is not just about raw information (i.e., something *a* stands for some meaning *b*). It also involves the potential for acting in certain ways.

Gosselain (2008) acknowledged that pottery-making traditions could not be reduced to the simple transmission of information. We have seen above how he argued that practices, choices, and beliefs are part of a continuum where previous practices are continually developed and

assessed in the situated context of making. More specifically, according to Gosselain (2008) "traditions - specific sets of procedures, gestures, tools, materials, finished products, and beliefs and attitudes toward actors and materials - display an amazing propensity to mix old elements, borrow elements, invent new traditions, manipulate material culture strategically, and be the loci of constant redefinitions by individuals and local groups" (p. 152).

This view opens to see styles from their temporal perspective, underlining their capacity to channel and constrain human actions.

2.4.2 - The transgenerationality of style

According to the long-term, agential, and semiotic positions on style reviewed above, I argue that modes of thinking and acting are never fully in control of social groups or individuals alone. Quite the opposite. The arguments advanced by Gosden, Knappett, Joyce and Lopiparo, and to a lesser extent also Gosselain point to a very different understanding of style; one in which people and things are affected by the long-term histories of certain classes of things (e.g., pots or houses). In other words, stylistic universes created by the spatial and temporal relationship among things sharing similar aesthetic qualities and functions channel people's modes of thinking and acting over generations. I argue that it is the long-term trajectory of material culture, which I will henceforth refer to as the transgenerational nature of styles, that might help grasp the underlying dynamics by which the Kamares style endured over generations while displaying inventiveness in both surface decorations and shapes.

However, while clarifying the position on style that I want to pursue in studying the Kamares style in the next chapters, this stance on the transgenerationality of style still does not go very far in explaining the underlying process that seems to drive the tension between inventiveness and stability that emerges from the diachronic analysis of stylistic and technological studies of Kamares. Nor does it help shed light on the tension between inventiveness in shape and decorations and stability in techniques. I thus propose to ground this research on these recent studies to explore the transgenerationality of the Kamares style from a perspective that looks at the dynamics behind continuity and change in material forms in the making. What I argue lies in a mnemonic perspective. With this mnemonic perspective, I refer to an approach to style that accounts for the agential qualities that stylistic universes have in providing people with a way to remember

previously existing modes of acting and thinking about how to make something according to the obligations placed by a stylistic universe.

I will argue in the following chapters that if there is something for which styles are important, it is in how they allow people to make sense of their past, structure their present engagements with things sharing similar combinations of shape and decoration, and provide us with a potential for future actions (Article 1). To support my argument, I move on to examine Gell's thesis (Chapter 3), which served as a foundation for some of Gosden and Knappett's theories. If I do so, it is because my argument is that Gell (1998) was onto something when he suggested that style could be seen as a single object distributed in space and time which recapitulates, on the historical and collective scale, "a movement of memory reaching down into the past and a movement of aspiration, probing towards an unrealized, and perhaps unrealizable futurity" (p. 258).

Chapter 3 – An Anthropological Approach to Style

In this chapter, I begin by presenting Gell's arguments against the prevalent taxonomic approach to style (Section 3.1) and elucidate his definition of style. I then explore the process that leads Gell to investigate style as a temporally and spatially distributed entity over time (Sections 3.2-3.5). In the latter part of this chapter, I merge the discussion on stylistic universes from Section 2.4 with Gell's insights on style, culture, and time, which are still underdeveloped in anthropological and archaeological theory (in philosophy of mind, Gallagher, 2017).

To conclude, I will employ Gell's argument for cognition and memory (Section 3.6) to advance my proposal for considering style as a memory process (Section 3.7). This approach allows me to configure the dynamics of change and stability in the Kamares style from a transgenerational mnemonic perspective, focusing on the development of technical skills, choices, and material forms across time. In essence, I seek to address the transgenerational nature of style, as introduced in Section 2.4.

3.1. A critique of style

In the opening section of *Art and Agency*, Gell provides a critical analysis of taxonomic approaches to style and their connection to the concept of culture. It is worth noting that, as thoroughly discussed by Davis (2007), Gell's work can be considered as two books collated into one.

In the first part, Gell attempts a rejection of Kantian aesthetics, exploring the indexical relationships existing among different agents and artworks and how these relationships exist in the social realm. According to this perspective, artworks capture (abduct) the viewers extending the agency of the artist (or the patron, see Davies, 2007, p. 214). The second part of the book is all about the relationships between styles and how they relate to artworks and people as distributed entities. It is in discussing this second part that here I concentrate my efforts to ground an alternative conceptualisation of style to those discussed in Chapter 2.

In this part, Gell initiates his argument on style by contending that in the realm of art anthropology, styles should not be attributed to individual actions, art schools, or artistic movements; rather, they signify ideas of culture or society – a typical interpretation of style as those discussed in style and doing (Section in Chapter 2). However, as I illustrate below, this initial

interpretation takes a whole new direction when he configures style as an "inter-artefactual domain" or, in the worlds of Gosden (2005) a *stylistic universe*. But let's go step by step.

According to Gell, style is defined in anthropology as the configuration of stylistic characteristics exhibited by objects, while culture refers to a set of shared beliefs among a group of people. He asserts that units of style are conventional, self-contained, and distinct ethnographic entities closely associated with specific historical periods and geographical regions. It is important to note that this concept of style was predominantly developed during the colonial era when styles were evaluated in relation to the so-called "traditional forms of art" (p. 155). Similar to the stylistic approaches in art history and archaeology discussed in Chapter 2, the anthropology of art involves the classification and tracing of artefactual changes. This is done to understand how people in the past made sense of their sociocultural context by analysing visual similarities among objects. Both archaeology and anthropology have traditionally categorised objects based on shared attributes of shape and decoration. However, Gell points out that this taxonomic approach to style often overlooks the nature of the relationships between the shape and decorations of artefacts. It also fails to consider the differences between one style and another. More importantly, it neglects the idea that styles are not merely characterised by shared formal, external properties, but they also represent specific cultures. In other words, Gell argues that common stylistic attributes among objects not only demonstrate stylistic similarity but also convey a connection with the cultures they represent.

Building on this premise, Gell embarks on an exploration of an alternative perspective on style; one for which style is used to investigate the relationships between artworks, cognition, agency, and time.

3.2 - Defining style

Gell's discussion on style begins with a review of Wollheim's (1973) suggestion that artistic styles can be categorised as "cultural" when they are shared by a social group, or "individual" when they are associated with a single person. To illustrate this concept, he provides the example of the Marquesan ensemble of artefacts that share decorative motifs derived from bodily decorations, such as tattoos, which is considered a cultural style (Gell, 1998, pp. 165-220). On the other hand, the body of work by an artist like Duchamp is seen as an instance of individual style (pp. 242-251).

Gell emphasises the importance of distinguishing between cultural styles and individual styles. In his view, individual styles depend on the existence of collective styles against which individuality emerges. In contrast, cultural styles do not rely on any other style for comparison. Cultural styles cannot be compared in the same way as individuals, such as when we compare two artists like Picasso and Matisse. To clarify this perspective, Gell presents the case of Picasso and Braque, both of whom had distinctive individual styles that emerged in the 20th century as part of a broader cultural style that defined and underpinned their individual styles (Gell, 1998, p. 159).

While Gell acknowledges the concept of "psychological saliency" as proposed by Wollheim he approaches it from a different perspective. For him, psychological saliency refers to the capacity of the intrinsic qualities of an artwork to capture the viewer's attention (p. 157). What Wollheim originally meant with this term is that people are attracted by aesthetically significant elements of artworks due to the personal style developed by a painter. That is, through performing with the canvas, the saliency of skilful painters is conveyed through their unique style. As a result, "style is personhood in aesthetic form" (Gell, 1998, p. 167; Wollheim, 1973, p. 188).

However, as an anthropologist interested in the connections between style and culture, Gell shifts the focus from the individual to how the psychological saliency of a style can also be attributed to cultures. In contrast to Wollheim's approach, Gell is more concerned with explanations to questions of social and cultural identity, rather than purely taxonomic classification. In essence, Gell views styles as references for culture, aligning with how archaeologists have traditionally approached this concept, albeit with a perspective different from the views described in Chapter 2.

Gell's approach emphasises that stylistic variation in material culture *is not intrinsically linked to specific human cultural forms*. He suggests that changes in artefacts can occur independently of human social groups and their specific cultural forms. This perspective aligns with the claims made by scholars like Gosden and Knappett, which were discussed in Section 3.5. According to Gell, an artefact in a variety of styles could promote the cultural role assigned to artefacts in any given culture.

Gell illustrates this idea by examining the connection between tattooing and Dravidian kinship relations in Marquesan societies. He argues that the involution of the Dravidian system, which involves political arrangements and spouse selection from close family systems, is linked to a mental scheme transfer to body arts, specifically tattoo art. Tattoo art enfolds, protects, and

encloses the individual, much like the social system encloses individuals within a strict circle of people. However, Gell's point is that this style of tattooing is not inherently responsible for originating the cultural idea of enclosing and enfolding the individual. Instead, another style of tattooing could serve the same purpose or idea. Essentially, Gell is suggesting that styles themselves do not inherently convey cultural messages or specific meanings. This perspective contradicts post-processualist views on style, particularly those of scholars like Wobst (1977), Wiessner (1983), and Hodder (1990), who argue that style is a social strategy used to communicate meanings. Gell's perspective suggests that a particular style serves a certain purpose based on how a particular sociocultural group uses the material culture they encounter. Styles are tools or means to fulfill a cultural role, rather than carriers of cultural messages.

Moreover, Gell argues that relying only on the iconographic character of a style does not provide any information about cultural dispositions. To illustrate this point, let's consider the example of the so-called Snake Goddess statuettes excavated by Arthur Evans in Knossos (Figure 16) (Bonney, 2011). Some have suggested that these female figures may represent a goddess or a priestess, and these interpretations often rely on iconological comparisons with other artistic styles from the Mediterranean, particularly Egypt and the Near East. However, the meaning attached to the style of these figures is closely tied to the cultural references and beliefs of the Minoan people. In other words, the cultural context and the role these statuettes played within Minoan society are essential for an understanding of their significance, and this goes beyond merely analysing their visual characteristics.



Figure 16 - Replica of the Snake Goddess figurine on display at the Ashmolean exhibition “Labyrinth: Knossos, Myth and Reality”. Courtesy of the Ashmolean Museum.

The example of the Snake Goddess statuette illustrates that cultural values are not inherently embedded in the aesthetics of an object. Instead, Gell suggests that cultures display a *psychological salience* that must be explored in conjunction with specific cultural parameters that members of a given sociocultural group learn through time to associate with styles. This argument brings with it an interesting methodological approach to style: by liberating this tool from its iconographic properties, it becomes possible to study the “formal attributes of artworks” without placing any *a priori* social or cultural meaning (Gell, 1998, p. 159). Instead, the analysis of these formal attributes allows for the exploration of the relationships between style and specific cultural parameters.

This approach lays the foundation for the idea of style as memory, which will be further developed and discussed in the subsequent chapters. It also challenges the conventional understanding of the relationship between styles and culture, as explored in the discussions on stylistic universes in Chapter 2.

I will come back to this topic when describing the methodology devised for the collection of the Knossian Kamares style data. But first, it is crucial to acknowledge the criticism that Gell

makes of the relationship between styles and culture and to link it with discussions on stylistic universes made in Chapter 2.

3.3 - The inter-artefactual domain

According to the above discussions on cultural styles, Gell (1998) argues that is a mistake to consider culture "responsible for the visual style of artefacts" and that, at best "culture may dictate the practical and/or symbolic significance of artefacts" (p. 216). Rather, as I am discussing in this paragraph, stylistic changes happen within the same style by means of small modifications. Accordingly, Gell suggests that styles are independent entities with their own internal dynamics that eschew those of cultural groups.

In fact, Gell (1998) contends that it is a misconception to consider culture "responsible for the visual style of artefacts" (p. 216). He argues that, at most, "culture may dictate the practical and/or symbolic significance of artefacts" (p. 216). He suggests that stylistic changes within a particular style occur through small modifications that are driven by the internal dynamics of that style. Therefore, he posits that *styles are independent entities with their own internal processes and dynamics that are distinct from those of cultural groups*. For him, "'style' is founded on connections between artefacts" (Gell, 1998, p. 217): a "'relations between relations' of forms" which eschews people's sociocultural dynamics and comes to govern stylistic change and continuity. Hence, styles become independent entities displaying unique internal dynamics that govern stylistic variations over time. Gell (1998) termed this relation between relations among the same class of artefacts "inter-artefactual domain" (p. 216). The notion of tbe inter-artefactual domain is grounded in the idea that styles present unique internal dynamics of change that are somewhat independent from human cultural forms. I explain step by step what he meant by inter-artefactual domain as it is key for my proposal on style.

Gell (1998) claims that the notion of the inter-artefactual domain operates on the principle of *synecdoche* (p. 165). Synecdoche signifies how a part of a whole can stand for the entirety of that thing. In the phrase, *all hands on deck,* the term *hands* signify the entire crew being called to help on the deck, not just their hands. In a similar manner, style functions through this synecdochic process. An artwork bearing the characteristics of a particular style becomes a reference to the broader cultural (or individual) style due to its stylistic attributes that stand out cognitively (p. 162). An artwork in a certain style comes to reference that specific cultural (or individual) style

through its cognitively salient stylistic attributes. The result is that any artwork "stands for" the stylistic canons of the tradition of material culture from which a cultural style originates (p. 162).

Gell clarifies that his use of synecdoche is metaphorical rather than linguistic and employs it to investigate how Marquesan artefacts with similar visual attributes are interconnected within the Marquesan style. He illustrates this process by likening synecdoche to a hologram, stating that it possesses the unique property where any part of the holographic image contains a diluted version of the information present in the hologram as a whole (p. 166). In line with this metaphor, Gell contends that when we view an individual object within the context of all other objects in its corpus, it appears as a microcosm of the entire corpus because our perception of it is influenced by our knowledge of the macrocosm it belongs to (p. 166). Essentially, every single artefact that shares specific shape and decoration attributes is emblematic of the interaction between that artefact and the Marquesan style. Gell suggests that a stylistic element within a particular style represents the style as a whole, but this representation is not based on taxonomy; instead, it centres on the psychological salience (or "cognitive saliency", Gell, 1998, pp. 162-163). The psychological saliency allows us to discern the connections between styles and the cultural parameters of a society (Gell, 1998, pp. 162-163).

Importantly, Gell (1998) claims that understanding the connection between fragments and the overall style enables to produce a "formal analysis" of a style and provides insight into how a specific style changes over time (pp. 166-167). He exemplifies this through his examination of the Marquesan corpus (pp. 168-214). In looking at the different changes in the Marquesan corpus, Gell illustrates that the relationships between decorative motifs are linked by visual transformations, resulting in a set of general yet non-restrictive rules that underpin the Marquesan art style (Figure 17). Only when these generalised internal rules that drive stylistic changes are identified it becomes possible to understand the cognitive significance that a cultural tradition has in rendering features of the culture cognitively salient (i.e., attractive and typical of a certain style, as defined above). Essentially, style does not carry meanings but "'instantiate' underlying cultural patterns" (Gell, 1998, p. 160). Gell's assumption is that these interactions between one stylistic element (i.e., tattoo or thing) to another are governed by the "principle of least difference" (p. 219). According to this principle, "the constraints governing production are the constraints governing the possibility of transforming a motif or a form into a related form" (Gell, 1998, p. 195). As I shall explore in the

next paragraph, the principle of least difference is the starting point Gell adopts to recast style as a distributed cognitive process.

3.4 - Style as a distributed object

The notions of synecdoche, inter-artefactual domain, and the principle of least difference, have interesting consequences to understand the underlying dynamics by which Kamares style continued over generations. This, regardless of the idiosyncrasy of its forms; chiefly for two reasons.

First, by thinking in terms of synecdoche, a vase displaying the qualities that I defined in Section 1.2.1 as typical of the Kamares style comes to instantiate this tradition and its associated cultural patterns (Section 1.2.1). That is, a style becomes a temporally and spatially "distributed object" (Gell, 1998, pp. 221-223). Second, the idea of inter-artefactual domain (or stylistic universe) governed by the principle of least difference, suggests a way to look at how the Kamares style has certain unique dynamics which *constitute* artisans' choices and actions over transgenerational time. I explore these suggestions for style as a distributed object and as constituting people's choices and actions with the case of stylistic transformation of Marquesan decorative motifs.

Gell (1998) reserves a section of his book to study the changes happening over time among bi-dimensional and three-dimensional Marquesan motifs used for tattoos and to decorate various kinds of material forms (pp. 165-220). These motifs are recognisable because they recur in identical form several times in the corpus. He focuses his attention on how relationships between motifs are expressed by procedures that allow to turn any motif into another motif. These procedures for which motifs slowly change over time are: plane transformations; coordinate transformations; hierarchisation or\and decomposition; transformation of dimensionality (p. 170).

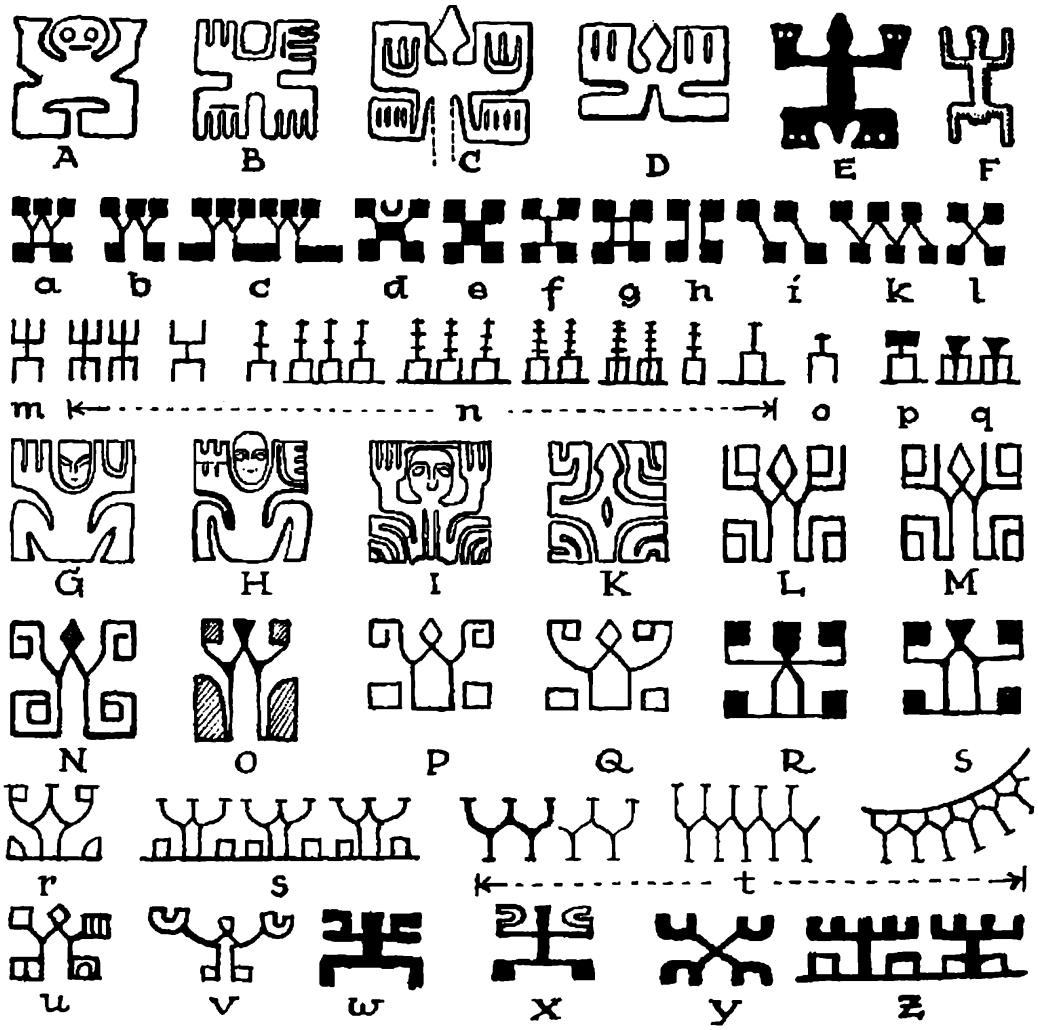


Figure 17 – Classificatory scheme of Marquesan motif *etua* by von den Steinen (after Gell, 1998, fig. 8.7/1).

Gell shows that in the making of novel motifs in the Marquesan style (Figure 17 for a list), the potential for generating a transformation is formulated in terms of relation between relations among motifs governed by the notion of synecdoche. There is no reason for the motif "face" or "*mata hoata"* to be transformed into a "seated *etua*", if not that "the Marquesan style decrees that they should look as much like one another as possible, given that they are, in fact, to be distinguished" (Gell, 1998, p. 218). Style considered a relation between relations is thus able to produce stylistic transformations that are consistent within the whole corpus of Marquesan motifs. Theoretically, it could be possible to trace relations between relations of Marquesan forms in combination with possible novel relations, thereby producing sets of endless morphologic interactions among motifs. However, these transformations are not the product of sudden and

drastic changes but, as mentioned, of small modifications where previous forms support the emergence of following ones. As this analysis implies, these modifications are not directly under control of Marquesans.

In fact, thanks to this analysis of stylistic transformation in the Marquesan corpus, Gell shows that there are recursive exchanges that allow understanding how are the internal dynamics of transformation in Marquesan's motifs what *channel* and *constrain* human action and thoughts. Specifically, as Gosden (2005) puts it: "Objects use human muscles and skills to bring about their own reproduction" (p. 194). The same process is described by musical styles. "An individual's style of speaking or writing, for instance, results in large part from lexical, grammatical, and syntactic *choices* made within the constraints of language and dialect he has learned to use but *does not himself create"* (Meyer, 1979, p. 3; emphasis added). The production of certain musical styles is not just altered by the composer but constrained by the internal rules of a music style. A music style is a "replication of patterning, whether in human behaviour or in the artefacts produced by human behaviour, that results from a series of choices made within some set of constraints. As a rule, few of the constraints which limit choice are newly invented or devised by those who employ them" (Meyer, 1979, p. 5).

I argue that Meyer here is after the idea that we act through things in a way that is rather automatic or pre-determined by an already existing sociomaterial context clustered by things made to follow specific styles. This idea is further expressed in the aforementioned work by Gosden (2005), for which:

"people are socialized into particular material worlds which exist prior to their birth. The nature of social being for people will be structured by the education of their senses by the objects surrounding them in childhood, giving them a series of stances and presuppositions towards the world derived from local material culture" (p. 197).

At the same time, variations within styles are the result of the inter-artefactual domain. Things not only made us but take *choices* for us, or in other words think for us by thinking together with similar objects in a certain style. This is quite evident in the stylistic transformation occurring within the Marquesan style described by Gell. In fact, it was according to the Marquesan style internal dynamics, or internal "visual logic" of Marquesan art (Gell, 1998, p. 172), that a *mata*

hoata could be turned into a seated *etua* by the rigid motions on one of the axial plains of the decorative motif. As I will show, the independence of styles resonates with the idea developed in Article 1 that "the cognitive efficacy of material culture lies primarily in the fact that it makes possible for the mind to operate without having to do so, that is, to think through things in action without the need of mental representation" (Malafouris, 2007, p. 92). But I will now return to discussions on Marquesan style transformation as there is an additional point that I want to develop below: the idea of *styles as distributed objects*.

As Gell argues, the principle of least difference is not visible in one single Marquesan form but becomes evident "only in the *ensemble* of their relations with one another looking at several forms in this style" (p. 218; emphasis in the original). The result of these relationships is a network of transformational relationships where one motif is united to preceding and following ones by visual associations. There is no sense of temporal direction, i.e., of origin or end. What Gell describes in showing how one motif is flipped, mirrored, or turned around to create a novel one, is that there exists a *continual process* of change brought about the inter-artefactual relationship of the Marquesan style. More specifically, he argues that Marquesan motifs and forms are "portions of a distributed object corresponding to all of the artworks in the Marquesan system, distributed in time and space" (p. 220). For Gell, taken as a whole, the Marquesan art style "can be conceptualized, macroscopically, as a 'distributed object' in time and space" (p. 221). Although scattered in museum and private collections, sketches and drawings, and scholarly texts, the Marquesan style maintains its own integrity as a hologram or aggregate of fragments. And, if these artefacts are united with others in making up a unique distributed object, it is "because, each has passed, uniquely, through a Marquesan mind, and each was directed towards a Marquesan mind" (p. 221).

Gell argument here is that there is a *structural isomorphy* between material world and human cognition, whereas some external material elements are linked to internal human consciousness. Essentially, things are seen to have an agency of their own that mirrors that of people. Such isomorphy between internal and external neural resources is central in Gell's argument for the materialisation of the agency of cultural groups or artists. This is evident in the example of the Kula exchange of valuables in Melanesian society. As Gell states:

"The successful Kula operator controls the world of Kula because his mind has become coextensive with that world. He has internalised its causal texture as part of his being as a person

and as an independent agent. 'Internal' (mental processes) and 'outside' (transactions in objectified personhood) have fused together" (Gell, 1998, p. 231; see Knappett, 2005, pp. 61-62).

Such an argument for the isomorphy between material culture and cognition for which style becomes a distributed object in space and time, is further developed, as I illustrate in the next two paragraphs, from a mnemonic perspective.

3.5 - Style and time

To properly understand Gell's hypotheses for memory, I first develop the connections he makes between style and temporality and then move to link style and memory.

Adopting Neich's (1993) study of the Maori meeting houses, Gell claims that these structures exist as a historical assemblage of things produced according to previously built houses; pretty much in line with the Marquesan corpus. The graph in Figure 18 shows the transmission of selected figurative paintings and carvings found on and within these houses. The black dots with numbers are the houses while the letters correspond to the painting traditions. The lines that connect the dots refer to the progression of different Maori art traditions. In discussing the Maori meeting houses, Gell looks at how one house influences another in terms of overall forms so that each house accumulates changes over several human generations. Taken together, all accumulated Maori meeting houses constitute their style, which is distributed in both time and space through each of them. Gell (1998) refers to the entirety of "relation of relations" of Maori houses in the same way he referred to the Marquesan's motifs: a macro-object, that is "not as a collection of separate objects, but just one object with many parts distributed in many different places" (p. 167).

Gell argument seems to be that the totality of Maori meeting houses produced over time by an artist is, taken in its entirety, a unique spatially and temporally bounded object that has to do with the psychological saliency of the Maori that built them. Following this argument, we can configure the houses as specific events in time that bring together all previous works made by the artisans, their intentions, and the technical skills and knowledge accumulated in building them. For Gell artefacts materialise the agency of their creators, in the same way as Marquesan tattoos were able to materialise the sociocultural coordinates of the Maori culture. But there is another level of analysis that I want to go through since it is connected to earlier discussions on archaeological approaches to style and the long-term: that of temporality.

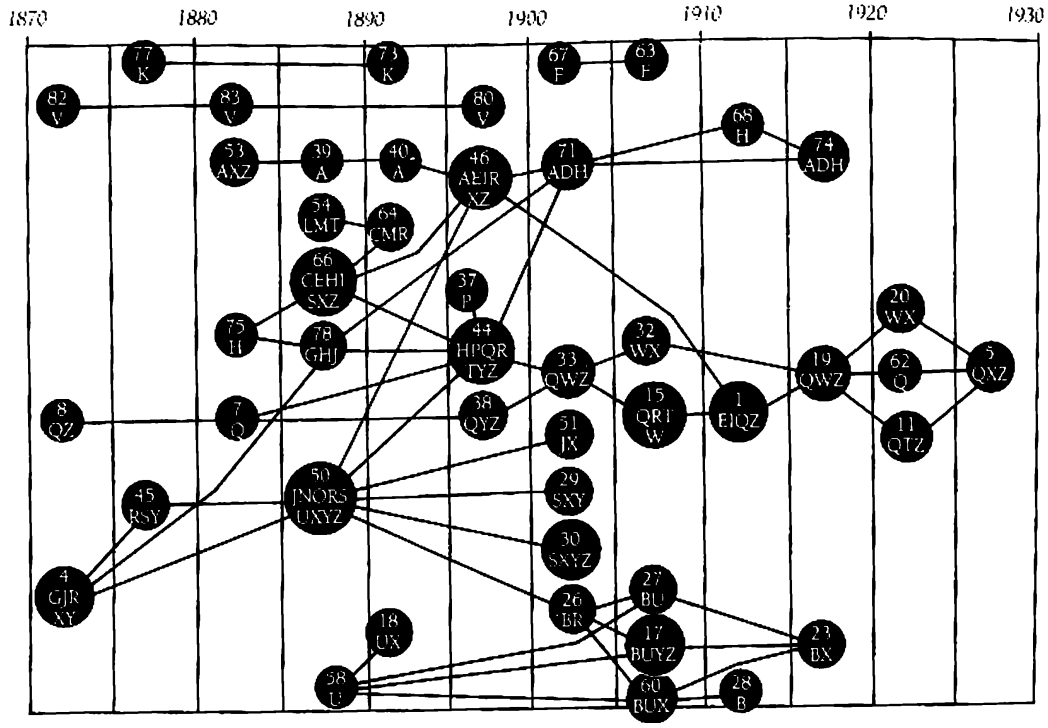


Figure 18 - Network of the Maori meeting houses distributed over time (after Gell, 1998, fig. 9.6/3).

For Gell (1998) previous Maori houses are moments in time, not just because they are datable objects (originating at certain space-time coordinates) but because they form *lineages*; they are ancestral to, and descended from, other previous houses. Taken together, they form a macro-object consisting of several houses which are linked to each other through psychological saliency, as manifested by their physical qualities which extend them into space and time. This extension is pretty much a temporal extension, whereas each element produced is *temporally extended in the past and in the future* by means of their shared visual qualities. In making novel houses, Maori builders keep doing certain actions, using certain materials, and executing specific techniques, thereby citing previous houses made in the past. This discussion resonates with those by Joyce and Lopiparo (2005) in that these authors, as we have seen in Section 2.4.1, also looked at dynamics by which previously made houses structured later generations' actions and choices (in selecting where to build new houses in relation to the historical features in the landscape).

It is in this continual process of reproducing artefacts linked by the same cultural and visual themes that it becomes evident how every single house is new but also recapitulates previous creations. And, in so doing, they also enable possibilities for prospective houses to be built by

supporting future creations; very much in line with discussions by van der Leeuw and Gosselain presented in Sections 2.3.4 and 2.3.5. According to this multi-temporal set of associations, artefacts come to possess material traces that embody both past and future.

The work by Munn (1973, 1992) on the anthropology of art and time clarifies some of Gell's ideas on time. By grounding her position in a phenomenological theory of the human perception of time as temporality, Munn suggested that conscious and unconscious experience of time results from actual practices. These actions from which the temporal character of social life emerges are part of a symbolic process that is continually produced in everyday practices. Again, these assumptions found parallels in the archaeological literature that consider time central for style (Gosden, 2006; Joyce & Lopiparo, 2005; Pauketat & Alt, 2003).

This perspective on action and time underlines the idea that individuals are always embedded in several temporal structures into which they think, act, and plan their future actions. These dimensions are lived or apprehended concretely via the various meaningful connections among persons, objects, and space continually being made *in* and *through* the everyday world. For Munn (1992) the experience of the past and the future involves actualising it in the present through things (p. 113). As she says, "the past-present-future relation (...) is intrinsic to all temporalizations irrespective of focus, inasmuch as people operate in a present that is always infused, and which they are further infusing, with pasts and futures" (p. 115). As for Gell, Munn also recognised the importance that things have in instantiating how the past and the future are mediated within a spatially and temporally distributed network of things working as indexes for culture.

But these relationships are more than just a network of temporally and spatially distributed artefacts indexical of those who originally made them. In fact, the temporal relationships among artefacts can be interpreted as a temporally extended cognitive process: memory.

3.6 - Style and memory

To link cognition and temporality Gell adopts Husserl's (1964) model of *internal time-consciousness* (Figure 19). Designed to explore the temporal unfolding of the cognitive process, Husserl (1964) argued that the basic unit of time-consciousness is not a single present moment but a *duration-block*: a temporal field that simultaneously contains present, past, and future. Husserl offered a phenomenological account of this temporality in describing the perception of a melody. In hearing a melody composed of several tonal sequences, we perceive the melody as a unique

ongoing object with a beginning and an end, rather than as unique dissociated tones. This because, according to Husserl, in hearing a tone B sound, what we hear is not just this tone, but rather a broader sequence also containing the preceding tone A and the following tone B. That is, in the moment of hearing B, the retention of the just-heard tone A is still *in perception* alongside the anticipation of tone C. It is not that B remembers A, thus producing an imagination of C. Instead, tones A, B, C are simultaneously kept in perception. Hence, the melody is perceived as a unique temporally distributed object composed of tonal sequences, whereas each note is a *retention* of something but also a *protentions* towards potential following notes.

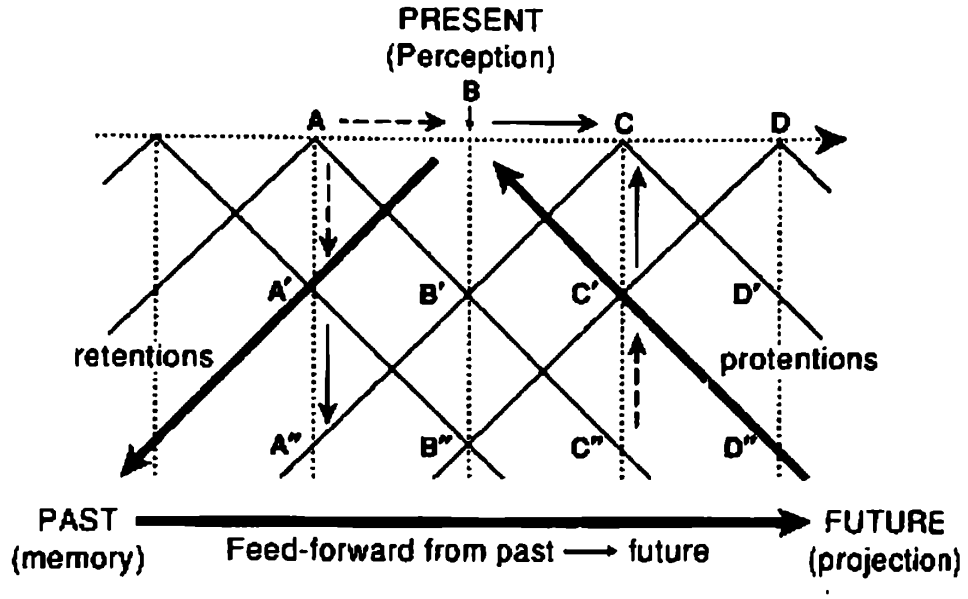


Figure 19 - Husserl's diagram of *internal time-consciousness* (after Gell, 1998, fig. 9.4/2)

Gell notes that there is no difference between Husserl's time-consciousness diagram and the whole temporal unfolding of the Maori meeting houses. Each house recapitulates the whole Maori style, in terms of synecdoche, while simultaneously also being the result of past sets of retentions, and retentions of retentions, that accumulated throughout the whole making tradition of Maori houses. Hence, each house is an accumulation of carvings, decorations, practices, lore, and skills. But not simply of that specific house. In being part of the Maori meeting houses style, each building recapitulates all previously built houses erected according to the sociocultural rules and obligations that this whole stylistic tradition imposed on people in their sociomaterial setting. But this is just part of the story.

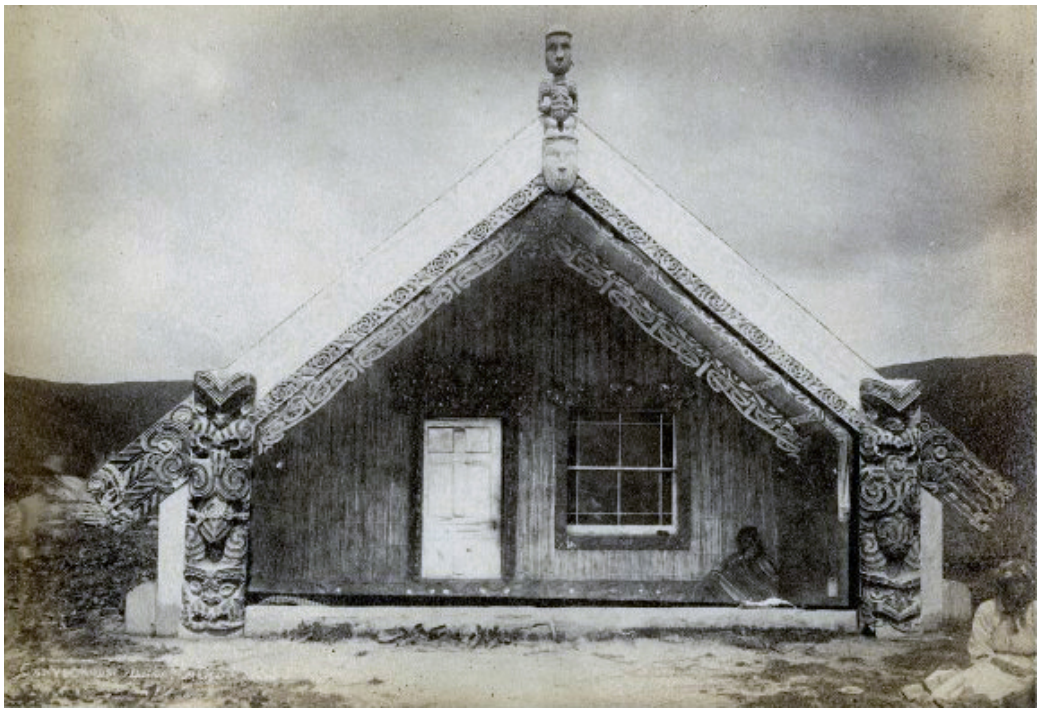


Figure 20 - Exterior of a Maori meeting house in 1881 (Hinemihi, Te Wairoa). Courtesy of the British Museum.

Each house (Figure 20), as we have seen earlier, also projects all these memories from the past into the future. In other words, a house operated as a memory of the necessary actions and choices required to obtain something similar to earlier creations. Yet, each house also projects into the future the virtuosity, identity, desires, lore, and skills of Maori builders to produce a new house for the community. Therefore, every single house is simultaneously a past and future object actualised in the present context of making (Prezioso, 2021). It is according to these multi-temporal connections that link together in a unique coherent object the whole Maori meeting houses that this tradition becomes a unique cognitive process distributed in time. More precisely, it comes to describe, in the words of Gell (1998):

"a movement of inner dureé as well as a collection of existing objects, and documents appertaining to objects which time has obliterated. The Maori meeting house (in its totalized form) is an object which we are able to trace as a movement of thought, a movement of memory reaching

down into the past and a movement of aspiration, probing towards an unrealized, and perhaps unrealizable futurity" (p. 258).

The whole cultural tradition is a memory that allowed future generations to produce something new but also in line with the internal requests that the Maori meeting houses place on people (Gell, 1998, p. 255). This continuous shift from tradition to innovation mirrors the processes of cognition itself, whereas every artefact having a style is a memory that instantiates a chain of future possibilities that are materialised in the houses. As Gell (1998) states:

"we can interpret any given meeting house, viewed from the latter-day perspective, as a '*memory' in objectified form, of meeting houses anterior to this one. Indeed, in terms of the cognitive processes of the Maori builders, 'memory' is the faculty responsible for the transmission of the lore, the skills – the 'tradition' in other words – which the house embodies"* (p. 257).

Therefore, Gell concludes his book with an important proposal: style is memory distributed in space and time through relations among artefacts sharing visual similarities. In the light of the above review, I now turn to explain the working hypothesis for style as memory that I develop in this work.

3.7 – Summary of *Art and Agency*

The above review of Gell's work presents a substantial contribution to rethinking style and reinforcing the considerations which I moved in the conclusions of the previous chapter; namely, that the *transgenerational* nature of styles supports a study of the underlying dynamics by which the Kamares style endured over time. I argue that, if that is the case, it is because Gell moves two important arguments.

The first one focuses on the idea that styles are more than simply collections of artefacts linked to one another by means of their aesthetic similarities. Instead, artisans must replicate specific actions and make the necessary choices to replicate something that fits within an existing style. This agential quality of styles paves the way to explore this notion as an active entity capable of producing, rather than being the product, of the social world. As we have seen, styles present unique internal dynamics which structure how bodies and brains react and organise over time the

rules within which humans have to comply. Gell thoroughly demonstrates that styles are, echoing Gosden's (2005) stylistic universes: a relation between relations of forms and cultural parameters which governs both the internal dynamics by which they change over time and the relationships they produce with people.

The second argument has to do with temporality and memory. In the latter part of my review of Gell, I discussed the intuition that styles are temporally arranged sets of material objects. The central idea is that each artefact is connected to previous and later ones, thereby forming a temporal network. Each artefact is a node that retains in its aesthetic qualities the memory of the past skills and lore used to produce it. At the same time, each node also comes to project those memories into the future. Therefore, each artefact becomes an event that conflates both material properties and cognition. Taken together, this temporally distributed network comes to describe a cognitive process: a sequence of memories of memories that makes it possible for future generations to produce something that is reminiscent of a previous artefact in a specific style.

These two arguments are central for this thesis in that they provide me with a starting point to rethink style and anchor my proposal for reworking this notion from a transgenerational perspective linked to discussions of memory. Let me explain what I mean with the above, before spelling out the hypothesis that I develop with the following articles and chapters.

3.8 - Style as transgenerational memory

If *Art and Agency* provides this research with a starting point for rethinking style and its role shaping in human thinking, it is because the idea of inter-artefactual domain overcomes the significant drawbacks in archaeological studies on style: it moves to see how, over transgenerational time, styles have dynamics that channel human actions and from which stylistic change emerges. However, this is only a starting point for reconsidering style. Although helpful, Gell's ideas are very theoretical and difficult to apply to the reality of the archaeological data, characterised by incompleteness and lack of precise dates. Also, Gell did not explore the agential properties of things entirely. For him, things are indexes of human actions and thoughts; i.e., their effects derive from human intentions and reflect those intentions, which the notion of psychological saliency encountered in Sections 3.2 and 3.3 condenses. Things *instantiate mental states*, rather than *constitute* them. In saying that things instantiate mental states, I am referring to the fact that things are cues that elicit (i.e., cause people) to think or act. Albeit Gell opens to see

how things can affect and effect their viewers and users, they do so because they extend humans' intentions. Instead, my use of *constitutive* here refers, in line with Malafouris's MET (2013), to the fact that material culture is inseparable from human thinking and action (see also Section 1.3). As we shall see in Section A1.8 and A1.9, for MET "minds and things, more than merely being causally linked, are constitutively interdependent—that is, that the one cannot exist without the other" (Malafouris, 2013, p. 77).

This discussion is all but trivial in my take on style. In fact, in considering things solely as cues for instantiating pre-existing mental states stored somewhere in the brain or mind, things made to fit within existing styles are still the result of human thought processes and secondary to how actions and thoughts are recalled. As I show in Articles 1, 2, and 3, things are more than simple indexes for some past intentions that can be brought forth in interacting with them. Things *constitute* modes of thinking and acting in the process of decoration-making. I will show this in detail when suggesting that MET supports my endeavour of carefully recognising and describing the formal qualities of Kamares, such as the diversity of its polychrome motifs from a perspective for which mind and matter are *constituted* in action (Section A1.6-A1.9).

This point on the constitutionality of material culture, and styles by reflection, becomes extremely important when considering the latter arguments that Gell brings on memory. The intuition that cultural styles are somehow linked with memory paves the way to rethink the transgenerationality of style discussed in Section 2.4. Specifically, in light of those considerations and the review in this chapter, my working hypothesis to this thesis is that the Kamares style describes a transgenerational memory that enabled Minoan artisans to remember and update their or their predecessors' technical skills and knowledge every time they engaged *with* and *through* raw materials, tools, previous creations in the context of making novel vases. In other words, a style describes a transgenerational memory of all accumulated material properties of things, technical skills, and knowledge that enabled artisans to remember modes of thinking and acting.

By rethinking style from Gell's anthropological perspective, I postulate that (1) style is a continual spatially and temporally distributed memory process continually updated over time; (2) remembering is not just reminiscing something past but the capacity that our bodies and brains have to adapt previously acquired modes of thinking and acting whenever we engage *with* and *through* things in the present context of action. Ultimately, I suggest that there is a closer relationship between memory and material culture than so far advocated in archaeology,

anthropology, and the cognitive sciences. The consequences of this transgenerational and mnemonic view of style are significant for both archaeological and memory studies. On the one hand, they support reconsidering the underlying dynamics by which the Kamares style endured over time while providing the field of memory studies with novel data to grasp the nature and workings of memory. On the other, they enable the study of memory as a distributed, extended, enacted, ecological, and multi-temporal phenomenon for which thinking and acting are instantiated and *constituted* by interacting *with* and *through* things.

Before moving to the methodology and data collected in this study to substantiate the above hypothesis (Chapter 6), a review of memory is much needed. Not only does it situate my proposal for memory and remembering presented in Article 1. It emphasises the importance of grounding the proposals that I develop in this thesis in MET.

Chapter 4 – Memory and Material Culture

In the conclusion of Chapter 3, I made the case that studying the Kamares style as a transgenerational memory might be a more efficient way to comprehend the dynamics through which the inventiveness and continuity of styles developed over time. However, different fields employ the term memory in slightly different ways, depending on their histories of research and applications. The same can be said of remembering.

To clarify my position on memory and remembering, this chapter explores how anthropology (Section 4.1) and archaeology (Section 4.2) have dealt with the relationship between memory and material culture. I decided to discuss anthropological and archaeological approaches to material mnemonics for three reasons. First, the cross-disciplinary approach of this study is also grounded in anthropology and archaeology, and therefore necessitates being situated within a tradition of memory studies within these disciplines. Second, because I develop my arguments on mainstream psychological memory research and recent studies in the philosophy of cognition in Articles 1, 2, and 3 I avoid discussing them here. Finally, my aim is to illustrate why I claim that current discussions on the continuity between mind and matter developed in the MET by Malafouris (2019a) are very much needed to ground my theoretical and methodological perspectives.

4.1 – Anthropology and material mnemonics

Anthropological approaches to material mnemonic owns to Durkheim's belief that the survival of societies relies on their capacity to "render the mythical past of the clan present to mind" by using artefacts during rituals (1971, p. 375). Whilst not explicitly interested in memory but in the dynamics that bound individuals into societies and how these persist over time (Greenwald, 1973), Durkheim's works were influential in later anthropological and archaeological approaches to memory. Of these, particularly important was the study on memory developed by Connerton (1989).

4.1.1 - Commemorative practices

Connerton (1989) expanded Durkheim's insights on the role that representations of a society have for remembering the past and legitimising social groups. His main argument was that societies' beliefs and ideas on how the group should be are reproduced during commemorative

rituals that necessarily involve habitual bodily practices and material culture (also Casey, 1987). To do so, Connerton first situates his idea of social motor-habit memory within memory theory, and then develops his argument on commemorative practices.

Connerton began by discussing three main types of memory: personal, cognitive, and habit-memory. Personal memory and cognitive memory respectively refer to what default psychological theories call episodic and semantic memory.[17] Interestingly, while he agreed that cognitive memory is all about the encoding-storing-retrieving of "words, or lines of verse, or jokes, or stories" (Connerton, 1989, p. 22), he also challenged this mainstream view. He argued that, in attempting to understand memory as a human universal mental faculty, default memory theories have dismissed the role that the sociocultural coordinates have during encoding.[18] Conversely, his suggestion is that encoding is deeply rooted in sociocultural contexts. Specifically, he argued that encoding is based on a semantic code: "a mental map acquired in childhood, and, as such, it is a code that is shared collectively" (p. 28). Different groups possess their unique shared semantic codes which allow individuals to decode and remember past events in their own specific ways. For Connerton, the importance of motor-habit memory and material culture lies in the manner in which this semantic code is acquired. Defined as "the capacity to reproduce a certain performance" and as that memory which "we frequently do not recall how or when or where we have acquired the knowledge in question" (pp. 22-23), motor-habit memory becomes central in Connerton's theory. In fact, he argues that this type of memory, disregarded in the social sciences, plays a central role in how individuals learn the above-mentioned social code and societies endure through time.

To counterbalance studies in the social sciences, Connerton discussed motor-habit memory and habits. For him, habits stand for continuous activities, reinforced by means of repeated acts, which become somehow interiorised (i.e., incorporated) to the point that one stops thinking about them. This is what happens, for instance, during the process of learning how to play the piano. By executing the correct actions associated with the piano-playing practice, the acts repeated over time are *incorporated* in the body. As in the case of piano playing, habits are those activities that become incorporated in the individual to the point that their execution is unconsciously

[17] Episodic memory refers to "the ability to re-experience a time- and-place-specific event in its original context" (Squire & Dede, 2015, p. 3). For instance, the memory of one's last birthday party. Instead, semantic memory is concerned to "facts about the world" (Squire & Dede, 2015, p. 3).

[18] Encoding "concerns perceiving, recognizing, and further processing an object or event so that it can be remembered later" (Kellogg, 2015, p. 94).

reproduced. Furthermore, Connerton (1989) remarked, habits are acquired "in the same way that we acquire our native language" (p. 30). That is, habits are incorporated through repeating certain actions since childhood and unconsciously recalled by means of motor-habit memory. Therefore, for Connerton habitual behaviours which constitute social rules (i.e., how people should act in a given sociomaterial context) are incorporated into the body by performing actions learnt since childhood. Connerton refers to this unity between social norms and habits from which communities identify themselves as "social habit-memory" (p. 34). It is at the intersection of social motor-habit memory and commemorative rituals that Connerton developed his proposal for the continuation of societies.

Connerton's main argument is that commemorative ceremonies are the social and physical locus where habitual practices and ideas about the society become incorporated through re-enacting rituals. Connerton considered commemorative ceremonies as being essentially based on rituals: highly repetitive set of actions that, because of their recurring nature, imply a continuity with the past. But commemorative ceremonies themselves are associated with the past. As the example of Aboriginals' initiation ceremony described by Durkheim shows, these events recall something happened at a fixed place or past moment in time (e.g., mythical past, birthdays, festivals of Christian saints). If they do so, it is by "ritually re-enacting a narrative of events held to have taken place at some past time, in a manner sufficiently elaborate to contain the performance of more or less invariant sequences of formal acts and utterances" (Durkheim, 1912, p. 45). The example of Christianity used by Connerton elucidates this idea.

The whole Christian religion is said to have originated in the specific historical moment of the crucifixion: the sacrifice of Christ on the cross is the original moment that Christianity recognises as foundational for the group. In being the foundational moment that shapes the values of Christianity, all rituals reference this specific moment via scripted practices (e.g., Easter) and physical objects (e.g.. holy cross). It is this repetition of rituals during ceremonies that function effectively as "mnemonic devices" (Durkheim, 1912, p. 61) which enable individuals to slowly incorporate past ideas and beliefs.

Connerton case for memory is that rituals work as mnemonic devices not because they act as symbols (i.e., for their relationship with something else as in a grammar-like syntax), as Durkheim implied. In being tied to specific dates, the past is brought back every time through ritual practices involving specific sets of actions and varieties of material culture (e.g., images of the cross). Thus,

if commemorative ceremonies bring the past beliefs that keep the group together in the present, they do so because our bodies keep performing previously acquired actions in line with what the commemorative rituals require. As Connerton remarked, memory is sedimented in the body through the re-enactment of rituals. This was the case for the Christian rituals and their scripted bodily ritual performances, repeated every single year starting with Easter. I clarify here that Connerton's usage of "re-enactment" refers to the repetition of certain performances, as in the case of theatrical plays where actors repeat movements and sentences according to a pre-made script. Re-enactment is, therefore, strongly tied with the idea of ritual as a repetitive set of actions - something to which I return in Articles 1 and 3. In attempting to explain how the body re-enacts the past in the context of commemorative ceremonies, Connerton suggested that there exist two types of social actions: incorporating and inscribing practices.

Incorporating practices refers to actions that work as "messages that a sender or senders impart by means of their own current bodily activity (e.g., handshaking)" (p. 88). In a later publication, Rowlands (1993) describes these practices as adopting an "iconic symbolism" (pp. 142; i.e., what Durkheim called images or representation of societies) that evades any organised rituals and is only occasionally revealed to larger portions of the society. The power of incorporating practices rests in their *"*capacity to assault the senses" (pp. 142), which is the "effect that the infrequent transmission of cultural materials has on evocation and cultural recall" (pp. 142). Interestingly, by assuming that bodily actions convey meanings, Connerton breaks up the long-standing dichotomies between types of memories. In fact, he argued that: "Bodily practices of a culturally specific kind entail a combination of cognitive and habit-memory. The appropriate performance of the movements contained in the repertoire of the group not only reminds the performers of systems of classification which the group holds to be important; it also requires the exercise of habit-memory" (p. 88). Bodily actions are productive of both motor habit and episodic or biographical memory.[19] Their power, Rowlands (1993) remarks, lies in their *"*capacity to assault the senses" (p. 142), which is the "effect that the infrequent transmission of cultural materials has

[19] This suggestion for incorporating practices is an important one. In fact, it breaks with the dichotomy among the different kinds of memory typically in use in default memory studies (e.g., Squire & Dede, 2015). Moreover, it is in line with some recent views in the philosophy of memory (e.g., Moyal-Sharrock, 2009; Sutton, 2015), for which more important than information-laden dichotomies are the context where practices occur, such as in dancing (Carmona, 2021).

on evocation and cultural recall" (p. 142). A position similar to that of Gell reviewed in Chapter 3.

Conversely, *inscribing practices* are those acts that retain information into some kind of physical object (e.g., print, photos, computers) after the action is completed (e.g., printing a document). As Rowlands (1993) remarks, these "practices refer to how frequent repetition and the extensive logical integration of verbalised ritual discourse facilitates the dissemination of religious knowledge as a transportable ideology" (p. 142). The prototypical example, which will return also in Donald (1991), is that of writing. Connerton (1989) claims that the alphabet is the perfect example of inscribing practices because it works as a "mechanical mnemonic device" which remembers the shared linguistic code (i.e., writing rules, sounds, and meanings attached to the sentences) learnt during childhood (p. 75). Other examples are religious speeches (e.g., sermons) with their encoded revelations (i.e., hidden meanings) used to convince the crowds.

This distinction between incorporated and inscribed practices is also reiterated by Whitehouse's (1992, 2021) works on religious experience, in which he argues that literate and non-literate societies present two distinct modes of religiosity. Literate societies structures memory by adopting a code (e.g., Gospels in the Christian religion) shared through prescribed verbalised practices passed across generations via repetition of highly formalised rituals. Contrarily, in non-literate societies memory is reproduced through less organised practices which adopt objects, colours, and other evocative elements of the performance to elicit human emotions (e.g., pain) and produce unconscious memories in its participants.

Before turning to discussions on material culture and memory by Rowlands (1993), I critically review two main points by Connerton concerning the relationship between material culture and memory. First, that social memory is not pre-imposed by a social group but sustained by habits produced through (more or less) structured habitual bodily performances. Second, that material culture is productive of cultural categories and meaning because of their repeated use during bodily performances. This stance on habits, material culture, and memory, opens to study how the Knossian Kamares making tradition have structured remembering and memory. However, there is one major drawback. Albeit remembering is mediated through performances that re-enact cultural beliefs and practices (i.e., memory is experienced through bodily practices), Connerton still retains an informational stance on memory. Even when the past is re-enacted through bodily practices in the present, remembering is still about the manipulation of information located somewhere in an

individual's inside. However, as I discuss in Chapter 6 and Articles 2 and 3, if Minoan artisan could trace Kamares decorations on a pot it was not because past pots retain or instantiate some kind of information, but because the presence of previous decorations suggested possible actions or choices (i.e., what they could, or not, do).

I now turn to emphasise the role that material culture has for memory by discussing Rowlands' stance on their role for the continuity and transmission of culture.

4.1.2 - Memory and cultural transmission

Rowlands interweaves Connerton's and Whitehouse's study on modes of religiosity to suggest that material culture always partakes in the transmission of cultural forms. As he remarks, if cultural traditions endure it is because "people are exposed constantly to highly visible examples of material objects invested with authoritative credibility" (1993, p. 142). Rowlands argues that archaeological approaches to material mnemonics, which I will describe below, reveal that there is not just one way in which societies remember themselves. Rather, cultural transmission is made of "a more complex intertwining of cycles of preservations and curation of monumental built form with objects loss in burials and ritual hoarding of the deliberate destruction of property" (Rowlands, 1993, p. 142). Essentially, that practices involving ephemeral and more enduring material artefacts can be seen as part of strategies for the transmission of cultural forms in every culture.

By assuming this position on mnemonic practices and material culture, Rowlands postulates an even closer relationship among time, memory, and artefactual typologies. He shows how conceptions of linear time derived from the Classical and Medieval periods are directly connected with Aristotelian theories of remembering (Carruthers, 1998; Ricœur, 2004). These conceptions refer to the idea that time is defined in terms of linear, teleological progression from the past to the present (see Gell, 1992 for conceptions of time in anthropology), and that memory works in the same way in referencing the past. The example of the repetition in Western aesthetic object traditions taken from Gombrich (1960) exemplifies these discussions.

Rowlands argues that the rediscovery and reuse of the Corinthian capitals in 20th-century postmodernist Europe works in the same way as rhw Aristotelian and Freudian theory of mind, for which traces of memory are imprinted on a wax block (Robins, 2017). In both cases, remnants of the past rediscovered by contemporary societies and traces imprinted in the mind are both latent

in memory. As he remarks: "Memory traces exist as marks which are not conscious, but by appropriate stimuli they might be energised long afterwards" (144). Equally, examples of Corinthian capitals await latent to be rediscovered and replicated by later societies, without any specific meaning attached but just the desire of returning to some previous model. Hence, Rowlands's suggestion is that object traditions work as *memory traces* part of a collective group awaiting to be reactivated by the desire (i.e., an unconscious stimulus) to return to the past.[20] Interestingly, he argues that, because of this direct linear connection from the past to the present, object traditions are meaningless: there is no meaning to them but only the desire to return to a sense of origin.

Therefore, "objects traditions, rather than language or speech, serve as the only means of gaining access to such unconscious traces, and they do so by allowing direct re-engagement with past experience in ways that are prevented in language" (Rowlands, 1993, p. 144). It results that the reason why objects (e.g., heirlooms, souvenirs, and photographs) "have this particular capacity to evoke and to establish continuities with past experience is precisely because, as a material symbol rather than verbalised meaning, they provide a special form of access to both individual and group unconscious processes" (p. 144). In a nutshell, material culture can remind people in ways that written text cannot. Whereas the former evokes and establishes direct unconscious connections with the past without the necessity of any social or cultural meanings to be involved, linguistic symbols make explicit their meanings by expressing them with words.

According to this view, material culture is contentless but made "to be talked about and invested with the memories and striking events associated with their use" (144). Hence, if objects are productive of memory, they are so because of their materiality: their capacity to endure, and, hence, to "assert their own memory, their own form of commentary and therefore come to possess their own personal trajectories" (p. 144). Rowland shares this idea with Connerton, who already recognised that sociomaterial contexts are productive of remembering because "the physical objects with which we are in daily contact change little or not at all, so providing us with an image of permanence and stability" (Connerton, 1989, p. 37). Therefore, it is through their unique qualities and histories that they become productive of memory to different people in their different

[20] It worth mentioning that Rowlands (2003, 2010) will later develop the idea of "active externalism", a stance on the active role of extra-neural resources for cognition similar to the Extended Mind (Clark & Chalmers, 1998), which I discuss in Sections A1.4 and A2.3.2.

contexts of action. This is what Rowlands (1993) argues when he says that "remembering is a form of work and is inseparable from the motive to memorialize" (p. 144).

I argue that this is so far the strongest contribution to memory, the idea that practices (e.g., funerary rituals) are inseparable from the reasons (e.g., keeping the social order) and the objects (e.g., funerary remains) that are part of what is to be memorialised. This is evident in the case of war memorials. The presence of the inscribed names of the deceased soldiers embodies the monument with the ideals of sacrifice of those who died to defend the nation and redemption for the survivors, thereby linking past, present, and future in a unique unifying moment. War memorials are thus turned into material symbols: *aide memories* that connect the past to the present, exploring the desire of re-establishing the ideas of social cohesion that were culturally memorialised with the monument. Hence, in moving towards thinking about objects and objects traditions in terms of material symbols for memory, Rowlands considers material culture central for memory and cultural practices important in remembering. However, the sociocultural context continues to dictate what and when material symbols serve as *aide memoires*, and hence how cultural transmission unfolds in time.

Nonetheless, for the first time in the scholarly literature, material culture is not merely seen as something which enables a more direct, unconscious connection with the past. Because of their materiality, such as in the case of the war monument, material culture becomes a culturally built sign that supports memory as *aide memoires.* This idea of enduring materiality is a central one when it comes to archaeological discussions on memory. In fact, as I shall show in the next section, this idea was taken and developed in archaeological approaches to material mnemonics.

4.2 - Archaeology and material mnemonics

The influence of studies by Durkheim (1912), Halbwachs (1976), Connerton (1989) and Rowlands (1993) on social memory and the role of images of the society (e.g., monuments and artefacts) in ritual commemorations inspired archaeological research on material mnemonics.

In this second part of this chapter, I distinguish three main archaeological approaches to memory: the *past in the past* (Section 4.2.1), *memory practices* (Section 4.2.2), and *time and memory* (Section 4.2.3). By any chance these should be considered as mutually exclusive categories, and there are studies that could be easily categories under one or the other.

4.2.1 - The *past in the past*

The first archaeological approach to material mnemonics further developed the idea that the enduring quality of things is central to the relationship between material culture and memory (e.g., Bradley & Williams, 1998; Galaxy, 2018). Specifically, views within the *past in the past* investigated the effects that groups' shared notions of their history had in legitimising authority and producing social memory by using different types of material culture from the past (e.g., monuments, heirlooms, texts).[21] This means that, enduring objects from the past worked as memories of previous communities and helped present ones to legitimise themselves in the present. The now-classic case of Stonehenge (Figure 21) presents a good example of traditional *past in the past* views.



Figure 21 - The blue stones of Stonehenge. Photo by author.

Archaeological excavations and chronological studies on this monumental area have shown that all the features of this complex were not built in the same period but consisted of three main phases

[21] The definition of social memory in archaeology differs slightly from Connerton (1989) or Halbwachs's (1976). In general, archaeology defines social memory as "a collective notion (not an individual belief) about the way things were in the past" (Van Dyke & Alcock, 2003, p. 2).

(Cleal et al., 1995; Ruggles, 1997; Bender, 1998). First (2950-2900 BC), communities erected a ring of posts (i.e., the Aubrey Holes) within a circular earthwork. Second (2900 - 2400 BC), new wooden poles were added to the existing northeast entrance of the first wooden ring. Ultimately (2550 - 1600 BC), several circles of bluestones associated with different construction phases, replaced and updated the wooden circle in different periods of time. In this fine example, it is possible to observe how the pre-existing enduring feature of each phase supported later communities to add novel or upgrade previous architectural features. Proponents of the *past in the past* argue that pre-existing timber or stone circles erected by previous communities worked for later social groups as memories for past human activities in structuring the construction of novel features (Bender & Aitken, 1998; Bradley, 2002, pp. 82-111).

Continuity in the context of Stonehenge can also be seen in how the past offers a potential for re-enacting future ritual (sacred or secular) activities. Whilst archaeologists will never be entirely sure of the function that the complex held in prehistoric times, they generally agree that rituals centred on the cyclical movements of the sun, moon, and stars used as indicators for the passing seasons (Cusack, 2012). This use differed from that of the Medieval period, when the stones of the complex were "revered and believed to have curative powers" (Bender & Aitken, 1998, p. 101). The case of Stonehenge illustrates the idea behind the *past in the past*: by being present as enduring features of the landscape, it becomes part of a social strategy used to bring the past and its associated values and beliefs into the present and bring societies together (Alcock, 2002; Assmann, 2011; Bradley, 2002; Van Dyke, 2004).



Figure 22 - Roman dedication to Neptune on the altar of the church of Santiago at Padron, Spain (after Van Dyke, 2019, fig. 1).

This process by which enduring artefacts are actively deployed to legitimise new social groups based on a shared idea of the past is even more evident in the example that Van Dyke (2019) presents of a Roman dedication to Neptune now in the church of Santiago, in Spain (Figure 22). Originally a Roman dedication associated with a temple that stood in the area, the stone was considered sacred and turned into an altar by the early Catholic communities that believed it was the dock stone to which the ship that delivered St. James' body was tied. It then became a means to legitimise both Medieval and modern Catholic groups who gathered in the church. In this example, the dedication, the physical setting of the church, and the narratives produced by decades of human interactions allowed the reproduction of social memory and bridged Roman, Medieval, and modern Catholic communities (Dyke, 2019, p. 208).

A useful way to think of this approach to material mnemonics is Holtorf's (1997) use of the term "prospective memory" (p. 47). For him, monuments such as megaliths were built by the elites with the purpose of preserving memories about their power and role in the society for later communities. Their monumental, enduring quality implicitly suggests that this type of immovable objects is made to survive generations, and with them also survives the memory of the social group which built them. According to this view of objects as prospective memory, a "monument is an erected sign which encodes a message in a permanent way for communicating with people that are

(possibly) millennia away" (Holtorf, 1997, p. 47). This position is also shared by Nora (1989), who produced a series of studies on French national monuments and considered these places as *"lieux de memoire*", or *realms of memory*: a collective symbol of French identity through which continuity of use continually defined the political identity of the nation.

Interestingly, approaches to the *past in the past* that consider enduring objects as symbols that convey a social and cultural meaning are echoed in the works by Vygotsky (1978; also, Valsiner, 2009). His pragmatic and cultural approach investigated how humans "actively manipulate their relation to the environment, and through the environment they change their own behaviour" (p. 51). He claimed that the "very essence of human memory consists in the fact that human beings actively remember with the help of signs" (p. 51). Therefore, objects such as monuments or even knotted handkerchiefs are signs which "extend the operation of memory beyond the biological dimensions of the human nervous system and permit it to incorporate artificial, or self-generated, stimuli" (p. 39). Therefore, things can act as signs for memories and alter people's relations with the environment giving shape to "new forms of a culturally-based psychological process" (p. 40). Hence, for Vygotsky the environment is a constructed ensemble of cultural resources that extend and complement memory insofar as these resources work as information-laden signs that support human innate biological memory. This view is also shared by Donald (1991). However, as I shall describe in Section 4.2.3.1, his approach to signs takes a step further in developing the relationship between material culture and memory. It suffices to say here that while for Vygotsky and proponents of the *past in the past* material culture acts as symbols imbued with some kind of social and cultural meaning that work in a similar way to human biological memory (even when they improve it), for Donald (1991) material culture and internal memory display different, complementary properties (e.g., they co-operate synergically toward remembering). I will return to this important discussion on the complementarity of material culture and memory in Section 4.2.3.1 and Article 1.

The archaeological examples and the parallels that I draw with cultural psychology show, the *past in the past* argues that social memory is produced through manipulating pre-existing artefacts, altering the physical space, and producing novel narratives. While it is useful to recognise that material culture memorialises social meanings and enables memories to be projected into the future, this approach presents two main shortcomings when it comes to explore the relationship between material culture and memory.

First, if material culture is important for remembering a community of its shared past it is only because of the meanings that living members imbue into it. If the Roman dedication to Neptune is important for social memory, it is not because of its very presence in the Church but because of the ideas and beliefs that the modern Catholic community associates to it. When even recent approaches to *the past in the past* explore how types of material culture other than monuments (e.g., inscribed texts, heirlooms, representations) produce social effects beyond legitimisation (e.g., authority, identity, gender, religious thought, and ethnicity), they still consider the social world as the starting point to think about the role that material culture plays in memory.

Secondly, only examples of enduring material culture are considered as symbols in which social or cultural meaning can be encoded, thus becoming productive in the context of memory. Consequently, the relationship between material culture and memory is viewed as a symbolic one, facilitated by the enduring properties of certain objects. According to this perspective, these objects *act as proxies for memories* which stand for an arbitrarily meaning placed onto them. These studies still adhere to a Saussurian structural theory of semiotics applied to material culture and memory (Hicks, 2010; Rowlands, 2004). In this framework, objects function as a system of signs in a way similar to a code or grammar, with their meaning imposed by societies. This position reiterates the arguments presented in the review of style (Section 2.2), where proponents of style and meaning considered styles as a linguistic system, reinforcing the hylomorphic view of the mind.

As I shall describe in the next paragraph, this perspective on material culture and memory takes on a different definition in archaeological studies that place more emphasis on the practices involving enduring objects.

4.2.2 - Memory practices

The archaeological perspective on material mnemonics, which I refer to here as *memory practices*, posits that people's actions with objects and the traces of past actions left by these practices on these objects form the foundation upon which communities reconstruct social meanings and cultural beliefs. These views are more closely aligned with Connerton's (1989) and Rowland's (1993) discussions on inscribed and incorporated practices, as they account for the ongoing construction of social memory. This perspective explores how the active use of material culture in the context of specific activities produces memory and leaves behind *traces of past actions*. The term *trace* is used to denote "an imprint that has been left behind by a past agency

and which remains in the present as its testimony" (Borić, 2010b, p. 4). In general, studies falling under the category of memory practices assume that the reproduction of societies is not merely a matter of assigning new meanings to the remnants of past cultures, as was the case in the past. The presence of traces from repeated actions, particularly those associated with specific traditions, plays a central role in memory and remembering. Therefore, in this archaeological approach to material mnemonics, the exploration of continuity and change in practices (i.e., traditions of doing something) becomes crucial in understanding how past communities remembered social meanings and cultural beliefs.

It's worth noting that the studies categorised here as *memory practices* partially originated from debates within the *post-processual current* in archaeological theory (Harris & Cipolla, 2017, pp. 22-26). This perspective developed in reaction to the environmental determinism and structuralism of processual archaeology. Post-processual views shared concerns about subjectivity, power structures, and agency (Dobres, 2000; Dobres & Robb, 2000). Rowlands (1993) partly supported this view, adopting Connerton's initial argument on incorporating practices to illustrate how things provide access to memory through bodily performances. As he remarks, things are not merely passive stand-ins for meanings but signs designed "to be talked about and invested with the memories and striking events associated with their use" (p. 144).

This interest in the agency of material culture was primarily sparked by social theories such as Giddens (1984), Latour (1993), and Bourdieu (1977). In general, according to these sociological studies, the construction of societies is supported by people interacting with various types of things, which "constrain, direct, and assist our day-to-day activities" (for a general discussion, see Hacking, 1999; Olsen, 2003, p. 88). Therefore, it is these early studies that, as Hicks (2010) summarises, material culture came to assume a much more significant role in how social meanings and cultural beliefs were instantiated (or materialised) through the repetition of practices (e.g., Pauketat, 2001b; Seremetakis, 1996). Such an agential and practice-oriented view of material culture supported archaeological and anthropological studies interested in understanding how things and associated practices played an active role in shaping communities.

However, not two studies in *memory practices* are the same. Some of these examine how human activities leave behind traces that are essential for the recollection and reproduction of social memory (Borić, 2010a; Joyce, 2015). These contributions highlight how the observation and interpretation of traces by past communities supported the production of socially and culturally

shared beliefs. In assuming the importance of past traces, these studies examine how the enduring materiality of things make them suitable to memorialise past practices and re-adapt social beliefs in the present. In assuming this view, material culture becomes an agent in the construction and interpretation of memory because of the presence of traces left behind by past practices. This importance on things, practices, and traces of actions is equally central in Mills and Walker (2008). Contributions in this volume illustrates the capacity of things to preserve traces of previous activities and how activities themselves are essential for the reproduction of social memory (also, Meskell, 2008; Miller, 2005). Examples such as the construction of shrines in pre-existing cemeteries, the continuity in use of certain offerings, or the changing burial customs emphasise how "people remember or forget the past according to the needs of the present" (Van Dyke & Alcock, 2003, p. 3).

While most archaeologists interested in memory focus on examining the traces of past activities and their agential qualities, others investigate the nature of these practices. This is particularly the case for scholars interested in understanding how past social groups commemorated the deceased by interpreting monuments and their evolving meanings across generations(Hallam & Hockey, 2001; Hamilakis, 2013; Hill & Hageman, 2016; Jones, 2007; Mills & Walker, 2008; Williams, 2003a). Others analyse the relationships between memory and things in various contexts of activity (e.g., building houses, Hendon, 2010), or through a variety of mobile artefacts (e.g., pots, jewelry, combs, photographs Joyce, 2003; Ruby, 1995; Williams, 2003b). For instance, the contributions in Van Dyke and Alcock (2003) explore how places of commemorative activities involving mobile or immobile things explicate the dynamics by which social memory is constructed and conceptualised through practices (see also Article 3).

The contribution by Pauketat and Alt (2003) demonstrates that studying the well-known tradition of mound-building in North America provides insight into the process through which Native American populations negotiated notions of identity, power, and meaning. Their long-term study of the construction and subsequent abandonment of flat-topped pyramidal mounds in the Midwest and Midsouth reveals how local populations mediated their past and constructed social memory by creating specific types of mounds that partially diverged from tradition. In this example, a tradition isn't merely transplanted from another region or preserved from the past and replicated in the present to convey a specific social or cultural meaning. The act of constructing mounds involved actively building memories, with each mound echoing previous ones while also

differing in physical qualities. This tension between continuity and change, similar to what we encountered in the Kamares style, underscores the dynamic and continually reproduced nature of traditions in response to present social and cultural dynamics. As the authors note, "the construction and abandonment of mounds was a matter of building memories and, not incidentally, alternately underwriting or undoing central authority" (Pauketat & Alt, 2003, p. 171).

More recent approaches also look at how these ritualised practices involving things elicit memory through bodily senses, in both prehistoric and modern settings (Jones, 2007). The example of Minoan funerary practices by Hamilakis (2013) provides a good example of this approach to memory practices.

During the third and early second millennium BC, from EM I to MM II, the handling of the deceased in Crete involved a practice of "accumulation and hoarding" for most of the inhabitants (Hamilakis, 2013, p. 132). However, different regions had distinct funerary traditions, reflected in both the funerary architecture and the methods of disposing of bodies (Legarra Herrero, 2009). In the south-central Mesara and the northern Knossian region, thousands of human remains have been discovered scattered, piled, or placed in niches within circular stone structures known as tholoi. These types of tombs were used for collective burials and remained in use for different generations, with some continuously used for over a millennium (Legarra Herrero, 2011). According to a prevailing theory in Minoan archaeology, the bodies placed in the tholoi would gradually deteriorate, losing their physical similarities. This progressive change signified the transition of the deceased from the realm of the living to the world of the dead and ancestors (Branigan, 1998). However, tholoi were not solely intended for the dead.

Paved or enclosed open-air annexes served as social spaces "for interaction and negotiation of social relationships" (Legarra Herrero, 2011, p. 55). These areas served as places where people could engage with both the living and the dead through rituals involving the manipulation of the deceased body. In general, these funerary ceremonies involved drinking activities and the preparation of the body before its final placement in the tholos. Hamilakis (2013) describes how upon entering the tomb, the lingering smell, the darkness of the main chamber, the sensory experience of touching small bones and deposited objects all evoked memories of previous visits to the tomb for the living while also reinforcing cosmological beliefs about the ancestors. In this example, the practices involving materials and the traces of previous activities converge to allow participants in the funerary rituals to remember through the embodiment of the senses influenced

by the social and material context of the ritual. I will revisit the importance of the sociomaterial context for memory later (see also, Article 2 and 3), when discussing the perspectives in the philosophy of mind that consider the environment's significance in how people remember (e.g., Hutchins, 1995b).

In conclusion, we can say that *memory practices* shifts their attention from considering things as *proxies for memory* to observe how memory is instantiated in practice – specifically, through the active use of material culture. Instead of being seen as symbols imbued with social meanings, objects acquire significance through the activities people engage in with them. This interaction is where, for instance, the construction of Native Indian mounds allowed local communities to reproduce cultural forms they had experienced before and adapt them to their specific social and cultural circumstances. As a result, variations in mound-building traditions materialize the continuity of a tradition while highlighting that memory practices are continually examined and adjusted to meet the needs of contemporary society. As suggested by Rowlands (1993), "object traditions" play a central role in how practices consistently preserve the memory of past societies, as they are "culturally constructed to connote and consolidate the possession of past events associated with their use or ownership" (p. 44). In contrast, the example of Minoan burial rituals by Hamilakis illustrates that memory practices are not solely a matter of social groups but also involve the sensory dimension of material culture. Memory is not just a mental act but encompasses objects, practices, and the senses.

For the approaches reviewed above, material culture is valuable for memory not only because it endures over time, thus providing links to the past. For *memory practices*, material culture generates memory through the meanings it acquires in specific activity contexts. Consequently, objects establish social and cultural beliefs through active engagement with them in the present. For example, in the case of these Minoan funerary rituals, the beliefs or mental states enacted reference narratives of past events or cosmological forces, such as ancestors. Thus, these materials become intertwined with actions and are instrumental in the memory of the participants gathered in this social arena. In doing so, they prompt us to consider how the enduring nature of objects makes them suitable for memorializing and adapting social beliefs and cultural traditions. These perspectives emphasize the significance of accounting for both the repetition of practices and people's relationship with objects and the traces of past human activities, rather than solely focusing on the objects themselves (Meskell, 2008). In Articles 1, 2, and 3, I will revisit this point

to demonstrate how remembering in the context of creating Kamares style decorations is akin to Connerton's re-enactment, an experience that is lived in action and felt through the body during secular or sacred ritual activities.

This approach to memory and material culture brings with it one main shortcoming: by equating repetition of practices emerging from traces left on material culture with social memory, remembering and memory are reduced to cultural traditions. As it has been recently emphasised by Van Dyke (2019), who mentions the works of Fowler and colleagues (2010) as prototypical example, "equating social identities and habitual practices with 'social memory' risks conflating memory with culture, weakening memory's heuristic value" (p. 214). While *memory practices* provide valuable insights by highlighting the intersection between material culture and memory as it unfolds in action, these views share similarities with the past in the past perspective. They tend to reduce memory to a social strategy employed to legitimize a society's present needs. In the case of Native American traditions related to mound construction, the memory of traditional practices and the presence of previously constructed mounds in other regions are adapted to the local sociomaterial context. The memory of the past is constructed and materialized in the creation of new flat-topped structures. Consequently, cultural traditions, such as the one described by Pauketat and Alt (2003), can be seen as equating memory with cultural continuity.

One significant limitation of the approach equating social memory with culture is that it neglects the diverse nature of memory, the varied ways in which different cultures commemorate their past, and simplifies the act of remembering to a mere reproduction of past practices. A more fruitful perspective, as exemplified by Hamilakis's (2013) work on practices and memory, explores the phenomenological experience of recalling the past in the context of highly sensory funerary activities during the Early and Middle Bronze Age. This approach avoids conflating memory with culture and underscores the importance of activities with material objects in specific settings for generating memories for both individuals and communities. It further highlights that cultural activities play a crucial role in bringing forth the different memories that material culture comes to embody through human and natural activities, such as decay, over time.

In the following paragraph, I will delve into the temporal dimension of material culture and memory within archaeological approaches to material mnemonics.

4.2.3 - Memory and time

These perspectives assert that the relationship between material culture and memory is inherently temporal, with the enduring qualities of objects and the traditions of their use playing a role in prompting recollection in the present (Bailey, 2007; Gosden, 1994; Lucas, 2012, 2021; Olivier, 2011; Olsen, 2010; Thomas, 1996; Hamilakis & Labanyi, 2008). This stance may appear to echo the principles of both *the past in the past* and *memory practice*s, as they all highlight the significance of enduring material culture in the context of memory. However, the distinction lies in the fact that studies exploring memory and time in material mnemonics within archaeology focus on the long-term processes through which objects or assemblages (e.g., the tholos tomb) come to represent and memorialize human activities.

Archaeologists who investigate the interplay between material culture, memory, and time have drawn inspiration from the phenomenological works of philosophers like Bergson (1910), Husserl (1964), and Heidegger (1975). Bergson's discussions on durational time have been particularly influential in underpinning the ideas discussed below. Without delving into extensive details here (for more comprehensive discussions, see Ansell-Pearson, 2018; Hamilakis, 2017; Lucas, 2012; Olsen, 2010), it is sufficient to mention that durational time refers to the concept that all past events coexist and accumulate within the present moment. Durational time implies more than just temporal continuity as shown by the *past in the past*; it emphasizes the idea that, through their endurance, objects accumulate multiple past instances that have transpired in their presence. This perspective underscores the capacity of material culture to transcend the temporal boundaries of human life and accumulate different temporalities. As I review below, approaches that falls under *memory and time* have explored Bergson's intuition through the notion of palimpsest.

Originally adopted in literary studies and the performing arts (Cryderman, 2002; Jones & Shaw, 2006; McDonagh, 1987), the term emphasises the interplay between erasure and inscription, and how this double process creates multi-temporal entities that do not follow conventional, linear views of time (for non-linear ideas of time, Bloch, 1998, ch. 7; Gell, 1992). This term was initially used by landscape archaeologists to describe how different phases or periods (e.g., Iron Age) could be discerned by dissecting the landscape (Crawford, 1953; Randall, 1934). It was with Bailey (1981), Binford (1981), and Foiley (1981) that the term became "a means of pointing to the longer-term process which the archaeological record gives us evidence for, rather than the short-term,

ethnographic scale of events" (Lucas, 2012, p. 118; see contributions in Holdaway & Wandsnider, 2008). For instance, Bailey (2007) recognised five types of palimpsests:

1. True palimpsests, whose traces are completely erased over time and resemble a unitary depositional context.
2. Cumulative palimpsests, in which traces of actions are impossible to reconstruct from observing the archaeological record.
3. Spatial palimpsests are similar to cumulative ones but the activities that produce them do not occur in the same area but are adjacent.
4. Temporal palimpsests are accumulation of different materials from several periods. The example of Early and Middle Bronze Age Minoan practices, with materials accumulated in the tholos, fits with this type of palimpsest.
5. Palimpsest of meaning are those ones in which objects accumulate social and cultural meanings according to different uses. An example of these palimpsests is presented by Gosden and Marshall (1999). The authors describe how a Fijian necklace in the Pitt Rivers Museum was donated in 1874 by a local chief to a British missionary, who later kept this object in England before one of his descendants donated it to the museum. In this period, the object shifted from being the product of Fijian culture to be part of British colonial practices and history, thereby accumulating social meanings over time.

These five palimpsests illustrate diverse long-term temporal dynamics that shed light on various aspects of behaviour, demanding distinct explanatory principles. They suggest that different timescales bring forth various processes that require differing concepts and explanatory variables (Bailey, 2007, p. 200). Central to Bailey's theory is the concept of "temporal perspectivism", which asserts that each of the temporal dynamics mentioned above adheres to its own set of rules governing formation processes and calls for different types of behavioural explanations. By examining the protracted dynamics through which human actions, materials, and natural depositional processes coalesce to create palimpsests, time takes on a significantly more pivotal role in the accumulation of temporally dispersed moments in materiality. In essence, these palimpsests offer people access to a multitude of phases and historical periods embodied in matter, enabling memory to be recollected in the present. This notion aligns with Olsen's (2010) claim that the material world demonstrates how the "past actually gathers in the present" (p. 26).

Olivier (2011) partially supports these views by suggesting that palimpsests "represent a cumulative phenomenon of sequences of human occupation (that produced archaeological remains), thus *recording memory* in the land in the form of superimposed, stratigraphic layers" (p. 129, emphasis added). Much like the perspectives described earlier, Olivier proposes that archaeological records amass sequences of human activities and encompass various moments in time. These moments in time and their associated memories reside within the ongoing changes resulting from the overlapping periods of activity and inactivity. Periods of inactivity, during which depositional processes conceal the traces of past actions, serve as interfaces that allow archaeologists to discern the temporal successions that accumulate over time. This concept can be illustrated through the archaeological practice of excavation.

In any excavation, it can be assumed that archaeologists digging in the central room of the tholos encountered several strata associated with periods of human activity. These activities include funerary practices such as carrying the body of a deceased person, scattering the bones from a previous inhumation, depositing, moving, or removing specific artifacts to reintroduce them into circulation. All these actions, possibly followed by additional funerary practices, left marks that accumulated in the archaeological record. Olivier contends that archaeologists can discern these different periods primarily because of periods of inactivity, during which the physical processes of sedimentation preserve the traces of human actions in the archaeological record. However, it follows that what remains fixed in the archaeological data during periods of inactivity is merely a fragment of the past: all accumulated human practices up to the specific moment observable and documented by archaeologists while excavating the archaeological record. This aligns with Olivier's statement that the past is lost, and only periods of inactivity retain or memorialize all instances of physical changes that occurred in the archaeological context. Olivier notes, "What appears to be a single construction (a hearth, a workplace) is actually an accumulation of physical changes most of whose stages are no longer visible" (Olivier, 2011, p. 130). These periods of inactivity not only memorialise centuries or millennia of accumulated human activity but also preserve the material remains of past human activities.

The scattered bones, figurines, stone or clay vessels, knives, or combs also become entangled in these continual periods of activity and inactivity, becoming memories themselves. They function as palimpsests that record past human actions. Olivier (2011, p. 132) adopts the term *memory objects* to refer to both archaeological records and assemblages of things. In his words,

"A memory object is one in which time is inscribed, or better stated, a material entity in which the memory of a moment in time is recorded" (Olivier, 2011, p. 132). Essentially, archaeological deposits and material culture work in the same way as palimpsests. Just as archaeological strata reference multiple periods of time, so does material culture. Not all the pots or figurines are from the same period or were deposited at the same time. They function as palimpsests that recapitulate, through the visible physical traces left on them, several moments in time, each with its own history of production, use, and discard.

This definition of memory objects leads to one of Olivier's crucial claims: while memory objects memorialize the past, they are not memories themselves. In other words, things do not contain the memory of what happened to them, and the past is never fully accessible in the present. Due to the processes of repetition and transformation that occur over the long term, memory objects only function as indexical signs of all those past events that can be discerned from the memory objects that survive in the present. Essentially, Olivier argues that the past is just a memory, buried by time and only partially accessible to us through archaeological practices.

While Olivier raises interesting points for exploring the relationship between material culture and memory from a temporal perspective inspired by Bergson, he does not provide a clear path for further exploration or exploitation of this relationship. Lucas (2021) also recognizes this drawback in Olivier's work and similarly argues that his discussion on memory "sets up the question but does not really offer an answer" (p. 94). Equally interested in long-term archaeological processes and their ties to memory, Lucas compares the palimpsests resulting from the dual process of erasure and accumulation to the workings of memory in default psychological theories (e.g., Freud's writing pad; Freud 1964). However, his approach to material culture and memory differs in that he sees the past recorded in the archaeological record in terms of information. While Lucas never explicitly uses the word "information", he describes how archaeological practice materializes and translates the knowledge memorialized in the archaeological record (i.e., the palimpsest) into more modern data archives (e.g., drawings, databases, written reports, photographs). Essentially, the information on the past memorialized in the archaeological record "simultaneously produces the archive of the excavation process and of the site itself" (Lucas, 2012, p. 259).

These approaches to *memory and time* reviewed brings something new to the discussion on material culture and memory. I emphasise here two main points. First, these studies acknowledge

that material culture has long-term temporal dynamics that eschew those of humans. It is by virtue of this capacity to outlive individual that things come to accumulate the traces of past happenings occurred to them at different moment in time. This is what Hamilakis and Labanyi (2008) refer to when they discuss the mnemonic nature of things that have been used, reworked, and adapted over time. Specifically, they remark that:

"These objects defy easy attempts at dating and chronological arrangement; they are, rather, multi-temporal, enacting and evoking different times simultaneously. They speak of time as coexistence rather than succession. And they embody, materially and physically, memory as duration" (p. 6).

The views discussed above suggest that remembering something from the past emerges from the interaction between the practices that both past and contemporary people perform with material culture. This position resonates with considerations on style and time, as discussed in Section 2.4, and supports an investigation of memory that goes beyond default memory theories and the temporal scales of human activity, as described in Section A1.1.

Secondly, for these approaches, memory is a present endeavour that involves how people, especially archaeologists, reassemble information about the past. While it's still related to the past, memory here is very much a concept tied to the present. For Olivier, the past is something lost, and memory objects are traces or signs that can only be interpreted through the lens of the present. Similarly, for Connerton, remembering is not simply the recollection of a past memory but is tied to the repetition of habitual practices learned through the body in the present. These arguments will be revisited in Article 1, when discussing how from a Material Engagement Theory (MET) perspective, remembering becomes a present rather than a past endeavor (Section A1.10.3).

While these approaches are useful for thinking about memory from a long-term, multi-temporal perspective and as a present endeavour, they generally retain the idea of material culture as passive surfaces that can be written, erased, and read (Carruthers, 1998; Ricœur, 2004). This observation is not surprising, as these ideas derive from earlier philosophical and psychological approaches where memory is still considered a block of wax. Even when Bailey and Olivier suggest that the past can be completely lost to us, things and archaeological contexts still function in terms of passive surfaces waiting to be written by physical depositional processes and human activities.

Thus, instead of being active participants in memory due to the accumulated multi-temporal histories of past uses and physical events that have happened to them, things still serve *as proxies for remembering*.

In the next paragraph, we will explore how some archaeologists, such as Donald (1991) and Jones (2007), have incorporated archaeological studies and re-addressed the relationship between material culture and memory.

4.2.3.1 - Exograms and engrams

Grounded in the cognitive sciences and archaeology, Donald (1991) makes a stronger claim than previous views on material mnemonics. His main argument can be summarised as such: humans' last evolutionary stage consisted of the capacity to craft and use various types of graphics symbols, such as pictures, writing systems, and graphs as external memory devices to offload increasingly complex information.

Donald (1991) argued that changes in the neural and bodily architecture of previous human evolutionary stages (i.e., primate, homo erectus, archaic human) enabled the earliest *homo sapiens* to develop the cognitive ability to adopt graphic symbols as ways of "external symbolic storage" (d'Errico, 1995; p. 308; also Goonatilake, 1991; see contributions in Renfrew & Scarre, 1998). In his book, Donald discusses several examples of external storage systems, such as monuments, cave paintings, hieroglyphs or cuneiform scripts, alphabets, numerical systems, maps, mathematical theorems, and computer software. The case study of the evolution of visual symbols is particularly relevant to describe his argument on the externalisation of memory.

Donald described at great length how two and three-dimensional carvings on ivory (40,000 BC) and cave paintings (25,000 BC) required complex manufacturing skills, the expert use of tools, knowledge of the landscape to collect the right resources, and experience on behalf of the makers regarding the subjects (e.g., animals, humans, landscapes) to be depicted. Cave paintings, such as those found in Altamira and Lascaux, are generally regarded as highly complex because of the skills and knowledge required by the maker to paint these realistic figures. He argues that, because of these qualities, cave paintings could be linked to specific episodes or events and thus represent direct links to previous experience. He referred to the emergence of these complex figures as a "visuographic invention" (Donald, 1991, p. 275): an essential step in human cognitive evolution which enabled the gradual externalisation of memory into ever-elaborated forms.

In the latter part of his work, Donald linked these earliest forms of visual symbols to later developments in literacy and numeracy. He examined how the earliest writing systems (i.e., Mesopotamian cuneiform and Egyptian hieroglyphs) became gradually more complex. In so doing, he illustrates how, by rearranging in space visual figures associated with ideas and sounds, humans could increasingly offload in material culture information that would have been otherwise difficult to remember and manipulate over phylogenetic time (e.g., literary texts or mathematical theorems) (pp. 333-334). Thus, Donald concluded that drawings, marks, numbers, and writing systems worked as *exograms*, the external equivalent of *engrams*: the neural representation of a memory stored in the neural tissues of an individual (Semon, 1921; Lashley, 1950; Eichenbaum, 2016). Hence, forms of material culture work as stand-ins for previously acquired information on a specific event or fact that exists "outside of the individual, rather than in visual memory" (p. 284). Consequently, he posited that "External memory is best defined in functional terms: it is the *exact* external analogue of internal or biological memory, namely a storage and retrieval systems that allows humans to accumulate experience and knowledge" (p. 309, emphasis in the original). Despite this functional equivalency between *engrams* and *exograms*, Donald recognised a qualitative difference in how exograms extend human memory (Sutton, 2007).

First, in being external to the brain, exograms can be easily improved, changed, or discarded over time (e.g., the evolution of writing systems). Second, their information can be moved across different formats. Third, they possess indefinite storage capacity (i.e., do not forget as humans do). Fourth, they outlive individuals because of their non-biological nature. Lastly, exograms are "*crafted*; that is, they are symbolic inventions that have undergone a process of iterative examination, testing, and improvement" (Donald, 1991, p. 315-316). In being external to human biology and possessing unique qualities that set them apart from internal memory, exograms allow people to recall, manipulate, and put into storage information previously stored. This enduring quality of exograms enabled future generations to access and improve the information. Exograms of all kinds, therefore, give rise to a "collective memory bank" that works "as any external memory device for a computer" (p. 311).

This last quality of exograms highlights the social nature of memory and provides a link to anthropological approaches to material mnemonics. An example of these studies is that of Jones (2007), for which "notched bone implements, clay and stone tablets, carved stelae, (…) maps, drawings, photographs, phonographs" extend human storage for memory acting as "devices for

storing memory in extrabodily form" (p. 1). However, if Donald saw things as storage for memory amenable to modifications, Jones considered memory as resulting from an imperfect act of recollection occurring through the embodiment of the senses. Specifically, he claims that if things are productive of memory, that is because their physical aesthetic qualities elicit emotions in people. Hence, the relationship between material culture and memory is a sensory one whereby material culture works as memory for meanings to people because they instantiate memory through the embodiment of the senses (also, Hamilakis, 2013). Yet, whilst undoubtedly fundamental in thinking about how emotions and the aesthetic dimension of material culture may be productive of memory - something which I shall discuss in Article 2 - this distinction between Donald and Jones does not change the idea that material culture works as a collective memory bank. Therefore, for Donald and Jones, the sociomaterial context becomes a constructed ensemble of cultural resources used as signs to extend human memory and aid in solving remembering problems beyond human capacities.

Donald's distinction between internal and external memory resources is essential for the relationship between material culture and memory. It shows for the first time that exograms improve (or *complement)* our innate biological memory (see Sutton, 2007). However, whilst Donald and Jones started to recognise that material culture and memory are more closely linked than so far accounted, they still consider things secondary to human cognitive processes. Even if acknowledging that exograms differ from engrams, there is no difference in how a cuneiform tablet or a decorated pot work in mnemonic terms. Essentially, insofar as they operate as a system of symbols capable of storing information, types of material culture are considered exograms regardless of their physical qualities. However, in the article that follows, I argue that if there is something for which material culture differs from internal biological memory, it is in *how* different types of material culture, with their qualities, histories, and traditions of uses, affect the ways in which we act and think in specific situated contexts (Gosden, 2005; Knappett, 2010; Malafouris, 2013).

In the following article, I present an alternative pathway to consider the cooperation between material culture and memory grounded in Malafouris's (2013, 2019a) MET and supported by recent developments in the philosophy of cognitive sciences.

Article 1 – Enacting Memories *Through* and *With* Things: Remembering as Material Engagement[22]

Abstract

For mainstream theories, memory is a skull-bound activity consisting of encoding, storing, and retrieving representations. Conversely, unorthodox perspectives proposed that memory is an extended process that includes material resources. This article explains why neither representationalist nor classical extended stances do justice to the active and constitutive role of material culture for cognition. From Material Engagement Theory, we propose an alternative enactive, ecological, extended and semiotic viewpoint for which remembering is a way of materially engaging *with* and *through* things. Specifically, we suggest that one remembers when one updates their interactions with the world, a form of engagement previously acquired through sociomaterial practices. Moreover, we argue that things are full-fledged memories, since they accumulate and bring forth how we have materially engaged with them over different timescales. Last, we highlight the need for studies considering the cognitive ecologies where remembering takes place in its full complexity.

A1.1 - Introduction

Memory is one of the phenomena that most attracts researchers in the cognitive sciences. Thanks to memory, or so mainstream perspectives argue, we can build our personal past through encoding, retaining, and recalling important information in our mind or brain. Without memory, we would not be able to access our experiential record as a coherent whole and would be forced to wander around lost between unrelated moments. As a result, our life would have no past or future, and we would remain trapped in a continuous present.

Despite being hegemonically seen as a skull-bound process, different theories have begun to acknowledge the importance of material culture for memory. Such is the case, for example, with theories of extended cognition. This material turn agrees with current proposals that consider it crucial to seriously examine the cognitive relevance of things, an aspect long neglected in cognitive

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studies. This article aims to elucidate the relationships between memory, remembering, and material culture.

In the first section, we analyse the mainstream and traditional accounts of memory, outlining the problems that derive from considering it an internal, mental activity, consisting of the storage and recovery of mental states. In the second section, we examine theoretical proposals about memory that recognise material culture as having some role in mnemonic processes. We argue that these proposals, despite constituting unorthodox views, do not do justice to the role things have for cognition since they still consider material culture as subordinate to internal mental processing. Accordingly, we uphold the need for a model that considers materiality in all its seriousness and clarifies the process by which people and things co-constitute each other.

In the third section, we show why the Material Engagement Theory (MET) is a suitable theoretical framework for achieving such an enterprise. MET is a contemporary theoretical framework emerged in the field of cognitive archaeology. It combines elements of the embodied, embedded, extended, enacted, ecological, and semiotic approaches to cognition. According to this framework, mind and matter co-constitute and intertwine to such extent that they are ontologically inseparable. For MET, then, the study of cognition is the study of how humans engage *with* and *through* materiality over time.

Drawing from MET, in the fourth section we present our original view on memory. We claim that remembering is not an internal phenomenon but a way of interacting *in* and *with* the world. We contend that remembering is, more specifically, a type of material engagement by which we update in our interaction with the world a form of engagement previously acquired through sociomaterial practices. Furthermore, we propose that thanks to processes of semiotisation, things become memories themselves, since they accumulate meaningful ways of engaging with the world over different timescales of material engagement. In our view, memory is an extended and continuous process that unfolds over different timescales of material engagement *with* and *through* material signs. Finally, contrary to traditional accounts of memory, we conclude that things endure not because we form an internal copy of them but because they remain meaningful for material engagement. This is achieved thanks to the processes by which, over different timescales, the material qualities of things become intertwined with the specific sociomaterial practices in which humans take and have taken part.

A.1.2 - Mainstream Accounts of Memory

Theoretical models of memory come in a variety of flavours. There are general and specific ones (i.e., dealing with a particular mnemonic system, such as procedural, episodic or semantic memory) (see Ribot, 1907; Roediger et al., 2002). Some models claim to be holistic, while others are specific to disciplines such as psychology, archaeology or neuroscience (Solomon et al., 1989). There are also formal models (i.e., devoted to explaining the structure of mnemonic processes) (e.g., Oberauer & Kliegl, 2006), and others that are clearly oriented towards practical applications (e.g., that investigate the use of memory in education or decision making) (e.g., Klein, 2015).[23] Of course, we cannot produce a detailed exegesis of all the perspectives that have tried to circumscribe this complex phenomenon that we call, to be economical, *memory*. Nevertheless, we do wish to draw attention to a series of ontological assumptions that underlie most models of memory.

Some of those assumptions are linked to the very definition of *memory* and *remembering* (i.e., what *memory* is and what *remembering* means). One of the perennial legacies in cognitive science is the conception of memory as a *place* (Roediger, 1980). In Locke's words, memory is the repository or store-house where we store and retain memories (i.e., the objects of our past thoughts) to retrieve them later. Remembering is "the power to revive again in our minds those ideas which after imprinting have disappeared, or have been as if it were laid aside out of sight" (Locke, 1881, p. 97). Thus, memory is primarily about the *psychological survival* (Ebbinghaus, 1984) of external stimuli under the form of *mental states*, somewhere on a private inside. Many others have endorsed this view by defining memory as a treasure-house or the backstage of performance (Cicero, trad. 1967), a room (Freud, 1924), or a store (Atkinson & Shiffrin, 1968). The adoption of such spatial metaphors, so pervasive in definitions of memory and other cognitive phenomena, almost discloses the extent to which Cartesian metaphysics have influenced (and live on within) cognitive studies. It led theories to assume the primacy of the first person and the existence of an executive centre, independent of embodied action and the material world, where high-level reasoning is carried out (Smit, 2020). For even when contemporary researchers do not speak of memory in the same terms as Cicero, they continue to hold a localisationist ontology.

[23] Some models even account for false and distorted memories (for an overview, see Brainerd & Reyna, 2005) and their practical consequences (e.g., Loftus, 2003, 2005). For instance, the classic experiment by Loftus and Pickrell (1995) showed that misleading post-event information can lead subjects to experience memory distortions or recollect events that never happened to them (e.g., getting lost in a shopping mall when they were children).

Meanwhile, in the computational paradigms, it remains hegemonic to speak of memory as a process of encoding, storage, and retrieval of information *in the mind* (McBride & Cutting, 2019). Information encoding formats can surely be very varied: bits and chunks of information (Miller, 1956), propositional mental representations (e.g., Tulving, 1983), mental plans (Miller et al., 1960), mental images of various types (e.g., Bergson, 1910; Cornoldi et al., 2008), semantic-conceptual networks (e.g., Lindsay & Norman, 1977), and scripts (e.g., Abelson, 1981; Schank & Abelson, 1977), among others. Regardless of the format, they all refer to mental, internal entities. For others, the *locus* of memory is not an abstract mind but the brain. Ribot (1895), who proposed that "memory is, in essence, a biological fact; by accident, a psychological fact" (p. 1), and James (1892), for whom retention takes place as a "purely physical phenomenon (...) in the finest recesses of the brain's tissue" (pp. 291-292), pioneered this perspective. Based on this, Penfield's (1950) experiments showed that stimulation of the human cortex could evoke recollection and concluded that the place of memory is the brain circuits. Added to the proposal that the brain is an organ of computation (Marr, 2010), this view motivated studies that, to this day, attempt to unravel the nature of the neurobiological mechanisms of memory and the location of memory-related information in anatomical structures of the brain (e.g., the hippocampus or the medial septum) (e.g., Allen et al., 2020; Hanslmayr et al., 2019).

Another assumption associated with localisationism is that memory is an individual psychological capacity (Tulving, 1983): as private entities in charge of memory, the mind or the brain are inaccessible to others. Interestingly, this assertion is even shared by the somewhat more recent field of *collective memory*. Thus, several studies attempt to explain how social contexts unidirectionally affect individual memory processes and "how memories can be biased through contact with others" (Echterhoff & Hirst, 2009, p. 106). The underlying hypothesis is that "a given social setting can *dictate* what sorts of recollections are most appropriate or commensurate with *individual goals of communication*" (Roediger et al., 2002, p. 17, emphasis ours). Meanwhile, other studies inspired by the contributions of social psychology regarding *social representations* and *culturally shared knowledge* (Moscovici, 1961) focus on how individuals appropriate a community's understanding of its shared past (e.g., Carretero & Van Alphen, 2018).

We want to argue here that the localisationist and individualistic commitments of these mainstream perspectives seriously limit our understanding of memory. First, because by situating mnemonic processes exclusively in the subject's mind or brain, they dismiss both the constitutive

role of *contexts of activity* and *material culture* that define the pragmatic usefulness of memory. If there is anything for which memory is cognitively relevant, it is how it eases the achievement of our objectives in everyday contexts of activity. In such contexts, things do not only matter to the extent that they generate sensory impressions that can be internally stored, as mainstream perspectives suggest. Second, by thinking of memory as a process of inputting, storing, and outputting, mainstream views adhere to a *substance metaphysics* that neglects the dynamic aspects (Bickhard, 2019) of memory as a process. Furthermore, the emphasis on the individual dimension of memory leaves relevant questions unexplained (e.g., how do we communicate with others about what we remember if mnemonic contents are individual and private?). We will argue here that there is more to the social dimension of memory than the collective forces that can affect individual performance: memory is, itself, a joint activity. To move towards our characterisation of *memory as a situated and collective practice with, through, and about material culture*, in the next section we analyse contributions that have claimed that things do play some role in mnemonic processes.

A.1.3 - Memory and Things: A Troubled Relationship

Pragmatic and cultural perspectives have repeatedly drawn attention to the intimate relationship between cognition and the practical settings where it takes place (e.g., James, 1892; Merleau-Ponty, 1963; Sereda, 2011). Since cognition is *situated*, its study must acknowledge specific activity forms and their changing functions (e.g., Leontiev & Luria, 1972; Nelson & Fivush, 2000). From such a view, memory could not be a self-sufficient psychological function. As "a by-product of everyday life" (Nelson, 1989, p. 131), memory is oriented towards obtaining a *pragmatic profit* (Alessandroni & Rodríguez, 2019). Therefore, understanding memory involves, inevitably, acknowledging *where* and *for what* we remember.

Since material culture is a fundamental part of our *cognitive ecologies* (Hutchins, 2010), considering pragmatic settings necessarily implies *rethinking the role that things have in cognitive processes*. On one point there seems to be some agreement: things are more than just lifeless substrates that motivate sensory impressions, and their importance far exceeds that of being the *aboutness* of internal mental states (i.e., external referents to which our internal states would be causally linked). As to what the concrete role of things is, the agreement is not so blunt. In what follows, we review two perspectives on the matter.

A.1.4 - Objects as Proxies for Remembering

"I was still a little girl... one night... I remember...".[24] This is how Leïla begins to narrate one of the plot knots of *Les pêcheurs de perles*, Bizet's famous opera (Cormon & Carré, 1923, p. 15). In the story, a fugitive called Zurga desperately knocks on the door of her cottage, asking for shelter. Leïla, assuming great risks, promises to protect the man, thus saving his life. In gratitude for not handing him over to his pursuers, Zurga decides to give the girl a pearl chain necklace. In doing so, he says "(...) take this chain and keep it always, in memory of me! I will remember!"[25] (p. 15). Leïla would always carry the necklace as a symbol of her loyalty to that promise. Years later, Zurga finds himself caught up in a love dilemma. Despite trying to seduce an enigmatic woman whose identity he does not know, she is determined to love Nadir, one of Zurga's most trusted friends. The choir foretells it all: Nadir will "un*chain"*[26] (p. 21) the fury of the gods. Indeed, tormented by his anger, Zurga orders the murder of Nadir and the woman, who is willing to die alongside her beloved. Before leaving for execution, the woman gives a fisherman her pearl chain necklace and asks him to hand it over to her mother. Zurga is dumbfounded: the enigmatic woman is, against all odds, the same girl who years ago saved him from death. The outcome is known: Zurga forgives Leïla and Nadir and, to fulfil his original promise, sets a fishing camp on fire so that, during the distraction, the lovers can escape. Just before the end of the opera, Zurga tells Leïla: "Leïla, remember, you saved me once, be saved by me"[27] (p. 31) while showing the necklace and dramatically breaking its chains.

In this fine example, it is quite evident that the pearl chain necklace is somehow related to memory. Some would say it behaves as an *aide-mémoire,* an artificial device specifically conceived to spur remembering (D'Errico, 2001). If it had not been for the pearl chain necklace, the end of the opera would most likely have been different (i.e., Zurga would have executed the couple without knowing the woman's identity). Vygotski (1978) considered cases like this one in positing his theory of *indirect memory*. For him, indirect memory is a higher psychological function, of logical nature and cultural origin. Like other higher psychological functions (e.g., creativity), this specifically human capacity is semiotically mediated, involves conscious control, and allows us to reorganise and self-regulate our behaviour. What does it mean that memory is

[24] "J'étais encore enfant…un soir…je me rappelle…".
[25] (…) prends cette chaîne…Et garde-la toujours, en souvenir de moi! Moi, je me souviendrai!".
[26] "déchaîne".
[27] "Leïla, souviens-toi, tu m'as sauvé jadis, soyez sauvés par moi".

semiotically mediated? In a nutshell, that we can actively influence the way we remember by making use of signs. The paradigmatic case analysed by Vygotski (1978) is that of the knot in the handkerchief:

"When a human being ties a knot in her handkerchief as a reminder, she is, in essence, constructing the process of memorising by forcing an external object to remind her of something; she transforms remembering into an external activity. This fact alone is enough to demonstrate the fundamental characteristic of the higher forms of behaviour. In the elementary form something is remembered; in the higher form humans remember something" (p. 51).

The process by which we transform and use the knot *as a reminder to remember something* follows, from this perspective, a series of steps. First, there is a person's desire to remember some mental content in the future. Since she knows she will probably forget it, she transforms whatever object into a symbol of that content by establishing an arbitrary, idiosyncratic convention (i.e., signs are "self-generated stimuli"; Vygotski, 1978, p. 39), only valid for her (i.e., if other subjects saw that knot, they most likely would not interpret it as a reminder). In doing so, the object becomes a vehicle for the meaning to be conveyed: the externalisation of memory transforms things into a type of *memoria technica* (Grey, 1751). Secondly, thanks to semiotic interpretation processes, the object *acts back* on its creator by bringing back meaning. Thus, on seeing the symbol, the subject deconstructs the sign she has created, recalls that she should remember, and is guided back to the appropriate mental content (e.g., a belief).

Nevertheless, symbolised objects do not indicate, in any way, *what* we should remember. They act as a wake-up call, as *auxiliary means* (Daniels, 2001) that trigger the subject's memory processes. In this way, memory is still, for Vygotski, the retention and recovery of information *in* and *from* the inner world. The novelty is just that external elements can mediate this activity. It is also worth noting that although things are functionally important (i.e., they help us remember), they appear here to be *semiotically contingent*: any object can be in place of any content, regardless of its material characteristics. Zurga's necklace could have referred to other quite varied contents (e.g., an important date). Moreover, Zurga's story could equally have been evoked by other objects besides the necklace (e.g., a knot in a handkerchief). Things behave, therefore, as *nonsemantic factors* (Shanon, 1990). As here things do not add nor subtract anything to the meaning they refer

to, they are mere *proxies for remembering*. Of course, this leaves some issues unsolved. Let us just suggest one of them: Why does Zurga break the necklace after recovering his memories? After all, if the association between the object and the memory was no longer significant or useful, it would have sufficed for Zurga to "dissolve" it mentally, on the plane of the arbitrary symbolism that created it in the first place. Why does Zurga need to get materially engaged with the necklace? We will come back to this later.

A.1.5. Things as Instantiations of Mental States

Theories of extended mind, active externalism, and vehicle externalism (Donald, 1991; Hutchins, 1995a; Clark & Chalmers, 1998; Rowlands, 1999; Sutton, 2010) argue that, under specific circumstances, information-laden things can instantiate cognition, therefore implying that cognition need not be skull-bound (e.g., Kirsh & Maglio, 1994; Heersmink, 2020a, 2020b).

Donald (1991) was among the first to propose that things can instantiate memory. Particularly, he argued that the development and use of visual symbolic systems (e.g., cave paintings) resulted in a new stage of human cognitive evolution where things started to serve as external memory storages. In contrast to the *engram* term coined by Semon (1921), Donald referred to external symbols as *exograms*: while an engram is "a single entry in the biological memory systems" (i.e., a memory trace of a past experience stored in the neural substrate, see Josselyn & Tonegawa, 2020), an exogram is an external record of an idea, an idea stored in a thing (Donald, 1991). Due to their neural nature, engrams are limited in storage, difficult to alter, and short-lived. Contrarily, the external nature of exograms makes them more stable and flexible for improving thinking, as well as indefinite in storage capacity: things do not forget as humans do (pp. 314-319). As an example, Donald provides an analysis of the use of writing systems, such as cuneiform or Egyptian hieroglyphs, work as storage for information. He shows that, by rearranging in space little figures associated with ideas and\or sounds, people were able to offload onto the environment complex information that would have been otherwise difficult to remember and develop (e.g., literary texts or mathematical theorems) (pp. 333-334). He also argues that the continuous use of writing systems through the generations produced a "a collective memory bank" that made available a virtually indefinite storage for information (p. 311), thus highlighting the cultural and longitudinal

nature of external memory.[28] More importantly, Donald believed that exograms are *functionally equivalent* to engrams inasmuch as they make up "a storage and retrieval system that allows humans to accumulate experience and knowledge" (p. 309).

After Donald, other authors have argued that things can instantiate cognition resorting to the idea of functional equivalence (Clark & Chalmers, 1998; Rowlands, 1999; Sutton, 2010; for digital technologies see Heersmink & Carter, 2020). Clark and Chalmers' view, for instance, maintains that memory extends into the environment insofar as external resources work as internal cognitive processes (1998). The quintessential example is the Inga-Otto thought experiment. In this experiment, whenever Otto needs to remember something, he writes and consults information on his notebook. Since the notebook plays for Otto the role usually played by biological memory (i.e., the storage and retrieval of information), the authors argue that it can be considered a part of his cognitive apparatus (p. 12). This conclusion is based on the *parity principle:* "if as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is part of the cognitive process" (p. 8).

Relative to Vygotski's theory of mediated memory, Donald's perspective on exograms and extended mind theories bring something new to the table: things are important for remembering not because they elicit memories (i.e., because they act as proxies), but because they can actually instantiate mental states. Given that exograms can store information, they expand and complement engrams, as does Otto's notebook. However interesting this rapprochement between things and memory, classical extended theories present some problems. First, memory remains a psychological function carried out, primarily, by an inner mind. If exograms and notebooks can act as sources of memory it is because they are considered functionally equivalent to internal remembering processes. As pointed out before, by equating external resources to inner mental processes, extended perspectives remain "inevitably tied to the boundaries between inner and outer that they wish to undermine" (Di Paolo, 2009, p. 10). As a result, while defending that cognitive processes can be extended into the world (Clark, 2008, p. 79), these theories leave the representationalist logic of information processing untouched. Second, they advocate that external

[28] Interestingly, while sharing Donald's arguments, Jones (2007) proposed a different view on how exograms externalise memory. For him, memory is manifested in the way in which people physically engage with exograms to retrieve specific information and not just in the content that exograms store. In this way, his view comes closer to our proposal.

resources can instantiate memory because they carry information. For instance, it is enough that Otto's notebook contains propositional information written on its pages to be considered part of his memory. This information-centred approach overlooks important aspects of our relationship with materiality. When we engage with things, we do not simply extract information from them. We can carry, touch, use, hold, and arrange things (among other possibilities), and each of these activities has cognitive relevance. As Sutton argued (2007), external resources may hold information in different ways, or not hold information at all. This reinforces the idea that things should not be considered as resources for cognition only because of their informational properties. Last, by giving primacy to the degree to which materiality resembles the inner processing of information, classical extended theories do not account for the unique characteristics of things, and how they affect or constitute memory (Sutton, 2007). What matters for them is that cognition *is* extended, not *where* it is extended. Somewhat paradoxically, this implies that materiality can act as an external memory despite its materiality.[29] However, there seems to be a big difference between remembering a story by writing it in a notebook or through Zurga's necklace. It is clear for us that differences in how materiality influences memory should be carefully addressed. This is something that cognitive theories have only recently started to consider and, therefore, is in need of further elaboration (Heersmink, 2020a; Hutto & Myin, 2013; Malafouris, 2004; Malafouris & Koukouti, 2018; Prezioso, 2021). With the aim of contributing to this ongoing debate, in the remainder of this paper we develop the argument that things constitute memory because of the particular characteristics of our material engagement with them.

[29] Our critique mainly applies to traditional perspectives on the extended mind, based on the parity principle. A more contemporary set of contributions, belonging to the second and third waves in extended mind theorising, have revised (e.g., Clark, 2003, 2008, p. 114) and even challenged the parity principle, and have suggested that cognition is a holistic affair (for a discussion, see Colombo et al., 2019). For instance, it has been proposed to define cognitive systems in terms of their degree of *integrity* (rather than their ability to extend), the latter defined as the ability of the elements of a system to work together as a unified whole to achieve the system's functionality (e.g., Goldstone, 2019). In considering the *complementary integration* between agents and artefacts (e.g., Heersmink, 2015), these contributions are somewhat aligned with the premises of Material Engagement Theory and the idea that cognition is a process of continuous becoming in which a coalition of human and non-human agents co-constitute each other (see Ihde & Malafouris, 2019; Malafouris, 2021a for a discussion on the concept of *participatory mentality*). Nevertheless, it should be noted that, as argued by Loughlin (2020), minimising or eliminating the parity principle could result in a distortion of the extended perspective altogether.

A.1.6. Material Engagement Theory: A Transactional Stance on Cognition

So far, we have shown that mainstream perspectives consider remembering as the manipulation of representations in the head. Other views extend the phenomenon beyond the individual, also considering things. When they do, however, they exhibit limitations. While in the case of things as proxies objects are arbitrary symbols that remind us to remember, for classical extended approaches things can work as realisations of internal mental states as long as they are functionally equivalent to the latter. Is it possible for things to be otherwise related to memory? In this paper, we argue it is, from MET's extended, enactive, ecological, distributed and semiotic stance (Malafouris, 2013, 2019a, 2019b). Furthermore, we briefly explain what *cognition* and *things* are for MET. In the last section, we elaborate on why MET implies a new look at memory as a situated activity where things are full-fledged active participants.

A.1.7. Think-ing as Thing-ing: An Extended, Enactive and Ecological Approach

If for the Cartesian tradition cognition is a property of *res cogitans* independent of the body and the environment, for MET it is quite the opposite: mind and matter co-constitute and intertwine to such extent that they are ontologically inseparable. Here, the study of thought processes is a situated enterprise. For one thing, this means that it is impossible to understand cognition as detached from its ecological conditions: to study cognition is to study *cognitive ecologies* (Hutchins, 2010), the space where brains, bodies, and things conflate (Malafouris, 2004, 2013). This is because thinking can only occur in structured material environments (Ingold, 2000), under specific material and social coordinates.[30] This is a strong hypothesis, as MET goes beyond perspectives that consider the sociomaterial as a context or as a causal influence on thought: the mind is "situated within and constituted by the material world rather than merely being about it" (Malafouris, 2018, p. 756). Things and socio-cultural practices are the matter of which thought processes are constituted (Gallagher & Ransom, 2016). Conversely, for MET materiality is not an instrumental dimension through which internal mental states are externalised: we do not think in the head and then express our thoughts using things as a medium. On the contrary, thought is articulated *with* and *through* things, during meaningful material engagements. Hence, thinking

[30] The idea that the sociomaterial coordinates of action are constitutive of cognition also applies to cognitive processes usually considered abstract and disembodied, such as imagination. Thinking, whatever its form, is always entangled with matter and the affordances of things (for a discussion, see Koukouti & Malafouris, 2020).

refers to acts of consciousness (Malafouris, 2019a) that emerge during transactional and transformational exchanges with the material world (Malafouris, 2019b): thinking is *thing-ing* (Malafouris, 2013, 2014), interacting with, through, and about things within specific forms of activity.

The material and interactive turn proposed by MET coincides with the aims of the enactive-ecological (EE) stances, where a core challenge is "to do justice to the role of the environment in guiding and constraining cognitive processes" (Kiverstein & Rietveld, 2018, p. 149). First, because for EE approaches, cognition is also a relational phenomenon resulting from the agent-environment co-determination (Varela et al., 1991). Accordingly, the minimum unit of analysis is that of an agent interacting in an environment: cognition is "an embodied engagement in which the world is brought forth by the coherent activity of a cogniser in its environment" (Di Paolo, 2009, p. 12). Second, the idea of *mind as minding* (Malafouris, 2019a) —an extended, in-between process emerging from the engagement with materiality— connects strongly with the enactive-ecological goal of understanding how and when, through interactions with their environment, organisms produce and sustain different forms of organisation. This point also implies the rejection of a substance metaphysics in favour of a process ontology (Bickhard, 2019), in which cognition is *cognitive becoming* (Gosden & Malafouris, 2015). Last, MET and EE paradigms agree that the usually considered *representation-hungry problem types* (Clark & Toribio, 1994) can be addressed without postulating the existence of skull-bound mental representations, namely "stand-ins" for external states of affairs (Kiverstein & Rietveld, 2018). As Malafouris (2019a) nicely explains, "things have a cognitive life not because of what they represent, or of how they can be represented, but for what they do" (p. 8).

As far as the study of the relationships between cognition and things is concerned, MET is a much richer perspective than orthodox paradigms, in at least two senses. First, unlike the empiricist tradition that sees things as incidental collections of sensations (Locke, 1881), MET maintains that things are active agents of the transactional process that thinking is. Second, MET rescues things from the place of the *aboutness* of cognition. Things are not fixed referents to which our mental representations are aimed (Malafouris, 2004), but the very arena in which cognition takes place (Ransom, 2019).

A.1.8. Material Engagement and Enactive Signification

Due to their material qualities, their histories of engagements, and the socio-cultural settings of which they are part, things become *meaningful*. In this sense, for MET things develop as semiotic entities rather than just being lifeless bits of reality. The process whereby things acquire specific meanings and become *material signs* in situated contexts where bodies, brains, and things conflate is termed *enactive signification* (Malafouris, 2013). Material signs act in unique ways. For instance, while linguistic signs arbitrarily symbolise content that is independent of them, material signs bring forth meaning by instantiating it. Since material signs are not enunciated but *enacted*, they are a constitutive part of what they express. Simply put, things acquire meaning in virtue of what we do with them (Malafouris, 2013, 2019b).

MET challenges the standard conception that meaning is an *a priori* mental product placed on things. Things do not "sit in silence waiting to be embodied with socially constituted meanings" (Olsen, 2010, p. 10): meanings are the emergent product of material engagement. For Afro-Cuban diviners, for instance, the concept of power is related to a consecrated powder they engage with while conjuring deities that *powder* is *power* (Holbraad, 2007). The process by which powder *becomes* power (i.e., powder comes to signify power) emerges in the action of conjuring divinities *through* and *with* powder. The diviners' power is, therefore, strictly correlated with the material qualities of powder, the gestures it gives rise to, and the sociomaterial practices where it is used.

This example illustrates why things, due to their capacity to act directly in the world through their physical presence, have ontological precedence over concepts. Thus, we agree that "the concept is meaningless without the actual substance" (Renfrew, 2001; as quoted in Malafouris, 2013, p. 97). Things, as material signs, embody meaning through qualitative, spatial, or temporal relations (Knappett, 2005), bringing forth concepts as concrete exemplars and substantiating instances (Malafouris, 2013, p. 97).

A.1.9. Material Engagement, Social Interactions, and Normativity

Material engagements are social in nature. Like any other aspect of our being-and-becoming-in-the-world, they occur in social situations that constrain and constitute them at the same time: socialisation and materiality coalesce within *sociomaterial practices*, thus making it impossible to

separate them except for pedagogical reasons.[31] Although many empirical studies on cognition fail to consider this fact in their methods (see Alessandroni & Rodriguez, 2020), the importance of the social is much more recognised in the theoretical sphere. For Leontiev (2009) and his Marxist model, for example, it was clear that individual activity does not exist outside the system of social relations *in which* it is part. The individual-society dualism, deeply rooted in the cognitive sciences, does not hold up because, ontologically, both the individual and society are dialectically co-determined (Castorina, 2020; Gergen, 2003).

However, at the processual level of ontogenesis (i.e., the developmental history of an organism), the social aspect undertakes perhaps greater importance than at the ontological level. Newborns are incredibly dependent and non-specific organisms (Karmiloff-Smith, 1996). Human babies, unlike babies of other species, require social contact and constant attention from their caregivers to survive. It is only due to social interaction through increasingly complex *modes of relatedness* that babies can progress and acquire skills (Stern, 1985). The idea that biology is *socially oriented* from the start (Wallon, 1970) has been an axiom for research in developmental psychology. Perhaps this is why there is a large academic literature on how, within *dyadic interactions* (i.e., adult-baby interactions, see Trevarthen & Hubley, 1978), aspects such as the coordination of body movements or the musical components of vocalisations are organised (e.g., Papoušek & Papoušek, 1981). In contrast, very little is known about the relationships between early interpersonal communication and material culture, probably due to the long-standing subject-object dualism which has skewed much of the psychological research (Malafouris, 2019b; Smit, 2020).

Fortunately, several authors have gradually begun to recognise the relevance of *early triadic interactions*, namely adult-object-baby interactions that occur before nine months of age (e.g., Striano & Stahl, 2005). This *triadic turn* in the study of cognitive development is crucial. On the one hand, because objects are part of interactions from the beginning. For "even when the child cannot blend in the same communicative act one object and another person, he is *placed by others in meaning-loaded material scenarios*" (Alessandroni et al., 2020, p. 1556, emphasis ours). On the other hand, because, as mentioned, things are more than bundles of sensory impressions. By taking part in sociomaterial practices that are sustained over time, things acquire *meanings* that are not

[31] Our proposal for considering both sociocultural practices and materiality is also shared by archaeological views on memory (Borić, 2010a; Mills & Walker, 2008; Olivier, 2011; Van Dyke & Alcock, 2003). Of particular interest is Jones (2003), who specifically argues that one cannot understand memory without considering the material dimension of things and the social practices associated with them.

accessible through mere individual exploration (Rietveld & Kiverstein, 2014; Rodriguez, 2012). In these cases, access is always semiotically mediated by others: during interactions, adults dynamically modulate the opportunities for action available to the infant (Nonaka & Goldfield, 2018) by deploying meanings through a plethora of semiotic mediators (e.g., use demonstrations, gestures, or language) (Alessandroni, 2020).

This fact has enormous implications: if children manage to establish meaningful material engagements with the world and can communicate with others around them, it is thanks to others who have acted as *semiotic filters* (Rodríguez & Moro, 1998), actively shaping niches of joint action. Caregivers are therefore guides who, little by little, introduce the child to the culturally relevant action formats that they embody during interaction (Kärtner, 2018). Recurrent patterns of activity also involve a non-discursive and enactive *normativity*: once specific interactive formats become ritualised (Rączaszek-Leonardi et al., 2019), adults expect children to be increasingly capable of engaging with material culture skilfully. Thereby, action becomes "subject to normative assessment as better or worse, as more or less correct given the specific demands of the situation" (Kiverstein & Rietveld, 2018, p. 154). Within this framework, "rationality is all about acting *comme il faut*" (Alessandroni, 2020), that is, complying with the proper ways of taking part in sociomaterial practices.

It is worth recalling, as cognitive archaeology teaches us, that sociomaterial practices and their normative qualities extend beyond the situated and ontogenetic timescales and unfold through long-term trajectories of human cognitive becoming (Gosden & Malafouris, 2015; Malafouris, 2013; Overmann & Wynn, 2019). This is so because, within the sociomaterial dynamics of interactions, "form gives rise to patterns of practice in people, and, equally, patterns of practice help create form" (Gosden & Malafouris, 2015, p. 703). Through their interweaving, things and sociomaterial practices come together into *traditions*, namely "specific sets of procedures, gestures, tools, materials, finished products, and beliefs and attitudes towards actors and materials" (Gosselain, 2008, p. 152). In this sense, traditions are appropriated, redefined, and passed on in specific contexts by interacting *with* and *through* knowledgeable others who act as guarantors of specific practices, alongside things themselves.

A.1.10 - A Material Engagement Perspective on Memory and Remembering

In the previous sections we have shown the limitations of traditional perspectives on memory and developed the foundations of MET. From this theoretical framework, objects are not passive referents of cognition nor do they possess meaning solely due to their informational capacities. Contrary to traditional cognitive studies, MET examines how our ways of thinking and socialising are "embedded in gestures of enactive signification" *through* and *with* things (Malafouris, 2019a). Applied to memory and remembering, the approach of material engagement and cognitive archaeology situates things back into our cognitive ecologies. It considers the active qualities that things have and how they shape our social and cultural worlds over time. By taking into account MET's premises, in this section we present a new way of considering the relationship between things, *memory,* and *remembering*.

A.1.10.1 - Remembering as Material Engagement

Once the standard representationalist approach is abandoned, it cannot be argued anymore that remembering is an internal mental process. Remembering, from an EE paradigm means, necessarily, a way of interacting *with* the world. From MET, remembering would be a way of engaging *with* and *through* things, namely an enactive, extended, semiotic, and situated activity. Consequently, the one who remembers is not the subject but *a-subject-interacting-with-and-through-a-thing*: the subject remembers as much as the thing remembers itself, and it is not possible to differentiate these two terms.[32] More precisely, remembering occurs in that in-between space that emerges when brains, bodies and things conflate according to sociomaterial dynamics of interaction.

However, not every interaction entail remembering. We propose that we remember whenever we update in our interaction with the world a form of engagement previously acquired through sociomaterial practices. We should note that our approach is in line with Bartlett's theoretical proposal, who, despite not analysing the role of materiality for remembering, studied memory in

[32] Psychology classifies types of memory according to the "different kinds of information they process and the principles by which they operate" (Squire & Dede, 2015, p. 3; for a discussion, see Michaelian, 2011). However, as we argue that memory is a transactional process occurring *with* and *through* things rather than the processing of internally stored information, our proposal does not concur with the mainstream classification of memory types (i.e., once memory is defined as a cognitive act involving brains, bodies and things, categories based on how information is mentally processed are no longer useful). In our view, a more productive undertaking would be to describe mnemonic activities and their sociomaterial coordinates (see Malafouris, 2013; Sutton, 2015).

relation to behavioural regularities. The notion of schema, so central to his theory, refers to "an active organisation of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organic response" (1995, p. 201). In terms of Bartlett's works, remembering can be defined as a behavioural attitude towards the world that emerges whenever we are re-enacting schemata (p. 208). A simple example is in order. Children appropriate the canonical functions of artefacts around ten months of age. When they do so, objects become functionally permanent (Rodríguez, 2012), and children become capable of performing canonical uses of objects, that is, uses that are congruent with socio-cultural norms (e.g., a cup should be used to drink liquids). These norms of cultural use are not inherent to artefacts themselves but learned through other subjects who (en)actively shape the ways children interact with things (e.g., demonstrating the canonical use of a cup). As the child incorporates the interactive dynamics that characterise the canonical uses of objects, she becomes more and more skilled at bringing forth canonical ways of materially engaging with the world. When the child re-enacts these particular kinds of interactions, she updates a normative way of engaging with material forms derived from longer traditions of sociomaterial interactions. We would argue that she is remembering how engagement should unfold in her community of practice and, by doing so, also reshaping the characteristics of current and future sociomaterial interactions.

A.1.10.2 - Things Are Memories

While arguing that remembering is a situated activity that takes place *with* and *through* things, we also sustain that things are more than symbols or material instantiations of internal mental states. As argued before, things accumulate ways of engaging with the world over different timescales of material engagement: from that of online action where memories are enacted (i.e., a child using a cup or a potter making a pot), through the ontogenetic one related to the process of learning an individual develops over time, up to broader transgenerational trajectories. Through enactive signification processes occurring on each of these timescales, things become material signs of the history of meaningful exchanges that took place with and through them. Thanks to this multi-temporal process of semiotisation, material signs bring forth the sociomaterial practices which gave rise to them. In doing so, they do not replicate past forms of action in the present. On the contrary, they enable new ways of interacting in the particular sociomaterial settings where we remember, structuring the characteristics of the material engagement. By virtue of this dual role

(i.e., things actualise previous ways of material engagement and shape current ones at the same time), *things are memories*.[33]

A significant archaeological example is the Minoan footed goblet, also called egg-cup (Macdonald, 2010). This goblet shape, decorated with different styles (e.g., polychrome, light-on-dark), lasted from EM IIA (2700 BC) to MM IB (1800 BC). As Macdonald (2010) writes, the goblet "had been accessible to large sections of the population, and had been used in countless generations and understood by them as a key element in Knossian traditions of daily consumptions and formal celebrations" (p. 205). By continually engaging with and through goblets, members of the Minoan society brought forth and fostered the persistence of specific sociocultural practices. In this sense, it is sensible to argue that each goblet served as a memory of the particular actions required to comply with the sociomaterial practices of the Minoan culture (i.e., drinking at feasts and in communal rituals), notably those of the Knossian society (from Knossos, Crete). Egg-cups, with their peculiar forms and changing decorations, also served as memories for artisans by reminding them to employ specific technical skills, follow cultural beliefs, choose certain raw materials and adopt particular attitudes towards those materials. Finally, egg-cups also acted as memories by pragmatically supporting the making of new pots which, at the same time, updated the egg-cup making tradition and enabled the following generations to learn long-standing technical skills and acquire associated beliefs. In brief, thanks to their emerging from a tradition of egg-cup using and making (i.e. the accumulation of previous episodes of mate- rial engagement with egg-cups), these goblets became material signs and memories for the Minoan society. Furthermore, in the case of pottery-making, it makes sense to conceive of the meaning of the egg-cups as an emergent result of the recurrent meeting of the potters' hands with the clay and not as a static meaning encoded and stored in their private minds.[34] This example shows why things can be regarded as memories that are re-enacted through material engagement.

[33] Olivier (2011, 2013) offered a related perspective when arguing that the past is the *materiality of the present*. In his view, 'the present is not actually what is happening right now, but rather the accumulation of all past times that have been materially preserved' (p. 124). Accordingly, because they come from a variety of pasts living on in the present, things act as memories. However, in his perspective the past gets recorded within things themselves (Olivier, 2013, p. 121). Following a process and transactional metaphysics, we argue that the meaning that emerges from material engagement is not encoded within things but gives rise to a *potential* for future interactions. This potential is relational in that it pertains to the brain– body–things network and becomes actualised in each new instance of material engagement.

[34] We agree with Malafouris and Koukouti (2018) that "it is the actual engagement with clay, in the throwing, that offers the opportunity of remembrance" (p. 173) and enables the re-enactment of specific forms of material culture.

A.1.10.3 - Remembering is a Cognitive Becoming

From MET, remembering is a way of interacting *with* and *in* the world, in the here-and-now. Likewise, things are memories not because they stand for encoded information but because they accumulate and bring forth particular ways of material engagement (Malafouris, 2004). Therefore, the pragmatic coordinates in which the activity of remembering takes place are not anecdotal. Conversely, we propose that they are essential, constitutive of remembrance. If remembering is meaningful, it is not because it allows us to dive into a nostalgic past but because it is functional in the present – a present that demands us to re-enact specific modes of interaction with the world. As Nelson (1989) argued, "what is remembered should be that that enables the individual to carry out activities, to predict, and to plan" (p. 144). Nelson alludes here to the *pragmatic profit* (Alessandroni & Rodríguez, 2019) of interacting with the world: what makes a memory meaningful is its practical value, the set of active possibilities that such a memory enables. These possibilities rest within the set of possible actions that specific things, acting as memories in the situated context of engagement, enable to carry out according to their material properties and histories of uses. We want to adhere to the idea that memory is not primarily oriented to the past, but that "the actual remembering process happens in the present and usually for the sake of the future" (Malafouris & Koukouti, 2018, p. 175).[35] Since "you can never plan the future by the past" (Burke, 2005, p. 55), to understand memory is to understand the activity of memory as it unfolds online. For this reason, the modes of interaction that remembering allows to bring forth in the present could not be just copies of previous modes of interaction. Memory does not reproduce meanings; it (re)constructs them (Bartlett, 1995). Therefore, we argue that remembering is cognitive becoming: a continuous situated process enacted *through* and *with* things in the context of material engagement where brain, body and culture conflate (Gosden & Malafouris, 2015; Malafouris, 2013, 2019a).[36]

[35] Archaeological studies on memory have long recognised the importance that memory has for present aims or future projects (e.g., Bradley & Williams, 1998; Joyce & Pollard, 2010; Meskell, 2008).

[36] Psychology generally maintains that the self and memory are inextricably linked thanks to processes that create and maintain self-continuity (Beike et al., 2004; Neisser, 1967). Similarly, it is often assumed that subjects form representations of the self that can be updated over time (e.g., Greenwald, 1980; Tulving, 2005). In adhering to the non-representational, interactive and situated framework provided by MET and the ecological-enactive approaches, our proposal raises a question about the connection between memory and the emergence and diachronic continuity of the self (i.e., if memory is continually (re)constructed by interacting *through* and *with* things in the world, how does our sense of self emerge and endure?). In line with Malafouris (2008), we argue that the self is "located neither inside nor outside the brain/body, but is instead constantly enacted in-between brains, bodies and things and thus irreducible

Returning to the example of the previous subsection, whenever a child uses a cup to drink, she is not bringing back a past event structure. Most probably, the situation she finds herself in now is not a reproduction of past situations. Neither the physical environment, nor the degree of thirst, nor the people around them, nor the actions being carried out are probably the same as those that characterised past situations. What remains unchanged between both contexts? We propose that it is the very possibility of re-enacting a profitable interaction in the setting in which the child is, to adapt to specific needs, through a functional material engagement with the cup.

A.1.10.4 - Remembering Ties Together Different Timescales

The fact that memory is an activity that occurs online is by no means the same as saying that it does not have a history. On the contrary: memory is a widespread practice, both in space and in time. This is because each material engagement is embedded in stories of interaction that unfold, at the same time, across different timescales (Malafouris, 2013; Gosden & Malafouris, 2015; Rączaszek-Leonardi et al., 2019).

Returning to the example of the child, the possibility of canonically using a cup at the online timescale (i.e., the here-and-now) constitutes a form of memory made possible by a story of interactions with different cups, mediated by adults, that have taken place in earlier moments of her life (i.e., the ontogenetic timescale). Throughout the ontogenetic development, children construct, thanks to the guidance of others, general ways of engaging with the material world that, as one of us proposed, should be seen as a case of conceptual thinking (Alessandroni, 2020). However, at the same time, these interactive dynamics could not exist without the broader transgenerational trajectories of material engagement (Gosden, 2005; Prezioso, 2021). If caregivers introduce babies into the practice of drinking from cups, it is due to two factors, (1) because they themselves were introduced into this practice by their caregivers, and (2) because cups, as meaningful artefacts, have endured to our days as memories. In fact, as the example of Knossian egg-cups shows, cups have been part of sociomaterial practices for our species for a long time, even in other cultural contexts. We therefore propose that material engagements provide coherence and cohesion to our cognitive experience: while bringing forth specific modes of interaction *with* and *through* the world, they tie together timescales belonging to different levels.

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to any of these three elements taken in isolation" (p. 1997; see also Malafouris, 2015; March, 2019). In principle, then, the self would be an emergent result of the process of cognitive becoming.

A.1.10.5 - Remembering is Material

Remembering is inseparable from the material properties of things since the dynamics into which cognitive practices are enacted are also set by the forms things take (Gosden, 2005; Gosden & Malafouris, 2015). Zurga's example is once again enlightening: remembering is so material to him that in order to forget he must break the necklace. If, as we argued above, remembering occurs through and with material signs, then it cannot be accounted for without acknowledging the cognitive relevance of the material qualities of things. While, for instance, we can remember by materially engaging both with a notebook and a cup, the *what* and *how* of the remembering is different in each case. Remembering through a notebook usually entails writing down something on its pages. Conversely, remembering through a cup involves the ability to use it dexterously (i.e., to drink from it). In these cases, the qualities of material engagement differ as a function of the material proper- ties of the things involved. This does not mean that the material properties of things predetermine our engagement with things. As mentioned, sociomaterial practices encourage specific ways of engaging with material culture (e.g., canonical uses of objects), thus creating action boundaries. However, things could never become meaningful and endure over time as memories for engagement if it were not for their material qualities. As Nelson (1989) nicely puts it, "the form versus function controversy is largely irrelevant (. . .) form is usually determined by function, just as function depends largely on form" (p. 392). Summarising, things endure not because we form an internal copy of them but because they remain meaningful for material engagement over time. This is due to the processes by which the materiality of things becomes intertwined with the specific sociomaterial practices in which subjects take part, over different timescales.

A.1.11 - Some Concluding Remarks

In this article, we developed an alternative perspective to mainstream memory theories. To this end, we first analysed the difficulties of orthodox views that claim that remembering is a skull-bound activity that occurs through the storage, manipulation and retrieval of representations in the head. Then, we explained why perspectives that consider memory as an extended process are reductionist and do not really do justice to the active role things have for cognition. Based on this,

we argued the need for a theoretical alternative that does not subordinate material culture to internal mental processing.

Based on the enactive, ecological, extended, semiotic and situated perspective of MET, we proposed that remembering is a way of engaging with and through things. More specifically, we suggested that we remember whenever we update in our interaction with the world a form of engagement previously acquired through sociomaterial practices. It is worth noting that certain aspects of our proposal have significant consequences for studies on memory. First, we defined remembering as a transactional process that does not occur in the individual mind but in the space that emerges when brains, bodies and things conflate during material engagement. In this sense, we affirmed that the one who remembers is not the subject but a-subject-interacting-with-and-through-a-thing. Defining memory in terms of interaction with and in the world collaborates with the understanding of cognition in concrete terms and is congruent with current challenges of ecological-enactive perspectives.

However, we provided arguments to consider things as full-fledged memories. Things accumulate, over different timescales, the ways in which we have materially engaged with them, according to the sociomaterial practices in which we have participated. Hence things, as material signs, are capable of both bringing forth past ways of material engagement and shaping current ones. Things are not the aboutness of cognition but active agents. They do not collaborate with cognition by providing input for internal processing: things are the very arena in which and through which cognition occurs. Finally, our proposal entails innovations for the design and implementation of empirical research. We have argued that the study of memory should account for the situations of material engagement that occur in specific sociomaterial coordinates. This implies a preference for studies that prioritise the analysis of the cognitive ecologies where remembering takes place over those that seek to achieve maximum control of variables in artificial environments (e.g., laboratory set- tings). In this way, our article is a defence for a situated study of cognition, which seriously considers its material, pragmatic and transactional nature.

Chapter 6 – Database and Analysis of the Knossian Kamares style

This chapter presents the re-examination of the data collected on the Knossian Kamares and the methodology adopted in this study. In the first half of the chapter, I provide my definition of the Kamares style (Section 6.1.). I then present the sources of data examined and describe the sampling strategy (Section 6.2). It follows a systematic description of the methodology adopted to ground the idea of the Knossian Kamares style as transgenerational memory (Section 6.3).

In the second part of this chapter, I describe the trends and patterns of the Knossian Kamares style emerged from the analysis of the four main tables: pottery (Section 6.4.2), geometric units (Section 6.4.3), motifs (Section 6.4.4), and compositions (Section 6.4). I also present my interpretations about the process behind the making of decorations, as it . Further results are discussed in Articles 2 and 3.

6.1 - Defining the Kamares style

Before deciding an effective sample strategy and carefully considering the limit of my research, the first crucial task was to give a clear definition of the Kamares style for me. As I discussed in Section 1.2.2, Kamares is a rather ambiguous term for an equally ambiguous pottery style. As emerged from the study of Protopalatial published materials discussed in Section 6.4, and according to the preliminary observation on the pottery material from the Ashmolean Museum and the Knossos Stratigraphical Museum (KSM), the criterion I apply to distinguish the Kamares style is the presence of a black or reddish-brown lustrous or semi-lustrous slip covered with geometric or floral motifs traced in white and at least one other colour among yellow, orange, red, or purple adopting specific techniques and skills.

As I already discussed in Section 1.2.1 this choice is not new but has been one of the main criteria to distinguish this group of pots since the excavations directed by Evans in Knossos. However, recent excavations around the island have shown the importance of the introduction of polychrome decorations as a marker for the unicity of this style (Andreou, 1978; Baldacci, 2017; Caloi, 2009; Carinci & La Rosa, 2007; Christakis, 2020; Haggis, 2007; Hood, 1966; La Rosa & Carinci, 2009; Macdonald & Knappett, 2007; MacGillivray, 1998; Momigliano, 1991, 2007).

However, this pottery style does not only strike the eye with its polychrome decoration traced on a black lustrous surface. As highlighted in previous chapters, it is how generations of artisans

played with these geometrical figures that makes this style unique. These distinctive material qualities, what I will refer to as *geometric units*, *motifs*, and *compositions* have informed the methodology and analysis presented in this chapter.

6.2 - Sources of data and sampling strategy

The source used to define the methodology and devise the database are the Protopalatial pottery materials housed in the KSM. It is worth noting that my initial research proposal aimed at producing a comparative study of pottery making from several settlement around Crete. Specifically, Knossos, Phaistos, Palaikastro, Kommos, Petras, and Malia. Due to the difficulties caused by the COVID-19 pandemic, I necessarily restricted my investigation to Knossos and decided to develop my hypotheses for memory and remembering from the perspective of MET, as highlighted in Section A1.10.

Whilst the deposits of Knossos are far from being accurate when it comes to the description of stratigraphic relationships among pottery materials (see Chapter 1), the work of MacGillivray (1998) and of recent studies in other settlement supplement the lack of precise dating. Also, in line with discussions on style made at the end of Chapter 2 and 3, the context of a vessel in the Kamares style is the whole Kamares stylistic tradition. That is, all those pots that share the same combination of decorations, shapes, and technical skills used in their making.

Not all pottery materials associated with the Protopalatial levels excavated in Knossos was used in this study. The pottery materials are at times very fragmented. Several boxes were filled with sherds at times smaller than 1 cm. It results that the diagnostic sherds that can be classified as Kamares according to the definition given at the beginning of this chapter are few and far in between. Hence, my sample strategy consisted of a careful selection of all the pottery fragments that exhibited macroscopic evidence of polychromy. This also means that fragments exhibiting only white decorations that could not be compared with other examples where there was at least one other colour including yellow, orange, red, or purple were excluded from my sample. I preferred to be certain that the material was purely polychrome to develop a more in-depth analysis, rather than also including pots that might have been decorated in White-on-Dark ware. To do so, I adopted a representative sampling; meaning, I described all the ceramic material from the boxes investigated and selected a subset of those pieces that matched with my definition of Kamares style.

This diagnostic material examined comes from the original excavations of the Protopalatial deposits carried out by Evans and Mackenzie at the beginning of the 20th century. The material was partially published by MacGillivray (1998, 2007), Macdonald and Knappett (2007), Hood and Cadogan (2011). Albeit in a fragmentary state, the pottery fragments sampled by Evans and Mackenzie, and later relocated by Pendlebury in the KSM, come from different areas of the palace (e.g., the "Area of the Polychrome Jug", the West Court). Whilst this material turned out to be useful to devise the database and far more abundant than described in old and new publications, it also presents some critical drawbacks.

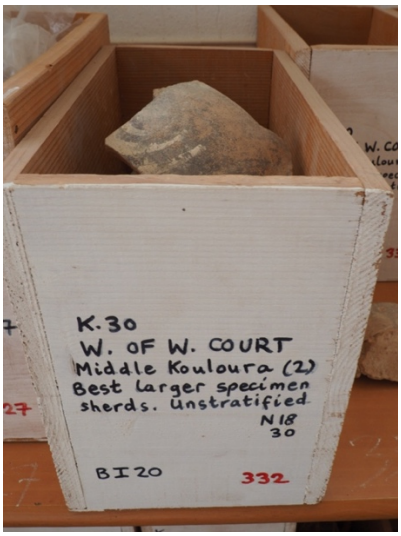


Figure 23 - Example of one of the boxes from the KSM containing the Knossian Kamares material. Photo by author, courtesy of the British School at Athens.

First, if Mackenzie's (1903, 1906) documentation on findings and contexts is generally accurate for the period, the details on the excavation does not follow a stratigraphic methodology. The original documentation, also often reported on the boxes in the KSM (Figure 23), presents the the names initially given to the different area excavated from 1903 onwards. However, this notation and the description of the various floors do not help when trying to ascertain the original context of the single artefact. Consequently, precisely dating the material is anything but challenging.

Second, the absence of a detailed stratigraphic study does not allow for an accurate reconstruction of the contexts where the pots come from. There are cases where the original place of retrieval has not yet been recognised. The reconstruction of the different areas of the complex

excavated covered most of the original trench pits, making difficult, where not impossible, to find the original spots. Despite these issues, there is nowadays a general understanding among Minoan archaeologists regarding some of the areas excavated by Evans and Mackenzie. For example, we only have a vague idea of where the Trench Pit 11 described by Mackenzie is located, and thus from where comes most of the MM IB pottery. If we have a better sense of the location of this trench it is partially because of Pendlebury's (1933) publication, used by generations of scholars to understand the contexts described by Mackenzie in his diaries.[37] Moreover, as already mentioned in Section 1.2.3.1, I also adopted MacGillivray's (1998) reconstruction of the Knossian Protopalatial deposits that I still consider to be accurate for issues of context and dating.

A third issue has to do with the boundaries of this study. I limited my research to the Knossian Kamares phenomenon because of the limitations caused by the measures put in place to contain the spread of the COVID-19 during the pandemic, and my consequent interest in developing my insights on style as transgenerational memory. Therefore, I did not make comparisons with contemporary, preceding, or following pottery styles. I equally decided not to consider seals and wall paintings even when there seems to be a strong visual similarity. What I am trying to say here is that the trends and patterns described in the following paragraphs are the result of my conscious choice of limiting this study to the material forms and techniques employed for the making of Kamares pots from Knossos. This means that there is the chance that the same skills, techniques, and choices were made in the context of making other pottery styles, seals, or wall paintings. Technological studies (Day et al., 2006; Day & Wilson, 1998) and personal observations suggest that there are strong connections among styles, regions, and periods. This choice of limiting my observations only on pottery also results from my initial research proposal. My proposal before the COVID-19 pandemic outbreak was to gather ethnographic observations on pottery making from contemporary potters living in the site of Margarites (Rethymno, Crete). An endeavour that was made impossible by the social distancing rules placed during my period of study. As highlight in the conclusions, this study might be carried on with future research projects.

One last issue regards the sample strategy adopted by Evans and Mackenzie during their excavations. Whilst sampling and collecting data for this study, I noticed that there seems to be a

[37] Specifically, I used Pendlebury's personal copy updated with annotations on trench pits, context of retrieval, and boxes with pottery materials.

change in the choices of what materials Evans and Mackenzie decided to keep.[38] The pottery from the earliest excavations show a stark predominance of decorated pots and absence of any cruder wares (e.g., conical cups), a situation that changes with later excavations. This selection provides only with a partial picture of the combinations among shapes, decorations, and techniques employed in the MM period. We have archaeological evidence that amounts only to a small fraction of the whole material produced and used – a situation applicable to Knossos and other sites on the island. However, it is also true that there is a high chance that decorated materials were kept for their appealing visual qualities.

The drawbacks presented above should not put us off track in terms of the validity of these data regarding the hypothesis on memory, remembering, and the research question on Kamares style detailed in Section 1.3. Chiefly, because I argue that the context for this investigation is not the social or cultural milieu, nor the geographical provenience of these pieces, or their stratigraphic context within the palace of Knossos. In line with the anthropological approach advocated in Chapter 3, and further developed with studies by Gosden, Knappett, and Malafouris (Sections 2.4.1-2 and A.1.6-1.9), the context of a Kamares vase is the Kamares style itself: a stylistic universe resulting from all relation of relations among all material objects that share same combinations of shape, decoration, and making techniques. That said, I move to describe my methodology.

6.3 - Devising the database

Crucial to explore the intuitions moved in the previous chapter was designing a database to provide with solid empirical foundations on which to ground my interpretations. It was important to produce relationships among all the distinctive physical qualities emerged from the observation of the Protopalatial Knossian pottery. This requirement implied the use of a dynamic and relational structure based on multiple nested tables to accommodate my observations. What I needed was a flexible tool for: (i) recording detailed observations on the decoration-making, such as the chronostratigraphy on the execution of specific motifs recognised through over-imposition of each geometric figure (e.g., line, dot, spiral); (ii) linking multiple sets of data from various nested tables, so to flexibly extract data according to the phenomenon or question I want to investigate; (iii) altering or inserting additional types of data with future projects.

[38] This intuition is confirmed by Christakis, which recognises "that Evans and Mackenzie changed their sampling strategy with later excavations" (personal communication, November 21, 2020).

Among the different alternative possible, I decided to devise a multi-layered relational database using FileMaker Pro. Whilst less flexible than other database management systems, this software is extremely reliable in terms of how the data can be stored, accessed, and analysed. For example, tables can be easily exported into other formats or software (e.g., MS Excel, R), allowing for more flexibility. It combines a robust relational database capable of handling complex relationships with a user-friendly way to build an interface to enter or retrieve data. The software also allows to quickly produce online applications, facilitating future access or data collection from multiple users. Users cannot directly access the stored data with queries as in other relational databases (e.g., MySQL) because of FileMaker Pro user-friendly appraoch. However, this was not an issue as I coded a specific layout (i.e., a sub-Section of the database), *Analysis*, that allows me to extrapolate information from the different tables through SQL queries (Figure 24).

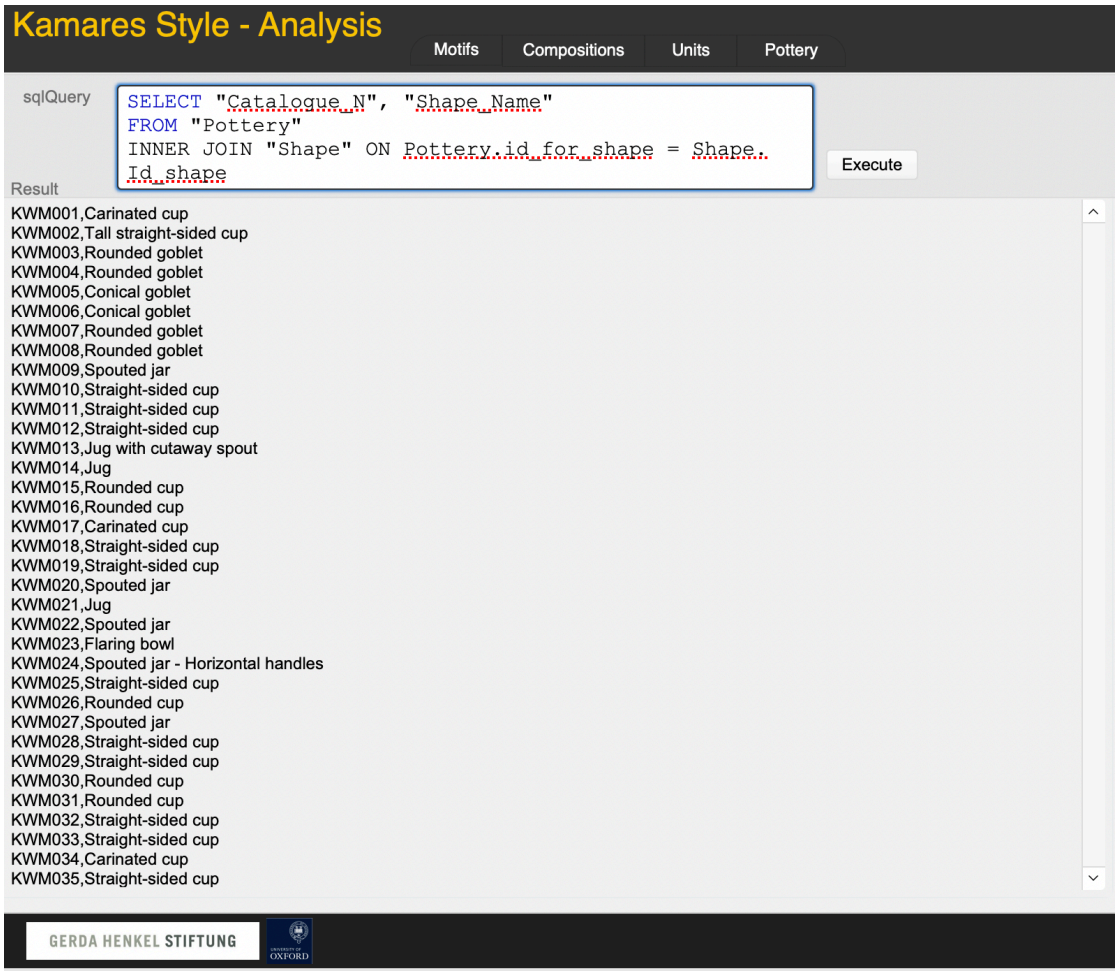


Figure 24 - Layout of the table *Analysis* designed to have more flexibility in extracting data.

This gives me more flexibility in how to extract my data. In fact, the queries can collate and aggregate information from different tables without the necessity of being directly connected through existing relationships. In this way, I can gather data and create tables according to the phenomenon to study. The flexibility allowed by this tool means that additional data, such as anthropological observations on the making, can be easily added to the existing structure with future projects. Now it follows a description of the process by which I devised the database (Figure 25).

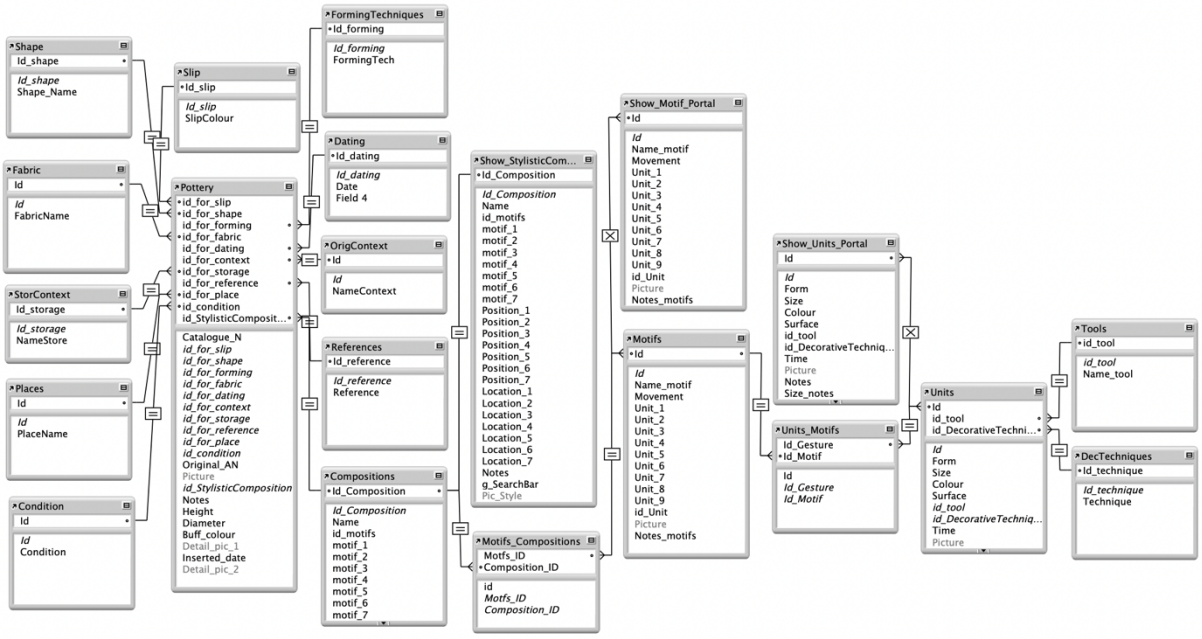


Figure 25 - Structure of the database devised for this research with detail of all tables and relationships.

The first step was creating different tables according to the observations gathered on the direct examination of the Kamares sampled from the assemblage. As mentioned in Section 6.1, the preliminary study of the Kamares pottery carried out in the Ashmolean Museum and, later, in the KSM emphasised that the main character of this style is polychromy of its geometric figures. Thence, it was important to record all the data that allowed me to observe the patterns produced by what I called in the context of analysing the Knossian Kamares pots *geometric units*: the physical residual traces of actions and choices, defined in terms of basic geometric figures (e.g., s-shaped line), alongside the techniques adopted to trace them (e.g., continuous movement) as they can be perceived through the senses. I return on *geometric units* in the Section 6.4.2, suffices to say here that these units, whilst being indexical of a moving hand, are not treated in this work as gestures but as material properties (e.g., *Line - horizontal R(ed)*). The data on units as material properties of actions and choices are recorded in the table *Units* (Figure 26). This table stores information on form (e.g., lines, dots, triangles), size, colour, tool, and the decorative technique employed to produce that specific unit.

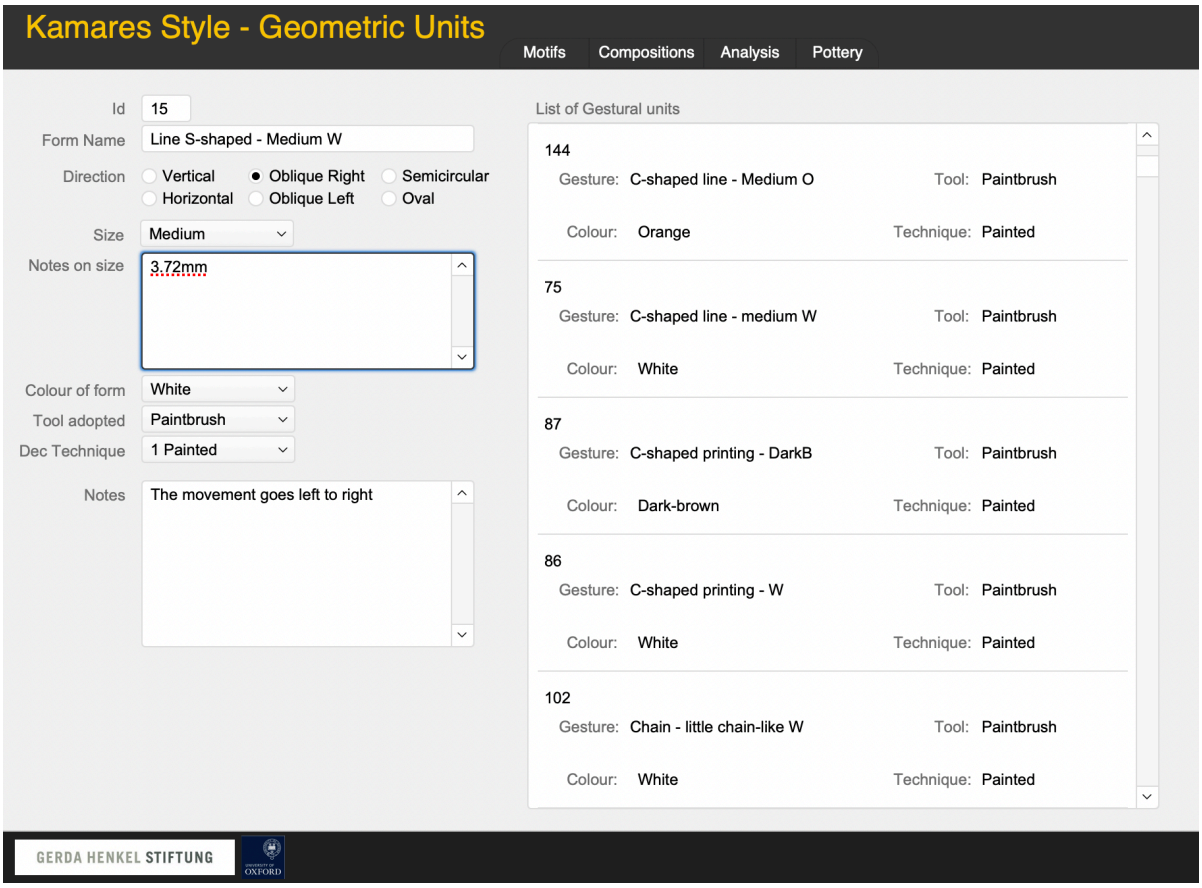


Figure 26 - Layout of table *Units* containing data on geometric units.

However, I argue that geometric units are not to be considered isolated entities. Artisans traced sequences of units, giving shape to visually coherent aggregates which I termed *motifs*. The preliminary ethnographic studies of potters at work, which I conducted in the village of Margarites (Rethymno, Crete) before the outbreak of COVID-19 and with following visits, suggests that motifs can be thought as sequences of *geometric units.* Hence, I devised the table and the layout *Motifs* (Figure 27) to allow me to record sequences of up to nine different geometric units. These sequences refer to a chronostratigraphy of actions, whereas each unit that I considered as being part of a motif was recorded within a sequence of subsequent actions recognised through over-imposition. My choice of restricting a motif to a sequence of no more than nine geometric units was informed by my observation of all motifs recognised in the sample. Meaning, any of the motifs presented more than nine geometric units at the same time.

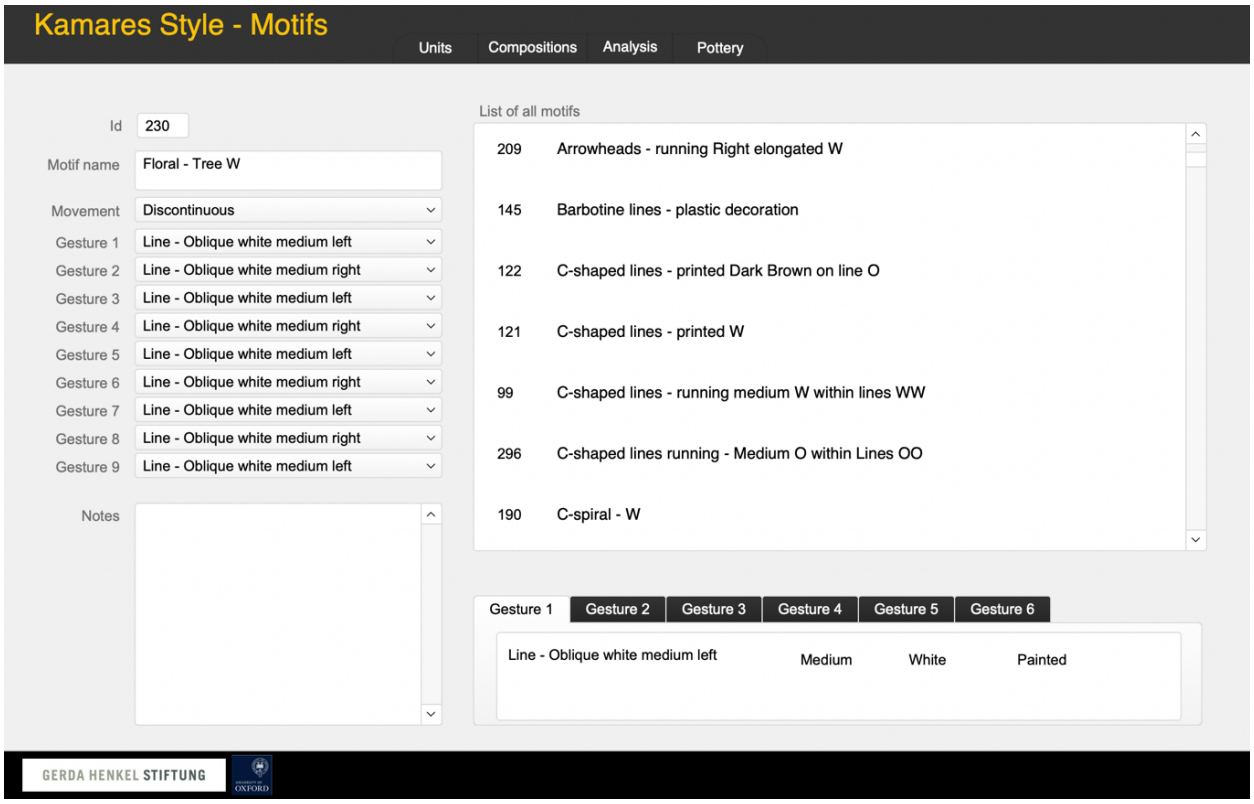


Figure 27 - Layout of table *Motifs* with the data collected on the combination of geometric units.

The table *Compositions* documents the different motifs observed on the surface of a single vase (Figure 28). This table can record up to seven different motifs, each with their associated relative position on the surface of the vase (i.e., neck, bottom, rim, body, base, base-body, base-rim, base-neck, body-rim, body-neck, whole, spout, handle). While collecting data on the Kamares compositions, I found very challenging to identify the chronostratigraphy of motifs. Therefore, contrary to the table *Motifs*, here I did not record motifs trying to reconstruct from the material traces left behind by artisans the chronostratigraphy of actions.

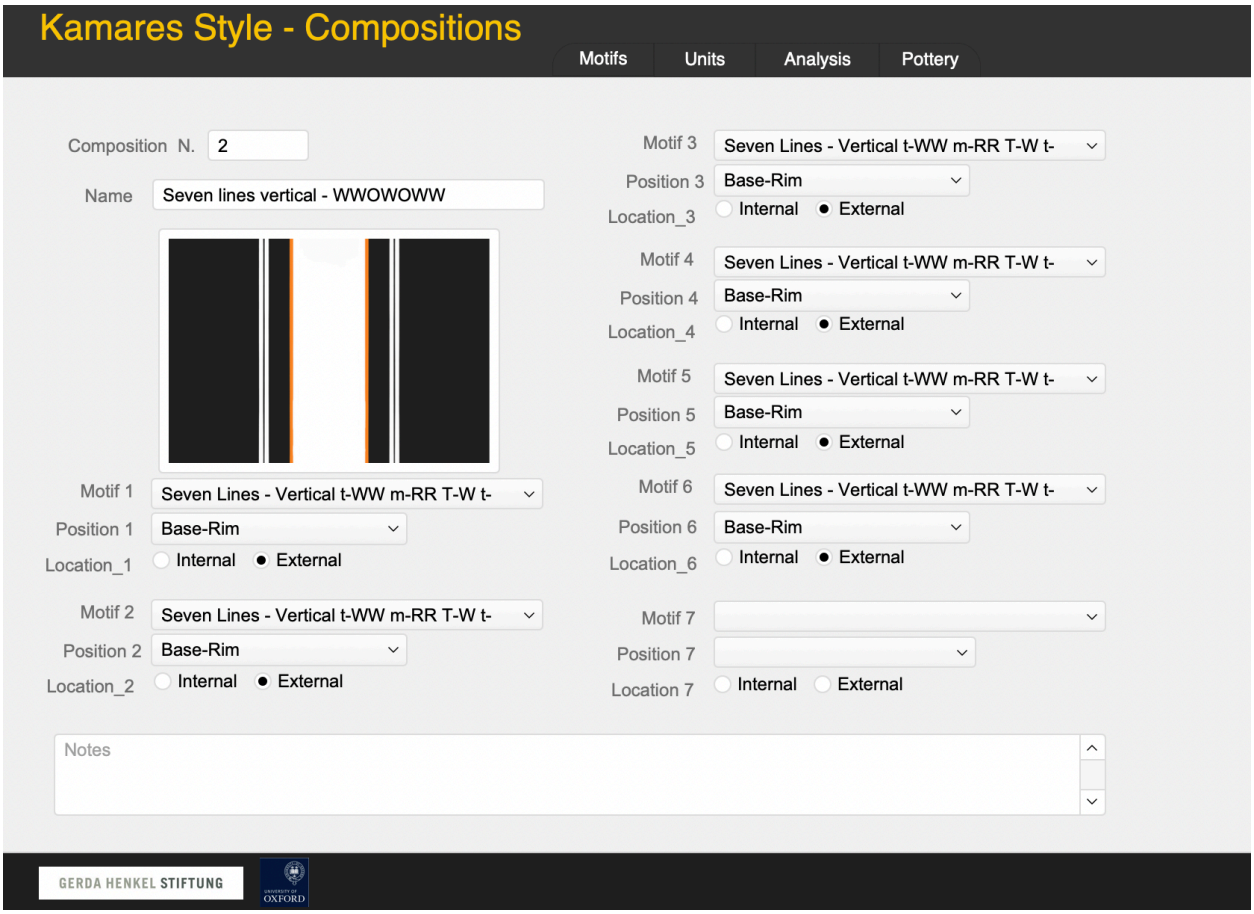


Figure 28 - Layout of table *Compositions* containing data on the associations among motifs.

Finally, all the information acquired and stored on geometric units, motifs, and compositions concerning a specific vase, was linked to a unique table: *Pottery* (Figure 29). The table pottery does more than just aggregate data on the decoration-making. As Figure 25, which describes the links among all tables shows, *Pottery* brings together all the different types of information regarding the pot analysed: Catalogue number, shape, forming technique, context of retrieval, storage, original accession number, condition of the pot, fabric, colour of the slip, dating, composition, references, and notes.

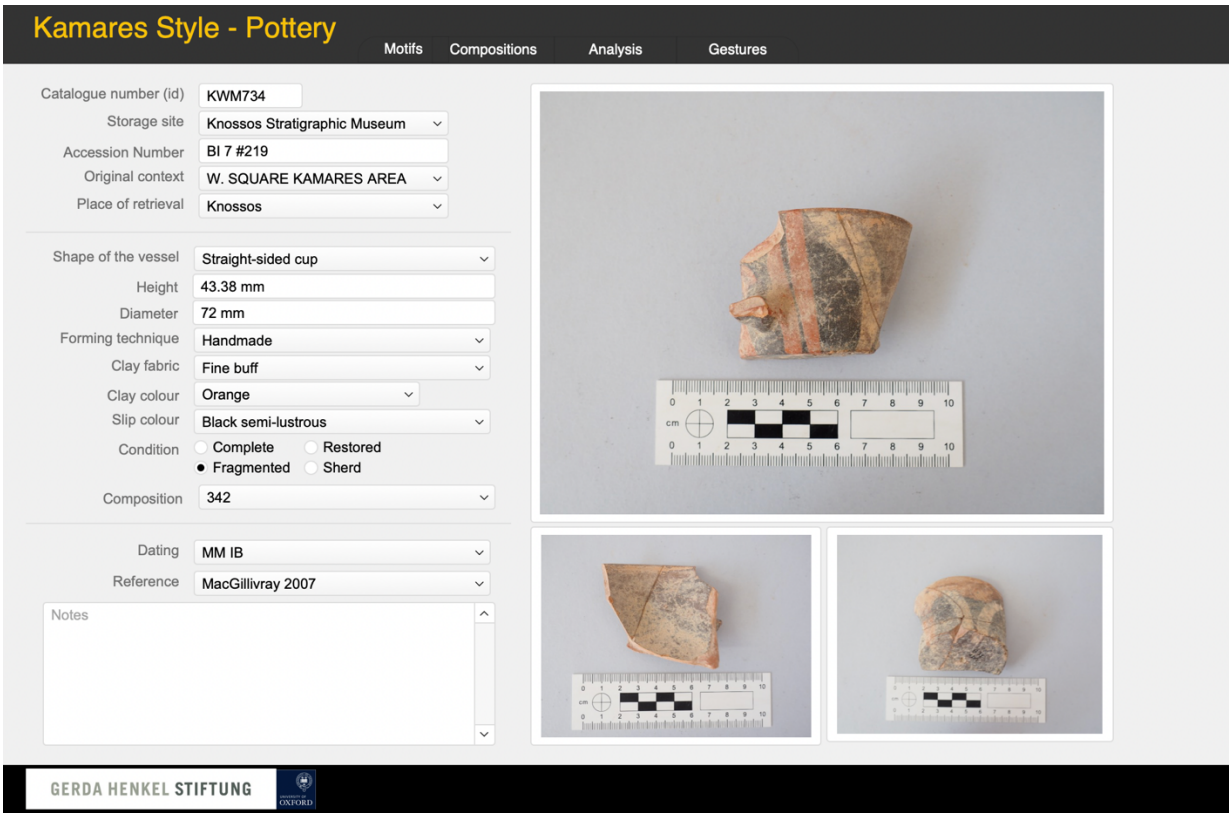


Figure 29 - Layout of table *Pottery* with all the data on the vases examined.

Again, as illustrated in Figure 25, these fields are not static but are linked to different tables storing the associated information (e.g., slip, places, fabric). This structuring of the database allows for more modularity. That is, it will allow me to alter information on the pottery studied without compromising the pre-existing data. Should it be necessary, it would be possible to update the data in the associated *Pottery* table without altering the database.

Three fields in *Pottery* require a brief explanation. The field *Composition* links the data previously recorded into *Units*, *Motifs*, and *Compositions* to the *Pottery* table, enabling all related fields to be showed in the forms placed in each layout. The second field, *Forming technique*, refers to the throwing techniques (i.e., hand-made, wheel-shaped, and wheel-thrown). This distinction in pottery forming techniques was informed by the study of pottery making by Knappett (1999), Berg (2007), and Choleva (2012).

The last field, *Dating*, is the one that took more effort from my side when analysing the materials and requires a bit of background on issues of dating. Entries in this field are based on Evans relative chronological distinctions described in Table 1. However, as mentioned above and

in Section 1.2.3, the documentation regarding the Protopalatial deposits is fragmentary and only partially published. Most dating comes from stratigraphic studies of the ceramic deposits and stylistic observations among artefacts in the palace. These deposits were clustered into groups consistently sharing stylistic features, according to their location in the various areas of the palace (Cadogan et al. 1993). The names of these groups come from the most representative ceramic deposit(s) and the relative chronologies have been linked, whenever possible, to other Cretan and Aegean regions. Only at a later stage scholar have connected these sequences o the traditional schema introduced by Evans and Mackenzie, mostly with the aim of producing chronological correlations (see, Momigliano, 2007a, pp. 6-7).

There are several dates associates with different sub-types of Kamares styles or wares (e.g., "White Banded Style"; MacGillivray, 1998, pp. 58-59). These dates vary depending on the region, place of retrieval within deposits, or set of decorations. Ultimately, my choice of dating a single piece of pottery, rather than focusing solely on the motifs or stylistic composition, presents various advantages. When possible, the pottery is associated with a context, hence giving additional information on its date and, consequently, on the compositions and motifs recognised. It goes without saying that date refers to the date of deposition of the pot, not of the executions of gestures that produced motifs and compositions. Cataloguing more pottery pieces in the database will make possible to establish more fine-grained dates. It follows that the development of motifs and compositions might also become more accurate. I shall now move to the description of the analysis of data.

6.4 - The analysis of the Kamares style

As detailed above, most of the observation and data collected involved observing the materials as the results of artisans' actions and choices in making Kamares style surface decorations. This section should not be considered a thorough assessment of the hypothesis of style as transgenerational memory, which I develop in Articles 2, 3, and in the conclusions.

In the second part of this chapter, I focus on describing the analysis of the data gathered on making Kamares style decorations. In each subsection, I present the process by which the data collected on geometric units, motifs, and compositions have been analysed. Examples drawn from the database, tables, and charts are adopted to explain the patterns and trends that emerged in the data analysis. Each section provides interpretations of these patterns and related trends.

6.4.1 - Pottery

The overall number of vases recorded in the database is 765. Figure 30 presents their distribution in the Middle Minoan (MM IA, IB, IIA, IIB, IIIA).

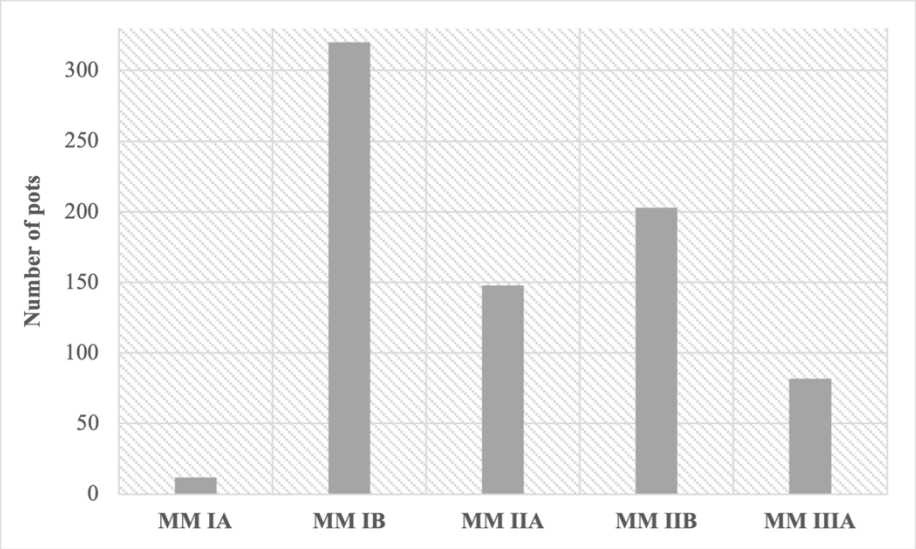


Figure 30 - Distribution over time of Knossian Kamares vases.

As it is possible to see in the graph (Figure 30), most data concern MM IB and IIB. The concentration of pots recognised in this period may be biased by the sampling strategy that I used for the data collection, which, as I mentioned in the opening of this chapter focussed on the diagnostic pottery material. Another element that we should necessarily keep in mind in analysing these results is the situation of the deposits and the sampling technique adopted during Evans and Mackenzie's excavations. For MM IIIA, we have deposits such as the "House of the Fallen Blocks" and the "Sacrificed Oxen" that, albeit still excavated by Evans and Mackenzie with a non-stratigraphic methodology, present a better assemblage (for a recent re-analysis, see Mathioudaki, 2018). Certainly, it is possible to recognise how MM IB is the period with the most significant amount of Kamares material. The presence of fewer pots in this style in MM IIA and later MM IIB could signify that the Kamares became more exclusive over time, or that circulated less within the palace. Given the chronological patterns presented in Figure 30, it may be useful to observe

the distributions of Kamares pots in the different context of retrieval within the palace and through time.

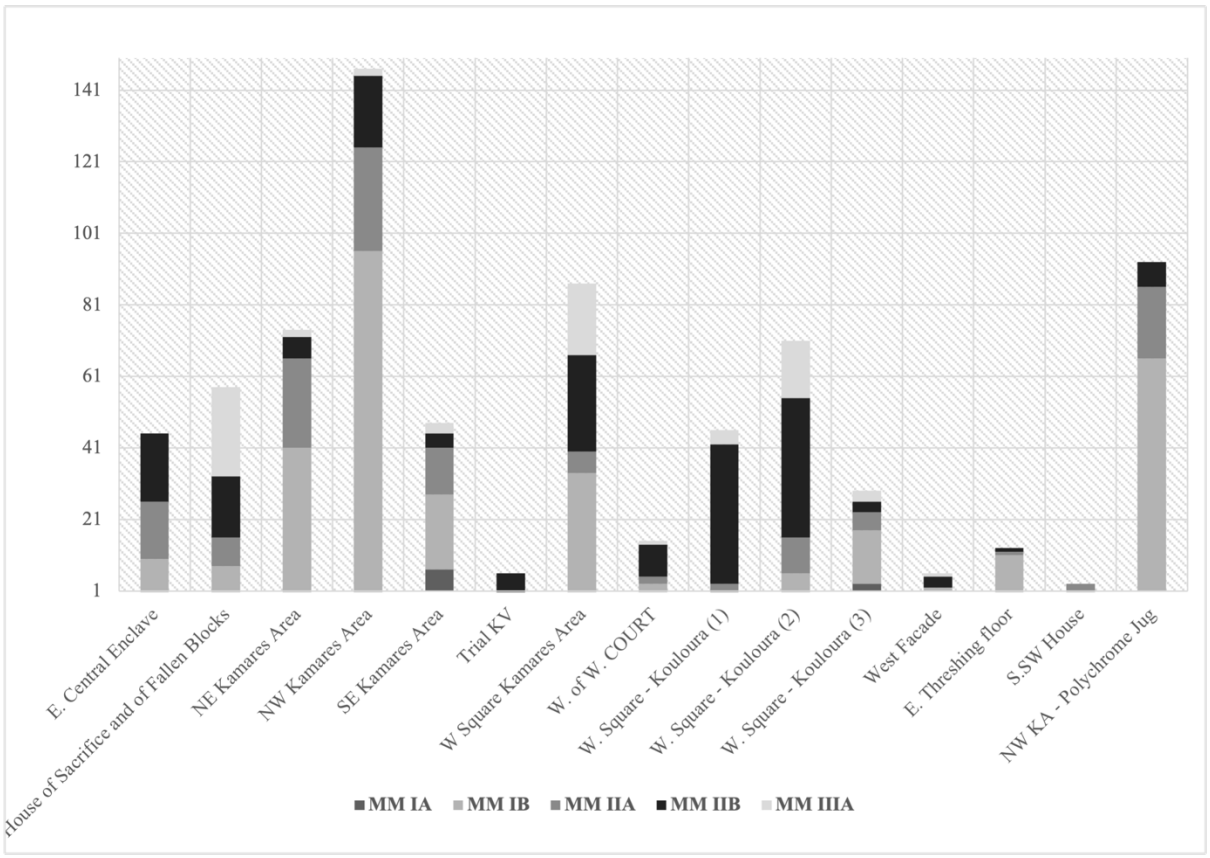


Figure 31 - Distribution over time of the pottery within each context of the palace.

Figure 31 shows the distribution of Kamares style vessels in their different contexts from MM IA to MM IIIA. The contexts used in the chart are a simplification of the original context described in Mackenzie's diaries and reported later in Pendlebury's (1933) guide to the KSM. It is also worth mentioning that MacGillivray (1998) recognised that many sherds from various contexts join. He points out that most pots were initially stored in other areas and moved from their place of destruction to that of final deposition. In terms of the distribution of the material over time and within the various retrieval contexts, Figure 31 presents a complicated situation. It seems difficult to pinpoint the materials to specific groups and link them to precise period, although this endeavour is rendered much easier by the recent re-examination of pottery groups and deposits (Cadogan et al., 1993; MacGillivray, 1998, 2007; Momigliano, 1991). It is also true that observations regarding

the specific context of retrieval might give us more information on the nature and period of deposition of materials. The database contains all data related to the original context of depositions, with the particulars of all retrieval places (Figure 29). It means that further analysis of the spatial relationships among artefacts can be easily drawn. However, the present study does not focus on the spatial arrangement of materials. Rather, my aim, partially in line with that of Gosden (2005; also, Garrow & Gosden, 2012), Knappett (2010), and Gell (1998) before them, is to explore how the context for a specific vase in the Knossian Kamares style is the relation that it has with other vases sharing this same style. As critically discussed in Section 2.4 and Chapter 3, the idea behind style as transgenerational memory is grounded in the intuition that similarities among artefacts are what bring about their own reproduction. We produce and use things based on our knowledge of the sociomaterial context where we are acting, learnt through developmental processes. It is due to these considerations that a fine-grained definition of contextual data is not required at this stage.

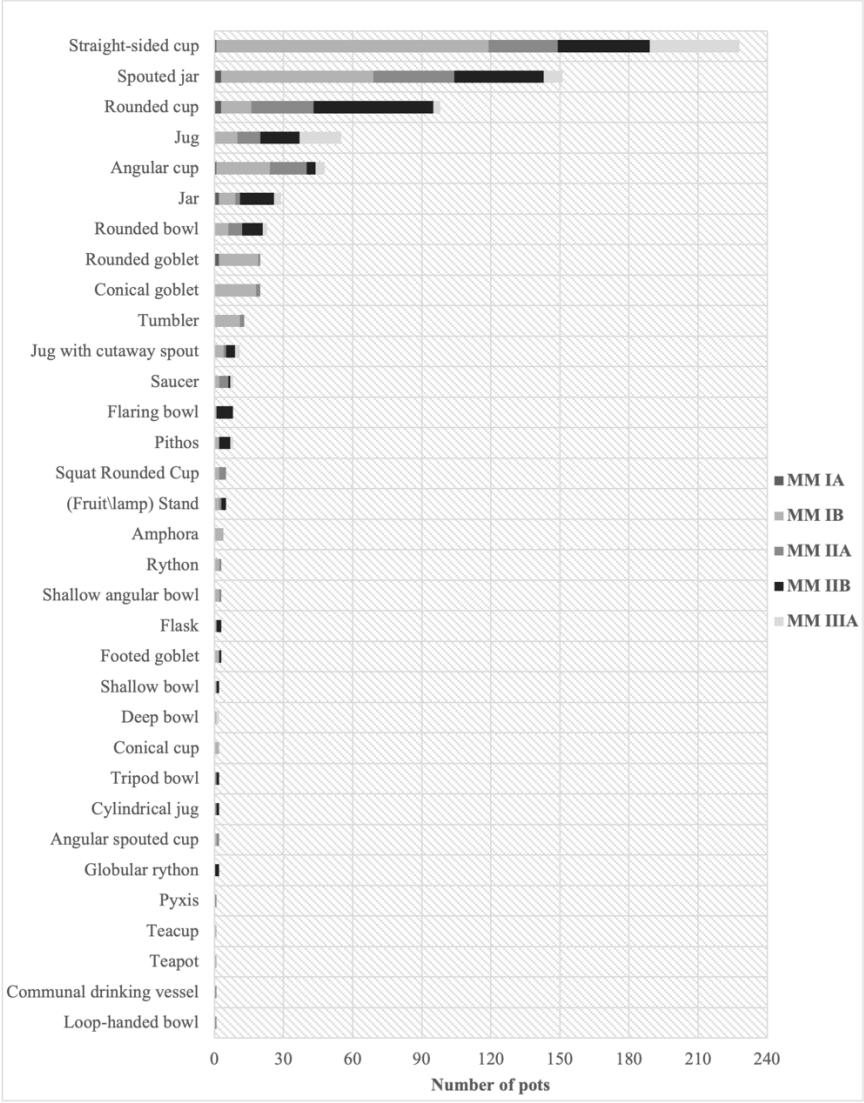


Figure 32 - Total of the different shapes of pottery in the whole assemblage divided by date.

Figure 32 presents the list of shapes with the absolute number of vessels recorded over time. By far, the straight-sided cups are the most abundant shape with 228 pieces. 151 are the exemplars of spouted jars, making it the second most frequent shape recorded in the assemblage. The other frequent shapes are all different types of tableware. There are 98 rounded cups, 55 jugs, 48 angular cups, 29 jars, and 23 rounded bowls. These data reveal interesting trends. First, that Kamares style decorations were made on the surfaces of different shapes and not only on specific examples of tableware (e.g., straight-sided cups or rounded cups). The case of 8 fragmented pithoi, a type of shape usually connected with more domestic and utilitarian forms and not elite circles, is quite a clear example (Christakis, 2018). The same can be said of the 55 jugs and the 29 jars.

A second pattern recognisable in the table (Figure 32) has to do with the temporal dispersion of these shapes. The MM IB period is the one with more disparate forms, covering almost all shapes of pottery. Some of these shapes disappear entirely from the archaeological record of later times, particularly those more frequently attested in the EM period (Momigliano, 1991, 2007). It seems that with MM IIA, shapes that were less often made in the past slowly gain momentum. These are rounded cups, rounded bowls, spouted jars (particularly of the rounded type), and saucers. This prevalence of rounded forms over conical ones (conical goblet, rounded goblet, tumblers) might have been the result of the widespread introduction of the wheel, already started in MM IB in Knossos (Knappett, 1999a, 2004). The use of the wheel might also be linked with the emergence of more linear motifs arranged into more precise bands (Evely, 1993, p. 292). However, this observation would require additional ethnographic data that could be collected with future research.

Returning to the analysis of the graph in Figure 32, MM IIA and IIB show the same patterns in terms of variability of shapes and frequency. The main difference among these two phases is the presence of a more conspicuous number of utilitarian ware (e.g., flaring bowl, tripod bowl, jar, flask, shallow bowl) in MM IIB than in MM IIA.

In concluding, taken alone these data alone say little concerning the Kamares style. More interesting patterns and trends over the long-term can be ascertained by integrating the data above with the description and analysis of geometric units, motifs, and compositions: the long-term making of the Knossian Kamares decorations.

6.4.2 - Geometric units

The data concerning geometric units is the most complex to observe, analyse, and understand from an archaeological perspective. Before getting into the data description and analysis, I define my usage of this term and its limits within this thesis.

As we have seen in Section A.1.9, for MET is not tenable to say that the geometric lines traced on the surface of pots are the passive product of an idea imposed on matter. Rather, they are active material signs, signifying the dynamics of the movement that created them (Malafouris, 2019a). *Geometric units* exemplify the ontological continuity between matter and mind: between the physical material properties of Kamares pots and the ways of thinking and acting emerging every time an artisan produced a new vase in this style. This idea of continuity between matter and mind

that is here at the core of geometric units is expressed by Gosden and Malafouris (2015) when they state that: “There is a continuity between all forms of matter and energy and the same applies to the physical and the mental, which are now seen as different aspects of a single reality of becoming” (p. 703).

With the term *geometric units* I thus refer to the actual physical material properties of actions, such as tracing a spiral, perceivable through the senses when actively exploring the vases. Geometric units can be identified by observing the residual traces of skilled actions executed by the artisans in the context of decoration-making. I classified these traces in terms of orientations (e.g., horizontal or vertical), sizes (e.g., thin or thick, medium or large), movements (e.g., discontinuous or continuous), and employed decorative technique. With this term, I am also attempting to recapture a tradition of structural approaches to the study and classification of decorative forms in the broad field of ceramic studies (Gardin, 1978; Plog, 1980; Shepard, 1956; van Berg & Jeunesse, 1994). Contrary to these studies, my take on the process of classification and observation of decorations is stripped of any methodological and conceptual association with the linguistic metaphor. That is, my approach to decorative units does not refer to a language-like grammar system where lines, dots, or triangles are organised into complex structures (i.e., motifs and themes) following rules like those of language grammars (Gallin, 2011; Shepard, 1956). A methodology adopted in Aegean archaeology by both Furumark (Furumark, 1939, 1941) and Walberg (1976), as discussed in Section 1.2.4 and 3.2.

My reading of geometric units appreciates how materials qualities and their meanings do not encode information, as for the linguistic sign, but gives rise to a *potential for future interactions* in the context of material engagement. We mentioned this proposal for the memory and remembering in Section A.1.10 (see also, Malafouris, 2004). I argue that this potential (i.e., having the capacity to structure modes of thinking and acting) is relational in that it is “constantly enacted in-between brains, bodies, and things and thus irreducible to any of these three elements taken in isolation” (Malafouris, 2008, p. 1997; see also, March, 2019). As mentioned in Article 1, these potential for future interactions provided by the sociomaterial context are not passive symbols imbued with meanings, as it was for Donald and Vygotsky. But enactive signs that brings about possibilities for actions and thoughts in the context of interacting *through* and *with* them (Malafouris, 2019a, 2019b, 2021a).

For example, the presence of a specific motif on a previously made Knossian Kamares vessel does not contain information on what or how to produce it. Instead, it suggests to an artisan the possible actions, choices, skills, and techniques which might be required to obtain something that is reminiscent to it. The possibilities afforded to an organism acting within a specific environment constituted of people, things, and practices, alongside the skills which that organism comes to possess allow a potential for thinking and acting to be constituted in the context of skilful action (Bruineberg & Rietveld, 2014; Kiverstein & Rietveld, 2018; Rietveld et al., 2018; Rietveld & Kiverstein, 2014). According to MET and ecological-enactive paradigms of cognition discussed in Article 1, we make sense of the world through direct engagement *with* and *through* things, people, and the sociocultural practices that tie them together. From this perspective, the lines and dots of Kamares are not static. By thinking about geometric units as conflating gestures and material properties, I try to capture them as actions, material properties, and traces of creative gestures (Malafouris, 2019a, 2021a). This is, by looking at geometric units from this perspective, I am trying to shift from seeing these basic figurative traces as fixed structures towards thinking about them as potential for actions, choices, skills, and techniques - i.e., in terms of how they instantiate and constitute possibilities for artisans engaged in decoration-making to trace future geometric units. To put it simpler, geometric units refer both to the material properties recognisable on the surface of pots and the required choices and actions to produce them.

It is crucial to note that, at least in this work, there is a methodological limitation in my take on geometric units. That is, the observation of archaeological data alone can hardly accommodate an analysis that considers decorations simultaneously as material properties and actions. As shown below, the information stored in the database on these units describes simple geometric elements. Specifically, lines (e.g., S-shaped, U-shaped, arrow-shaped); dots; semicircles; ovals; squares; rectangles; triangles. Each of these has different orientations (i.e., horizontal, vertical, oblique) and sizes (i.e., thin, thick, medium or small, medium, large), colours, tool used, and decorative technique employed. They also present information on whether movements were exerted discontinuously or continuously (without or with the rotation of the recipient; Roux, 2019, p. 104). As this list points out, these entries do not describe gestures but physical material properties. They account for the qualities observable from analysing the material and are thus *only indexical of the possible gestures and choices that artisan made in the decoration-making context*. Therefore, the geometric units catalogued during the data collection and analysed below do not describe the actual

gestures and movements that artisans performed in the making. They are an attempt to formalise the theoretical assumptions moved in Chapters 2, 3, and 4, as well as a means to ground my proposal for transgenerational memory postulated in Section 3.8.

It is worth mentioning that this limitation for the study of geometric units partially stems from the situation caused by the COVID-19 pandemic. In fact, as I stated in Section 6.2, my aim with this project was to supplement the archaeological data collection with ethnographic observation on the making of shapes and decorations. Therefore, in the context of this study, I will avoid any discussions on these basic geometric figures as gestures, aiming to develop these ideas with future studies.

Now that I clarified my definition on what geometric units are and presented their shortcomings, I turn to describing the analysis of the data. I will look at the general descriptions of data before seeing whether there are specific patterns over time and relationships between geometric units and motifs. Finally, I will present a general interpretation, followed by more details on the links between geometric units and my proposal style as transgenerational memory.

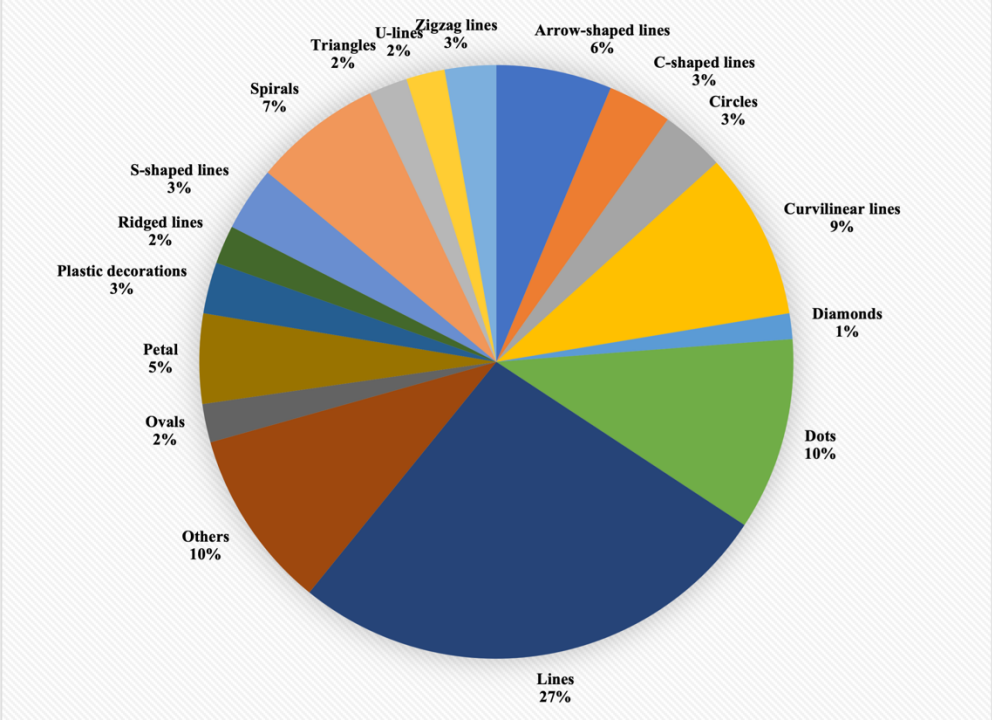


Figure 33 - Percentage of the geometric units documented in the assemblage.

Shape name	Total

Arrow-shaped lines	9
C-shaped lines	5
Circles	5
Curvilinear lines	13
Diamonds	2
Dots	15
Lines	38
Others	14
Ovals	3
Petal	7
Plastic decorations	4
Ridged lines	3
S-shaped lines	5
Spirals	10
Triangles	3
U-lines	3
Zigzag lines	4

Table 2 - List of all the different geometric units with numbers in the assemblage.

Overall, the number of geometric units recognised is 143, divided into 17 different forms, as described in Table 2. The pie chart in Figure 33 shows that most of the forms are lines (27%), either oblique, vertical, horizontal, each characterised by size (thin, medium, thick) and colour (orange, white, red, black, purple). It follows the dots (9%) that are equally characterised by size (small, medium, big, sprayed) and colour (red, white, orange).

With 1% of the whole assemblage the smallest percentage is that of Diamonds, with only two units recognised. Albeit we can say that, in general, all these forms are representative and found in relatively fair numbers. Interestingly, although perhaps unsurprisingly, are the high percentages of curvilinear lines (9%) and spirals (7%). The scholarly literature considers these forms are typical of the Kamares style, especially mixed together into various motifs as shown in Figure 34 (Betancourt, 1985; Walberg, 1978, 1983).



Figure 34 - *Composition Spirals-W(hite)O(range) and two lines vertical thick-O(range)O(range)* (MM IIIA) (KWM087). Photo by author, courtesy of the British School at Athens.

An argument could be moved here against geometric units: that these basic sets of geometric figures are shared among other styles and form the basis of decorations within and outside of Crete. Whilst this argument certainly holds true theoretically, it does not stand empirically. Lines and dots are shared by world cultures, the difference lays in how these cultures employ (i.e., trace) them within their specific cultural and stylistic contexts. For instance, not all cultures trace sequences of arrow-shaped white lines horizontally on black lustrous slips to decorate their pots. Nor they do trace sequences of these arrow-shaped white lines (at times with a stamping tool or a paintbrush) to produce something that we now call a *floral band.* Essentially, while basic and surely widespread over space and time, these geometric units should always be analysed as part of the sociomaterial context where they are traced. I claim, in line with proponents of cognitive ecology (Hutchins, 1995a, 2010; Tribble & Sutton, 2011), that we cannot disentangle the making of decorations from the social and material context where they are made. Clarified the importance of considering units within their sociomaterial context, I return to the analysis of the data.

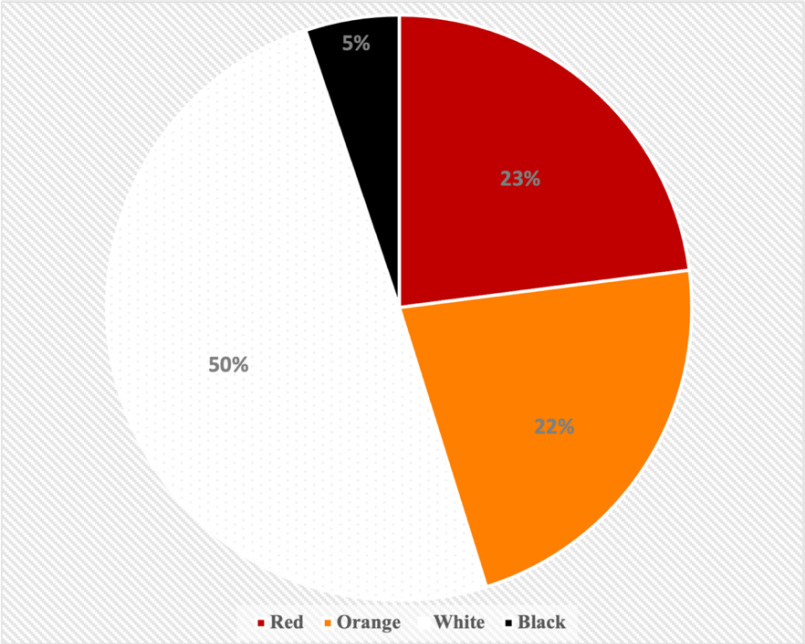
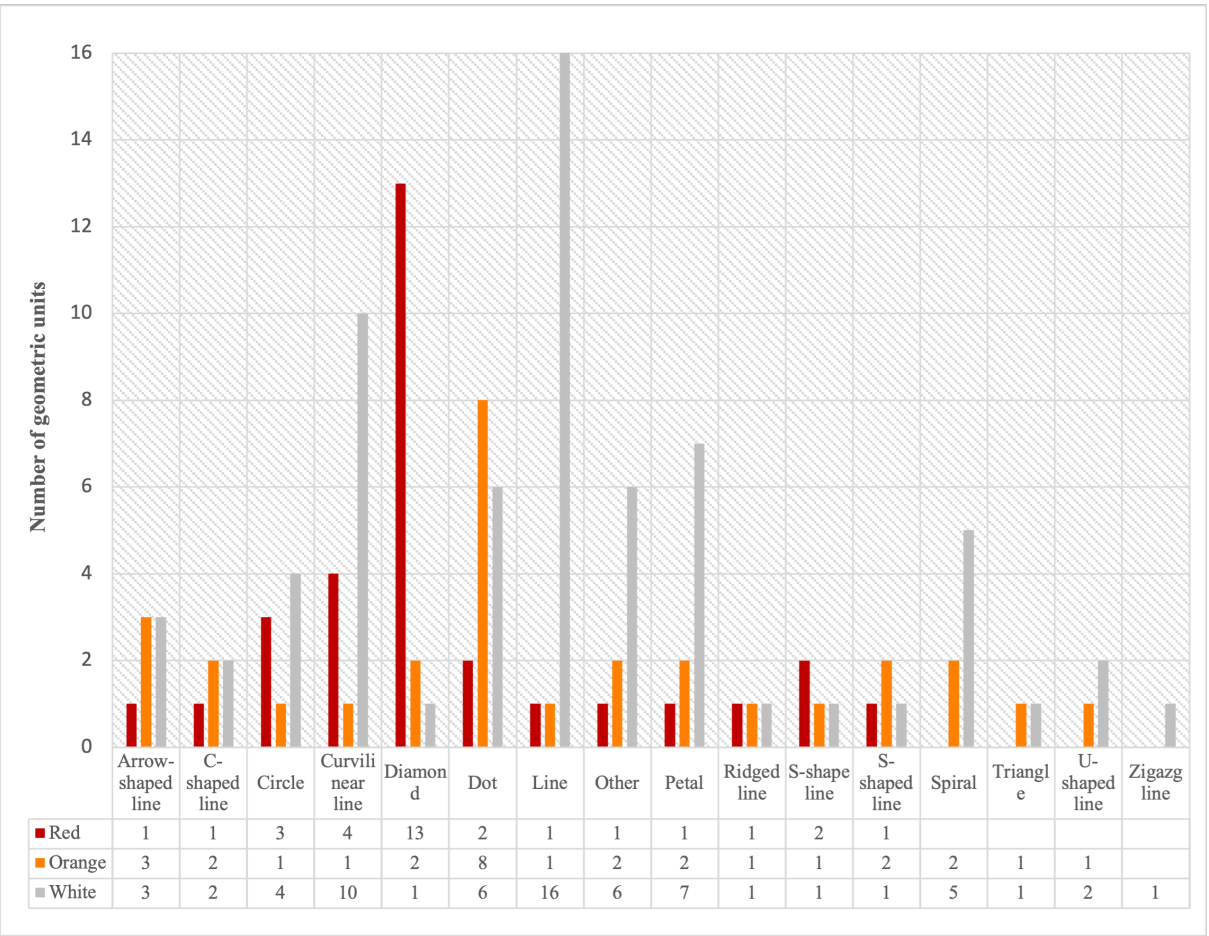


Figure 35 - Percentage of the colours used to trace the geometric units.

Given that the main criterion for describing the Kamares style is the polychromy of the geometric units, I tried to see if there were general patterns in the use of colour. The chart in Figure 35 shows that the most common colour is white. Half of the 143 geometric units were traced using this colour. Red and orange, respectively 22% and 23%, were used in almost the same percentage. While interesting, these results taken alone do not add too much to the discussion. Hence, I tried to see if there were correlations among these three colours and the sixteen geometric units documented (all those in Table 2 but the plastic decorations because colourless).



	Arrow-shaped line	C-shaped line	Circle	Curvilinear line	Diamond	Dot	Line	Other	Petal	Ridged line	S-shape line	S-shaped line	Spiral	Triangle	U-shaped line	Zigazg line
Red	1	1	3	4	13	2	1	1	1	1	2	1				
Orange	3	2	1	1	2	8	1	2	2	1	1	2	2	1	1	
White	3	2	4	10	1	6	16	6	7	1	1	1	5	1	2	1

Figure 36 - Comparison among the different types of geometric units divided by colour (red, orange, white).

Interestingly, Figure 36 shows that both simple (i.e., horizontal, oblique, and vertical) and curvilinear lines are mostly traced in white. Spirals and petals are traced with the use of chalk-white paint too. The colour red seems to be used chiefly for diamond decorations (e.g., rhomboids) and is also well attested for tracing curvilinear lines and circles; two forms similar in terms of execution. Interestingly, there are no spirals, U-shaped lines or triangles in red. The same can also be said of zigzag lines, which seems restricted to the white colour. The orange pigment is widely adopted in almost all forms, but seems to be specifically used to paint dots. Overall, the red colour is less used than both white and orange. This might be related to the fact that this colour seems to be attested mainly from MM IIA. While these do not show any specific patterns or trends, they might be more useful in qualitative descriptions of the material, for instance in discussing particular motifs; as I do in the following Articles 2 and 3.

The next step was to start looking at the presence of patterns and trends discernible from the observations of geometric units. Therefore, I devised a SQL query to gather all geometric units associated with pots dated to the various periods. I then plotted the data to see the percentage of geometric units and their temporal distribution of geometric units throughout the MM period. It is important to note that in both the pie chart (Figure 37) and bar graph (Figure 38) account for all the geometric units occurred in each period as they appear counted more than once on different pots.

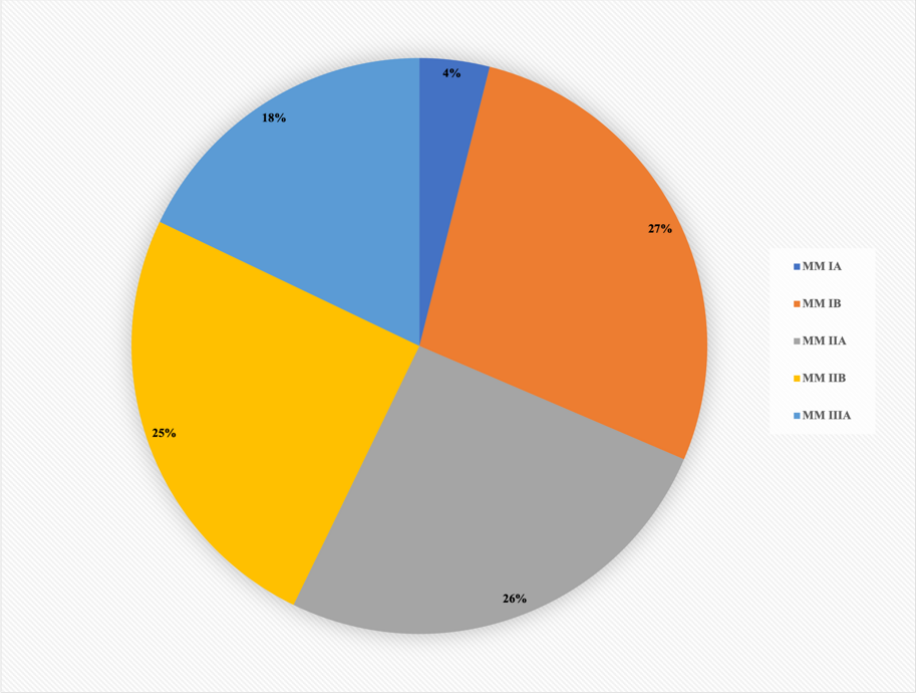


Figure 37 - Percentage of geometric units for each period.

Figure 37 shows that, besides MM IA with only 4% of geometric units attested, there is a uniform distribution of the overall units in all periods, with a slow decline in MM IIIA; a perhaps unsurprising result given that during the data collection I did notice that the same geometric units were repeated in the making of different motifs. So, it did not surprise that the percentages in Figure 37 show a uniform distribution of gestures on all periods from MM IB.

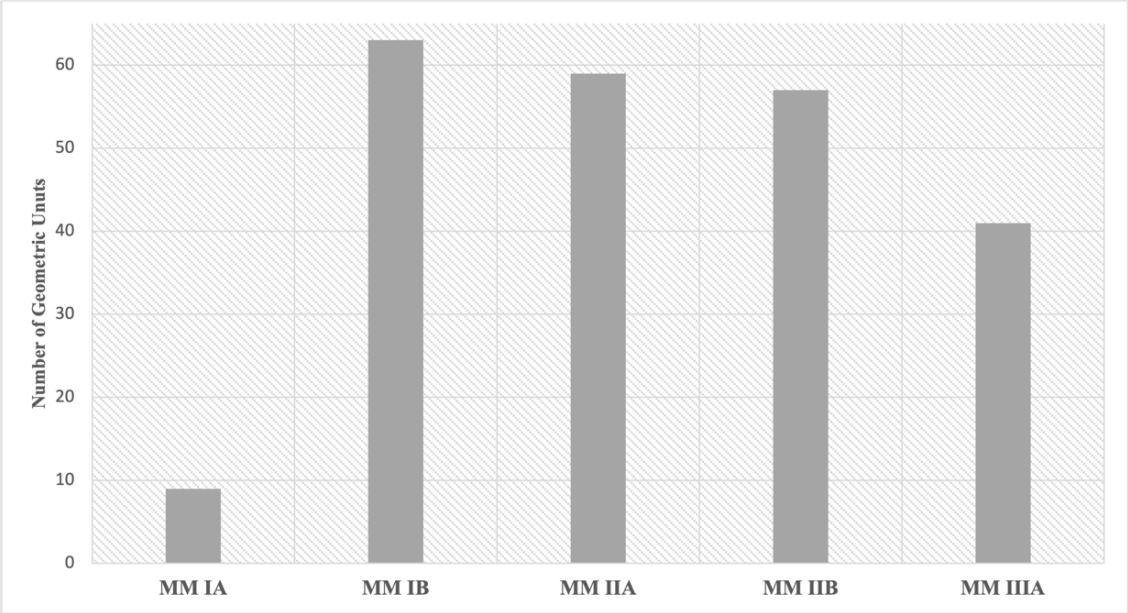


Figure 38 - Distribution of all geometric units in the MM period.

With the absolute data of geometric units divided for each period, Figure 38 emphasises this uniform distribution over time. From MM IB throughout MM IIIA, the data convincingly show a continuity among the geometric units that make up for the 314 motifs. This trend underlines the continuation of practices among generations of potters; that is, continuation in the use of tools, colours, and techniques, along with movements and specific gestures not directly discernible from the archaeological observations but inferable from the material traces. It also shows a continuity in the properties that ensured the Kamares style to endure. With a 4% of the whole assemblage (9 occurrences in total), MM IA is the only value that goes countertrend compared with the other periods. This might be the result of lack of MM IA deposits excavated in Knossos or of the sampling choices adopted. Similar trends for this period might also emerge in the analysis of motifs and compositions. I will return on this issue when analysing those data.

While pointing to the continuity of geometric units over time, overall, these data do not show whether we are looking at the same ways of thinking and acting that emerge every time artisans produce motifs by tracing geometric units. Crucially, I wanted to ascertain the presence of variability or stability in geometric units over time. I thus juxtaposed in Figure 39 the distribution of Figure 38 with the data on new units introduced per period. With new units, I refer to the geometric figures that are attested for the first time in each MM phase.

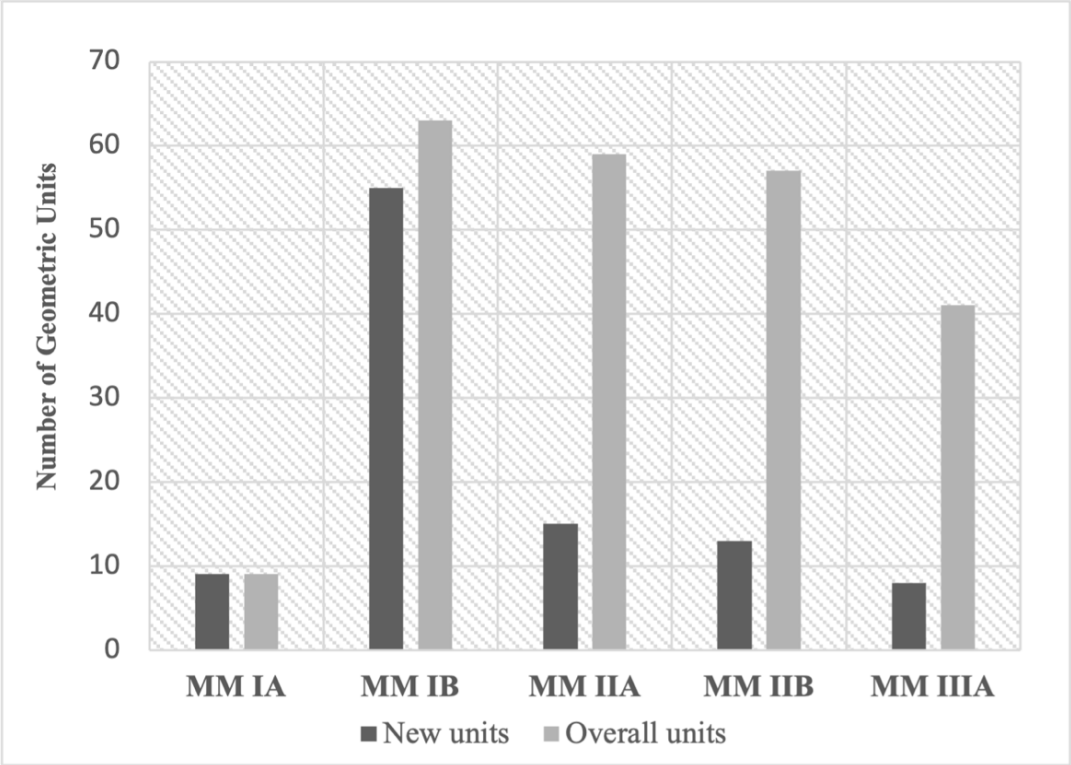


Figure 39 - Comparisons between the introduction of new and the overall numbers of geometric units.

As Figure 39 clearly shows, from MM IB onwards artisans adopted the same geometric units to produce the Kamares decorations. It also seems that MM IB was the period in which artisans were more active and the Kamares style more open to experimentations. However, this observation could be the result of lack on data for the MM IA Knossian deposits. More data on the Knossian, and in general Cretan MM IA pottery, are needed if we want to trace better conclusions. An interesting development of this study could be observing if there are the same trends in Neolithic and EM styles. Overall, according to the data examined here, we can say that the relatively small numbers of geometric units introduced in MM IIA, MM IIB, and MM IIIA show a degree of consistency on the behalf of Minoan artisans on the necessary actions, choices, and technical knowledge.

This consistency can also explain the continuity observed in the previous charts and graphs. I initially planned to look at what kind of shapes were introduced in each period to find out if there were correlations among them. However, the table resulting from querying the database revealed

that the numbers of lines, dots or spirals newly introduced did not show any specific pattern or trend. They were equally present in every period, from MM IA to MM IIIA.

Thus far, I have only considered information regarding geometric units as isolated, separated entities. However, they can hardly be considered in isolation. In fact, when observing these geometrical units, the eye follows their associations and close the gaps between them, so that groups of isolated units appear connected into coherent wholes: motifs. There is undoubtedly a cultural and subjective bias to be considered here, and more scientific explanation might be captured adopting eye-tracking technologies (see, for e.g., Malafouris & Koukouti, 2022; March & Vallée-Tourangeau, 2022; White, 2008). Nonetheless, by looking at examples of Kamares style (Figure 40 and 41) is difficult to argue against the presence of combinations of geometric lines made to form motifs. A similar observation can be moved approaching these motifs from the perspective of making. I argue that, whenever an artisan was tracing a motif, it was in the specific moment of tracing one geometric unit that allowed the following ones to be traced accordingly (i.e., acts as a way to scaffold and build a stratigraphy of actions). Like the notes of a melody, each single unit is not just an isolated entity but part of a string of units that come together in producing a motif. Whereas melodies do not leave marks but disappear when the music stops, motifs leave a material trace. What I am trying to say here is that geometric lines should not be considered isolated entities but as partaking into larger wholes that help structure actions and thoughts in the tracing of motifs. An example derived from a case study on drawing helps clarifying this point.

In a recent article, Casati (2019) looks at how in different drawing tasks problems such as reproducing accurately an object observed in real time, the presence of already traced lines support the actions of choosing and tracing following ones in drawing the selected subject. Specifically, in drawing a rock in the sea, he shows how whilst drawing the first line is a swift action, the second action is slower “because it is controlled by the perception of the first line that one must follow” (p. 4); it thus requires adapting in the here-and-now to the previously traced line to achieve the desired result. However, it is the existing line what enable and structure the following one(s). A similar pattern is what I also found in the sequences of geometric lines which trace a motif.



Figure 40 - MM IB straight-sided cup from the "NW Kamares Area of the Polychrome Vase .03" (KWM528). Photo by author, courtesy of the British School at Athens.



Figure 41 - MM IIA bridge spouted jar from "W. OF W. Court Kouloura 3 House best sherds" (KWM181). Photo by author, courtesy of the British School at Athens.

The example of KWM528, dated to MM IB (Figure 40), shows how white and orange oblique lines are sequentially traced to create the *Five oblique lines - Thin-W(hite) W(hite) Medium-O(range) Thin-W(hite) W(hite)* motif. According to the observation on the over-imposition of geometric lines, I claim that the four white lines were traced from the bottom to the rim, from left to right, with a thin paintbrush, followed by a thick orange line that partially cover the four white lines. Each white line organised, as described by Casati (2019), the following ones and give shape to a motif. It worth noting that these combinations of orange and white lines continue also in later period, even when there is a general standardisation towards dividing the decorative surface of the pot into horizontal lines, as in KWM181, dated to MM IIA (Figure 41).

There hence seem to be norms behind how geometric units are aggregated together into motifs. These norms regard the uses of colours, tools, practices, and artisans' gestures, which seems to be additionally constrained by the types of motifs adopted by the artisans. However, a full-fledged exploration on how geometric units are united in producing motifs becomes possible when looking more in detail at the motifs. Here I just show that there exists a correlation between the overall number of geometric units and motifs in each MM phase (Table 3).

Period	Gestures per period	Motifs per period
MM IA	9	22
MM IB	63	177
MM IIA	59	144
MM IIB	57	129
MM IIIA	41	71

Table 3 - Overall number of geometric units and motifs in the Middle Minoan.

It comes without saying that more motifs bring with them more geometric units. Hence, it does not surprise that the numbers of geometric units and motifs in Table 3 present the same tendency. However, there is an unexpected observation that can be made here: while geometric units remain more or less constant over time, motifs fluctuate. Moreover, Table 4 shows that there is no correlation between the introduction of novel geometric units and new motifs (i.e., motifs that are not attested in previous periods). This is quite evident in MM IIB, when the overall numbers of novel geometric units (13) is not reflected in that of the motifs (44).

Period	New geometric units	New motifs
MM IA	9	22
MM IB	55	155
MM IIA	15	76
MM IIB	13	44
MM IIIA	8	17

Table 4 – Comparison between numbers of new geometric units and new motifs.

Apparently, the dynamics of production behind the creation of motifs suggest that there is an increasing variation in how geometric units are adopted over time. There is, hence, some process at play here that needs to be further investigated with the analysis of motifs and compositions.

What I shall do in the next paragraph. Before moving to motifs, I present my considerations and initial interpretations on the analysis of geometric units.

6.4.2.1 – Summary

According to the data described and partially analysed above, three main observations can be made on geometric units.

First, the most compelling pattern highlighted by the percentage, numbers, and overall distribution of geometric units concerns their configuration over time. They remain consistent and continue from MM IB to MM IIIA with little or no variations. Continuity and consistency can also be observed in the choices and use of colours. Similar dynamics are at play when examining the emergence of new geometric units. As visible in Figure 33 and Table 2, geometric units are uniformly distributed across the period analysed. The only exception is the surge recognisable in MM IB. The same patterns of continuity and consistency are highlighted by the relationships between geometric units and motifs. These trends are visible both when looking at the overall numbers of units and novel decorative forms spread over the whole period. This is quite interesting for what concerns the proposal for style as transgenerational memory. Continuation and consistency in the practices and material properties demonstrate that geometric units "co-operate synergically with one another" (Gell, 1998, p. 163). They act as a coherent whole of practices and material forms, rather than being isolated entities. Related with other previous or contemporary ones, each geometric unit brings with it both the material properties displayed by previous Kamares pots and the practices necessary to produce them. These temporal relations determine the sociomaterial context where artisans remember actions and thoughts. Precisely, in being physical geometrical units and indexes of human action enduring over time, gestural units are central in organising artisans' thoughts and actions in the decoration-making context.

Second, continuity and consistency of geometric units also indicate continuity in skills and knowledge. While I consider units to be material qualities, as described in Section 6.4.2, they also pertain to the knowledge and skills needed to make them. Examples of this would be the choice in pigment to use for tracing a dot (apparently orange and white), tool to use, and technique to employ. Hence, geometric traces suggest how, when combined in the act of decoration-tracing, they produce a potential to create motifs that seems to be an important factor in how it guided or constrained what, how, and when geometric units had to be traced. The importance of these

polychrome geometric units for the overall style and their correlation with motifs is evident in Tables 3 and 4. It was in the choices made in the selection of a tool and a pigment, and in executing the gestures required to leave behind the trace of a line that artisans could enact in the present moment of decoration-making — as we have seen in Section A.1.10, a previously learnt modes of materially engage *with* and *through* tools, raw materials, and past creations.

Last, continuity and consistency of the Knossian Kamares geometric units did not only support artisans' re-enactment of technical skills and knowledge in the present. The synergy among people, practices, and materials structured the potential for generations of artisans to remember actions and thoughts. In the two examples of pottery presented in Figures 40 and 41, we have seen how the same geometric units are used to make up different motifs. While in the straight-sided cup of Figure 40 the white and orange lines were used to give shape to the *Five oblique lines - Thin-W(hite) W(hite) Medium-O(range) Thin-W(hite) W(hite)* motif, in the bridge spouted jar (Figure 41), the white and orange lines are part of distinct friezes. However, while both vases share the same basic geometric units, it cannot be denied that they somehow partake into the Kamares style. The making of Kamares decorations on the surfaces of two cups instantiates and constitutes the required choices and actions. Essentially, these norms are set of shared rules that actively shape how geometric units will be traced in the context of decoration-making, thereby governing the principles by which this style changes or endures over time. The continuity and consistency of geometric units not only set up the stage for memory to endure over transgenerational time. It also set specific norms on how actions and thoughts are re-enacted in the tracing Kamares style units. I delve on the role that the aesthetic of these figures has for memory and remembering in Article 2.

Considering the observations made above, I maintain that the continuity and consistency of geometric units (i.e., the movements, techniques adopted, tools, and raw materials as described in Chapter 1) accounts for the totality of Kamares style: a temporally and spatially distributed set of decorative forms, skills, and knowledge that allowed for the continuation of actions and thoughts from the past into the present.

6.4.3 - Motifs

Coherent sequences of geometric units recognised by the eye as belonging to the same pattern due to their spatial relations give shape to *motifs*. Motifs are consistent wholes resulting from the

combinations of one or more, similar or different geometrical units that united produce a visually consistent pattern. Below, I describe the data acquired and analysed on the Knossian Kamares motifs.



Figure 42 – Fragmented rounded cup from the "W. Square East Kouloura (I) II.7" (KWM124). Photo by author, courtesy of the British School at Athens.

I recognised and documented an overall number of 314 motifs. Each of them recorded into the table *Motifs* resulted from the combination of geometric units. So that, for example, the motif *Two lines - medium O(range)W(hite)* recorded in the composition *Wavy lines W(hite) and horizontal line R(ed)* on pot KWM124 in Figure 42, results from a discontinuous movements combining two geometric units: one *Line – Horizontal medium W(hite)* followed by one *Line – Horizontal medium O(range)* traced with a brush on the bottom of the cup.

It is crucial to point out that the data on motifs are undoubtedly incomplete due to the fragmentary characteristics of the material before going on to detail the data analysis on motifs. However, the reconstruction of designs that were only partially preserved was facilitated by comparisons with documented Protopalatial pottery examples from Kommos, Phaistos, Petras, Malia, and Palaikastro. I assumed that the motif used in these sites were the same based on visual similarities. Whereas motifs presented differences in terms of the geometric units traced to make them, I considered them to be distinct and, thus, did not analyse them. This step was essential to

improve consistency in the data; i.e., avoid re-entering in the database motifs that differ one from each other only because of the fragmented nature of the assemblage.

Prior to considering any links between shapes and types of motifs or continuity over time of specific motifs, I decided to observe the frequency of the most common motifs in each period. This data refers to all the motifs traced by Minoan artisans on the pots part of the assemblage, including motifs repeated on the same pot. For instance, the aforementioned rounded cup KWM124 presents two *Wavy line - Medium W(hite)*. Therefore, the motif *Wavy line - Medium W(hite)* is counted two times towards the total number of *Wavy line - Medium W(hite)* attested in each period.

MM IA	
Motif name	**Quantity**
Line - Horizontal medium W(hite)	4
Triangles running - medium W(hite)	3
Dots running - medium W(hite)	2
Three lines - Oblique medium R(ed) W(hite) R(ed) lines	2
Three lines – R(ed) red medium W(hite) thick lines	1
Lines oblique frieze - alternated thin- W(hite) and medium-O(range)O(range)O(range)O(range) with horizontal line O(range)	1
Line - Horizontal medium R(ed)	1
Line - horizontal medium O(range)	1
Two lines - Horizontal medium red and white	1
Five lines - Vertical thin W(hite) thick R(ed) thin W(hite)	1
Dots running - 3W(hite) 2R 3W(hite)	1
Two circular - medium W(hite)R(ed)	1
Dot and line running - medium W(hite)	1
Three lines - vertical medium O(range)	1
Four lines - thin-W(hite) medium-O thin-W(hite)	1
Two lines - zigazag horizontal medium W(hite)	1
Two lines - medium O(range)W(hite)	1
Three lines - Horizontal W(hite)O(range)W(hite)	1

Four lines - oblique medium W(hite)	1
Two lines - Oblique O(range)O(range)	1
Two lines - Oblique W(hite)	1
Three lines - Oblique medium W(hite)	1

Table 5 – List of with all MM IA motifs observed in the Knossian Kamares assemblage.

MM IB	
Motif name	**Quantity**
Line - Horizontal medium W(hite)	55
Line - horizontal medium O(range)	43
Three curvilinear lines - Left W(hite)W(hite) R(ed)R(ed) lines	32
Line - Horizontal medium R(ed)	30
Semicircular Lines - Horizontal medium W(hite)	28
Line - Oblique W(hite)	20
Three lines - vertical medium O(range)	20
Lines oblique frieze - alternated thin-W(hite) and medium-O(range)O(range)O(range)O(range) with horizontal line O(range)	18
Three lines – R(ed) R(ed) medium W(hite) thick lines	16
Two lines - Vertical medium O(range)	16
Two lines - Oblique O(range)O(range)	12
Five oblique lines - Thin-W(hite) W(hite) Medium-O(range) Thin-W(hite) W(hite)	11
Barbotine lines - plastic decoration	11
Three lines - horizontal medium-W(hite)R(ed)W(hite)	10
Line - Vertical medium W(hite)	9
Three lines - Horizontal W(hite)O(range)W(hite)	9
Floral - Rosette - Dot R(ed)-O(range) with little dots W(hite)	8
Two lines - horizontal medium W(hite)	8
Line - Vertical R(ed)	8
S-shaped lines chain - Medium W(hite)	7
Two lines - medium O(range)W(hite)	7
Sun - Dot R(ed) + Lines W(hite)	7

Two lines - Oblique W(hite)	7
Two lines - vertical medium W(hite)	6
Four lines - vertical W(hite)O(range)O(range)W(hite)	6
Seven Lines - Vertical t-W(hite) m-R(ed)R(ed) T-W(hite) t-W(hite)	5
Dots running - medium W(hite)	5
Lines - Oblique parallel W(hite) thin lines	5
Line - Horizontal thick W(hite)	5
Semicircular three lines - medium-W(hite)	5
Semicircular line with dot medium W(hite)	5
Two lines - medium W(hite)O(range)	5
Three lines - oblique medium R(ed)	5
Dot - Medium W(hite)	5
Four lines - oblique medium O(range)O(range)O(range)O(range)	5
Dots - circle medium W(hite)	5
Line - Horizontal thin R(ed)	5
Line - Zigzag vertical medium W(hite)	5

Table 6 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IB.

MM IIA	
Motif name	**Quantity**
Line - Horizontal medium W(hite)	31
Line - Horizontal medium R(ed)	20
Line - horizontal medium O(range)	17
Two lines - Oblique O(range)O(range)	10
Wavy lines - thin-W(hite)	9
Two lines - Oblique W(hite)	9
Lines - Oblique parallel W(hite) thin lines	8
Dots running - W(hite)R(ed)	7
Foliate band - medium W(hite)	7
Dots running - medium W(hite)	6

Three lines - vertical medium O(range)	6
Dots parallel - two lines small-W(hite)	6
Two lines - Horizontal medium R(ed) and W(hite)	5
Circle – R(ed)	5
Wavy line + lines horizontal - thin W(hite)	5
Three lines - Horizontal W(hite)O(range)W(hite)	5
Spiral - medium W(hite)	5

Table 7 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IIA.

MM IIB	
Motif name	**Quantity**
Line - Horizontal medium W(hite)	34
Line - Horizontal medium R(ed)	33
Foliate band - medium W(hite)	30
Two lines - medium W(hite)O(range)	27
Dots running - W(hite)R(ed)	26
Two lines - medium O(range)W(hite)	26
Line - horizontal medium O(range)	25
Wavy lines - thin-W(hite)	24
Lines - Oblique parallel W(hite) thin lines	19
Wavy line + lines horizontal - thin W(hite)	18
Dots parallel - two lines small-W(hite)	18
Spiral - running W(hite)	17
Fish - Oval-R(ed) + 2 lines horizontal thin W(hite)	16
Spirals Running - Dot R(ed) and S-shaped lines W(hite)	16
Spiral - medium W(hite)	15
Spiral Running - Negative Medium W(hite)	14
Two lines - Horizontal medium R(ed) and W(hite)	13
Dots running - medium W(hite)	12
Floral - Rosette - Teardrops W(hite)	9
Dots running - W(hite) within lines W(hite)	8
Foliate band - stamped W(hite) with lines R(ed)R(ed)	8

Foliate band - thin W(hite)	6
Line - Vertical medium W(hite)	6
Spiral - thick W(hite)	6
Triangles running - medium W(hite)	6
Frieze - dots running R(ed) on line O(range) within lines thing W(hite)	6
Arrowheads - running Left elongated W(hite)	6
Arrowheads - running Right elongated W(hite)	6
S-shaped running - lines horizontal W(hite)	5
Two lines - Horizontal medium W(hite)R(ed)	5
S-shaped line - medium-O(range)	5
Spiral - thick O(range)	5
Spiral Basic running - medium W(hite)	5

Table 8 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IIB.

MM IIIA	
Motif name	**Quantity**
Foliate band - medium W(hite)	18
Dots running - W(hite)R(ed)	17
Two lines - medium O(range)W(hite)	15
Two lines - medium W(hite)O(range)	15
Spiral - medium W(hite)	10
Line - horizontal medium O(range)	9
Line - Horizontal medium W(hite)	7
Line - Horizontal medium R(ed)	7
Spiral Running - Negative Medium W(hite)	6
Line - Vertical medium W(hite)	6
Spiral - thick O(range)	6
Spiral - thick W(hite)	6
Floral - Flower Petal O(range) Spiral W(hite)	6
Floral - Rosette - Teardrops W(hite)	5
Dots sprayed - Small W(hite)	5
Line ridged - horizontal medium-W(hite)	5

Dot W(hite) encircled in dots W(hite)	5

Table 9 - List of the most common Knossian Kamares motifs (i.e., more than 5 occurrences) observed in MM IIIA.

Tables 5-9 describe the most common motifs recorded in each period with their absolute frequency. For MM IB to IIIA, I only considered those motifs that appear more than five times in each period. I avoided MM IA because of the scarcity in data for this period and perhaps because the skills and expertise surrounding the making of Kamares was not yet widespread, presents only a few basic polychrome motifs.[39] MM IB presents a surge in novel motifs, the majority of which linear motifs. The ten most common ones are lines, vertical, horizontal, or oblique, in white, orange, or a combination of both. Interestingly, with ten instances the Barbotine decoration – which I consider here as being a motif part of Kamares for the sake of this study - is also common.



Figure 43 -Rounded cup KWM016 with motif *foliate band – thin W(hite)* from "Test Pit 11 - W. Square Kamares Area 1904" (MM IIB). Photo by author, courtesy of the British School at Athens.

[39] This, if we do not consider the role that previous and contemporary styles and wares, such as the Dark-on-Light and White-on-Dark had in providing to artisans with an already existing tradition of skills, knowledge, and decorative forms.

The MM IIA period shows a continuation of linear motifs from earlier phases. Pretty much in line with MM IB. A novelty for the period is the emergence of white spirals, which became more common in MM IIB. This is the phase that presents the largest quantity of similar motifs, mostly derived from previous forms. Interestingly, most motifs now spread over the whole diameter of a pot horizontally, rather than being traced on isolated parts of a vessel's surface. Given the high level of standardisation showed by these continuous running motifs, especially in comparison to MM IIA and MM IIB decorative forms, I argue that the artisans who made these pots started to consistently adopt the wheel for producing the running decorations – but additional studies, possibly ethnographic investigations, are needed to shed light on these dynamics. Ultimately, in MM IIIA there is a shift in the most common motifs. The so-called *foliate band – W(hite)* motif (Figure 43) became the most common form, following by *Dots running - W(hite)R(ed)* which, for the first time take over the several types of lines used in the past. However, these observations should be taken with a pinch of salt in that there are fewer pots dated to this period than MM IB, IIA, and IIB.

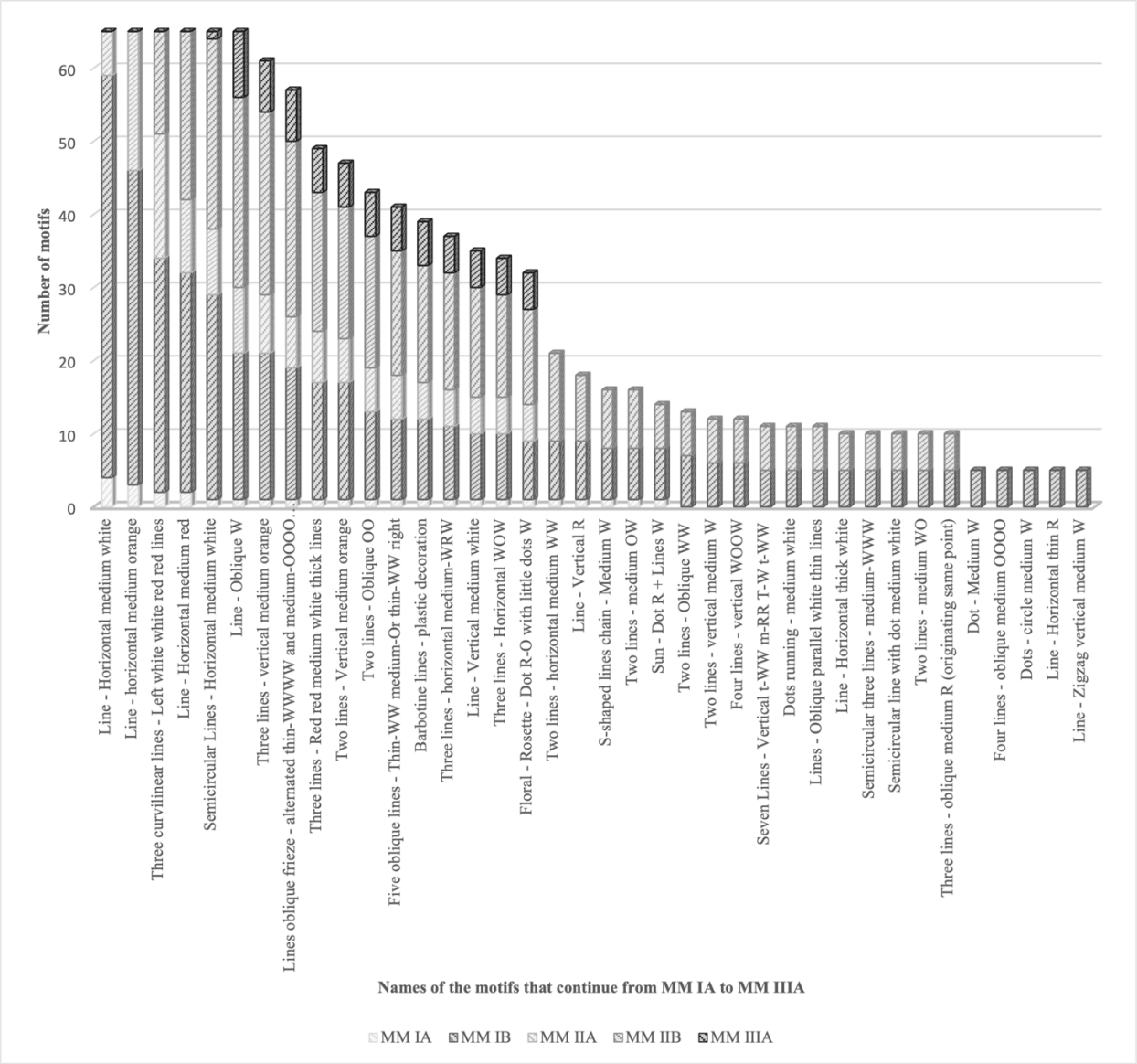


Figure 44 - Comparison of the absolute frequency of the most common motifs occurring in each period.

The most important information that I could extract from the analysis of the overall numbers of motifs recognised in the database regards the continuity of previous motifs into later periods. To have a better idea of this continuation, which is already quite evident in the Tables 5-9, I queried the database to produce a temporal distribution of the motifs from MM IA to IIIA.

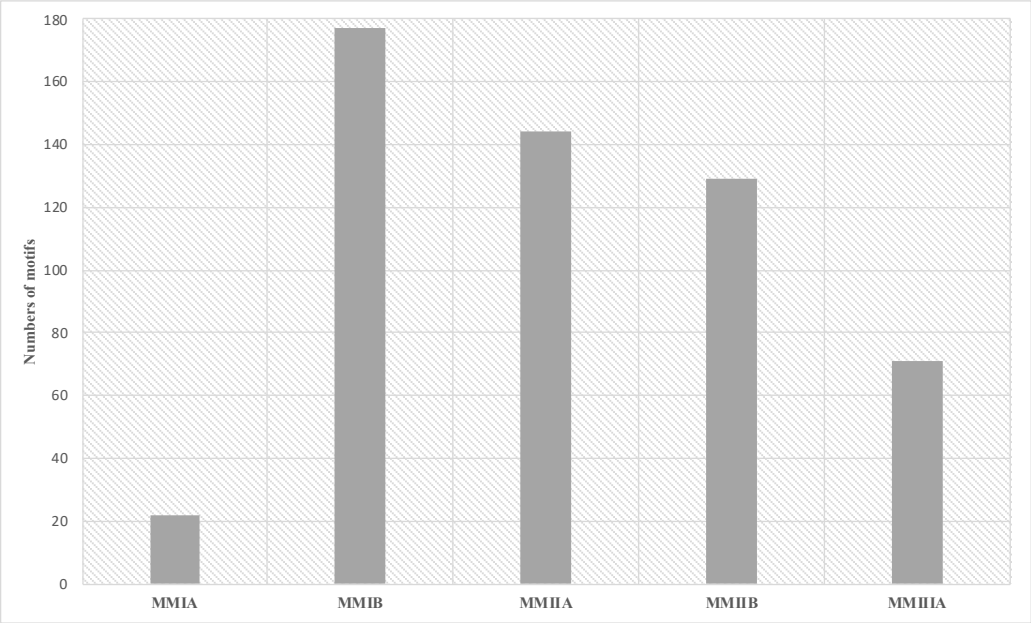


Figure 45 - Distribution of all the motifs in the Middle Minoan.

Figure 45 presents the distribution of all motifs recorded in each period, regardless of their frequency in the assemblage (i.e., how many times a single motif appears over the surface of one or more pots). MM IB is the phase with the highest number of motifs attested in the assemblage analysed. This observation might not be a coincidence, as MM IB is also the period with the highest concentration of pots (313). On the contrary, MM IA is the period with fewer motifs introduced. Again, as for MM IB, this is reflected by the small population documented in this period (12). Given the trends described in MM IA and MM IB, one would expect similar patterns to show up in the other periods. It would be estimated to find that MM IIA, of which there are 148 pots in the database, has fewer motifs than MM IIB, which is the period with the second highest number of vases documented (203). However, this is not corroborated by the data. The overall number of motifs recorded in MM IIA is 144, slightly more than the 129 that occur in MM IIB. For MM IIIA, the total amount of motif is 71, recognised on 82 vases.

To have a better idea of these trends, Figure 46 opposes the total number of motifs, as it is presented in Figure 45, with the overall quantity of new motifs recorded for each period. I.e., the data regarding only the motifs that do not appear previously and that, hence, make their appearance in those periods. For example, in MM IIA I recorded for the first time the motif *Floral - Rosette -*

Teardrops W(hite). Even if it also recurs in MM IIB and MM IIIA, in Figure 46 it is counted only once and in the data regarding MM IIA.

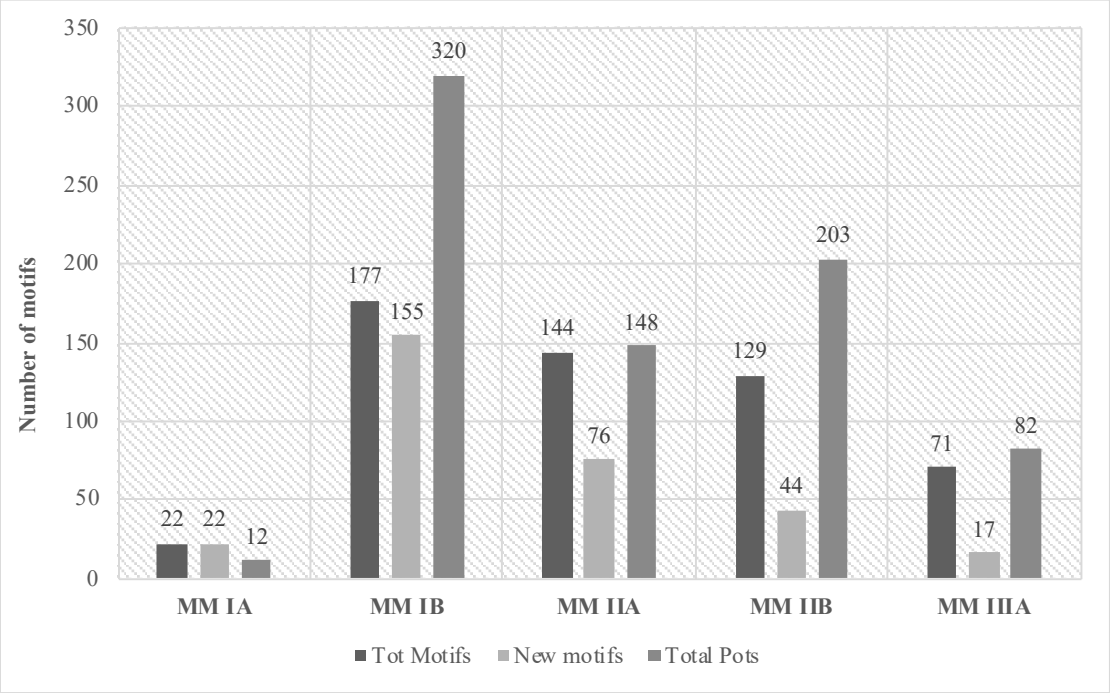


Figure 46 - Comparisons among overall motifs, new motifs, and overall number of pots for each period.

Figure 46 shows that MM IB is the period with more new motifs introduced (155). It follows MM IIA with 76, MM IIB, MM IA, and MM III. It is curious to note here that, albeit there are 82 pots recorded in MM IIIA, only 17 motifs are new. The table also demonstrates that the number of pots analysed is not proportionate to the overall number of motifs occurring in each period and the number of new ones added in each phase. The pie-chart (Figure 47) with the percentage of new motifs distributed across the five temporal stages confirms this trend.

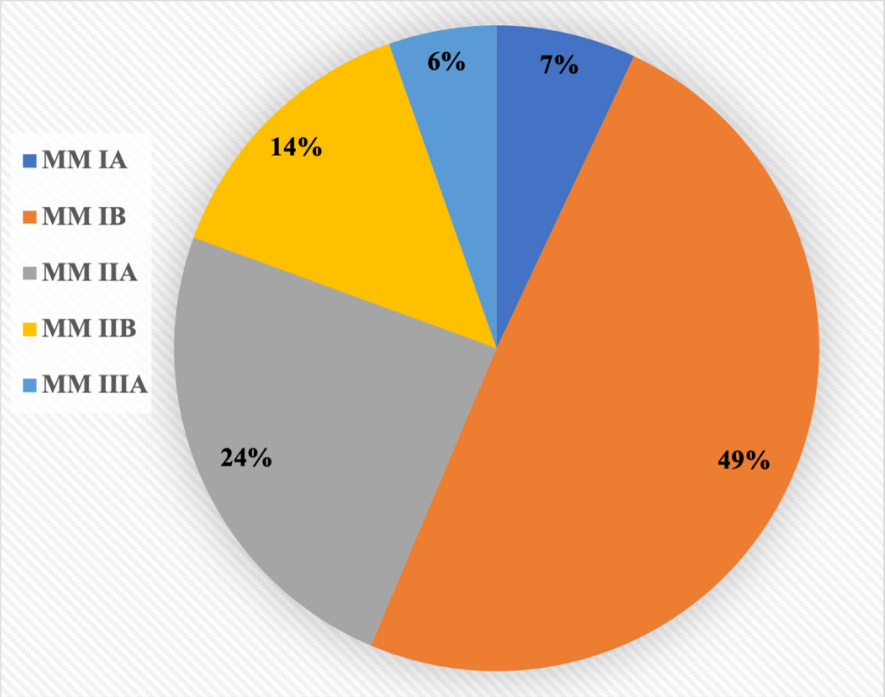


Figure 47 - Percentage of new motifs introduced in each period.

As expected, Figure 47 shows that MM IB has the highest percentage of new motifs introduced. As it was the case for geometric units. This period must have been one of experimentations and creativity, with new motifs incorporating different geometric units. With the second highest overall number of motifs executed by artisans, MM IIA amounts to 24% of the whole motifs observed on the pots. As stated, what surprises is the datum concerning MM IIB period. This phase of the Kamares style is usually described by past studies as the "Classical Kamares" (Betancourt, 1985, p. 96; Walberg, 1978). However, as Figure 46 illustrated, of the 129 motifs recorded only 44 were introduced in this period. This is still a huge number, which suggest that artisans continued to adapt previous motifs and produce something new within the Kamares tradition.

For both MM IA and MM IIIA, numbers are low partly because of the absence of deposits found to date. Aside from the "House of Fallen Blocks" and of "Sacrificed Oxen", originally excavated by Evans and recently re-analysed by Mathioudaki (2018), other deposits are less clear in terms of stratigraphy. Therefore, both Figures 46 and 47 suggest that the results concerning MM II are not biased by the data collection but indicate the presence of a pattern concerning the re-use of previous motifs. This observation is suggested by the overall quantity of motifs recorded in each phase and the introduction of novel ones.

6.4.3.1 - Summary

The analysis of the data the motifs suggest three main patterns. First, the most striking one shows that most recurring motifs identified for each period occur in later times. An example of this trend is the *Foliate band – W(hite)* that emerges in MM IA and continues up to MM IIIA. The analysis above shows that motifs do not disappear to leave room to newer ones. Nor they are replaced by more complicated or evolved ones. Motifs do not take the place of previous ones or disappear. Instead, novel motifs co-exist alongside previous ones. Therefore, I argue that motifs *accumulate* and *continue* over time, rather than being replaced by more complicated forms and forgotten. These patterns suggest that older motifs are recalled and reused in later pots, either consciously or not (as in the analysis by Garrow & Gosden, 2012). From the perspective of MET, there is not just continuity and accumulation of static motifs over time. In being traces of actions and thoughts (Malafouris, 2019a), motifs show that such continuity and accumulation is also reflected in modes of thinking and acting. As highlighted in Article 1 when discussing the tenets behind the MET, thinking and acting emerge from an organism's interaction *with* and *through* things. Meaning, they cannot be disentangled from the context of making these motifs and from motifs themselves (see also Malafouris, 2021b). By tracing the geometric units that produce motifs, artisans execute specific actions and make choices (e.g., which motifs to put, what tool to adopt, what pigment). Therefore, motifs enable the actions and thoughts to be recalled in the present moment of action.

Second, considering the observations on trends in Figures 44-47, it would be challenging to sustain that the Kamares style became more evolved over time; at least, from observing the patterns behind motifs. According to the data extracted from the database, processes of *accumulation* and *continuation* are not directed towards a predetermined future (i.e., towards more complicated forms or even a new style). This because, as seen, all motifs but one endured over time, with some appearing in MM IB and continuing to be traced for centuries. This suggests that artisans involved in the making of Kamares vases, when tracing geometric units, could remember all the repertoire of the Knossian Kamares motifs that were available up to their period. With this, I am not suggesting that these artisans stored somewhere in their brains or minds the whole set of motifs that were traced in the past. What I am trying to say here is that if they could trace the required geometric units needed to produce a motif, this was because they had engaged at some moment in

the past with a pot (or other type of artefacts) that specific motif. With experienced I refer to the fact that in the sociocultural context where artisans lived and worked, they had access to decorative forms that, at a later stage, they could replicate. I already suggested in Chapter 1 that the sociocultural context of the Middle Minoan, either in terms of production and consumption, was one of exchange and movements of materials and people. Hence, with experienced I am referring to a history of material engagements between these motifs and the artisans. These engagements could be developed in the context of making these motifs, maybe as part of their training in a workshop, or as part of communal events happening in the palaces. It is through building a history of engagements with pots that artisans could remember, in the context of pottery making, the previously existing motifs that were circulating in the wider sociocultural milieu. However, if artisans could remember and learn how to trace these motifs, this was not because they merely observed motifs in the past. It was in directly interacting with the tools, different pigments, and clays that they could acquire over time the skills and knowledge to *produce* Kamares style pots. The artisans become accustomed to the long-term process of creation of the Kamares style by being continually exposed to pots in this style. Even if artisans would have not taken part into the consumption practices attested in the palaces, they would have been able to learn through others and their finished products. The workshop found in Malia seem to suggest that, while spaces could accommodate only two or three artisans at the same time, there was a community where more than one potter or painter was involved in the making of these luxury items. In a way, artisans' actions and thoughts were affected by the past and their immediate present context: the memory of skills and knowledge required to keep producing Kamares style pottery emerged in the moment of tracing the geometric units (Section 6.4.2.1).

By doing so, they do not only adopt recent motifs and introduce something new to achieve a desired, and perhaps novel motif. Through their interaction with examples of Knossian Kamares style pottery, artisans could remember the motifs and correlated geometric units available up to their period. This observation suggests that Gell was onto something in arguing that, within the boundaries of a cultural style, there is no clear temporal direction (e.g., from the past to the present or vice versa). Instead, the Knossian Kamares style is indeed a distributed set of memories of skills, choices, and actions where one motif references previous ones. Simultaneously, the presence of these motifs, be it a deliberate or unconscious referencing of previous thoughts or actions, enabled future generations of Minoan artisans a potential for future creations. Every single *Foliate band* –

W(hite) drawn on the surface of MM IB vases enabled future *Foliate band – W(hite)* motifs to come into being in the action of tracing the geometric units to decorate a new Kamares style vase.

Third, continuation and repetition, united with absence of temporal directionality, do not imply that the Knossian Kamares style is static or immutable. The graph in Figure 44 shows that certain motifs emerge out of continual processes of *aggregation* and *combination* similarly to those recognised for the geometric units. We can see these processes at play in the already mentioned case of the *Foliate band – W(hite)* and the *Foliate band – Stamped W(hite) with Lines R(ed)R(ed)*. While the former is attested in the assemblage since MM IA, the latter appears in MM IB and continues until only MM IIB. The *Foliate band – W(hite)* is usually the result of an artisans tracing lines by exerting continuous movements with a paintbrush. The later motif is a discontinuous movement where the white paint is applied with a sponge or stamp, followed by the tracing of two horizontal red lines on top. The two horizontal red lines do not come out of nowhere but are attested in the motif *Two lines – Horizontal R(ed) R(ed)* in five different compositions and on the surface of seven pots dated from MM IB to MM IIB. I argue that the *Foliate band – Stamped W(hite) with Lines R(ed)R(ed)* is not the result of a novelty introduced by a pre-rendered idea later imposed on matter. It emerged in the making of a new Kamares vase because of processes of *aggregation* and *combination* of the *Foliate band – W(hite)* and the *Two lines – Horizontal R(ed) R(ed)*. This example shows how previously traced motifs enabled artists to produce new ones by aggregating and combining those that had already been produced or experienced. In other words, creativity unfolds through the adaption of existing decorative styles and ways of thinking and acting in the context of making something new.

Therefore, the Knossian Kamares style is all but static. It is a process continually updated every time artisans engaged *with* and *through* past creations, tools, and raw materials in the context of making new Kamares vases. The entire accumulated transgenerational memory of the Kamares style is instantiated and constituted in the very moment of material engagement: when the artisan's hand uses a paintbrush to trace geometric units and adjusts its movements in response to the feeling of the vase's surface. Actions and choices, skills and knowledge, emerge in the very act of tracing the gestural unites required to obtain a specific motif. Furthermore, by making a new decorated pot that will circulate in the Minoan sociomaterial contexts, artisans enable a potential for future decorations to be remembered and updated, feeding into the transgenerational Kamares style.

Therefore, from these preliminary observations, I maintain that Kamares motifs such as the *Foliate band – W(hite)* are peculiar kinds of *material signs*: memory traces. Since memory traces are peculiar material signs, it is due to the dispositional properties that they enable artisans to recall thoughts and actions in the moment of drawing geometric units. As I will explore in detail in the Sections 6.4.4, where I discuss several examples of motifs, a memory trace denotes the unity of memory and matter as it unfolds in action (also, Malafouris, 2019a).

I move now to explore in more detail the connection existing between motifs and compositions, as it is pivotal to explore questions about the inventiveness and creativity of Kamares decorative forms.

6.4.4 - Compositions

Compositions refer to the spatial associations among one or more motifs found on the surface of a single pot. In total, I observed and recorded 365 compositions. I documented the spatial correlations between motifs as they appear on the surface of each vessel in order to comprehend the techniques and processes through which Minoan potters traced compositions.

During the data collection, I pinpointed each motif to a specific area of the pot (i.e., rim, neck, body, base, bottom; or their combinations, e.g., body-base) and associated it with others through their spatial location. I argue that these associations are useful to understand the degree of freedom that artisans had in choosing what motifs to trace and, therefore, which actions to perform, skills to enact, tools to use, and choices in raw materials in the decoration-making context. Specifically, the analysis of the relationships between motifs enables to see "the range of motifs and design variation possible at a specific point in time" (Morris, 2006, p. 103). Here follows a description of the data acquired and analysed on compositions aimed at developing a better understanding of the dynamics behind transgenerational memory.

As mentioned, the database contains data on 365 compositions. This is an impressive number when compared to the 143 geometric units or the 328 motifs. In the data gathered from the deposits of Knossos, it is challenging to find more than ten pots sharing the same composition. In Table 10, I reported only the nine compositions that appear more than ten times in the assemblage. Of the remaining ones, only 63 occur between three and ten times, while 58 are recorded on no more than two vases. Most compositions observed, 216 overall, occur only once in the assemblage.

Compositions	Total
Three registers – Dots W(hite)R(ed) + foliate bands + Dots W(hite)R(ed)	34
Oblique O(range)W(hite) frieze with W(hite)O(orange)O(orange)\W(hite)O(orange)W(hite) lines	18
Wavy lines - Fishes R(ed) and little dots W(hite)	17
Lines oblique W(hite)W(hite)O(orange)O(orange)W(hite)W(hite)	17
Curvilinear lines W(hite)W(hite)R(ed)R(ed)	16
Three registers – Semicircular line W(hite) + Line O(range) + Semicircular line W(hite)	15
Line horizontal O(range) over rounded neck	13
Spirals-W(hite)O(range) and two lines vertical thick-O(range)O(range)	11
Five oblique lines W(hite)W(hite)O(orange)O(orange)W(hite)W(hite) + line oblique W(hite)	11

Table 10 - List of the nine compositions that have more than 10 occurrences in the database.

These data suggest that variations underline a degree of autonomy undocumented in either geometric units or motifs. It looks like artisans could freely make choices on which motifs to use to decorate their vessels. It comes without saying that this freedom rested within the range of motifs that the geometric units that the already existing vases decorated within the Kamares style enabled them to trace. It is possible to see these preliminary results considering scholars' observations on the creativity of Kamares decorative forms. Particularly appropriate sounds Betancourt's (1985) statement, already quoted in the introduction, that "creativity and excitement of the unexpected are regular traits of the style" (p. 97). I argue here that inventiveness and creativity were the result of the freedom that artisans had in composing together several motifs to produce something that was always visually new or catchy, as it is nowadays. Hence, if no two vases are identical, it is not because techniques differed from the past. Nor because motifs were always new or changed from contemporary and past ones. Instead, creativity and inventiveness played out in how artisans' modes of composing motifs were new and, almost, unexpected. To better explore these dynamics, I decided to query the database to obtain more insights on compositions.

The first step was to see the distribution of compositions across the Middle Minoan. I wanted to observe both the overall frequency of compositions and the single occurrences. To do so, I

plotted a bar chart with stacked columns comparing the overall numbers of compositions with the compositions that appear only once in each phase (Figure 48). My aim was to see the ratio between the totality of compositions, which includes the same compositions counted more than once, and how many times a single composition appears in each period; similarly to how I previously approached geometric units and motifs. In this way, I could have a better sense of the variability in the ways artisans played with motifs in the making of Kamares vases.

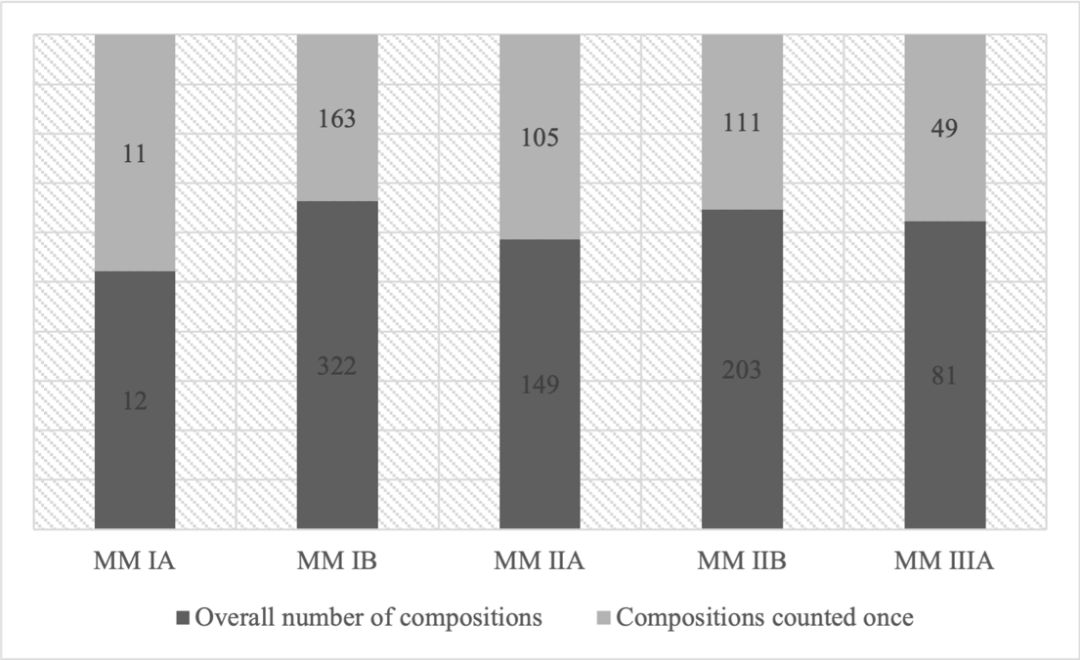


Figure 48 - Stacked bar chart confronting the overall number of compositions with the numbers of compositions counted only once in each period.

The distribution of the overall number of compositions shows a pattern equivalent to those observed for geometric units and motifs. MM IA is the period with fewer compositions, whereas MM IB is the phase with the highest. This pattern does not surprise, for the reasons detailed under both geometric units and motifs. However, there is a difference from the analyses carried out so far: MM IIA sees a slightly lower frequency than MM IIB. This latter period sees an increase in terms of compositions, in ways that find no parallels in either motifs or units. A similar pattern is replicated in the number of compositions counted only once in each phase. The characteristics of this chart also highlight the unusual number of compositions in MM IIB.

In terms of innovations, Figure 48 shows that the trends resemble those regarding compositions. The high number of compositions in MM IB suggests that this was a period of openness and inventiveness in decorative forms. More interesting is the difference between new compositions in MM IIA and MM IIB, which appears to be minimal. Instead, MM IIIA has a pattern in the reuse of compositions that is more pronounced than in earlier periods. Overall, the trends described by the Table 10 and Figure 48 show a pattern that is slightly different from those of geometric units and motifs. On the other hand, it confirms the general assumptions by scholars in the field of Minoan archaeology on the creativity of Kamares style.

Another striking attribute that I did not appreciate in previous charts concerns the continuity of previous compositions into later periods. There seems to be a certain degree of openness in how artisans aggregated motifs into compositions. This, to the point that every time an artisan found themselves decorating a vessel in the Kamares style a new composition was created anew. This observation breaks with the trends and patterns we have seen for geometric units and motifs. Whilst the continuation of the Kamares style can be seen as dependent on both units and motifs, compositions were constantly altered to reflect the unique demands of the situated context of decoration-making. This might have been the result of the Minoan sociocultural context were artisans lived. More data might surface when comparing different Kamares traditions from other regions, an endeavour that could be carried out with future research.

Before moving to see other patterns emerging from compositions, I collated all the data on the geometric units, motifs, and compositions introduced in each MM period in Figure 49.

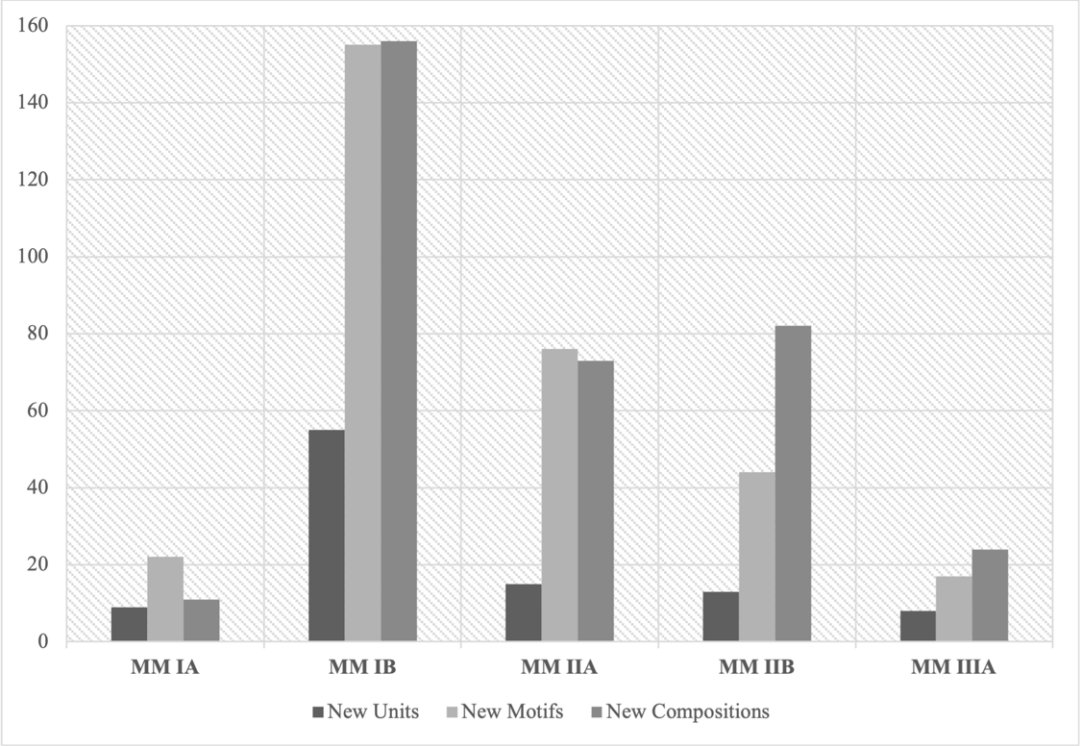


Figure 49 - Comparison between the numbers of new geometric units and motifs in relation to the trend of the new composition over time.

In some ways, the most striking attribute in Figure 49 is the discrepancy in terms of the number of compositions compared to motifs and geometric units. Another characteristic that surprised me when plotting the graph concerns MM IIB. The chart shows that new compositions (i.e., compositions that do not appear in previous periods) manifest the same tendency of both geometric units and motifs. However, in contrast with the decline of newly introduced motifs and geometric units visible in MM IIB, it also demonstrates that there is still a considerable number of novel compositions; meaning, there is not a decline in decorative forms as in other periods. Of these, the most striking examples are those represented by the composition *Three registers – Dots W(hite)R(ed) + foliate bands + Dots W(hite)R(ed)* (Figures 50 and 51) of which there are 34 pots in total.



Figure 50 – Rounded bridge-spouted jar dated to the MM IIB (KWM083). Photo by author, courtesy of the British School at Athens.



Figure 51 – MM IIIA rounded bridge-spouted jar (KWM701). Photo by author, courtesy of the British School at Athens.

These results might suggest that MM IIB was a period of stability in decorative forms, with artisans tracing decorations within the set of geometric units and motifs defined by circa 150 years of Knossian Kamares tradition. Thus, openness and inventiveness were not expressed through introducing new geometric units or motifs. Rather, inventiveness rested in how artisans traced together motif and recalled geometric units, drawing them into novel compositions. This surge in compositions observed in MM IIB might also be connected to some change at the level of social groups within or outside the palace.

6.4.4.1 - Summary

In the previous section, I attempted to discern how compositions changed or continued throughout the duration of the Kamares style. My aim was to inform questions on change and stability, as well as continuity and creativity of this style. In so doing, I recognised three key patterns.

The first has to do with the high variability identified among compositions through the Protopalatial period. The magnitude of this variability, which outnumbers all the other parameters observed in this study, suggests that there is something behind the numbers recorded during the data collection. Table 10 presents only nine compositions over a total of 365. I maintain that these numbers are the consequence of a high degree of autonomy in the actions and choices that artisans could take in the context of making a new Kamares vase. As shown by Figure 49, geometric units

remain constant over the long-term while compositions do not. They are continually updated through the choices of drawing specific motifs over others, while gestural units remain consistent over the whole period. Considering these observations, I agree with the general idea that Kamares style is a creative kind of pottery. However, my claim is that the whole long-term duration of the Kamares described above shows that this results from a continuous iterative creative process. My use of creativity here does not imply the presence of internal (i.e., skull-bound, intracranial) states of thinking in the form of mental representations, later reproduced in material form. It refers to the multiplicity of human responses emerging in the situated context where actions take place (Malafouris, 2014a; Bruineberg & Rietveld, 2014).

The second observation is that although there is a high degree of variability in the making of Kamares compositions, there is also a certain continuity in forms. However, such continuity does not result from the persistence of earlier compositions into later periods. The bar chart in Figure 48 shows that new compositions are always more than half of the overall compositions per period. So, if compositions played a role in enabling artisans to remember the skills and knowledge accumulated transgenerationally, it was not by giving them access to an already existing set of material forms and correlated skills and ways of thinking and acting that served as a foundation for the reproduction of past compositions. That would be the case if compositions were to present a trend such as that of motifs. But this is not the case. Hence, I rule out that compositions had a direct role in influencing artisans' actions and choices. It is more plausible to think that are motifs, and the underlying geometric units, what enabled artisans' memory of skills, practices, and choices to emerge in the making. Compositions result from a continuous process where motifs and geometric units are put under discussion, adapted, and creatively assembled into ever-changing forms.

The third idea I want to bring up here has to do with the variability of composition over time. The data analysis demonstrates not only that Kamares resulted from a continuous iterative process sustained by the making of motifs achieved by tracing geometric units. Rather, it shows that inventiveness and openness in making compositions unfolds in the very moment of tracing novel motifs. This is underlined by the fact that most compositions are attested only once, thereby suggesting that the spatial configurations among motifs on the surface of a single vase was an act that emerged in the here and now. This suggest that remembering is very much a present enterprise that has little to do with the past. That is, when practices, raw materials, tools, techniques, ideas,

previously made pots all come together when artisans traced novel decorations. This observation is in line with discussions made in Section A1.10.3, where I proposed that memory is a pragmatic enterprise whose aim is directed towards the present or future (also, Malafouris & Koukouti, 2018).

There is one last observation on compositions that has less to do with memory and remembering but it is equally important to shed light on the mindset of Knossian Kamares artisans. Despite the diversity in compositions there is an increasingly standardised way to locate on the surface of every pot sequence of radiating spirals, dots, or s-lines. In MM IIA simple patterns, such as diagonal, horizontal, and vertical lines or pendant are clearly used to structure the surface space of the vessel. This observation confirms previous studies by Matz (1928) and Furumark (1941) on the inclination of artisans in producing radiating decorations. They frame sequences of motifs like spirals or zigzags (Figures 50 and 51). Sequences of motifs concatenated together also confirm the torsional nature of polychrome decorations. While compositions differ, there is a lot of repetition and redundant patterning in the different groups of motifs. This is evident in the spirals or foliate bands that form torsional chains of motifs that stretch for the whole diameter of the pot. There is indeed a standardisation in the compositions of the Kamares pots in the later stages of the MM, as well as a general attitude learnt by artisans in producing aggregations of motif that follow the tenets of torsional decoration that Matz (1928) and Furumark (1941) already observed in their sytactical analyses of Minoan pottery.

To sum up, the analysis of the Kamares style compositions supports the idea that this style is not simply a taxonomic endeavour but describes a continual process whereas already existing forms are continually adapted to the present sociomaterial context where decorations were traced. The Kamares style is continually assessed and (re-)enacted every time artisans engaged *with* all accumulated motifs, tools, raw materials *through* specific practices when creating a new composition. Rather than recalling something passively from memory, the patterns underlying Kamares style compositions show that thinking and acting emerge and are instantiated whenever Minoan artisans engaged in the Knossian decoration-making.[40] Therefore, composing motifs together into compositions according to the requests that geometric units impose on artisans' bodies, allowed generations of Minoan artisans to remember their and their predecessors' actions

[40] As already mentioned in Article 1, and as further develop in Articles 2 and 3, with (re-)enacted, I refer to the capacity our bodies and brains have of adapting previously acquired modes of thinking and acting "in line with what the dynamically, changing environment demands or solicits" (Bruineberg & Rietveld, 2014, p. 10).

and thoughts, whilst updating the Kamares style by putting in circulation novel ornated pots. I argue that this is what enables the transgenerationality of memory and uncover some of the dynamics behind creativity in Kamares decorative forms.

Article 2 – The Role of Aesthetics for Memory: A Material-Engagement Approach to the Making of Knossian Kamares Decorations[41]

Abstract

In presenting the study of Bronze Age Knossian Kamares (ca. 1950-1700 BCE) making of polychrome decorative motifs, this paper investigates the degree to which the aesthetic material forms of things (i.e., the combination of materials, shapes, and decorations) constitute memories of sociocultural practices: patterns of skilled actions, thoughts, and the beliefs attached to them. Specifically, I propose that Knossian Kamares decorations are memories because they are material signs of past sociocultural practices that occurred *with* and *through* them over time. Ultimately, this essay aims to call attention to the role of the aesthetic qualities of material forms and their associated sociocultural practices in constituting memory from the perspective of material engagement theory.

A2.1 - Introduction

Recent archaeological and anthropological approaches to aesthetics suggest things are essential in affecting people's thoughts and actions (Gosden, 2001, 2005; Knappett, 2005; Malafouris & Koukouti, 2021). These approaches inform this study's proposal for aesthetics and memory: that the aesthetic dimensions of things, the material forms they take, work as memories of sociocultural practices (i.e., patterns of skilled actions, thoughts, and the beliefs attached to them) in a specific sociomaterial context (i.e., the situated environment made of people, things, and their shared practices). As I will show later, remembering is not just about recollecting something from memory. Instead, remembering is something we do (i.e., a pragmatic and transactional endeavour): a way of materially engaging *with* and *through* things in a specific sociomaterial context (Prezioso & Alessandroni, 2022). I clarify that my aim here is not to discuss aesthetics as a philosophical analytical category but to explore how *aesthetic material forms* partake in memory. Where

[41] Published in the Archaeological Review from Cambridge Vol. 37.2 (Prezioso, 2022).

'aesthetic material forms' denotes how certain combinations of materials, shapes, and decorations affect people's thinking and acting in their sociomaterial contexts.

This proposal for the role of aesthetic material forms for memory is supported by observations drawn from my investigation of the Protopalatial (Middle Minoan IB–Middle Minoan IIIA, ca. 1900–1700 BCE) Kamares pottery from Knossos (Crete, Greece).[42] As I show below, despite its creativity in shapes and decorations, as well as complexity in techniques and skills, Kamares maintains visual consistency and temporal continuity, offering a good case study to explore the interactions between aesthetics and memory.[43]

In the first section, I describe the Kamares style and present a critical review of Kamares stylistic studies to show how style and mainstream (Western) art-oriented aesthetics are two faces of the same coin. In the second section, I briefly discuss anthropological and archaeological approaches to aesthetics and their implications for studying memory. In the last section, I entwine my analysis of the Knossian Kamares decoration-making with material engagement theory and ecological-enactive paradigms of cognition, pinpointing the role of aesthetic forms for memory and remembering.

A2.2 - The Kamares style

"Creativity and the excitement of the unexpected are regular traits of this style" is how Betancourt (1985, p. 97) concludes his remarks on the inventiveness and richness of the surface decorations of Minoan Kamares pottery (see also Betancourt, 1990; Carinci, 1997; Walberg, 1976). Dated to the Protopalatial period, Kamares is characterised by white, red, orange, and purple decorations painted on a dark-black lustrous slip. Oblique, vertical, or horizontal lines predominate. Curvilinear lines, dots, and diamonds also feature prominently (Figures A2.2-5), particularly towards the end of the Protopalatial period (Betancourt, 1985; Walberg, 1983, 1986). However, creativity and inventiveness are not expressed solely through diversity in polychrome figures. They are also indicated by how Minoan artisans chose these figures and skilfully traced them to produce geometric or naturalistic patterns: polychrome motifs combined into various

[42] The meaning of the term 'Kamares' is still debated today (Levi & Carinci, 1988; MacGillivray, 1986; Van de Moortel, 2006a), with scholars adopting 'polychrome' to define a broader category of materials (MacGillivray, 1998; Macdonald & Knappett, 2007). My use of 'Kamares' here refers to a Minoan ceramic tradition defined by the interplay between polychrome geometric figures over a black slip.

[43] These dynamics are not limited to Kamares but can be applied to other past and present styles and making traditions. Also, memory is only one of the many dimensions of aesthetic experience, the one on which I focus here.

creative compositions that still strike contemporary observers (Knappett, 2005, 2008; Walberg, 1976). These decorative features are not only restricted to the finest examples of this style. Tableware (e.g., straight-sided cups or bridge-spouted jars) and storage pots (e.g., jugs or pithoi) also present polychrome motifs (Betancourt, 1985; for Knossos, see Macdonald & Knappett, 2007; MacGillivray, 2007).

The creativity and diversity of Kamares are not only implied by the variability of its shapes and surface decorations but are also manifested in the skilful use of raw materials (e.g., pigments) and the adoption of different forming (e.g., layering) and decorating techniques (e.g., stamping). For instance, in Knossos, wheel-shaped or wheel-thrown pots appear alongside handmade ones (Knappett, 1999). Decorations could be painted, stamped with various tools (e.g., sponges), or made of clay appliqués (e.g., barbotine at Phaistos; Caloi, 2009). Variability in the production and use of pigments (e.g., talc white or purple) is attested in various Cretan regions (Day et al., 2006). Due to these qualities, Kamares was subjected to stylistic and technological studies. I focus on the former as they help to shed light on the roots of mainstream (Western) art-oriented aesthetics, and its shortcoming in exploring the linkages between memory and aesthetic material forms.

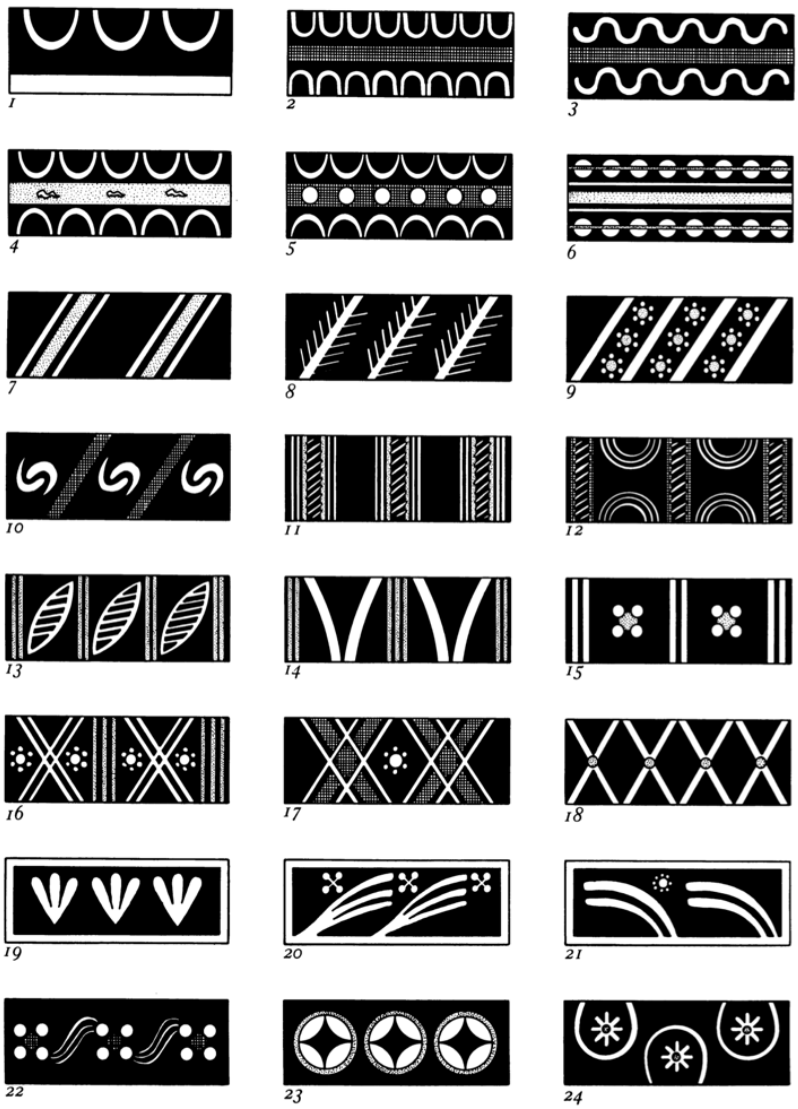


Figure A2.1 - Selection of decorative patterns in the *Woven Style* on straight-sided cups from Protopalatial deposits of Knossos (MacGillivray, 1998, fig. 2.1, reproduced with permission of the British School at Athens).

A2.2.1 - Stylistic studies of Kamares

The earliest Kamares studies focussed on its creative qualities of shape and decoration to produce stylistic sequences aimed at better understanding the chronological unfolding of the Minoan civilisation (Mackenzie, 1906; Zois, 1968). Walberg (1976, 1978, 1983) developed a comprehensive description of different types and their stylistic evolution, which she arranged over four periods: Pre-Kamares, Early Kamares, Classic Kamares, and Late Kamares. In so doing, she placed vessels sharing similar physical qualities (i.e., shape, decorative motifs, types of

decorations, and decorative syntax) into the same categories and assumed them to be chronologically contemporary to others because of these similarities. While influential in later studies on Kamares (Andreou, 1978; MacGillivray, 2007), her stylistic approach presented some drawbacks. The lack of direct examination of materials and archaeological contexts, and the objective difficulty in categorising this idiosyncratic pottery style, resulted in theoretical stylistic typologies "grounded in an overly schematic and abstract geometric view of artefacts, *de facto* detached from the technique, actual size of the object, and from the decorative repertoire" (Levi & Carinci, 1988, p. xv).[44] Recent publications and new excavations allowed for more fine-grained stylistic classifications and chronological sequences. For instance, MacGillivray's (2007) work produced detailed shapes and decorative styles of the Knossian Protopalatial deposits (fig. A2.1). Albeit more attentive to the materials than his predecessors, MacGillivray adopted the same stylistic approach: pots exhibiting physical similarities were subsumed under a referent type (i.e., a category) and placed in a unilinear temporal trajectory.

In producing fictional categories, this approach presents one major drawback (for discussions on style: Boast, 1997; Prezioso, 2021; Sørensen, 2015)[45]: it separates material forms and their aesthetic dimension from the reality of the archaeological datum. It follows that processes behind the creativity of Kamares and its dynamics of change and continuity are reduced to static referent types, thereby separated from their sociomaterial contexts and sociocultural coordinates of interaction. I will later contend that in the context where Minoan artisans remembered skilled actions and choices required to make new decorations, motifs were active agents in a complex ecology of people, things, and practices without which memory could not survive over generations.

I ague in the next paragraph that the divisions fostered by stylistic approaches are partially rooted in mainstream (Western) aesthetics.

A2.3 - Aesthetics in anthropology and archaeology

Archaeology has engaged with notions of aesthetics since its earliest developments (for a review, see Skeates, 2017). Of these, particularly influential was Kantian aesthetics, for which intentionally and skilfully created things are considered artworks capable of eliciting pleasurable

[44] "l'approccio metodologico, fondato su una troppo schematica ed astratta visione geometrica dei manufatti, scissa di fatto dalla tecnica, dalle dimensioni reali dell'oggetto, ed anche dal repertorio decorativo".

[45] This stylistic approach is not only confined to studies of Kamares but has been used in various geographical areas around the world (e.g., styles of Celtic art, see Garrow et al., 2008).

feelings. Diverging from mundane things, artworks become detached from the sociomaterial contexts where they were made, used, circulated, and discarded (Ingold, 1996, p. 205). This view reiterates century-old abstractions and separations among categories of aesthetic experience (e.g., mind\matter, artwork\artefact), disclosing the influence of Cartesian metaphysics on aesthetics (see discussions in Ingold, 2001; March, 2019).

While some authors recognised the challenges of adapting this aesthetic view to archaeology (e.g., projecting contemporary judgment to prehistoric artefacts; see contributions in Tyler et al., 1994; for recent discussions, see March, 2020; Robb, 2017), others adapted it to answer questions of stylistic transmission or societal change (Conkey & Hastorf, 1990; Hegmon, 1992). As the overview of Kamares illustrated, it is through these latter studies that the Cartesian legacy of Kantian aesthetics lived on, thereby limiting attempts to explore how things "come to matter to our senses and acquire aesthetic agency (the ability to move us) in a specific context" (Malafouris & Koukouti, 2021, p. 212).

Recent anthropological and archaeological studies have challenged these long-standing assumptions and suggested that things and people are entwined into webs of reciprocal interactions that affect our thoughts and actions (Gosden, 2001, 2005; Knappett, 2005; Malafouris, 2011). Gell's (1992, 1996, 1998) works were particularly influential in redirecting anthropological and archaeological studies. In considering artworks agents capable of affecting social contexts and relations, Gell explored how artworks' qualities have after-effects (e.g., dismay) on people.[46] For example, he (1998) argued that the Malangan wooden idols of Papua Nuova Guinea, being painted and carved with motifs chosen according to the identity and possessions of the deceased and of current and future landowners, affect the memory of those involved in the funerary ceremony (also Küchler, 2002). Functioning as a "repository of *past* 'social effectiveness'" (Gell, 1998, p. 226, emphasis in the original) evoked during their burning in ceremonies, the Malangan carvings memorialised the deceased's possessions and projected into the future novel relationships between landowners. While less interested in artisans' memories of technical skills (but see discussions on Trobriand carvers; Gell, 1994, p. 54-55), Gell was onto something: the qualities of things (e.g., carvings), the actions associated with them (e.g., carving and burning motifs), and memory (i.e., the cognitive process responsible for the continuation of technical skills and knowledge) are

[46] Gell (1992, p. 42) termed his refusal to consider the aesthetic values of artworks *methodological philistinism*: "an attitude of resolute indifference towards the aesthetic value of works of art".

linked. This suggests that the aesthetic material forms of Kamares, technical practices, and memory might also be linked.

Gosden presents a stronger argument for how the qualities of things affect people in their sociomaterial contexts: aesthetics rather than art, as Gell maintained, is a vital concept to appreciate how the values that different cultures place on things shape social relationships and channel people's thoughts and actions. Gosden (2001, p. 165-166) argues that aesthetic values (see Plato & Meskin, 2014) do not result from things' physical qualities. Instead, certain qualities are valued and selected over others by sustained interactions between people and things in their sociomaterial contexts. Therefore, things assume aesthetic values which set up patterns of activities according to the contexts where people grew up.[47] These dynamics of interaction between things and people become clearer when observing the long-term trajectories of styles (Gosden, 2005; Knappett, 2010; Prezioso, 2021). For example, while for its whole duration the Kamares exhibits regional and temporal variations, it also presents a coherent logic (e.g., use of black slip and polychromy). In outliving artisans, it is difficult to assume that continuity and change in Kamares aesthetic material forms were imposed by people alone or influenced by other things (e.g., imports).[48] It is more likely that, as Gosden (2005) illustrates with archaeological examples from Roman Britain, variations resulted from patterns of recurrent activity established through continually interacting with things. As I shall elucidate below this is shared by the material - engagement approach (Malafouris, 2013). Essentially, things are what set the norms by which people think, feel, and act, thereby channelling skilled actions into using and reproducing things (Gosden & Malafouris, 2015).

A2.3.1 - Sociomaterial practices

I maintain that the dynamics of socialisation and materiality discussed above conflate in *sociocultural practices:* ritualised patterns of skilled activity and thought emerging from sustained interactions between people and things in their sociomaterial contexts (Prezioso & Alessandroni, 2022: 18; also Bruineberg & Rietveld, 2014). For instance, the tracing of a Knossian Kamares geometric unit (e.g., a red dot) on the surface of a pot follows specific sociomaterial dynamics: it

[47] For a recent discussion on the importance of the situated context for aesthetics, see Malafouris and Koukouti (2021).

[48] Gell (1998, ch. 8) also confronted the idea of style and developed similar conclusions about its independence from human thinking (i.e., the inter-artefactual domain).

requires artisans to select the right tools and raw materials and execute specific bodily movements, while acting according to possible ideological or cosmological beliefs (e.g., using a specific raw material or executing non-technical gestures). Over time and through sustained interactions, tracing a red dot becomes a sociocultural practice. It results that sociocultural practices bring together thoughts and actions according to the sociomaterial context where they occur. Meaning sociocultural practices are situated practices: they are not just acquired at a precise moment but continually reassessed by people within their sociomaterial environments (for traditions as practices, see Gosselain, 2008).

In the next section, I illustrate with selected case studies from Knossian Kamares deposits how aesthetic material forms were memories for Minoan artisans of sociomaterial practices.

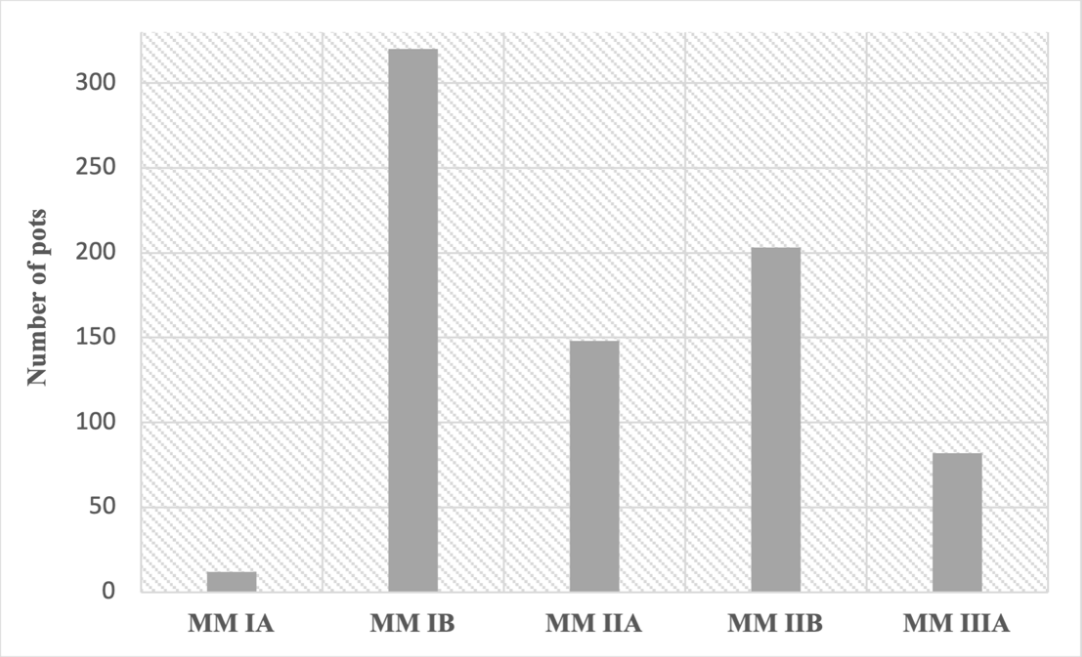


Table A2.1 - Distribution of re-examined pots according to (Minoan) relative chronological periods.

A2.4 - The Making of Knossian Kamares Decorations

The study involved the re-examination of 765 complete, fragmented, and restored vessels (see Table A2.1 for the temporal distribution of the assemblage) excavated by Evans and Mackenzie from 1900 to 1906, now in the Knossos Stratigraphical Museum.[49] Due to the lack of stratigraphic

[49] The material was selected according to the presence of observable traces of decorations or shaping techniques.

sequences, the material was dated according to a stylistic approach supplemented by pottery studies from Knossos (Macdonald & Knappett, 2007; Momigliano, 2007b; Mathioudaki, 2018), Kommos (Betancourt, 1990; Van de Moortel, 2006b), Phaistos (Levi & Carinci, 1988; Caloi, 2009; Carinci & La Rosa, 2007; Baldacci, 2017), Petras (Haggis, 2007; Relaki, 2016), and Malia (Poursat & Knappett, 2005). This stylistic approach consisted of recording data on the making of decorations acquired through macroscopic observations. This stylistic approach differs from those previously discussed for two main reasons. First, it aims to examine these data from a long-term perspective on the relationship between technical skills and material forms. Second, the data acquired are not limited to the physical qualities of pottery but also include the examination of their associated practices: traces of techniques and gestures that are observable on the surface of pottery remains.

The next two sections describe the data acquired on *geometric units* and *motifs*. While geometric units allow me to introduce the material engagement and ecological-enactive approach, motifs support my claims for the role of aesthetic material forms for memory.

A2.4.1 - Geometric units as ways of thinking and acting

I defined motifs as aggregations of geometric units (e.g., lines, dots, spirals, diamonds, petals) combined into systematic sequences by means of decorative techniques (i.e., painting, spraying, stamping, incising, excising) executed using tools (i.e., paintbrush, blade, sponge, stamp) and raw materials (i.e., pigments). According to this definition, I examined how Minoan artisans traced different sequences of geometric units to make motifs.

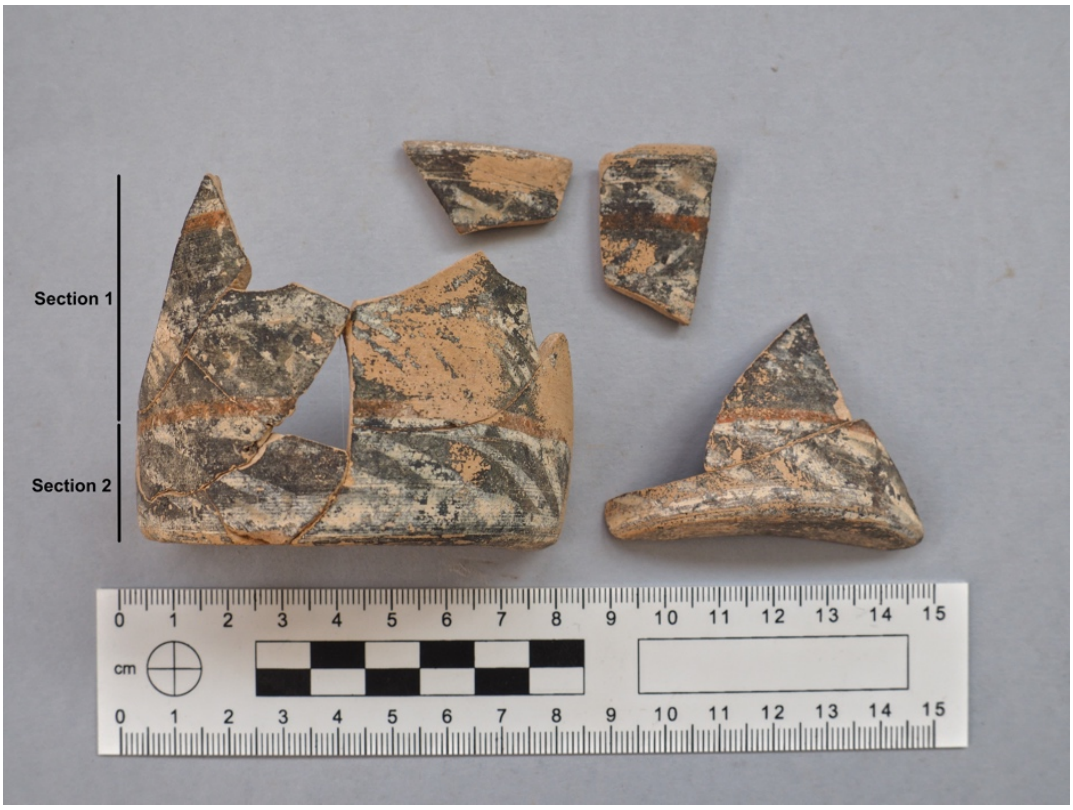


Figure A2.2 - MM IIB straight-sided cup (KWM125) from the "West Square East Kouloura" at Knossos (photo by the author, reproduced with permission of the British School at Athens).

I documented the colour, thickness, size (i.e., length or diameter), the potential tool employed, the decorative technique and the direction of the gesture executed in tracing units. Each unit was then associated with others considered part of the same motif. This operation consisted of numbering the units according to the order of execution recognised from the analysis of superimpositions. For example, the straight-sided cup in fig. A2.2, dated to the MM IIB period, presents two motifs: the *Foliate band – W(hite)* in section 1 and the *S-shaped running lines – White* in section 2. As visible in the figure, each of these motifs results from combining specific geometric units into sequences. The *Foliate band – W(hite)* was made by the continuous use of a stamping tool to draw *Arrow-shaped – White* units. In section 2, the *S-shaped running lines – White* resulted from sequentially painting oblique *S-shaped – White* lines, followed by two single *Line horizontal – White* clearly superimposed on the *S-shaped – White* lines. In doing so, this analysis produced a chronostratigraphy of geometric units: sequences of polychrome geometric forms and the actions required to produce them.

Needless to say, motifs would not exist without these units and the practices of drawing them. Less straightforward is to recognise the extent to which these geometric units were essential to Minoan artisans for remembering the technical skills required to produce motifs. For instance, we have seen that the *Foliate band – W(hite)* (fig. A2.2) resulted from a continuous gesture: a hand using a stamping tool and a white pigment to draw a sequence of *arrow-shaped lines*. One could argue that those lines are *physical traces* painted centuries ago and that they only represent the intentions, choices, and perhaps cosmological beliefs of their original maker(s). However, this would withhold the fact that every arrow-shaped line also involves an *action*: the gesture of using a stamping tool. Considering these lines as merely representing something would be limiting as those *arrow-shaped lines* are also *signs* that refer to the gesture required to trace them, alongside the skills and choices made in selecting a stamping tool and the white pigment. Therefore, I suggest avoiding considering units only as the externalisation of artisans' internal thought processes.[50] More productive is to consider these units as being simultaneously physical traces, actions, and signs that constitute artisans' thoughts and actions (Malafouris, 2019a).

This ontological stance on the constitutive nature of geometric units for thinking and acting is grounded in material engagement theory, for which "the relationship between cognition and material culture is not one of abstract representation, or some other form of action at a distance, but one of ontological inseparability" (Malafouris, 2013, pp. 18-19). And according to which "our ways of think-ing are better described as modes of thing-ing"; that is, "the kind of thinking we do primarily *with* and *through* things" (Malafouris, 2019a, p. 7). Thing-ing is also at the core of *enactive signification*: "the process by which material signs bring forth meaningful experiences rather than representing or transposing meanings as signifiers of a signified" (Malafouris, 2021a, p. 98). These observations are partially echoed by ecological-enactive paradigms of cognition, which define cognitive capacities (e.g., remembering) "in terms of skilful activities in sociocultural practices and the material resources exploited in those practices" (Rietveld & Kiverstein, 2014, pp. 326-27), and for which cognition is a relational phenomenon emerging from the activities of an agent in its environment (Varela et al., 1991). Therefore, cognitive capabilities are *enacted*: "an embodied engagement in which the world is brought forth by the coherent activity of a cogniser in its environment" (Di Paolo, 2009, p. 12)

[50] I am referring here to *hylomorphism*: the idea that the form is imposed by a mind on matter (see Ingold, 2010; Malafouris, 2013, 2014, 2019a; March, 2019 for discussions).

From this perspective, geometric units shift from being passive traces resulting from a mind imposing form over matter to modes of *thing-ing*. Rather than representing artisans' thoughts and actions, units re-enacted (i.e., brought forth) technical skills, choices, and beliefs required to trace geometric figures in the context of Knossian Kamares decoration-making. Moreover, by taking part in the sociomaterial dynamics of interactions over several generations throughout the Protopalatial period (i.e., through enactive signification processes), geometric units became part of recurrent patterns of activity for Minoan artisans: sociocultural practices.

Having defined geometric units as modes of *thing-ing* and sociocultural practices, I now introduce the motifs and discuss how they were memories of sociocultural practices.

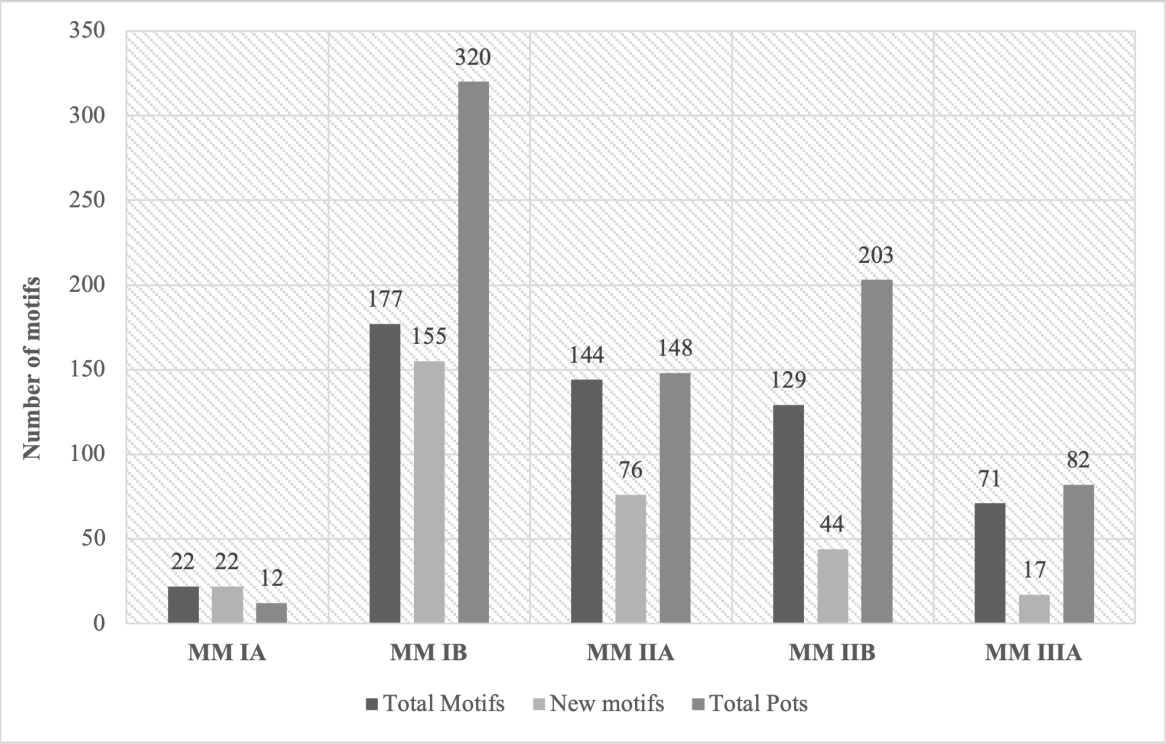


Table A2.2 – Comparisons among overall motifs, new motifs, and overall number of pots for each period.

A2.4.2 Motifs as Memories of Sociocultural Practices

The totality of motifs recognised in the assemblage is 314. Table A2.2 presents the overall number of motifs, novel motifs, and the number of pots for each period. *Novel motifs* refers to original sequences of geometric units aggregated into new combinations as they appear for the

first time in every period.[51] According to the table, the first period (MM IA) has the lowest quantity of motifs (22) and pots (12). The following one (MM IB) shows a considerable increase in both pots (320) and motifs (177), the majority of which (155) appear for the first time. Similar patterns were expected in the two successive ones (MM IIA and IIB), but this was not the case. In the MM IIA, novel motifs (76) were slightly more than half of the overall number of motifs recorded (144) but relatively high in comparison to the totality of pots (148). Conversely, while MM IIB has the second highest number of vessels (203), new motifs (44) are one third of the overall motifs observed (129).

[51] Speaking of novelty in motifs for the MM IA, when the first polychrome examples make their appearance is more complicated. However, most, if not all recognised motifs are already attested in the White-on-Dark pottery that dates to the Early Minoan III period and has been found in the "SFH Foundation Trench" and "Upper East Well Groups"' at Knossos (Momigliano 2007).

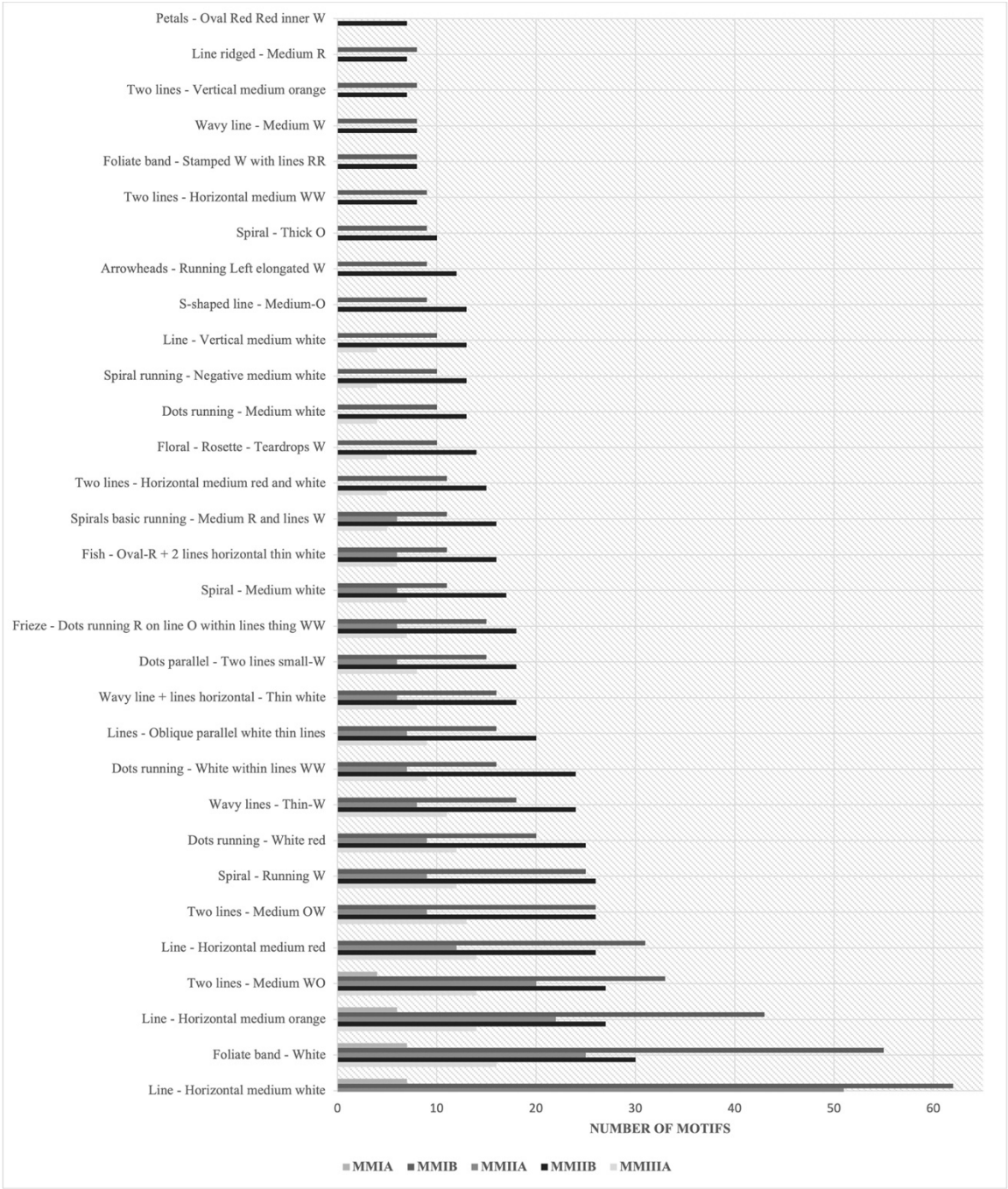


Table A2.3 - Multiple bar-chart presenting the commonest motifs associated with their temporal frequencies.

Table A2.3, which shows the most common motifs and their temporal distribution over the Protopalatial period, presents a more detailed picture of the processes behind making motifs. The most recurrent ones are those involving lines, traced on their own or in combination with others

(e.g., *Two lines – W(hite) and O(range)*). Next, follow those motifs with dots, painted alone or alongside lines (e.g., *Dots running – White red* or *Dots running – White within lines W(hite) W(hite)*). Various motifs with spirals (e.g., *Spiral – Running White*) also occur frequently from MM IB onwards. The data from Tables 2 and 3 indicate that motifs did not leave room for newer or more complicated ones, but past motifs co-existed alongside more recent ones (see Tables A2.2-3): motifs *continued* over generations.[52]



Figure A2.3 – MM IB handmade straight-sided cup (KWM478) from the "Northwest Kamares Ware Area of the Polychrome Jug" (photo by the author, reproduced with permission of the British School at Athens).



Figure A2.4 – MM IIB fragment of rounded spouted jar (KWM082) from the "West Square East Kouloura (I)" (photo by the author, reproduced with permission of the British School at Athens).



Figure A2.5 – MM IIIA fragmented straight-sided cup (KWM158) from "West of West Court Middle Kouloura (2)" (photo by the author, reproduced with permission of the British School at Athens).

The motif *Dots running – White red* (Figures A2.3-5) presents an example of continuation. Documented in 34 pots from MM IA to IIIA, it shows that continuity in the practice of sequentially

[52] Garrow and Gosden (2012) and March (2020) have made similar observations on styles of Celtic art and Jomōn pottery.

painting a white dot followed by a superimposed smaller red dot lasted almost 300 years. This *continuity* implies that generations of artisans remembered in the context of decoration-making the necessary sociocultural practices (i.e., the gestures to trace white and red dots as geometric units using brushes) required to make a previously seen or traced *Dots running – White red* motif. Continuity also indicates that the memory of these sociocultural practices cannot simply be in the head of a single artisan (otherwise practices would get lost). More plausible is that, as in the case of Malangan described by Gell (1998), memory was distributed in the qualities of pots and continually re-enacted by artisans when making decorations.[53] Essentially, continuity in motifs indicates that present artisans' activities were shaped by their or their predecessors' previous engagements with the units and motifs available up to their period. What I am trying to say here is that if Minoan artisans could re-enact skills and techniques, it was because of their repeated interactions *with* and *through* the previously made Knossian Kamares decorative forms that were available to them. Thus, a Minoan artisan could acquire the skills and techniques distributed in past Knossian Kamares pots by tracing the units required to draw a specific motif (e.g., *Dots running – White red*). But not only. In leaving on the surface of Kamares vessels the traces of her techniques and skilled gestures, she put in circulation novel decorative forms and, therefore, new possibilities for future generations to re-enact sociocultural practices. It is according to these temporal and interactional dynamics that Knossian Kamares motifs become *material signs* of all histories of previous sociocultural practices that occurred *with* and *through* them. In being material signs, motifs did not represent but enabled artisans to re-enact gestures, skills, and beliefs in the making. Therefore, they became memories of the sociocultural practices required to make Knossian Kamares decorations.

This does not imply that artisans remembered motifs by recalling information from their minds or brains,[54] but by tracing sequences of units to replicate past aesthetic material forms. For instance, every time an artisan found herself decorating a vessel in the style of Kamares and decided (or was requested) to trace the *Dots running – White red*, that is when and how she remembered: she re-enacted in the present engagement (i.e., the making of new *Dots running – White red*) the past sociocultural practices (i.e., her and hers predecessors history of tracing white and red dots

[53] This position is also shared by cognitive ecology, for which the basic unit of analysis for cognition is that of an individual immersed within its environment (Hutchins, 2010).

[54] According to mainstream memory theories, memory is the process of encoding, storing, and retrieving information located in the mind or brain (McBride & Cutting, 2019).

geometric units) required to make a new instance of this motif. Hence, she remembered not because she had in mind the correct sequence of units required to trace the motif but by virtue of the continual exchanges that occurred *with* and *through* motifs acting as material signs of past engagements. In this context, remembering becomes a way of materially engaging with motifs through their correlated sociocultural practices in the context of Knossian Kamares decoration. Remembering is not a mere mental act but something we do: a transactional and pragmatic endeavour (also, Malafouris & Koukouti, 2018; Myin & van Dijk, 2022).

Ultimately, in assuming this stance on memory and aesthetic material forms, changes and stability do not appear to result solely from societal changes. Due to continual exchanges *with* and *through* motifs acting as material signs, the Knossian Kamares style was continually questioned and prone to modifications every time an artisan found herself drawing a motif on the surface of a pot. This assumption adheres to the idea that, while material signs bring forth the sociomaterial practices that give rise to them, they do not bring back something past. Instead, sociomaterial practices are continually adapted and updated according to the sociomaterial settings where we remember.[55] This is also reflected by the creativity of Kamares decorative forms. In fact, as the assemblage analysed indicates, Minoan artisans never truly replicated something from the past. Rather, they updated and adapted their and theirs' predecessors previously acquired sociocultural practices according to the period and requests of the social group.

In considering remembering a way of materially engaging with and through things, memory becomes a process continually re-enacted over time according to the sociomaterial context where remembering occurs.

A2.5 – Final conclusions

In this essay, I argued that the Knossian Kamares motifs were memories to Minoan artisans of the sociocultural practices required to make Kamares decorations. To this end, I presented an overview of Kamares stylistic approaches and disclosed their linkages with mainstream (Western) theories on aesthetics and their major drawback: they limit our understanding of how things shape thoughts and actions. I then presented recent archaeological and anthropological studies to help

[55] This stance is also echoed in Bartlett's (1995) notion of *schema*: a constructive enterprise where past experiences are not replicated but organised according to the present context where an activity unfolds (also, see Wagoner, 2013).

overcome this limitation. Based on these, I argued that materiality and socialisation occurring within specific sociomaterial contexts over time give rise to sociocultural practices.

Using case studies from my study on the making of Knossian Kamares decorations, I showed how geometric units are sociomaterial practices and motifs are memories. Specifically, I argued that motifs are memories because they are material signs of the history of all previous sociomaterial practices that occurred with and through them. In so doing, motifs allow artisans to re-enact their or other artisans' previous practices. Hence, I defined remembering as something we do: a way of materially engaging *with* and *through* things in a specific sociomaterial context. Ultimately, I concluded with the suggestion that change and stability in Kamares aesthetic material forms may have resulted from continual acts of remembering, which in return reassessed and updated this style over generations of artisans.

Article 3 – The Knossian Kamares style as Transgenerational Memory[56]

Abstract

This paper introduces a new perspective on the constitutive role of material culture for memory using the Knossian Kamares pottery style as a case study. It challenges prevalent approaches in mainstream memory studies, which confine memory to individuals' brains or minds, suggesting a deeper relationship between material culture and memory. Presenting a novel methodology rooted in cognitive archaeology to study the long-term making of Knossian Kamares decorations, I suggest that the Knossian Kamares pottery style is a transgenerational memory that enabled generations of artisans to remember, learn, and update technological skills and knowledge. I will also claim that, in assuming this distributed, enactive, and non-representational stance on style as memory, it becomes evident that remembering is something we do: an active engagement that emerges *with* and *through* material culture in specific sociomaterial settings.

Keywords: Memory, Material Culture, Minoan archaeology, Material Engagement Theory, Style

A3.1 - Introduction

Memory is the faculty by which we make sense of ourselves and the world. It grounds how we act, think, and feel about ourselves and phenomena in the world (Tulving, 2002). Not only does memory have the capacity to bind together our temporally scattered experiences, but it also supports other cognitive functions, such as but not limited to learning, imagination, creativity, and problem-solving. Given the importance of memory, it should not surprise that disciplines such as philosophy, psychology, or archaeology have produced frameworks and explanations of what memory is and how remembering works.

According to these views, remembering is regarded as the cognitive ability through which we retrieve previously stored information in memory. A handful of these studies indicate that, beyond

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studying the brain, considering things, places, or practices can provide valuable insights to researchers interested in memory. These insights shed light on how individuals remember and explore how knowledge is preserved across generations. Some of these even propose a deeper connection between memory, material culture, and people. As we will explore in Section 1, one of the long-standing debates concerns the relationship between memory and material culture. Numerous frameworks and theories in archaeology and outside have proposed different approaches to study the effect of things in memory and remembering; however, they are not entirely unproblematic.

In Section A3.2, I will contend that the Material Engagement Theory (henceforth, MET; Malafouris, 2013, 2019) offers fresh perspectives on the relationship between memory and material culture. In fact, it proposes that in studying cognition we need to account for its situatedness: the sociomaterial context made of people, things, and practices where cognitive faculties, such as but not limited only to memory, emerge whenever we engage *with* and *through* things. With this approach, my aim is to suggest that material culture *constitutes* memory, highlighting the fact that things do not merely trigger remembering but are the very essence of *how* we remember.

In Section A3.3, I ground these intuitions using the Minoan Kamares pottery style from Knossos (MM IB – MM IIIA, ca. 1950–1700 BC).[57] Renowned in Aegean archaeology for its remarkable variety of shapes and decorations, this polychrome pottery style showcases the inventiveness of artisans in crafting these vessels and serves as an apt example for investigating the processes through which technical skills and lore continued and changed over time. Through a careful examination of the processes of creation of the Knossian Kamares style documented through the direct observations of the traces of making practices, I show that if artisans could remember, learn, and update their predecessors' technical skills and knowledge this was because the Knossian Kamares style was a *transgenerational memory re-enacted* whenever they were making novel vessels in this style. Therefore, remembering is *something we do* – a way of material engaging *through* and *with* things.

Ultimately, this paper aims to contribute to the discourse on the relationship between material culture and memory with an archaeological example. This case study attempts to enhance our comprehension of memory and the mechanisms underlying the act of remembering, showing the importance of accounting for archaeological timescales to study cognitive phenomena.

[57] My use of the term Minoan here follows Betancourt's (1999), who defined it "in terms of its general material culture and in terms of its approach to visual symbolism (…) on seals, pottery, and other objects" (p. 33). For the origins of this term, see Karadimas and Momigliano (2004).

A3.1 - Memory and Material Culture

Mainstream theories in psychology have approached memory as a universal phenomenon (e.g., the multistore model by Atkinson & Shiffrin, 1968) or focused on specific memory types (e.g., working memory, Baddeley, 2010). Contributions to the understanding of memory can be traced back to Greek philosophers such as Plato and Aristotle (Bernecker & Michaelian, 2017) or more contemporary philosophers, including Hume (1999) or Bergson (1910). Besides psychology and philosophy, other academic fields have also developed ideas and frameworks. Archaeology is one such field (see review by Van Dyke, 2019).

Despite their diversity in how they approach memory, these disciplines generally share at least one of the definitions advanced in cognitive neuroscience: "(1) memory as neurocognitive capacity to encode, *store* and retrieve *information*; (2) memory as a hypothetical *store* in which *information* is held; (3) memory as the *information* in that *store*; (4) memory as some property of that *information*; (5) memory as a componential process of retrieval of that *information*; and (6) memory as an individual's phenomenal awareness of remembering something" (Tulving, 2000, p. 36; emphasis added). According to this generally shared definition, memory is the psychological capacity of preserving information that can be recalled at a later stage. However, I will argue here that if memory is crucial in our day-to-day lives that is in the way it organises how we act, think, and feel according to the sociomaterial contexts where we remember, not solely because it stores information about the past. In other words, my argument throughout this essay is that to better understand memory and remembering, it becomes crucial to account for the different varieties of material culture that populate past and contemporary environments. This perspective necessitates a closer investigation of how studies have considered the impact of material culture on memory and remembering.

In this section I wish to draw attention to how studies in psychology and archaeology explored the relationship between material culture and memory. I start by highlighting two fundamental assumptions that underlie mainstream memory research: *localisationalism* and *representationalism*.

A3.1.1 – Localisationalism and representationalism

The most held assumption in mainstream theories claims memory to be a storage for information. Through the years, philosophers and psychologists have endorsed and updated this view by adopting

different spatial analogies (Roediger, 1980). For example, if for Plato and Aristotle memory comprised a wax block imprinted with past sensory impressions (Agócs, 2019), for Locke (1689) memory worked as a repository or storehouse of objects located in an individual's mind. In showing that stimulation of the temporal cortex reactivated patterns of neural connections that triggered memories, Penfield (1950) referred to this brain area as the "*storehouse* of remembered experience" (p. 349, emphasis added). For these orthodox theories, memory is located somewhere, usually in the mind or brain.

The corollary of this localisationalist perspective is the idea mentioned above that remembering is the process of retrieving previously stored information encoded in *mental representations* (Ryder, 2009; Marr, 2010; Newell & Simon, 1961). Cognitive psychology defines mental representations as an "unobservable internal code" for propositional information (Kellogg, 2015, p. 7). Where propositional information refers to specific kinds of knowledge about external objects, i.e., information represents (states, asserts) that something about the world is in a certain way (Travis, 2004).[58] According to this "representationalist" view (De Brigard, 2014, p. 402), remembering is necessarily supported by mental representations which *pre-exist* the act of recalling something from memory; an idea that holds true even for scholars that consider this phenomenon to be a re-constructive process liable to distortions or even failures (Bartlett, 1995; Loftus & Pickrell, 1995; Michaelian, 2012). In conforming to this view, the stimuli caused by interacting with a pot would code information about its shape, colour, or an event that happened in the past (e.g., when the archaeologist unearthed the vase). These different kinds of information are considered "types of memory" (Nelson, 1989, p. 130), each associated with specific brain areas (e.g., temporal cortex, Allen et al., 2020).

These mainstream studies underscore the longstanding philosophical and psychological localisationalist and representationalist views on memory (for a discussion, see Sutton, 2015). While valuable for examining how this phenomenon works at the level of the single individual, this perspective aligns with the centuries-old Cartesian view for which the (inner) mental realm is separated by the (external) world (Barandiaran et al., 2009; Ingold, 2010). In assuming this philosophical position, material culture is external to the remembering process which happens inside an individual's mind or brain. Hence, for these mainstream psychological studies, things work as

[58] This informational stance on memory and remembering goes back to the introduction of the digital computer as a metaphor for the mind (Searle, 1990), underlining the Cartesian roots of cognitive neuroscience (for a discussion, Brette, 2022).

cues or triggers for remembering something already stored in memory. Even when psychology acknowledges that "some sort of a more complex interaction between stored information and *certain features of the retrieval environment* seems to be involved in converting a potential memory into conscious awareness of the original event and corresponding behavior" (Tulving & Thomson, 1973, pp, 352-353, emphasis added), these views still contend that things are only cues for remembering. This situation arises from the fact that these studies have been primarily interested in studying how individuals retrieve previously stored information from their memory.

The above discussion discloses the challenges mainstream memory studies pose when attempting to understand the potential relationship between material culture and memory. In considering memory a store for information happening in an individual's brain or mind, any potential environmental contributions are automatically removed from explanations of what memory is and how remembering works (Christensen et al., 2019). However, if memory exists within every individual, and is thus separated from the material world, how can we access other people's memories and remember how to act and think according to pre-existing social and cultural norms? If memories are located within us, should they not naturally disappear when our biological life comes to an end? Perhaps we should look more carefully at the possibility that memory involves more than information located in our inner insides and look at what happens in the world. This proposition demands a more situated and contextual approach that considers the social and material dynamics of memory.

Of all disciplines, archaeology has always placed the sociomaterial context at the forefront when addressing its research questions. Recent research has begun to explore the interplay between the material remains from the past and the preservation of memory. It is to these views that I now turn my attention.

A3.1.2 - Symbols, Palimpsests, and Practices

For scholars exploring how past communities established their authority and produced social memory using material remains of previous societies,[59] the enduring nature of things plays a central role in connecting memory to material culture (e.g., Bradley & Williams, 1998). For instance, Holtorf (1997) suggested that elites constructed monuments like megaliths with the explicit aim of

[59] Social memory is defined here as "a collective notion (not an individual belief) about the way things were in the past" (Van Dyke & Alcock, 2003, p. 2).

preserving memories of their power and societal roles for future generations. These enduring structures inherently imply their purpose to withstand the test of time, ensuring the survival of the memory of the social group that erected them. From this perspective, a monument is a "prospective memory" that encodes and stores information for future generations (Holtorf, 1997, p. 47). Donald (1991) also explored how material culture externalises memory (also, d'Errico, 1998; Goonatilake, 1991; contributions in Renfrew & Scarre, 1998). He was interested in how different types of things work as "symbolic systems" that, over time and continual use, scaffolded the evolution of human cognition (1991, p. 252). For instance, he showed how writing systems such as the cuneiform, starting as simple pictograms adopted for recording basic information become more complex over time, thereby enabling people to offload and elaborate increasingly sophisticated information (e.g., mathematical theorems). For these views, material culture is connected to memory because it works as symbols that store information that can be later recalled.[60]

Another prevalent assumption in the archaeology of memory is that archaeological deposits and the artefacts they contain work as palimpsests. In the case of a written text, a palimpsest refers to the accumulation of superimposed traces left behind by later writings. In archaeology, this definition has been adapted to describe the over-imposition of archaeological strata produced by depositional processes continuing over time (Bailey, 2007; Huyssen, 2003; Olsen, 2010). Palimpsests preserve the traces of human interactions and natural phenomena that occurred at different moments in time, therefore working as a memory for information about something past (Lucas, 2012; Jones, 2007; Borić, 2010a). However, because these traces are partially erased by later ones, the information they contain is only partially preserved and interpreted when excavated in the present (Olsen, 2010). Consequently, these views regard palimpsests as repositories of memories of natural and human events, which are then reconstructed in the present according to the traces and personal interpretations of contemporary archaeologists (Olivier, 2010). For these archaeological studies, memory is not fixed information confined to the brain but can also be stored in things or archaeological deposits, suggesting a more critical role for material culture than mainstream memory studies.

One last strand of archaeological memory research that I wish to discuss here examines how the active deployment of material culture during communal activities produces memory and preserves

[60] Cognitive researchers who explore how memory works have also investigated how external things extend human memory, functioning like external memory aids. The well-known study by Clark and Chalmers (1998) argued that a notebook worked as an external memory device that helped an Alzheimer's disease patient to access memory just like internal cognitive processes would.

traces of past actions (for anthropological antecedents, see Connerton, 1989; Rowlands, 1993). For these studies, communal or individual activities repeated over time leave behind traces on material culture that organise and structure present and future generations' interactions among people, things, and practices (Knappett, 2010; Joyce & Lopiparo, 2005; Pauketat, 2001; Henry, 2017). Examples such as the construction of structures in pre-existing settlements (Pauketat & Alt, 2003) or the persistent use of offerings (Williams, 2003c) show how activities associated with past examples of material culture adapt the "past according to the needs of the present" (Van Dyke & Alcock, 2003, p. 3). These views suggest that memory is something that happens in practice and extends beyond an individual's lifespan.

In exploring how memory was deployed in the past to sustain social groups, archaeology suggests that the relationship between material culture and memory is closer than in mainstream memory studies. In fact, it shows that studying memory is not just a neurological enterprise but requires observing the role that material culture and the practices that we do with them impact how we remember. It also suggests that memory works at timescales that go beyond those of people. Monuments, palimpsests, or traces left behind during communal activities extend beyond the usual limit within which memory is studied.

On the other hand, in implicitly accepting the general definition of memory as a process of encoding-storing-retrieving information, these views reiterate some of the mainstream localisationalist and representationalist drawbacks. I emphasise two that limit the joint study of material culture and memory. First, in suggesting that things are repositories of information, memory is still considered a location for mental representations. This view reiterates the artificial separation between inside and outside and does not allow us to explore the role of contexts, material culture, and practices in remembering. Second, by assuming that remembering is all about the manipulation of information, memory is considered an immutable and fixed entity. When repeated practices are seen as central to reproducing social memory, the content of what is to be retrieved is defined *a priori* by the social group, which dictates how and what is to be remembered. Contrarily, when discussing the findings on the Kamares style, I will argue here that memory is a process continually adapted and updated according to specific sociomaterial contexts. If memory is helpful in organising how we act, think, and feel, it is because of its capacity to adapt the past to the requests of the present. To present this view of *memory as a process unfolding in practice* with *and* through *material culture*, it is pivotal to consider memory not as preformed in the mind but as *performed* in

the world. Understanding memory necessitates accounting for its *situatedness* (James, 1892; Leontiev & Luria, 1972; Malafouris & Koukouti, 2018): the *where* and *how* of memory and remembering.

In the next section, I claim that MET provides solid theoretical foundations to develop an alternative perspective to mainstream psychology that can improve our understanding of the relationship between material culture and memory.

A3.2 - Thinking *with* and *through* things

The MET is a framework committed to a view of thinking "as a process that is profoundly embodied, situated and softly assembled from a variety of non-localizable mental resources (neural and extraneural) and skills spanning the boundaries of the individual brain and body" (Malafouris, 2014a, p. 144). Things and minds are ontologically inseparable entities in a constant state of change (Gosden & Malafouris, 2015). Therefore, for MET cognition is not located somewhere in individuals' insides, as maintained by memory theories. Nor is it something that has to do with mental representations. As Malafouris (2004) argues, humans "*think through things, in action, without the need of mental representation*" (p. 58, emphasis in the original). It follows that thinking is *thinging*: "the act of thinking and feeling *with*, *through*, and about things" (2014b, p. 11, emphasis in the original).

From this angle, cognition is not reducible exclusively to information *about* something in the world. Thinking and acting are constituted *with* and *through* things in specific sociomaterial contexts, thereby tying together people, things, and practices at different temporal scales of interaction (Gosden & Malafouris, 2015; Malafouris, 2015; Overmann & Wynn, 2019). These scales are the transgenerational unfolding of archaeological styles (Gosden, 2005; Kanezaki & Omori, 2022), the life-history of an object or archaeological assemblage (Gosden & Marshall, 1999), the developmental lifespan of a single individual, and the phylogenetic trajectory of our species (Coolidge & Wynn, 2018).

Because of its pragmatic and relational stance on cognition, MET has the potential to reconcile the study of memory with that of its context. Discussions on the *situatedness* of cognition and the process of *enactive signification* are particularly useful to ground my characterisation of memory and remembering.

A3.2.1 - The situatedness of cognition

By claiming that "[h]uman cognition, our multiple ways of thinking, are treated not as merely causally dependent upon but *constituted by* extracranial bodily processes and material artifacts" (Malafouris & Koukouti, 2018, p. 296), MET suggests that to understand cognition we must consider the *situated environment* where cognitive faculties happen – what I have previously referred to as the *sociomaterial context*. Taking sociomaterial contexts into account involves considering "not only the individual brain and body, but other people and groups, the physical environment, social interaction, cultural norms, artifacts and technologies" (Sutton, 2015, p. 416; also, Tribble & Sutton, 2012). This idea implies that cognition is not confined solely to the brain but emerges from various neural and extraneural agents, including material culture. However, we should refrain from viewing these different elements that constitute a sociomaterial context as isolated entities; on the contrary, they should be analysed as active participants in shaping people's thoughts and actions within a situated context. An example is in order.

Hutchins (1995) demonstrates that information about the required landing speed for an aircraft is not solely located in the pilot or co-pilot's brains, nor is it confined to the cockpit machinery that allows communication with the aircraft (e.g., bugs and altimeters). Even the speed card used by the crew to calculate landing speed alone does not carry all the necessary information. Instead, each informational resource is used to remind the crew of the speed to land the aeroplane safely. While still operating within a representational paradigm, this example supports the idea that "the unit of analysis for cognition must be extended beyond the individual in order to accommodate broader cognitive events that include interactions among people, artifacts, space, and time" (p. 67).[61]

Therefore, when it comes to appreciating the relationships between the situated context and memory, MET supports my aim of considering material culture, alongside the practices of use or making, which are essential for memory.

[61] Recent ecological-enactive approaches in the cognitive sciences similarly emphasise the significance of considering the situated nature of cognition (Bruineberg & Rietveld, 2014; Di Paolo et al., 2017; Gallagher, 2017; Hutto & Myin, 2013, 2017; Hutto & Peeters, 2018; Michaelian & Sant'Anna, 2021). For these studies, "the possibilities for action provided to an animal by the environment—by the substances, surfaces, objects, and other living creatures that surround the animal" are what structure thoughts and actions (Rietveld & Kiverstein, 2014, p. 327).

A3.2.2 - Enactive signification

The second postulate that can help my endeavour of reconciling things and memory goes under the name of "enactive signification" (Malafouris, 2013, pp. 91-118). In fact, not only MET suggests that studying cognition necessarily requires considering the sociomaterial contexts where actions unfold (the cockpit as a whole enables pilots to remember the safe landing speed). It also explains how the material culture that populates those contexts becomes essential for our ways of thinking, acting, and feeling.

If material culture comes to constitute cognition, that is because things have the capacity to bring forth meanings. Enactive signification refers to this capacity that things have to bring forth meanings and become *material signs*. For MET, enactive signification is the process of embodied "conceptual integration responsible for the co-substantial symbiosis and simultaneous emergence of the signifier and the signified that brings forth the material sign" (p. 99). According to this view, material signs do not "embody a 'communicative' or representational logic but an *enactive* one" (Malafouris, 2013, p. 90, emphasis in the original). Bartending students learn to associate the names of cocktails and the actions required to make them to the shape of glasses (e.g., collins, cocktail, rock, champagne) in the context of mixing drinks behind bars (Beach, 1993).[62] For them, a Collins glass does not simply stand for a Mojito. It is in engaging over time with the shapes of cocktail glasses through the mixology practices learnt through individual readings and during hands-on sessions with their instructors that a Collins glass becomes a material sign for a Mojito and the mixing skills required to make one.

As this example shows, meaning is not simply offloaded and stored in a glass, as Holtorf suggested for monuments or Donald for writing scripts. For MET, meaning emerges through sustained action *with* and *through* things. It is only due to this continual history of engagements *with* and *through* things that material culture assumes specific values for people. This is because material signs do not externalise thoughts but bring forth meanings through our direct engagement *with* and *through* them (Malafouris, 2019a). It is according to the process of enactive material signification that occurs over all mentioned scales of interactions (i.e., things' life-histories, transgenerational, developmental, and phylogenetic) that things come to acquire importance for us (Hutchins, 1995, p. 322; Malafouris, 2015). As I argue below, rethinking things as material signs opens to explore how, over

[62] While Beach (1993) still works within the context of *action theory*, he acknowledged that environmental features are important in how they "guide the acquisition and flexible use of a number of potential mnemonic strategies during the process of becoming experienced" (p. 192).

time, things come to accumulate histories of interactions able to bring forth memories (Prezioso & Alessandroni, 2022).

A3.2.3 - Constituting memory

In assuming that studying cognition is the study of cognitive ecologies (the sociomaterial contexts where thinking emerges *through* and *with* things) and that material culture becomes meaningful for thinking due to our history of engagements occurring *with* and *through* it, the MET provides a solid foundation for investigating the constitutional role of material culture in memory. This perspective helps avoid localisationalist and representationalist viewpoints lingering in mainstream memory studies and supports my intuition that there is a deeper linkage between material culture than has been advocated so far. But to convert this intuition into an arguable position, it is crucial to approach step by step how I configure the relationship between memory and material culture with the theoretical discussions on cognition advanced in this paragraph.

As a first step, I suggest grounding this intuition for memory and material culture in actual observations of archaeological materials. In particular, I propose investigating material culture from the perspective of making, that is looking at how, through observing the material qualities of things, artisans remembered, learned, and adapted technical skills and knowledge by directly engaging with raw materials, tools, and previous creations. However, my aim is not to focus on a single period or archaeological context. Instead, I seek to reclaim from archaeological memory studies, as reviewed in the previous paragraph, the idea that enduring examples of material culture and activities repeated over time structured how people interact in their present (Knappett, 2010; Joyce & Lopiparo, 2005; Pauketat, 2001; Henry, 2017).

In the following paragraph, I will use the long-term making of the Kamares pottery style as a case study, grounding my proposals for memory and remembering in careful descriptions of the processes of creation emerging from the re-examination of materials from Knossos (Crete).

A3.3 - Memory and Remembering in Middle Bronze Age Knossos

When stepping into the Middle Bronze Age rooms of the Heraklion Museum in Crete, visitors encounter a curious assemblage of cups, jars, and fruit stands covered in a lustrous black paint embellished with polychrome geometric and naturalistic

decorations in white, yellow, orange, red, or purple. This distinctive pottery tradition is commonly referred in the scholarly literature as Kamares ware or style, as I will henceforth call it.[63] This pottery has been found around the island in sites such as Malia and Myrtos Pyrgos (Poursat & Knappett, 2005); Phaistos (Baldacci, 2017; Levi & Carinci, 1988); Knossos (Macdonald & Knappett, 2007; MacGillivray, 1998); Petras (Haggis, 2012; Relaki, 2016); Kommos (Betancourt, 1990); and Palaikastro (Bosanquet & Dawkins, 1923) during the Protopalatial period (Middle Minoan IB - Middle Minoan IIB, ca. 1900–1700 BC).

Observing how lines, dots, spirals, and diamonds intersect or enclose stamped spirals or clay appliqués on the surface of different shapes discloses the distinctiveness of these pottery pieces. These formal variations do not only reflect curatorial choices or regional distinctions. Scholars have long recognised, as Knappett (2008) remarks, that "Kamares ware is so variable that no two vases are ever quite the same in shape and decoration" (p. 122; see also, Betancourt, 1985; Levi & Carinci, 1988; Walberg, 1978). In fact, what sets this style apart from earlier and later ones is not only the addition of polychrome decoration, but also the remarkable diversity in which artisans combined shapes and decorations to produce always different pots.

Because of these striking visual qualities, this pottery has attracted the attention of many scholars (Hogarth & Welch, 1901; Mariani, 1895; Myres, 1903; Taramelli, 1901; Mackenzie, 1903; Pernier, 1935). In Knossos, Mackenzie (1903, 1906) and Evans (1921, 1928, 1930, 1935) used ceramic findings and stratigraphical observations from their excavations in the palace to produce a taxonomic classification of the successive historical periods of the Minoan civilisation. Once a general chronological framework was established, Kamares continued to be the subject of several archaeological studies. Particularly early stylistic studies grounded in art historical approaches (e.g., Andreou, 1978; Mackenzie, 1903; Matz, 1928; Zois, 1968).[64] Of these, particularly influential were the works by Walberg (1976, 1978), Levi and Carinci (1988), and MacGillivray (1998).

[63] Originating from the cave where the first examples of this pottery were found (Taramelli, 1901), the term *Kamares* (Chambers in English) is still ambiguous today (Levi & Carinci 1988; MacGillivray 1986). Scholars have recently adopted the term *polychrome* (MacGillivray 1998; Macdonald & Knappett 2007). My usage of *Kamares style* in this article refers to a ceramic tradition found in Crete and the Mediterranean defined by the combination of white, yellow, red, orange, or purple geometric figures traced over a lustrous black or brown-reddish slip.

[64] The roots of this stylistic approach are grounded in art historical studies on attribution and connoisseurship (Morelli, 1892; Neer, 2005; Wollheim, 1973). For these views, shared visual attributes of artworks are useful to produce referent categories about individual styles, such as Rembrandt's *œuvre*, or general artistic movements like Cubism (Walton, 1970). Archaeologists, less interested in individual attributions (but see Gunn & Hill, 1977; Morris, 1993), adopted style to identify or create archaeological cultures (e.g., Graves, 1998; Plog, 1980) or produce relative and absolute chronologies spanning individual sites or whole regions.

Walberg's (1976) study of Kamares was based on Matz's (1928) and Furumark's (1941) structural studies on the relationship between the shapes of vessels and their decorations (Washburn, 2022 for a discussion on structural studies). For example, she adopted a stylistic approach to distinguish various types of *Wavy Lines* motifs and categorise them into four relative periods: Pre-Kamares, Early Kamares, Classic Kamares, and Late Kamares (Walberg, 1976, fig. 16). Each of these periods was characterised by specific categories for decorations and shapes. However, many archaeologists found Walberg's categories too abstract to describe the diversity and creativity of the actual archaeological data (Levi & Carinci, 1988; MacGillivray, 1986; Momigliano & Tomkins, 2007). The work of Levi and Carinci (1988), while more attentive to the diversity among Kamares pots that emerged from excavations, adopted a similar perspective on the Kamares style and its stylistic evolution. They produced ordered sequences of Kamares pot types arranged across time according to their similarities in forms and their retrieval contexts. MacGillivray (1998; 2007) also used this method to re-analyse the Knossian deposits excavated by Evans and Mackenzie. He created several styles of Kamares, such as the *Woven Style*, by aggregating all vases sharing a decorative pattern like the one in Figure 1. Thus, all vases exhibiting the same visual qualities are assumed to be part of the *Woven Style* and dated MM IB–IIA (ca. 1950-1850 BC). Other recent works, such as those by Baldacci (2017), Caloi (2009), Carinci and La Rosa (2007), Girella (2010), and La Rosa and Carinci (2009) have followed a similar approach.



Figure A3.1 – Example a cup in MacGillivray's (1998) 'Woven Style' from the "NW Kamares Area" (KWM115). Courtesy of the British School at Athens, photo by the author.

These studies have analysed Kamares from a stylistic perspective aimed at creating standardised sequences of types linked to a specific chronological period (e.g., *Wavy Lines* or *Woven Style*) arranged in an evolutionary fashion. They provide an outline of the progressive stages of this style and a reliable framework for chronological comparisons among Cretan sites. On the flip side, producing taxonomic categories arranged over time does not reflect the differences exhibited by the excavated material (for a discussion, see Sørensen, 1997, 2015).[65] As a result, questions on the tension between stability and change exhibited by the Kamares pottery and the role that the sociocultural contexts had in driving this tension are left unquestioned. With tension between stability and change I refer to the fact that, while each vessel stands out due to how artisans applied geometric motifs to different shapes, they also share certain formal attributes. The examples featured in Figures A3.1-3.2, A3.5-3.7, and A3.9-3.10 underline this tension between similarities in technical skills and knowledge and diversity in forms.[66]

Recent technological studies have partially challenged this situation. In considering the role of technical choices and practices (Day & Wilson, 1998, 2002; Day et al., 2006; Faber et al., 2002), these works suggest that the Kamares style was part of a tradition that involved "the raw material sources and the past recipes used by some potters in Central Crete from the Prepalatial, through the First Palace periods and into the Late Bronze Age" (Day & Wilson, 1998, p. 355). They also demonstrate that this tradition extended to consumption practices that required artisans to produce fine pottery, such as the Kamares, as evidenced by the remains of communal events in the Knossian deposits (Day et al., 2006, p. 59). These studies suggest that practices and sociocultural contexts are also part of this tension between change and stability in Kamares forms, reinforcing my proposal of exploring the role that practices involved in the making from a long-term view have for memory.

In the following sections, I will further develop on these studies to present my considerations for the Knossian Kamares style as transgenerational memory and remembering as re-enacting.

[65] Recent critiques of typologies and style have challenged the taxonomic approach of style from a relational perspective that observes how types emerge from their spatial association rather than according to their aesthetic qualities (Boozer, 2015; Fowler, 2017; Jones, 2007; Van Oyen 2015; Zedeño 2009).

[66] This tension is not limited to the Kamares style but is at the very core of the notion of style in archaeology. It applies to all periods and geographical contexts (e.g., Garrow & Gosden, 2012; March, 2021), and, as I discuss in the conclusions, this legacy still shapes questions of cultural transmission, making traditions, and artefactual variation.

A3.3.1 - Outline of the methodology

Excavated by Evans, Mackenzie, and Pendlebury from 1901 to 1930, the polychrome pottery was partially published in MacGillivray (1998), Macdonald and Knappett (2007), and Mathioudaki (2018). My re-examination of this material consisted of direct macroscopic analyses of the making techniques discernible from the direct observation of 765 fragmentary and reconstructed pots from the Protopalatial deposits within the palace (e.g., Area South of the Area of the Spiral Fresco). Here I will focus on the long-term making of decorations as they provide faster rates of change, supporting my proposal of exploring the impact of material culture on memory looking beyond the individual timescales. But by no means I am suggesting here to study shapes and decorations separately. In re-analysing the Knossian Kamares I considered decorations and shapes as united. However, for a matter of space and to support the main of this paper, I concentrate only on how the making of decorations unfolded over generations.

The material examined for this study was chosen according to a representative sampling approach, selecting only a subset of pieces that conformed to my definition of the Kamares style. According to this definition, for a pot or a fragment to be Kamares, it required the presence of a black, glossy slip adorned with decorations outlined in white and, importantly, featuring at least one additional colour (e.g., yellow, orange, red, or purple) on a black lustrous or semi-lustrous slip. The fragmented nature of this assemblage influenced my decision to use representative sampling. Given that most pieces were smaller than 1 cm, I only considered those diagnostic fragments that displayed evidence of polychromy. Fragments of the same vessel were only counted once. The definition of Kamares and sampling method were chosen to ensure that I did not include examples of other contemporary styles, such as White-on-Dark.

To study the long-term making of decorations, I employed a bottom-up approach rooted in the direct observation and comparison of surface decorations. This method allowed me to gather information on various aspects of the making process, including the techniques employed (such as stamping), the gestures used (whether circular or linear movements and the direction of these gestures), the tools utilised (such as paintbrushes), and the interactions between different decorative elements, what I termed *geometric units*, *motifs*, and *compositions*. Although I use terminology derived from structural approaches in ceramic studies (as seen in works by Gardin, 1978; Plog, 1980; Shepard, 1956; van Berg & Jeunesse, 1994), my interpretation of Knossian Kamares decorative forms is stripped of any theoretical or methodological association with linguistic

metaphors. Instead, I aimed to bridge the tradition of ceramic studies with more contemporary perspectives on cognition and material culture as described above (see also Knappett, 2010; Malafouris & Knappett, 2008).

Geometric units refer to the elementary polychrome geometric shapes traced by Minoan artisans. This includes considerations of the pigments chosen, the techniques applied, and the tools adopted in the making. These shapes encompass a range of colours, such as white, yellow, orange, red, and purple, and take various forms: horizontal, oblique, arrow-shaped, S-shaped, or U-shaped lines, circles, spirals, diamonds, triangles, and petals. Artisans employed diverse tools like paintbrushes, sponges, blades, and clay stamps, adopting painting, stamping, impressing, incising, excising, and spraying techniques. Two examples among the 143 geometric units identified in my analysis are the *Dot - Medium White* and the *Two Line – Horizontal Medium Red*, as evidenced in the rounded spouted-jar in Figure A3.2.



Figure A3.2 – Restored rounded spouted-jar (KWM342) from the "Area South of the Area of the Spiral Fresco 137A". Courtesy of the British School of Athens, photograph by the author.

In my interpretation of the materials, coherent sequences of geometric units come together to form *motifs*. An example of this is the *Foliate band - Stamped W(hite) with lines R(ed) R(red)*, which

results from combining several *Line - Arrow-shaped stamped Medium W(hite)* and *Line – Horizontal medium R(ed)* units. This motif is one of the 328 documented within the assemblage. In this case, geometric units are integral components of a chronostratigraphy of skilled actions. This is a sequence in which one unit, with its specific skills, choice of raw materials, technique, and tools, follows another to create something in line with the existing Knossian Kamares motif repertoire. I documented this chronostratigraphy of geometric units as it could be observed from their superimposition. This methodology enabled me to reconstruct the choices that Minoan artisans made in terms of what tools, raw materials, skills, and techniques to enact in tracing a particular motif. Motifs also provide insights into whether these movements were executed discontinuously or continuously, including whether they involved the rotation of the vessel (as discussed by Roux, 2019, p. 104). For instance, in the bridge spouted-jar depicted in Figure A3.2, we observe a continuous motif in the making of the *Foliate band - Stamped W(hite) with Lines R(ed) R(red)*.

Compositions refer to the spatial arrangements of one or more motifs on the surface of a single pot. In total, I observed and documented 365 compositions. To understand the processes employed by Minoan potters in making these compositions, I recorded these associations for where they were situated on the surface of a single pottery vessel. I located each motif to a specific area of the vessel, such as the rim, neck, body, base, or bottom, or, when covering more areas, combinations of these (e.g., body-base). These motifs were then linked to one another based on their spatial placement. For instance, consider the composition shown in Figure A3.2, comprising six motifs: on the rim, the *Dots running – W(hite) within lines W(hite)W(white)*, on the neck *Spiral running – Dot R(ed) and S-shaped lines W(hite)*, on the body the *Foliate band - Stamped W(hite) with lines R(ed) R(red)* enclosed within two *Dots running – W(hite) within lines W(hite)W(hite)*, and on the base *Two lines – Horizontal medium W(hite)W(hite)*. These associations offer valuable insights into "the range of motifs and design variation possible at a specific point in time" (Morris, 2006, p. 103), disclosing the technical skills and practices employed by the artisans in that period, their spatial perception, and the choices made in the making context.

Now that I have discussed the sampling and the stylistic methodology adopted, alongside the underpinnings of gestural units, motifs, and compositions in the context of the Knossian Kamares style, I will elaborate on how the data supports my intuition for style and memory.

A3.3.2 - Style as transgenerational memory

The re-examination of Knossian Kamares pottery suggests that there is more about style than the succession of stylistic attributes changing over time. It reveals a strong continuity in decorative forms, techniques, and skills that emerge in the decoration-making context. To be more precise, the analysis of motifs and geometric units implies that *the Knossian Kamares style represents a form of transgenerational memory*.

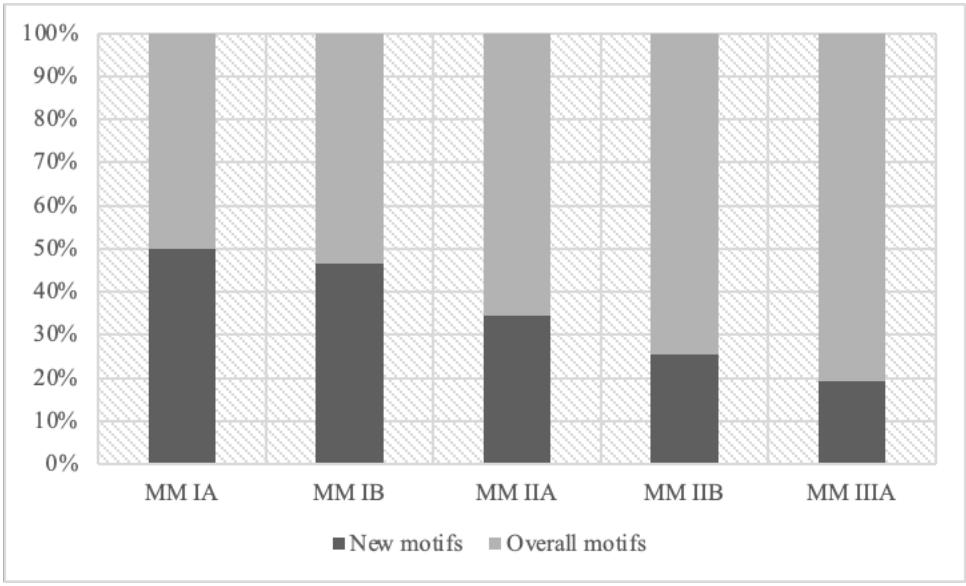


Figure A3.3 – Graph presenting the temporal distribution of the overall number of motifs and new motifs from MM IA to MM IIIA.

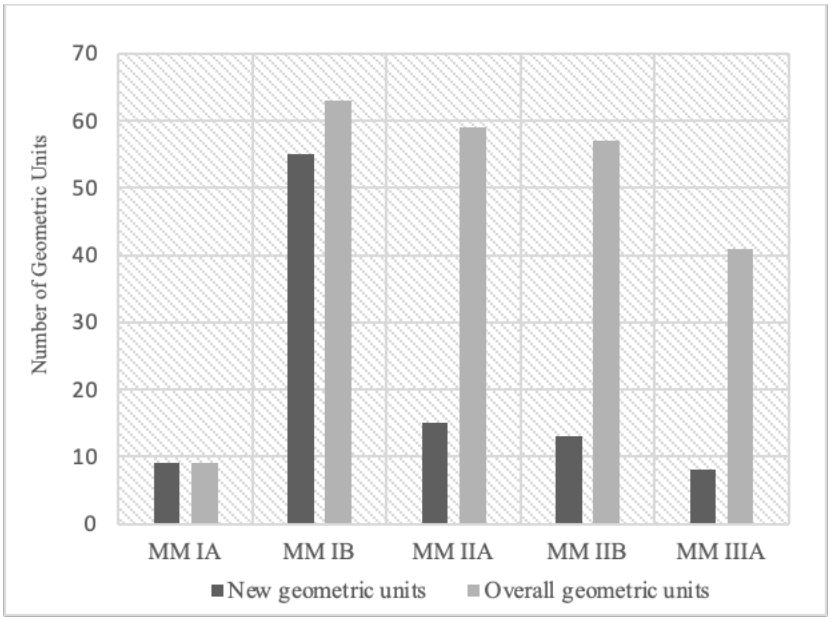


Figure A3.4 – Graph with the temporal distribution of all geometric units and novel geometric units divided for each from MM IA to MM IIIA.

For example, Figure A3.3 illustrates the temporal distribution of all motifs alongside the introduction of new motifs (i.e., motifs not documented in earlier periods). It is important to note that in this graph, as well as those in Figures A3.4 and A3.8, the temporal distribution of the data begins in MM IA and ends in MM IIIA. This reflects the result of my re-examination, which demonstrates that some of the pottery that conforms with my definition of Kamares was associated with MM IA or MM IIIA contexts. This distribution may appear unusual, considering that the scholarly literature typically refers to the Kamares style as the hallmark of the Protopalatial period. However, it may also suggest that this tradition has a slightly earlier origin and continues for a somewhat more extended period than previously documented, at least in Knossos.

Moving on to the analysis of the long-term making of decorations obtained based on the study of the motifs, the key observation we can draw from Figure A3.3 is that, apart from the *Petals – Oval R(ed) R(ed) inner W(hite)* motif in Figure A3.5, later motifs did not replace earlier ones; instead, they continued. A comparable pattern is evident in the bar chart depicted in Figure A3.4, where geometric units also demonstrate continuity from one period to the next.



Figure A3.5 – Fragment of a rounded cup with the *Petals – Oval R(ed) R(ed) inner W(hite)* motif (KWM509). Courtesy of the British School at Athens, photo by the author.

This observation on units and motifs suggests that, once a Kamares motif was traced on the surface of a pot, it entered the Knossian Kamares style and continued to be part of artisans' decorative repertoire in later periods. This is because a newly introduced motif, being physically present on the surface of a pot, entered into circulation opening opportunities for future generations of artisans to remember, learn, and update the technical skills and lore needed to trace the required chronostratigraphy of gestural units that compose a particular motif. To illustrate this point, let's consider the examples in Figure A3.6.

The *S-shaped lines chained - Medium W(hite)* motif involves a discontinuous movement: a sequence of several concatenated *S-shaped line - Medium W(hite)* traced with a paintbrush and a white-chalk pigment. This motif is typically found within compositions alongside the *Two lines - Horizontal medium W(hite) R(ed)* or one or more *Line – Horizontal medium R(ed)* motifs, it has been documented on ten pottery fragments ranging from MM IB to MM IIIA (see Figure A3.6a-c). While most of these fragments are dated MM IB period as noted by MacGillivray (1998, 2007), it's notable that the *S-shaped lines chained - Medium W(hite)* motif continued to be part of the Knossian Kamares repertoire during MM IIA and MM IIIA (see Figure A3.6b, c).



Figure A3.6 – a. Rounded bowl from "NW Kamares Ware Area" (KWM531). b. Fragment of an angular cup with tall rims from the "SE Kamares Area" (KWM066). c. Angular cup with tall rims from the "SE Kamares Area" (KWM063). Courtesy of the British School at Athens, photos by the author.

The continuity of earlier forms into later periods challenges the commonly held belief of typological studies of style, which suggests that later forms replace earlier ones. This continuity implies that skills and knowledge, such as tool usage and selection of pigments required to trace the geometric units that give rise to motifs, also endured over time. A motif becomes a material sign of the skills and knowledge necessary to trace the gestural units that make up a specific motif. As discussed above, in being material signs, motifs do not stand for some prefixed meaning (Malafouris, 2013). But, because artisans continually traced them, they came to constitute how artisans remembered and learnt technological skills and practices. The memory of skills and knowledge becomes embodied in the artisans but is also distributed into varieties of motifs that, by enduring over time, support the remembering of skills and lore.

This idea gains further support from the observation that earlier motifs and geometric elements were *aggregated* into later forms, emphasising the continuity of gestural units and motifs, alongside their correlated skills and knowledge. With *aggregation*, I refer to a process where artisans merged past motifs and geometric units to draw new motifs. These motifs, although partially reminiscent of

previous ones, differed from those made or experienced earlier. For example, the motif *Floral – Flower Petal O(range) Spiral W(hite)* (Figure A3.7a-d), dating MM IIIA, emerged as a Minoan artisan used a paintbrush to combine two or three *Spiral – Medium W(hite)* and a *Line – Petal O(range),* both of which had been documented in the assemblage since MM IIB. Alternatively, a variation of the same motif (Figure A3.7b, d) could combine the *Spiral – Medium W(hite)* with several *Line – Oblique Medium O(range)*. In both examples, MM IIIA artisans aggregated previous motifs and geometric units to create something visually new: a motif incorporating past Kamares decorative forms and the associated skills and knowledge.

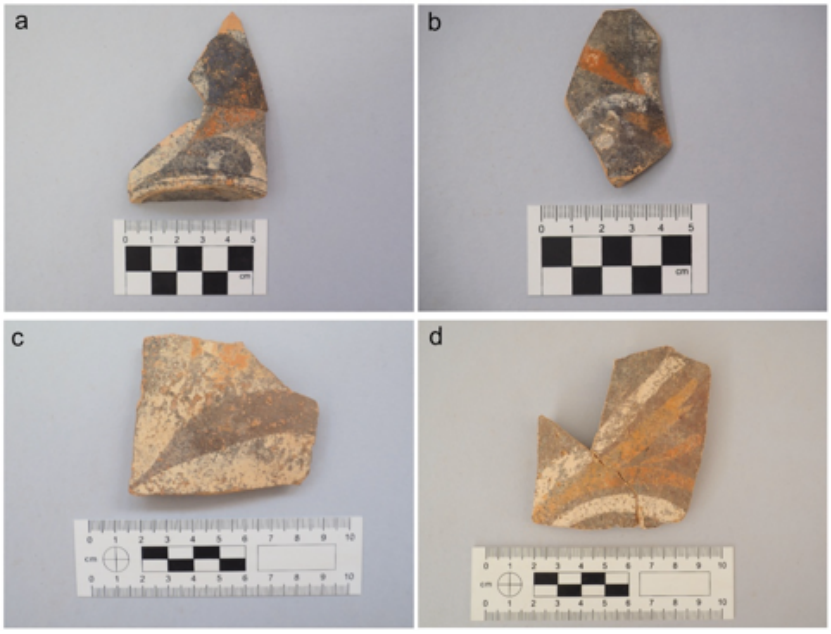


Figure A3.7 – Several examples and variations of the motif *Floral – Flower Petal O(range) Spiral W(hite)*, all dated to the MM IIIA. a. Broad straight-sided cup from the "West facade T.P. I" (KWM552); b. Straight-sided cup from the "House of Sacrifice East" (KWM433); c. Fragmented jug from the "House of Sacrifice" (KWM550); d. Possibly a jug from the "Test Pit 11 - West Square Kamares" (KWM768). Courtesy of the British School at Athens, photos by the author.

In examining the persistence and accumulation of motifs, it becomes clear that the Knossian Kamares style does not follow a linear progression from simpler to more complex forms. Instead, it illustrates that a style (a configuration of stylistic attributes changing over time) accumulates decorative elements and the associated skills and lore that were continually remembered, adapted,

and updated. Let's consider two vessels, one from MM IB and another from MM IIIA, both featuring the same *S-shaped lines chained - Medium W(hite)* (Figure A3.6a-c). We can reasonably deduce that the practice of using a paintbrush with white pigment was not simply forgotten or discarded. The same argument holds for the *Floral – Flower Petal O(range) Spiral W(hite)* and *Spiral – Medium W(hite) and Line – Petal O(range)* in MM IIIA (Figure A3.7a-d). These patterns, with their geometric units and technical skills and choices, persisted through generations of artisans. These examples illustrate these Kamares motifs remained a vital part of Knossian artisans' repertoire for generations, as further supported by the continuity in decorative forms highlighted in Figures A3.3 and A3.4.

Considering the above, I argue that the Knossian Kamares style describes an enactive and non-representational type of *transgenerational memory*. This memory encompasses knowledge of tools and raw materials, technical skills, and beliefs, all of which are distributed in each Knossian Kamares vase. From this perspective, it becomes challenging to confine memory solely to the brain. Instead, as the patterns of continuity and aggregation discussed earlier imply, we can conceptualise style as a situated memory continually (re)emerging in practice. Within this framework, memory practices, such as decoration-making, unfold in response to the demands of specific sociomaterial contexts (Moyal-Sharrock, 2009; Sutton, 2015). As per this definition, if a Minoan artisan could trace a *Floral – Flower Petal O(range) Spiral W(hite),* it was because she had access to examples of Kamares vessels decorated with *Spiral – Medium White* and *Petal – Orange Oblique* motifs up to her periods (MM IIIA). The memory of skills and knowledge was constituted *through* using, observing, making, and physically interacting *with* past decorated vessels in the context of tracing the units to draw a *Floral – Flower Petal O(range) Spiral W(hite)* or *S-shaped lines chained - Medium W(hite)*. Hence, the continuity of skills and knowledge, and the emergence of new motifs derived from aggregating previous ones, were made possible because generations of Knossian vessels were made available through consumption and production practices to both skilled artisans and apprentices. Consequently, technical skills and knowledge were passed across generations through a continuous process of material engagement *with* and *through* Kamares forms.

This proposition for style implies that the impact of things on memory is more substantial than previously suggested in studies focused on the relationship between material culture and memory. The things that surround us and our continual interaction with them are what constitute our memory. And if they do so, it is because they accumulate, over several timescales, modes of materially

engaging *with* and through them. By asserting that memory is a continual process emerging every time a Minoan artisan engaged *with* and *through* Kamares vessels, raw materials, and tools in the context of decoration-making, my proposal for style as transgenerational memory bears implications for how material culture partakes in remembering.

A3.3.3 - Remembering as *re-enacting*

Consistent with my earlier proposal for style as transgenerational memory, it becomes apparent that remembering technological skills and lore to achieve a specific task cannot be reduced to the activity of a brain isolated from its sociomaterial context. While remembering certainly involves the brain, it also encompasses the body and is inseparable from its social and material coordinates (Hutchins, 1995; Sutton, 2007; Tribble & Sutton, 2012). Hence, I argue that without the brain, body, material culture, and the practices that connect them, memory would not exist, and consequently, there would be nothing to remember. Minoan artisans did not recall technical skills and knowledge from memory but *instantiated and re-enacted them* with *and* through *material culture in specific sociomaterial contexts*. My use of *re-enacted* here does not refer to internal thought processes manifested as mental representations subsequently translated into material form. It signifies the capacity of our bodies and brains to rework and adapt previously acquired modes of materially engaging *with* and *through* things "in line with what the dynamically, changing environment demands or solicits" (Bruineberg & Rietveld, 2014, p. 10). In other words, re-enacting a memory necessitates individuals to adapt their thoughts and actions in accordance with the demands of the sociomaterial context at hand.[67] The example of Knossian Kamares compositions serves to illustrate my proposal for remembering as re-enacting.

[67] This idea resonates with Bartlett's (1995) (re)constructive memory theory, for which memory is all about schemata: a series of past reactions reconstructed every time an organism perceives a stimulus similar to one previously experienced (pp. 201-202; also, Wagoner, 2017). Such a view is also supported by recent ecological-enactive studies on memory (Hutto & Myin, 2017; Hutto & Peeters, 2018; Michaelian & Sant'Anna, 2021; Myin & van Dijk, 2022).

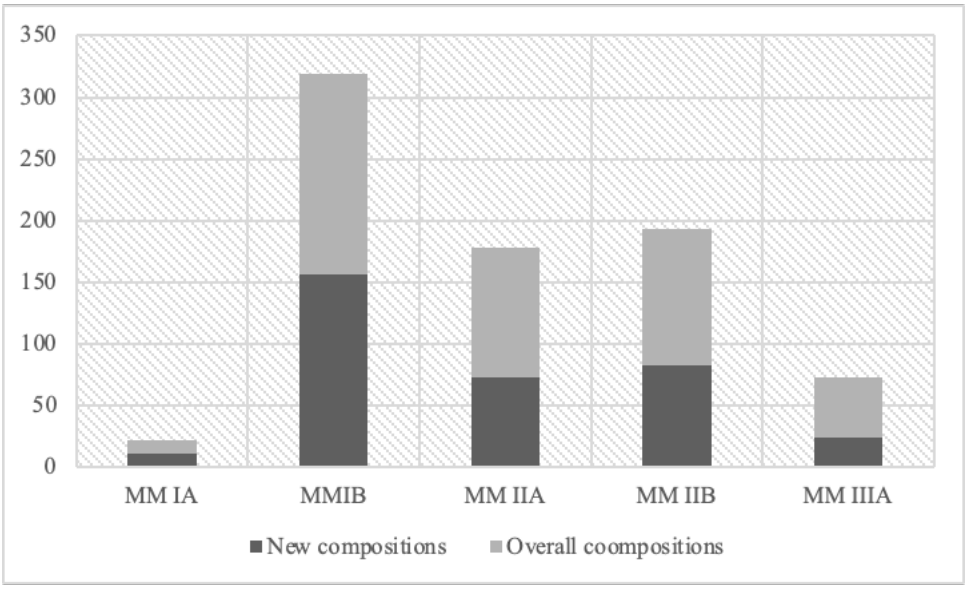


Figure A3.8 – Stacked bar chart confronting the overall number of compositions with the numbers of compositions counted only once in each period.

Compositions	**Total**
Three registers – Running Dots W(hite) R(ed), foliate bands, Running Dots W(hite) R(ed)	34
Lines oblique - O(range) W(hite) frieze with W(hite) O(range) O(range)	18
Wavy lines - Fishes R(ed) and little dots W(hite)	17
Lines oblique - W(hite) W(hite) O(range) O(range) W(hite) W(hite)	17
Curvilinear lines W(hite)W(hite)R(ed)R(ed)	16
Three registers – Semicircular line W(hite), Line O(range), Semicircular line W(hite)	15
Line horizontal O(range) over rounded neck	13
Spirals – W(hite) O(range) and two lines vertical thick-O(range) O(range)	11
Five oblique lines - W(hite) W(hite) O(range) W(hite) W(hite) O(range) O(range) + line oblique W(hite)	11
Vertical O(range) O(range) O(range) lines within W(hite) W(hite)	9
Three registers - Spirals running R(ed) and lines W(hite), Foliate band stamped with lines R(ed), Spirals running R(ed) and lines W(hite)	9

Table A3.1 – A list of all the polychrome compositions that occur more than nine times in the assemblage.

Figure A3.8 reveals that the data concerning compositions diverges from the trends observed in the analysis of geometric units and motifs. We find distinctive compositions in each period, with only a handful continuing from one phase to the next. This observation gains further strength when we consider that out of a total of 365 compositions, only eleven were replicated on more than eight vases, as shown in Table A3.1. It is particularly interesting to note that the compositions listed in Table A3.1 are not exclusive to any particular phase. For example, the *Three registers – Running Dots W(hite) R(ed), foliate bands, Running Dots W(hite) R(ed)* appears both in MM IIB and IIIA. Likewise, examples with the composition *Lines oblique - O(range) W(hite) frieze with W(hite) O(range) O(range)* are attributed to MM IB. These trends underscore the notable degree of creativity involved in making Kamares pottery. In this context, creativity is defined in terms of variability in motif selection and their spatial arrangement on the surface of vessels. These observations support scholars' arguments regarding the idiosyncrasy of Kamares decorative forms (Betancourt, 1985; Knappett, 2008; Walberg, 1978).

Furthermore, the data indicates that this openness in decoration-making did not stem from frequent changes in techniques, the introduction of novel geometric elements, or different motifs. Figures A3.3 and A3.4 show that motifs and geometric units persisted over time, even as compositions underwent constant change. When artisans traced Knossian Kamares motifs, they were not merely replicating past compositions and techniques, unless they intended to do so. Artisans adapted and modified their own and their predecessors' skills and knowledge to create pieces reminiscent of previously encountered vases. In other words, when tracing motifs, the Knossian Kamares tradition was re-enacted in response to present demands, resulting in always unique compositions. This can be observed in the decorative forms of the pots depicted in Figures A3.9 and A3.10.



Figure A3.9 – Rounded cup from "West of West court - Middle Kouloura (2)" (KWM104). Courtesy of the British School of Athens, photo by the author.



Figure A3.10 – Fragmented MM IIB bridge spouted jar from the "West square - East Kouloura (1)" (KWM117). Courtesy of the British School of Athens, photo by the author.

The two vases depicted in Figures A3.9 and A3.10 present respectively the *Running Dots W(hite) R(ed) with Stamped circles* and the *Three registers – Running Dots W(hite) R(ed), foliate bands, Running Dots W(hite) R(ed)*. Both compositions feature the *Running Dots W(hite) R(ed)* motif but differ in the inclusion of two other elements: the *Stamped circles* and *foliate bands*. This example highlights that, when decorating a vessel, the rules governing interactions among motifs were not preformed. Information regarding which motifs to select, techniques to employ, or actions to take in order to achieve a specific task was not simply recalled from an individual's memory. Instead, every time artisans traced the lines required to draw a *Running Dots W(hite) R(ed)* motif, a foliate band, or stamped circles, they were re-enacting the skills and knowledge distributed and accumulated through generations of previously made Kamares vessels. In doing so, Minoan artisans adapted and enacted in the present moment of making the necessary skills and knowledge from the past, as implied by the continually changing compositions. These adaptations may have been influenced by various factors, including an artisan's skills, prior experience with Kamares vases, influences from other styles of pottery or material culture, the availability of raw materials, or shifts in consumption patterns (Day et al., 2006; Day & Wilson, 1998).

Similar dynamics can be observed in the variations of motifs, such as the *Floral – Flower Petal O(range) Spiral W(hite)* in Figure 3.7a-d. As for the compositions themselves, their variations resulted from Minoan artisans re-enacting the transgenerational memory of the Knossian Kamares style when engaging in decoration-making. It was in the moments when the paintbrush touched the clay surface to draw geometric units, where the pressure of the artisan's hand encountered the smoothness of the black slip and clay, that the skills and knowledge accumulated within the Knossian Kamares style were instantiated and adapted to trace new motifs. A similar observation has been recently suggested in the context of Palaeolithic cave paintings, where the execution of lines and choices in pigments and subject to trace were not random but the result of consistencies in gestures derived from histories of making parietal decorations (Fritz & Tosello, 2007; Malafouris, 2021). In these contexts, what allowed an artisan's thoughts and actions to be re-enacted within a specific sociomaterial context was not solely dependent on the functions of their

brains. Instead, it involved the coordinated efforts of both brain and body engaged in ongoing interactions *with* and *through* material culture within their sociomaterial context.

My perspective on re-enacting not only explores the hypothesis that remembering involves more than the passive recollection of the past but also strengthens the idea that style is a transgenerational mnemonic process constantly updated by engaging *with* and *through* material culture in a specific sociomaterial context. In fact, whenever an artisan traced a Knossian Kamares decoration, she was enabling new possibilities for her and other artisans' future engagements. By decorating a vessel in the Knossian Kamares style that would circulate in the broader sociocultural milieu, she was making accessible the skills, techniques, and knowledge necessary for artisans to produce new Kamares pottery in the future. The same could be said for cave paintings, as well as other types of craft.

Considering the above, re-enacting signifies the fundamental mnemonic process through which past modes of material engagement are adapted to meet the demands of the present sociomaterial context. Re-enacting is never the reinstatement of something from the past but, instead, the adaptation of previously acquired skills and knowledge in line with the aims and demands of the present (Malafouris & Koukouti, 2018; Prezioso & Alessandroni, 2022). Therefore, remembering is re-enacting: *something we do* with *and* through *material culture and people in a sociomaterial context.*

A4. Final discussion

In this paper, I have drawn attention to some aspects of the long-term making of Knossian Kamares style which are essential to shed light on the relationship between memory and material culture. Firstly, by situating the Knossian Kamares style in relation to other aspects of pottery production and thoroughly discussing its long-term making processes, I suggested that *style is a transgenerational memory of technological skills and knowledge*. The continuity and aggregation of Knossian Kamares geometric units and motifs from MM IA to MM IIIA indicate that the persistence of decorative forms and associated technical skills and knowledge can be attributed to the ongoing material engagements that artisans had with Kamares pots over generations. Style is a memory distributed in time and space through things and people, enabling the continuity of knowledge for future generations. Without previously made and decorated Kamares vessels there

would be nothing to remember. Secondly, I argued that if styles are transgenerational memories, it becomes challenging to view remembering as simply retrieving information stored in the brain - or, as some archaeological memory studies propose, material culture. The variations in Knossian Kamares motifs and compositions suggest that the memory of technical choices, skills, and knowledge necessary for drawing decorations was not preformed in the mind but *performed* in the act of decoration-making. The Knossian Kamares transgenerational memory was continually re-enacted whenever artisans produced new Kamares style pottery. Therefore, I proposed that remembering is re-enacting, a way of doing something *through* and *with* things adapted to the sociomaterial context and the task to be completed.

This proposed perspective on memory and remembering has several implications for general research and our understanding of the relationship between material culture and memory. I outline here four main points.

Firstly, understanding how memory is constructed in diverse sociomaterial contexts *with* and *through* various forms of material culture acting as material signs accumulating histories of interactions becomes central to a deeper understanding of memory. This viewpoint highlights the situated nature of memory and emphasises the active role that material culture has in shaping people's thoughts, actions, and feelings at different periods. It also supports and opens up novel avenues for those studies of memory and, more in general, the cognitive sciences that are interested in exploring the mind as extended, enacted, embedded, embodied, and distributed in past and present sociomaterial contexts (Heersmink, 2021; Michaelian & Sutton, 2013; Sutton, 2015; Tribble & Sutton, 2012).

Secondly, contrary to mainstream approaches in psychology and archaeology, I propose that an approach grounded in MET can better use the available archaeological evidence and offer valuable insights for further archaeological studies on memory. The stylistic approach presented in Section 3 enables us to document and analyse changes in shapes and techniques of gestural units, follows the chronostratigraphy of their movements as they are combined into motifs, and documents the choices and techniques adopted in making compositions. By adopting this approach, the study of cognitive phenomena becomes testable and quantifiable through a meticulous examination of material culture and the sociocultural contexts where practices, including but not limited to pottery-making, are re-enacted. It could provide more data on the continuation of knowledge in Minoan Crete if this methodology is applied to previous and following styles and also used to

explore if similar or different mnemonic dynamics were at play in other geographical and (pre)historical contexts. Moreover, my suggestion underlines the constitutional role of material culture in memory and underscores the significance of studying skills and practices in conjunction with the materials involved in memory.[68] As mentioned in Section 3, recent studies on Palaeolithic markings and paintings suggest that this approach has the potential to contribute with novel insights (Fritz & Tosello, 2007; Malafouris, 2021).

Thirdly, the theoretical foundations and the stylistic methodology applied in the case study of Knossian Kamares style in Section 3 demonstrated that the continuity in technological skills and knowledge was shaped by transgenerational processes of accumulation and aggregation, as evidenced by geometric units and motifs. This suggests that material culture is not simply anecdotal but, due to its permanence over time and continuity in practices it is now seen as a constitutive element of memory. Artisans never started from scratch but had the whole transgenerational memory of skills and techniques distributed in each previously made Kamares pot. This enabled them to remember and adapt their technical skills and knowledge from the past according to their current sociomaterial contexts. The Knossian Kamares style was continually updated every time, thereby enabling a potential for future generations of artisans to re-enact skills and lore. However, rather than being seen as a passive transmission of information, this potential for future re-enactments is configured in terms of possibilities for action and throughs, determined by the tasks at hand and situated context. This proposition for style as transgenerational memory can offer archaeological and anthropological studies new insights into the dynamics of knowledge transmission and technological development. The stylistic methodology and the theoretical suggestions for memory and material culture obtained on the re-examination of the Knossian Kamares style might contribute to recent anthropological and archaeological studies on technology. In particular, the observations moved in Section 3 align with studies of technological transmission for which the "cognitive activity" of artisans, defined in terms of the choices and skills used in selecting, preparing, and using raw materials based on the possibilities offered by their environment (Roux, 2010, p. 223).[69] I am referring here to the works by Roux (2007, 2019),

[68] Considering the non-representational position I adopt with transgenerational memory, traditional classifications of memory based on information no longer apply (Squire & Dede, 2015). Given my emphasis on the relationality and situatedness of memory, it is more useful to classify types of memories in terms of different practices (e.g., pottery-making). Examining these practices allows us to observe how memory operates within a specific sociomaterial context without delineating distinct categories such as episodic memory, working memory, semantic memory, and motor habits.

[69] From these perspectives, style involves preserving the cognitive and motor skills learned during the apprenticeship process, with stylistic variation found in the transmission of these skills from one artisan to another. Social groups sharing technical

Gosselain (2008), Bril (2019), and Ingold (2001) among others (for reviews, see Costin, 2000; Hegmon, 2000), which explore technological change in terms of continuity and discontinuities and the dynamics of craft production and stability of traditions as part of individuals' learning processes. The argument on the constitutive role of material culture for re-enacting memory that I suggested in this paper can support these studies and develop insights on stylistic variation by providing a framework to explore the cognitive activity of individual artisans involved in learning skills *alongside* the transgenerational processes by which styles of material culture change over time. Examining how memory is reinterpreted *with* and *through* material culture over generations can provide insights into how techniques and finished products changed over time, reinforcing the ecological approach that underpins the aforementioned technological studies.

Ultimately, while my primary objective in this paper was to present a new argument for the constitutive role of material culture on memory using the Knossian Kamares as a case study, the analyses have yielded interesting observations with valuable implications for future contributions in Minoan archaeology. The data analysis has revealed that specific geometric units and motifs, along with their associated technical knowledge and skills, are attested as early as MM IA and endured until MM IIIA. This observation partly corroborates earlier studies (e.g., Walberg, 1976). It also suggests that consumption and production practices may have continued to impact social and cultural groups and influence later styles, at least in the Knossos area. For instance, it can be argued that technical skills and knowledge persisted beyond the Kamares style. LM IA (ca. 1600 – 1500 BC) pottery examples from the "Gypsades Well (Upper Deposit)" in Knossos (Hatzaki, 2007, pp. 180-181), or Neopalatial deposits of Kommos (Watrous, 1992), exhibit reeds and floral bands traced into friezes alongside spirals, lines, and stamps. These geometric units, motifs, and compositions visually and technically recalled previous Kamares examples. The endurance of these practices might also indicate continuity in the social groups that used and consumed this pottery. It is worth considering future research exploring the extent to which these temporal labels have been applied and how past pottery forms contributed to shaping the later Neopalatial production and consumption practices associated with subsequent styles. One additional observation regarding the Kamares style pertains to the openness and inventiveness of its polychrome decorations. For the first time, I provided concrete results that ground previous

traditions are called *communities of practice* (Roddick & Stahl, 2016). The term describes how identity is created through shared practices among individuals who practice together (Lave & Wenger, 1991).

scholars' assumptions that Kamares is a creative pottery (e.g., Betancourt, 1985). The study showed that this openness is not reflected in technological expertise or the production of entirely new motifs. Instead, I have demonstrated that inventiveness rested in the freedom artisans had to combine motifs and create ever-changing compositions. I suggest that this freedom might be reflected in the sociocultural milieu. I refer to the possibility that the Protopalatial period, broadly defined, was more interconnected than previously believed. The openness and inventiveness in pottery-making might imply a degree of societal freedom where individual artisans could freely reinterpret the Kamares tradition whenever they created a new pot in this style. It also suggests greater mobility among different communities of artisans across Crete. In fact, decorative skills and knowledge used in creating Kamares pottery could have been applied to other artisanal practices, such as painting frescoes and textile production. The *Wavy Line* style identified by MacGillivray (1998) might be a clear indication of fluidity in artisanal traditions, possibly also reflected in the structure of Protopalatial workshops. However, these are only some tentative suggestions that demonstrate the potential of this approach to transgenerational memory and material culture in addressing questions related to both new and existing materials and research questions.

In conclusion, the study presented in this paper suggests a closer connection between material culture and memory. It proposes a novel methodological approach rooted in the emerging field of cognitive archaeology, one that is attuned to archaeological timeframes, the diversity of material culture, memory practices, and the socio-material contexts where memory and remembering unfold.

Conclusions

In this thesis, I re-examined the Minoan Kamares style, which has been long recognised as an idiosyncratic pottery tradition that breaks with both past and present ceramic styles. The archaeological literature on the Kamares style has chiefly analysed this pottery based on physical similarities to produce better relative and absolute chronologies, evolutionary trajectories of combinations in Kamares shapes and decorations, explore social and cultural dynamics, investigate regional contacts and the presence of possible polities, and reconstruct long-term technological traditions in specific Cretan geographical areas. According to these studies, the Kamares style was

the product of a rising elite slowly gaining control over resources and practices of consumption during the Middle Minoan period. Regardless of the social and cultural interpretations, the literature on Kamares considers this creative pottery style challenging to categorise and analyse. Despite its openness and inventiveness, those studies show that the Kamares style was consistently reproduced across several generations. Hence, as I illustrated in the introduction of this thesis, there is a tension between creativity and stability, change and continuity in Kamares that archaeological studies have not yet directly addressed. Most importantly, these artefactual dynamics unfolding over centuries are reduced to the shorter timescales of human activities.

However, as I aimed to illustrate with critical discussions on the notion of style in archaeology, the dynamics by which Kamares decorative forms developed over time, eschew human temporal scales. As Gosden (2006) states in discussing the ways in which people and things intersect and develop over time: "Flows and stoppages of material culture also operate on time scales beyond that of the human life span. The longer-term unfolding of material forms is a vital, but largely unacknowledged, part of human life" (p. 431). If we have to pinpoint a critical drawback in the study of the Kamares style, that is the absence in the scholarly literature of an exploration of the dynamics by which creativity and stability played out across generations in different Cretan regions. Specifically, a study that considers how those pottery forms produced over time their internal temporal dynamics of change and stability, what Gell (1998) referred to as "the inter-artefactual domain" (p. 217). I called this long-term stance on this pottery the *transgenerational dimension* of the Kamares style, trying to emphasise the difference between phylogenetic and ontogenetic temporalities (Article 1).

This gap in studies on the transgenerationality of the Kamares, fostered by the hegemony of the taxonomic thinking derived from the cultural-historical tradition, brings an important consideration: the role that material culture has in shaping humans' modes of acting and thinking. In the review of style, I showed how most scholars consider cognition the product of internal representations located in the brain or mind, later materialised (or externalised) with things. I pointed out that this dualistic, Cartesian stance on human thinking, already criticised by Boast (1997), is at the core of archaeological views that considered style a way to communicate information about social identity and power structures. For these approaches, style works as a symbolic system and social strategy, suggesting that material culture results from some shared social beliefs in the mind of one or more individuals. I also pointed out that studies more inclined

to explore stylistic variation as part of choices taken in the making context equally share the idea that material culture is the exteriorisation of internal thoughts. Essentially, for these approaches, stylistic typologies work in the same way recipes do: they are sets of pre-imposed rules and sequences of actions to be followed in order to obtain a specific result. Yet, as we have seen, these theoretical outlooks preclude them from truly investigating the dynamics by which artefactual traditions endure and change over time, and how these changes affect human modes of thinking and acting. If this is the case, it is because studies on Kamares and style did not explore the transgenerational dynamics of artefactual tradition. In so doing, they considered things fixed referents to which our mental representations point. In assuming this hylomorphic view of the mind for which thinking pre-exists the processes that give rise to it (Ingold, 2010, pp. 91-92), these studies reiterate the now century-old Cartesian separation between mind and matter.

However, as Malafouris (2004, 2008, 2013, 2019a) explores within the framework of MET, things are not fixed referents to which our mental representations point but fully-fledged cognitive agents. Rather, for him the mind is "situated within and constituted by the material world rather than merely being about it" (2018, p. 756). In this thesis, I argued that this agential capacity of material culture for human cognition could be further explored by looking at the transgenerationality of styles. More precisely, I argued that by looking at the internal dynamics that the Knossian Kamares style produced in terms of similarities among artefacts in this style, we could concentrate on better exploring the transgenerational dynamics by which a style developed over time. That is, to follow Gosden's (2005) suggestion to study how "things behave in ways which do not derive simply from human intentions and in fact channel those intentions" (p. 196).

To proceed to develop the intuition on the transgenerationality of style and its agential capacity, I hope to have demonstrated how recent studies on style by Gosden (2005, 2011), Knappett (2010), and Joyce and Lopiparo (2005) have proposed that we appreciate the active role that material culture has in supporting human thoughts and actions over time. Whilst their suggestions sustain my enterprise with this thesis, the stance on material culture, temporality, and cognition that I move in this work is, in a way, more radical: styles do not just channel people's actions and thoughts but, in being long-term types of memories, they instantiate and constitute them. My argument for this essential, constitutional stance of material culture for memory can be resumed as follows: without the preceding tradition of Kamares style distributed in previously made pots, artisans would have never been able to acquire and remember the necessary technical skills and

knowledge to produce new Kamares vases and decorations. Nor could they have updated this tradition, providing future generations with the potential for enacting future modes of thinking and acting. In that sense, I assume that the Kamares style is a memory that constituted artisans' modes of actions and thoughts in pottery making. As shown in the articles incorporated in this thesis, this hypothesis for the constitutive role of material culture for memory aligns with recent discussions in the MET and ecological-enactive cognitive paradigms that assume things and practices to be what thinking is made of (Gallagher & Ransom, 2016; Malafouris, 2018; Ransom, 2019).

As discussed in Chapter 4, I grounded my assumption in the anthropological approach to art by Gell (1998). By accounting for the internal relationship created by the synergies among all objects sharing the same qualities of shape and decoration, Gell's (1998) argument for the "inter-artefactual domain" provides a useful conceptual tool to reframe the transgenerationality of styles (p. 172). Defined as a relation between relations of forms and cultural parameters that rule their internal dynamics of change and the relationships they produce with people, the inter-artefactual domain is pivotal in attending to the specific qualities by which the Kamares Style changed and continued. More importantly, it provided me with a helpful way to connect material culture, cognition, and temporality into one unique cognitive process: memory. Gell (1998) describes the Maori houses making-tradition as: "an object which we are able to trace as a movement of thought, a movement of memory reaching down into the past and a movement of aspiration, probing towards an unrealised, and perhaps unrealisable futurity" (p. 258). It was by interweaving past approaches to the Kamares Style, recent long-term archaeological studies on style, and the anthropological framework provided by Gell which supported the hypothesis I moved in this thesis: that the Kamares Style describes a transgenerational memory that enabled Minoan artisans to remember and update theirs or their predecessors' technical skills and knowledge every time they engaged *with* and *through* raw materials, tools, previous creations in the context of making novel vases.

In the remainder of this thesis, I attempted to better define this proposal for style as memory. I did so by grounding my assumption in the existing literature on memory and material culture and proving it through re-examining the Knossian Kamares pottery. I showed that, whilst anthropological and archaeological memory theories generally fall flat in showing that material culture plays a central role in memory, my endeavour of developing this alternative proposal for style as memory is in line with the enactive, ecological, extended, and situated perspective of MET.

The postulates of Extended Mind, Material Agency, and Enactive Signification developed by Malafouris (2013) bridge arguments on style and memory. As Malafouris remarks, the Extended Mind assumes that "minds and things, more than merely being causally linked, are constitutively interdependent—that is, that the one cannot exist without the other" (p. 77). This proposal theoretically resonates with the aforementioned suggestion that Kamares Style is a memory that constituted artisans' memories of technical skills and knowledge. The theory of Material Agency, defined by Malafouris (2013) not "as a fixed property of humans but as the emergent product of our engagement with the world" (p. 149), equally helps in considering Kamares vases as active agents directly participating in the constitutions of skilled practices through which the act of engagement with raw materials and tools was enacted.

In this sense, as I attempted to illustrate in the first co-authored paper (Article 1), we proposed that remembering is a way of engaging *with* and *through* things. That is, we remember whenever we update our interaction with the world a form of engagement previously acquired through sociomaterial practices. We affirmed that the one who remembers is not a subject but a subject interacting with and through things. In the context of that article, we also suggest that the process of enactive material signification is even more important for the proposal of memory and remembering that I present in this thesis. In the words of Malafouris (2013): "The material sign instantiates rather than symbolises. It brings forth the concept as a concrete exemplar and a substantiating instance" (p. 97). According to this definition, in Article 1 we provided arguments to consider things full-fledged memories. If they do so, we argued, it is because things accumulate over time the modes by which we have previously engaged *with* and *through* them. In considering things as material signs, we argued that they instantiate past modes of material engagement and organise present and future ones. Based on the developments presented in Article 1 and the data on the Knossian Kamares Style analysed as part of this research project (Chapter 6), I presented in Article 2 the idea that the aesthetic material qualities of Knossian Kamares pots were full-fledged memories for artisans of their or their predecessors' technical skills and knowledge. I then further elaborated in Article 3 the proposal for the Kamares Style as transgenerational memory and of remembering as re-enacting.

The methodology developed for the data collection and analysis was created ad hoc for this research. It was the result of the theoretical considerations on the anthropology of art by Gell (1998), for which style is a "cumulative process of discovery" made up of the interaction existing

among similar forms (p. 237), and Malafouris's (2013) MET. Unlike now-classic stylistic studies, my observations of shapes and decorative forms were not categorised as a *fait accompli* but as possible material traces of different techniques, choices, and raw materials spatially and temporally linked to each other through the material qualities and techniques discernible from a direct examination. For this aim, I devised three main categories which reflected the characteristics recognised in discussing the Kamares Style: geometric units, motifs, and compositions. Instead of seeing these as distinct entities, I considered them part of the same connected whole defined by their material qualities and techniques used to trace them. Combinations of geometric units aggregated together to produce coherent wholes: motifs that were themselves combined into compositions.

By adopting this stylistic approach specially devised for this study, I was able to meticulously examine the collaborative interactions among units, motifs, and compositions that unfolded over transgenerational periods. Firstly, I observed a consistent distribution of geometric units from MM IB to MM IIIA, with units such as lines, dots, or spirals employed to create various motifs spanning several periods. Examples are the lines of *Dot W(hite) R(ed)* on the bridge spouted jars in Figures 50 (MM IIB) and 51 (MM IIIA). There are also other examples in the database, such as KMW684 and KWM701, KWM 709, KWM 711, and KWM 785 to name just a few. The presence of the same geometric units also highlights how this style has a coherent existence as a domain in itself in terms of continuity of technical practices. In fact, in the aforementioned examples, the technique employed is identical: the artisan initially painted round white dots with a paintbrush and white pigment, potentially prepared in advance following a tradition studied by several scholars (Faber et al., 2002; Pappalardo et al., 2015). Then, before firing, they applied a smaller red dot on top of the white one using a finer paintbrush. This procedure was carried out to create sequences of *Dot W(hite) R(ed)* motifs on all the pots. The same continuous dynamics between decorative forms and crafting techniques are evident in Figure A3.7a-c. If a fragmented rounded bowl from "NW Kamares Ware Area" (MM IB), an angular cup with tall rims from the "SE Kamares Area" (MM IIA), and an angular cup with tall rims from the "SE Kamares Area" (MM IIIA) all share the same *S-shaped lines chained - Medium W(hite)*, it was the practice of drawing with a paintbrush using a white pigment S-lines was part of the request that the Kamares styls imposed over generations of artisans. The same can be argued for the MM IIIA *Floral – Flower Petal O(range) Spiral W(hite)* and *Spiral – Medium W(hite) and Line – Petal O(range)* (Figure 3.8a-d), These observations

indicate that once a Kamares motif was applied to the surface of a pot, it became an integral part of the Knossian Kamares style, allowing future artisans the potential to create new pots inspired by earlier motifs. Of course, there are variations among the pots in Figure A3.7a-c, specifically in how these motifs were incorporated into different compositions.

There is a tendency over time to structure motifs into two or three linear bands that confirms the observations on the radiating syntax moved by Matz (1928) and Furumark (1941). The database contains various examples that illustrate this tendency, including but not limited to KWM018 (MM IIB), KWM341 (MM IIB), and KWM377 (MM IIB). However, despite the move towards creating two or more friezes, a practice that appears to become more prevalent in MM IIA, the motifs used within these compositions are not entirely new. Instead, they are drawn from the past and adapted to form new motifs. This is evident, for instance, in the case of the MM IB straight-sided cups KWM038 and KWM473. These internal dynamics demonstrate that the Kamares style formed a cohesive stylistic realm that acted as a long-term form of memory for artisans.

These dynamics of change underlying the standardisation in MM IIA reveal that these more linear compositions – which is important to highlight were always different in terms of which motifs were combined to produce them, as indicated in Figure 48 – emerged by transforming existing motifs into novel ones. For example, the *Two lines – O(range) W(hite)* employed by artisans in MM IIA onwards to divide the various sections of a pot's surface decorations, such as KWM173, emerged through the adaptation of earlier forms and associated techniques. Preceding these were the *Two lines oblique – O(range) W(hite)* running from the base of conical goblets like KWM006, KWM050, and KWM174 or the *Two lines vertical – O(range) W(hite)* on straight-sided cups like KWM028 and KWM056. It was by working within this tradition, characterised by its demands for polychromy and the execution of geometric units and motifs defined by the pre-existing corpus of previously crafted and experienced pots, that subsequent artisans could remember, learn, and update this style. This study has demonstrated that the Kamares style maintained a cohesive existence as a stylistic universe distributed across both time and space, shaping the ways artisans thought and acted over time.

Subsequently, by examining the development of geometric units, motifs, and compositions over time, one of the key objectives of this research was to investigate the intrinsic connection between memory and material culture. This endeavour aligned with Malafouris's (2019a) proposition,

which suggests that "the moving hand and its material traces do not merely externalise the internal workings of a mind. Instead, intelligence is enacted through them; it proceeds along lines and material signs of one kind or another" (p. 3).

For example, in Chapter 6, I described how the *Foliate band – W(hite)* motif that first appeared in the MM IA and continued until the MM IIIA allowed old and novel generations of artisans a potential for future creations. Every single *Foliate band – W(hite)* traced on the surface of MM IB vases supported, either consciously or not, the tracing of future foliate bands alongside the necessary technical skills and choices in selecting tools or pigments to create something reminiscent of previously experienced *Foliate band – W(hite)* motifs. I also illustrated how this continuation in material traces and technical skills enabled artisans to update this style by adapting the whole tradition of decoration-making to the novel requests imposed by their sociomaterial context. I then tried to show how these dynamics worked in explaining the emergence of the *Foliate band – Stamped W(hite) with Lines R(ed)R(ed)* motif in the MM IIB (Figure A3.3; Section 6.4.3.1). Precisely, I described how it is because artisans continued to trace *Foliate band – W(hite)* motifs since MM IA and the *Two lines – Horizontal R(ed) R(ed)* motifs from MM IB onwards that they could combine these past decorative forms and correlated techniques into producing the *Foliate band – Stamped W(hite) with Lines R(ed)R(ed).* By thinking *with* and *through* previous creations in the context of decoration-making, artisans could re-enact in the present or for the future past modes of material engagement. The claim that I move here is that the *Foliate band – Stamped W(hite) with Lines R(ed)R(ed)* did not result from a pre-rendered idea later imposed on matter. It was part of that continuous process by which the Knossian Kamares style was updated every time artisans engaged with and through past creations, tools, and raw materials to make new vases in this style.

These discussions on the Knossian Kamares style as memory and the role of making practices in remembering are developed in Articles 2 and 3. The main scope of Article 2 was to elaborate on my suggestion that the Knossian Kamares motifs were memories to Minoan artisans of the sociocultural practices required to make Kamares decorations. In this paper, I asserted that motifs served as memories due to their accumulated history of past sociomaterial practices. This, in turn, enabled future artisans to enact previous practices, whether their own or those of previous artisans. Subsequently, based on the theoretical underpinnings developed in the first part of the thesis and the discussions elaborated on the data collected in the second part, in Article 3 I hope to have

demonstrated that this style was not a set of static categories but describes a cognitive process: a transgenerational memory of skills and knowledge continually updated every time artisans engaged with and through past creations, tools, raw materials, and previously acquired sociocultural practices. Moreover, by developing this perspective on style as memory, I also aimed to show that it is not tenable any more to consider remembering an internal mental faculty isolated from the sociomaterial context but is re-enacting: the capacity that our bodies and brains have to adapt in the present context of action a previously acquired mode of materially engage. Therefore, remembering is something we do: a way of materially engaging *with* and *through* things in the world.

When considering the process of remembering as an action that unfolds in practice, rather than a mental act involving the retrieval of information from an individual's brain, I contend that the Kamares style memory of technological skills and knowledge emerged in the interaction between an artisan's body and brain and the raw materials and tools. With this proposal, I did not suggest that artisans had to be surrounded by Kamares materials when producing new vessels to remember what to do. Instead, my suggestion is that it is in the history of material engagements accumulated by engaging *with* and *through* previous creations observed in the workshop when learning or attending communal consumption activities that the Kamares style enabled them to re-enact the creative process required to make new pots. This understanding of remembering is inherently linked to the sociocultural context of Middle Minoan Knossos.

Based on the analysis of the collected data, it appears that the sociocultural context for the production and consumption of Kamares pottery in Knossos was marked by the exchange of diverse materials and artisanal practices. Notably, the Kamares style seems to have emerged within a sociocultural production context where various traditions converged in the making of this pottery style. This proposition is substantiated by technological studies and the findings presented in this study.

One example of a tradition integrated into the production of Kamares pottery is the layering technique (Day et al., 2006). This technique has been in use in workshops located in the Mesara region since EM, initially employed for crafting vessels such as the Fine Grey ware. Evidence of its use is documented in EM IIA Knossian deposits, indicating the circulation of fine pottery produced in the late EM period throughout the island. In the MM IA and IB periods, the layering technique was adopted for creating Kamares pots, with some of them discovered in Knossos. This

suggests that artisans in various centres outside the Mesara region had access to these materials, allowing them to learn and experiment with these techniques.

Furthermore, the gradual adoption of the wheel-fashioning technique supports the idea of materials and technological expertise associated with the Kamares style circulating across different regions (Knappett, 1999a). Starting in MM IB, artisans affiliated with Knossos, Malia, Palaikastro, and Myrtos Pyrgos progressively embraced the wheel-fashioning technique. The techniques employed were generally consistent across these sites, indicating that artisans could move across the Cretan landscape, disseminating their technological knowledge (Berg, 2015). This gradual process became integrated into the production of the Kamares style. The data on shaping techniques in the database support the concept of the gradual adoption of the wheel until the MM IIB period, when most of the drinking and pouring vessels in the Kamares style were wheel-made.

Similar processes can be observed in how artisans incorporated past decorative traditions into the production of the Kamares style. During EM IIA there were instances of red and black slipped ware and burnished wares circulating within Knossos (Momigliano, 2007b, p. 57-61). While somewhat rare, early examples of Vasiliki ware have also been identified in Knossos in EM II (Wilson et al., 2004). These represent some of the earliest instances of pottery displaying the use of red and black pigments. Also, since EM IIA, the "West Court" and the "North-East Magazines" groups included several examples of White-on-Dark ware (Momigliano, 2007b, pp. 57-77). This type of pottery was characterised by a black slip and white torsional decorations.

As discussed in Chapter 1, technological studies have demonstrated that the black and brown-reddish slips employed in the Kamares style share the same composition as the black slip used in White-on-Dark ware (Noll et al., 1971; Betancourt et al., 1984; Faber et al., 2002, 2009; Pappalardo et al. 2015). The same technological dynamics of continuity in the White-on-Dark ware and the Kamares style are reflected in the selection, manipulation, and application of white pigments (Noll, 1982; Betancourt et al., 1984; Faber et al., 2002; Pappalardo et al. 2015). There exists a notable persistence in the tradition of producing white pigments, which originated with White-on-Dark ware and was subsequently incorporated into the production of the Kamares style, akin to forming techniques. While further investigations into the pigments of late Prepalatial pottery, aside from white and black, are needed to gain a more comprehensive understanding of these processes, we can infer that similar mechanisms were also at play for the other pigments. This continuity in technological skills and knowledge within the later Kamares style forms implies

that artisans were enmeshed in a sociomaterial context that exposed them to various styles, whether imported or locally produced. Consequently, artisans could create a history of engagements with these materials that enabled them to remember, learn, and adapt previous pottery traditions, resulting in the creation of something new yet partially reminiscent of those earlier creations. This observation reinforces my suggestion that remembering is not merely a recollection of the past but the adaptation of previous modes of materially engaging *with* and *through* things according to the demands of the present. In essence, what I am proposing is that Knossian artisans had access to the previous creation and, as such, they could remember and adapt in the present moment of making past technological skills and knowledge to produce something new: the Kamares style.

These observations lead to another crucial conclusion concerning the interplay between production and consumption contexts. I propose a connection between these contexts, suggesting that those residing in the vicinity of Knossos had access to these materials, including the artisans who would subsequently make new pottery. This implies that they would have had access to consumption practices on a daily basis and an understanding of the demands and requirements of consumers. It is worth noting that not all individuals would have been equally able to participate in these practices or exposed to the various pottery styles. The deposit studied by Macdonald and Knappett (2007) indicates that there was indeed a hierarchy of value associated with these pots, which may have mirrored the status of the individuals using the vessels. Nevertheless, it is possible that members of society could have participated in these social contexts in a manner more akin to the consumption practices of the Prepalatial era, which was potentially more inclusive than those of later periods (Day et al., 2006, p. 59; Knappett, 2008, p. 125).

In this sociocultural context, artisans may have been aware of the products in use during these ceremonies, even if they did not participate in them directly. In this regard, I propose that during the late Prepalatial and throughout the Protopalatial period, we do not witness the presence of an elite group exerting direct control over production. This is because the high level of creativity I identified when discussing compositions suggests that artisans enjoyed creative freedom to devise new motifs and integrate them into new compositions. Therefore, my contention is that the elites inhabiting the palaces, or using the palaces as arenas to reinforce social differences, did not directly control production. Instead, production and consumption were two distinct aspects of the Minoan sociocultural milieu. The dynamics of production dislocated in workshops outside the places met the demands of consumers localised in the palaces. Although the Quartier Mu workshop at Malia

seems to imply otherwise (Poursat, 2013), it is plausible that artisans did not reside in a single workshop but rather travelled across Crete from one centre to another. This could help explain the widespread adoption of the potter's wheel as well as the technological continuity in the manipulation and use of black, white, yellow, orange, red and purple pigments.

This situation generated an equilibrium between producers and consumers of Kamares that co-developed over the Protopalatial into a form of more hierarchical control from the palaces. This movement towards more direct control from the elites might be manifested in the growing standardisation of the overall syntax of compositions discussed above, as well as in the decreasing number of novel motifs as attested in the latter phases of the Protopalatial.

Before concluding there is one more point I would like to make regarding the production context and the creative dynamics that underscore the stability and evolution of the Kamares style. Numerous examples in the database corroborate my claim on the Kamares style as a nexus of various artisanal practices that extend beyond pottery production. It appears that artisans involved in making Kamares vessels were exposed, if not directly involved, in other artisanal activities such as metalwork, textiles, stone vase production, and wall painting.

For instance, Matson (1984) suggested that the red siltstone used to produce the red pigment in the White-on-Dark ware slip, also used in the Kamares style, was the same pigment used in the preparation of textiles, as evidenced in a case from Gournia (p. 55). If true, this observation suggests a connection between different artisanal practices, indicating that workshops were potentially shared among various artisans or that artisans involved in one craft also participated in others. These observations are reflected in numerous examples catalogued in the database. Fragments with *Wavy Lines* compositions, such as KWM015, KWM016, KWM071, KWM072, KWM073, KWM175, KWM773, or cross-hatchings like KWM029 and KWM064, resemble textiles. Some compositions feature bands decorated with rivets that evoke metalwork, such as KWM099, KWM749, KWM779, and KWM785. Various eggshell examples, like KWM761, KW423, and KW773, with their thin walls and dark black coatings, are reminiscent of metal vessels. Other compositions, such as those on KWM087 or KWM108, bear a resemblance to the later naturalistic decorations found in MM IIIA frescoes (Militello, 2013). There are also examples with red or white sprayed dots that evoke patterns seen in stone vessels (KWM088, KWM110, KWM112).

This suggests that the Kamares style was not merely a convergence of various pottery traditions that artisans remembered and adapted in the context of creating new pottery. As evidenced by the data on the motifs, artisans consistently introduced new ways of decorating the surfaces of Kamares pots, drawing from other artisanal traditions.

This perspective is not novel, but the data collected corroborate the observations made by Knappett (2008, pp. 123-14) and further support the earlier suggestion that artisans existed in a sociocultural milieu characterised by constant exposure to diverse artefacts and materials. In a broader context, the sociocultural environment of the Protopalatial period is marked by exchange and fluidity. Various members of society, including artisans, had access to a wide array of circulating materials during this era. This fluidity in artisanal forms, a defining feature of the sociomaterial context of the period, implies that artisans may have possessed versatile technical skills, interacted with various raw materials, or closely collaborated with other artisans specialising in different crafts. The example of the workshops in Malia, with various types of artisanal workshops in close proximity, suggests that artisans lived in an interconnected world of materials, people, and practices that fostered their creativity. This environment facilitated their ability to remember the technological skills and knowledge associated with cultural traditions, as seen in the case of the Kamares style.

To recap, I hope to have shown in this thesis that an enactive, ecological, multi-temporal, non-representational, and distributed approach to memory and remembering can help archaeologists to address issues of cultural development and explore the specific dynamics by which styles emerge, change, and disappear by giving rise to other styles or wares. Rather than considering styles as fixed entities which convey *a priori* social meanings, styles can be seen as processes that enable people to learn, update, and pass on modes of thinking and acting which are continually adapted to the sociomaterial contexts where practices of memory unfold. Moreover, the theoretical framework advanced here supports a study of memory and remembering in the cognitive sciences at large that is able to attend to the various ways in which the sociomaterial world instantiates and constitutes memory and remembering. Due to the theoretical underpinnings and specific methodology designed in this thesis, I attempted to move past the classical studies of style grounded in the cultural-historical and information exchange theory and understand the complexity and dynamism of style. To this extent, it is concluded that the Knossian Kamares style is best seen

as a memory process inseparable from the sociomaterial coordinates where artisans remembered previous ways of thinking and acting in the context of making vases in this style

Future directions

Discussions on the transgenerational nature of style, the significance of material culture and its associated practices in remembering, the role of the sociomaterial context in constituting memory, and the tension between stability and creativity at the core of style that emerged with this work have all highlighted some potential directions for future research. Here, I mention the four most significant.

Observations of trends and patterns in geometric units, motifs, and compositions from pottery from other sites around Crete might be added to the database to better understand the transgenerational nature of style and shed more light on the underlying dynamics behind the Kamares style. Such a study would give researchers additional information to investigate regional variations and exchanges over time among different regions and provide greater insight into the sociomaterial setting in which artisans lived.

A comprehensive ethnographic campaign around Crete may be developed, as was first intended before the COVID-19 epidemic, as a second study. It would be informative to further explore the findings from Chapter 6 about geometric units and how they relate to gestures, skills, actions, memory, and re-enacting (as suggested in Article 3).

Exploring the hypothesis of transgenerational memory as it pertains to various sociocultural settings and forms of material culture would be another way to develop and reinforce some of the observations only partially discussed in this thesis. Only recently has the expanding field of media studies realised how crucial it is to use a temporal perspective to examine how particular technologies, such as photography and AI, have been developing and re-structuring our modes of thinking and acting with and through digital and material culture. The long-term manufacture of Achulean handaxes is another case study to explore the hypothesis of style as memory. It continues to present challenges and raise issues for researchers interested in answering questions on the evolution of early humans' cognitive capabilities.

Ultimately, a long-term project to develop the suggestions presented here might be exploring the proposal for memory and re-enacting from contemporary philosophical studies (i.e., enactive-ecological and radical enactive cognitive studies) to impact medical anthropology. By developing

the archaeological and anthropological research studies mentioned above, it might be possible to better define the constitutive role that the environment plays in the re-enactment of past modes of thinking and acting, thereby researching alternative paths of recovery for patients affected, for example, by PTSD (Post-traumatic stress disorder).

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