The Marble Kyklos:

Social Cognition, Social Complexity and Material Engagement in the Aegean Bronze Age

Alexander Reid Aston

School of Archaeology

University of Oxford, Keble College

Submitted in fulfilment of the requirements for the Degree of Doctor of Philosophy

Hilary Term 2021

For Liza Octopus Diver, my mother: the bravest, most compassionate and resilient human I know.

vixere fortes ante Agamemnona
multi; sed omnes illacrimabiles
urgentur ignotique longa
nocte, carent quia vate sacro.

Many brave men lived before Agamemnon,
but all are sunk in the oblivion of the long night,
unweepable, because they lacked a sacred bard.

Horace's Odes (Book IV, Ode IX)

The Marble Kyklos: Social Cognition, Social Complexity and Material Engagement in the Aegean Bronze Age
Alexander Reid Aston
Keble College
Submitted in fulfilment of the requirements for the degree of Doctor of Philosophy
Hilary Term 2021

ABSTRACT

This thesis applies the principles of Material Engagement Theory (MET), which examines material culture as a dynamic and integral component of human cognitive systems, to study the relationships between Cycladic marble sculpting, social cognition and social complexity. The work investigates how material culture shapes the development of intersubjectivity and generates social interactions at emergent scales. As a case study in emergent social complexity this thesis examines the development of Cycladic marble sculpting and the Early Bronze Age ritual centre of Keros. In this light, Cycladic sculpting traditions can be interpreted to have mediated the shifting burdens of social cognition during the Early Bronze Age, facilitating the emergence of novel social organisation as a response to the changing dynamics of the Aegean world. In attempting a cognitive archaeology of Keros and Cycladic sculpting, this thesis examines a broad array of scientific data as well as underutilised archaeological evidence within the framework of MET to generate a coherent approach to social cognition in recent pre-history. If material culture is understood to be an intrinsic feature of human cognitive processes, it is possible to examine the archaeological record as a form of niche construction that has reshaped the evolution and development of the mind. Specifically, evidence from the cognitive sciences suggests an evolutionary feedback loop generated between hands, eyes and the bodies of others. Social cognition can thus be understood to develop from perception-action systems that evolved through pragmatic and cooperative social interactions mediated by material culture. Cycladic figurines, as this thesis argues, present as attention-capturing technologies which shaped identity formation and coordinated social interactions at emergent scales. The relationship between marble, social interaction and longboat voyaging provides a robust explanation for the development and transformation of Keros as well as the broader chronology of the region. Thus, it is argued that the attention-capturing properties of Cycladic figurines generated a semiotics of value through which kinship dynamics were conceptualised and manipulated, enabling the regional organisation of long-range voyaging regimes on Keros.



The Cycladic Islands

Table of Contents

LIST OF FIGURES ..... **i**

ABBREVIATIONS ..... **ii**

CHRONOLOGY ..... **iii**

ACKNOWLEDGEMENTS ..... **iv**

Introduction: The Emergence of Civilisation ***1***

i. Introduction: The Cycladic Early Bronze Age **1**

ii. Cycladica and Complexity **5**

iii. Complexity: Social or Otherwise **8**

iv. The Material Engagement Approach **12**

v. Structure and Methodology of This Thesis **17**

vi. Social Complexity Without Losing Your Marbles **19**

Chapter One: Metaplasticity and the Boundaries of Social Cognition ***22***

1.1 Introduction: Social Cognition and Social Complexity **22**

1.2 The Matter of Social Cognition **28**

1.2.1 Social Intelligence and Material Engagement 34

1.3 Distributed Social Brains **36**

1.4 Niche Construction and Scaffolded Minds **39**

1.5 Embodied Social Intelligence **46**

1.6 Social Things **50**

1.7 Kinshipping and the Mutuality of Becoming **57**

1.8 Signs of Value **59**

1.9 Conclusions: Metaplastic Niche Construction **66**

Chapter Two: The Emergent Landscape ***71***

2.1 Introduction: The Prehistoric Cyclades **71**

2.2 The Deep Emergence of Cycladic Seafaring **74**

2.3 Seafaring and the Aegean Mind **77**

2.3.1 Sea Intentions 79

2.3.2 Navigation and Development in the Deep Blue Sea 83

2.3.3 The Longue Durée of the Longboats 85

2.4 Emergence of the Neolithic **88**

2.4.1 Bodies, Quantities and Densities 91

2.5 Engineering New Ecosystems **95**

2.5.1 Global Complexities and Local Simplifications 99

2.6 Reorganising Bodies **102**

2.7 Conclusion: Cycladic Patterns of Emergence **105**

Chapter Three: Identity and the Agency of Marble ***110***

3.1 Introduction: Marble and the Body 110
3.1.1 The Evolution of Form 113
3.2 Finding their Marbles (c. ? - 3200 BCE) 119
3.2.1 Shaping the Earth 122
3.2.2 Eliciting form 125
3.2.3 The First Naturalistic Pieces 129
3.3 Figuring Through Stone (c. 3300 - 2700 B.C.) 131
3.3.1 The First Cycladic Styles 133
3.4 Bodies from the Sea (c. 2800 - 2200 B.C.) 139
3.4.1 Perceiving the Body 143
3.4.2 Shared Attention and the Application of Eyes 147
3.5 Losing Their Marbles (c. 2300 - 1900 B.C.) 150
3.6 Conclusion: Embodied Skill, Identity and the Cognitive Developmental Niche 151
Chapter Four: Valued Substances and Enactive Signs 157
4.1 Introduction: Marble, Meaning and the Material Sign 157
4.2 Far Horizons (Neolithic c. 5000-3000 BCE) 159
4.2.1 Saliagos 161
4.2.2 Ftelia 163
4.2.3 Strophylas 165
4.2.4 Closing the Distance 168
4.3 Setting Out (ECI c. 3300-2700 BCE) 171
4.3.1 Bodies and Vessels 174
4.3.2 Identity and Asymmetry 177
4.3.3 Fiddling Away 181
4.3.4 Fruits of the Marble Orchard 184
4.4 Conclusion: Community, Death and Growing Value 191
Chapter Five: The Semiotics of Gifting and Reproduction 196
5.1 Introduction: Value and Kinship 196
5.2 The Turning Tide: Naturalistic Pieces and the ECI-ECII Transition 199
5.2.1 Acceleration 204
5.3 The Full Regatta: Floruit of the Keros-Syros Culture 210
5.3.1 Marble Plantations 213
5.3.2 The Value of Gender 215
5.3.3 Chalandriani and the Peripheries of Marble Circulation 221
5.4 Dwelling in the Past 226
5.4.1 Skarkos 232
5.5 Conclusion: Regimes of Value, Oceans of Meaning 236
Chapter Six: Keros and the Marble Kyklos 239
6.1 Introduction: The Keros Complex 239
6.2 Interpretations of Keros 241
6.3 The Organisation of the Keros Complex 244
6.4 The Centre of the Attention 249
6.5 Mind the Pebbles 254

6.6 Canoes, Communities and the Voyaging Cycle 259
6.7 Fragmentation and Creation 262
6.8 The Emergence and Transformation of the Keros Confederacy 265
6.9 Conclusion: Keros and the Metaplastic Niche 268
Conclusion 275
Bibliography 285

LIST OF FIGURES

Cover Figure: The Cycladic Islands
Figure 1: Chronology of the Cyclades. After Broodbank 2000: Fig 2. III
Figure 2: Varieties of Cycladic Folded-Arm Figurines (Drawing adaptation by Dr Céline Murphy). 1
Figure 3: Keros and the Minor Cyclades. After Renfrew et al. 2007: Fig 1 2
Figure 4: Nexus of Cognitive Development 7
Figure 5: Peircian Sign Types. 65
Figure 6: Prehistoric Sites of the Cyclades. After Broodbank 2000: Frontispiece. 72
Figure 7: Major Typologies of Cycladic Figurines, After Renfrew 1969: Ill. 4. 115
Figure 8: Marble Pebbles from Saliagos. After Renfrew 2017: Fig. 3.10. 123
Figure 9: Shaped Marble Piece from Saliagos. After Renfrew 2017: Fig. 3.9 124
Figure 10: Saliagos Violin Piece, Archaeological Museum Paros. After Renfrew 2017: Fig. 3.7. 126
Figure 11: Grotta-Pelos Schematic Figurines (Drawing adaptation by Dr Céline Murphy.) 128
Figure 12: Fat Lady of Saliagos, Archaeological Museum Paros. After Renfrew 2017: Fig. 3.5. 129
Figure 13: Large Figurines (Drawing adaptation by Dr Céline Murphy). 131
Figure 14: Plastiras Pieces (Drawing adaptation by Dr Céline Murphy). 135
Figure 15: Louros Figurines. (Drawing adaptation by Dr Céline Murphy.) 136
Figure 16: Possible Louros-Plastiras Hybrid (Drawing adaptation by Dr Céline Murphy). 137
Figure 17: Louros and Plastiras Piece (Drawing adaptation by Dr Céline Murphy). 139
Figure 18: Kapsala, Spedos and Dokathismata Figurines (Drawing adaptation by Dr Céline Murphy) 140
Figure 19: Koumasa and Chalandriani Figurines (Drawing adaptation by Dr Céline Murphy). 141
Figure 20: Head with Painted Details (Drawing adaptation by Dr Céline Murphy). 148
Figure 21: Phylakopi Figurine (Drawing adaptation by Dr Céline Murphy). 151
Figure 22: Louros Athalassou Tomb 26. 208
Figure 23: Seated Harpist, Flautist and Cup Bearer (Drawing adaptation by Dr Céline Murphy). 216
Figure 24: Seated Female from Aplomata (Drawing adaptation by Dr Céline Murphy). 217
Figure 25: Keros as seen from the southern shore of Ano Kouphonisis with Dhaskalio on the far right. 240
Figure 26: Dhaskalio 247
Figure 27: The Keros Complex. After Renfrew 2013: Fig. 9. 252
Figure 28: The Minor Cyclades. ©Google 253
Figure 29: The Kouphonisia. ©Google 258

ABBREVIATIONS

Aegean-wide periods:

EBA (EB I, II, III)	Early Bronze Age (Early Bronze I, II, III)

Regionally specific:

EC I, II, III	Early Cycladic I, II, III

Term Abbreviations:

FAF	Folded-Arm Figurine
SDN	Special Deposit North
SDS	Special Deposit South
MET	Material Engagement Theory
CAS	Complex Adaptive System
ToM	Theory of Mind
NCT	Niche Construction Theory
GCT	Gene-Culture Coevolution Theory

CHRONOLOGY

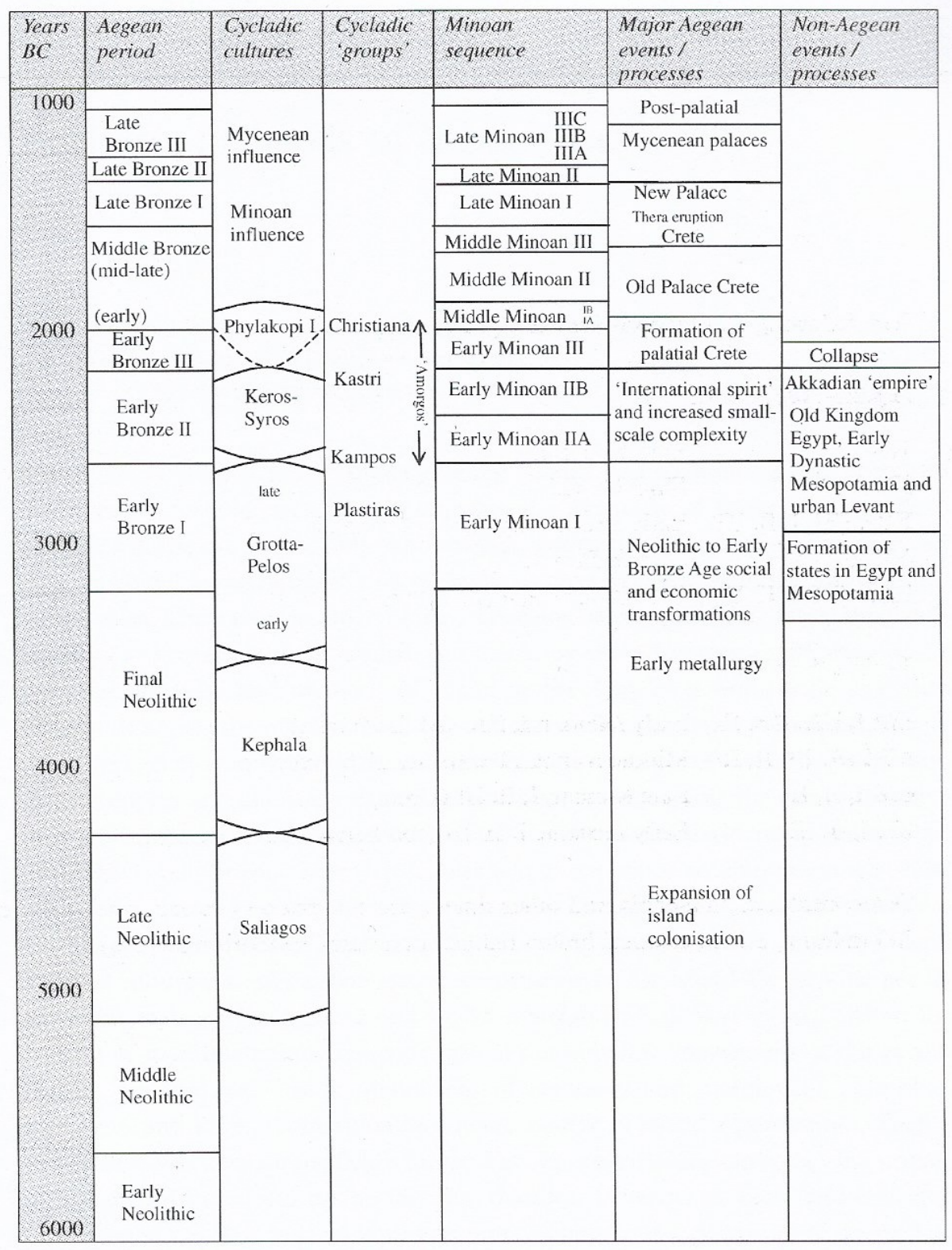


Figure 1: Chronology of the Cyclades. After Broodbank 2000: Fig 2.

ACKNOWLEDGEMENTS

This thesis was written during a period where the ongoing collapse of humanity's contemporary social, political and economic systems finally began to enter mainstream consciousness. Brexit, Trump and Covid-19 are among the many radical upheavals that have shaped the historic background in which this work has been researched and written. I hope that in some small way it will help to contribute to rethinking our relationships with each other and our environments as we so clearly must. On a personal note, my mother was diagnosed with cancer at the very start of my doctoral research, and I have watched her struggle with her illness for the past four years with the utmost grace and humour. This works is first and foremost a tribute to her, she is my hero, ally and inspiration.

I would like to thank my advisor Lambros Malafouris whose ideas, guidance and support has made this possible. It has truly been a privilege working with him. I would very much like to thank my examiners Cyprian Broodbank and Chris Gosden, their thoughtful criticisms and supportive approach have made this thesis immeasurably better. I am also grateful for the support I have received from my father, γιαγιά, grandaddy, sisters and the rest of my family. This thesis would not be complete without the insights and editing of Rachel Robinson (who was able to schedule me in sometime after fourth week). I also owe a great debt of gratitude to the Hextall family, it would have been impossible without you. Klint and Amanda Janulis, y'alls kin. Cory Marie Stade, Karenleigh Overmann, Fred Coolidge and Tom Wynn also have my thanks for their valued input and support. I am also deeply grateful to Sara Waller who helped me get to Oxford and has continued to keep me philosophically grounded during this long, strange trip. The Mangriotis, Robinson, Ball, Lynch and McDonnell families have also played a major role in making this possible and will always have my thanks. Bwana Yung Blud, it's been lekker. Lynn Edwards, please watch out for strange Californians in unicorn suits. I also cannot fully express my gratitude to everyone from the Keros excavation, the experience was one of the best in my life. Particularly I would like to acknowledge Colin Renfrew, Michael Boyd, Ioanna Moutafi, Myrsini Gouma, Giorgos Gavalas, Jill Hilditch, Céline Murphy, Kristen Mann, Ariadni Ilioglou, Marie Floquet, and all of Trench Nerd for the incredible knowledge and friendship they have given me. I apologise for anyone I have left out, know that you have my love and solidarity always. The thesis was a labour of love to express my deep connection to the Cyclades and its people. I exist because of the island of Paros and grew up playing in the ruins of Koukounaries. I hope that I have communicated some of the beauty, grandeur, mystery and importance of a place I consider home.

Introduction: The Emergence of Civilisation

i. Introduction: The Cycladic Early Bronze Age

Approximately five thousand years ago, at the margins of the Mesopotamian world, the island peoples of a dense and rocky archipelago began to transform the Aegean basin into a vast, canoe-based maritime network. Within roughly a millennium of the initial transition into the Bronze Age, the great palace systems of the Aegean began to materialise. In recognition of the vital role of the Cyclades in this process, Colin Renfrew, in his seminal book *The Emergence of Civilisation,* challenged both established narratives of the European Bronze Age as well as set a new standard for theoretical syntheses (1972 [2011]). The Cyclades formed the hub of the most complex and densely linked maritime interactions in the Aegean prior to the advent of the sail. Early Cycladic culture increasingly garnered renown and attention over the course of the twentieth century in no small part due to the virtuosity of the marble sculpting practices that flourished on the islands during the period. The elegant, simple and flowing forms of Cycladic figurines have been celebrated by modern artists, looted for contemporary art markets, and have captivated the attention of art historians and archaeologists alike with their enigmatic sophistication.

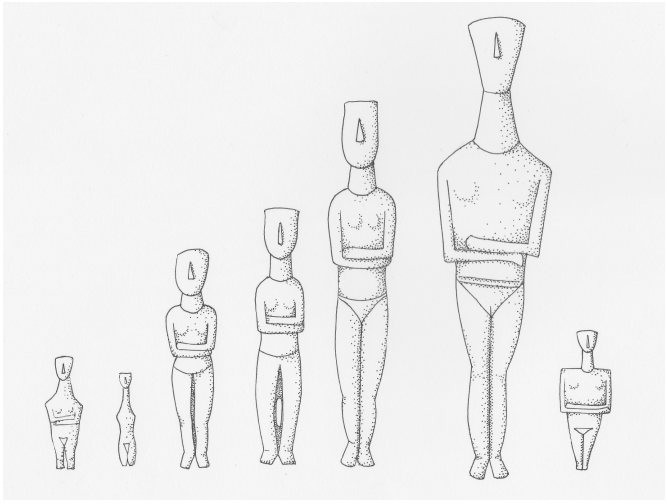


Figure 2: Varieties of Cycladic Folded-Arm Figurines (Drawing adaptation by Dr Céline Murphy).

Over the past six decades the mystery of the marble figurines has deepened with the growing realisation that the sculpting traditions were involved in regionwide rituals centred on the island of Keros (Renfrew et al. 2012; Renfrew 2013). Cycladic peoples congregated in their hundreds on the island, depositing ritualistically destroyed figurines and other materials in monumental acts of performance and festivity. From these ritual origins emerged an incredibly sophisticated architectural complex on the nearby promontory of Dhaskalio. Built in part with thousands of metric tonnes of imported marble (Dixon 2013), the site is a dense entanglement of buildings, halls, courtyards, promenades, stairways, and drainage systems on an inhospitable outcrop of rock. Materials were brought to Dhaskalio from across the region and intensive metal crafting occurred at the site (Renfrew et al. 2018a; Renfrew et al. 2018b; Bennet 2018). Keros is perhaps the most significant revelation in Aegean archaeology since the discoveries of Mycenae, Troy, and Knossos, a novel form of social complexity that prefigured the development of Aegean palatial systems.



Figure 3: Keros and the Minor Cyclades. After Renfrew et al. 2007: Fig 1

It is amidst this *kyklos*[1] of marble crafting, seafaring, and ritualism that we can reconsider how scalar transformations in social organisation, understood as spatio-temporal changes in magnitudes of activity, emerge. Humans are capable of coordinating social interaction across multiple scales such as households, kinship groups and regional communities. Such self-organising dynamics arise when heterogenous and disparate agents begin to form novel patterns of sustained interaction. The spontaneous ordering of social relationships is observable over time through evidence such as the cultural coherence of material assemblages, ritual congregations, shared narrative practices, as well as the creation and circulation of collective forms of value.[2] Cycladic sculpting traditions can be viewed as self-organising, form-generating processes best understood as an emergent patterning of bodily relationships which produced organisational coherence at multiple scales. To understand how Cycladic marble shaping coordinated the organisation of bodies at a regional level, it is critical to examine how the development of skill transformed the dynamics of social interaction. Ultimately, ritual centres such as Keros are emergent properties of the evolution and development of human social cognition, understood as the processes that enable people to perceive, understand, mediate and coordinate their intersubjective relationships. Specifically, this thesis examines how Cycladic intersubjectivity, understood as the recursive development of self-awareness and shared knowledge through social interaction, was intertwined with the shaping and circulation of marble.

[1] Κύκλος is the etymological root of cycle and Cyclades. The term literally translates to ring or circle, but also connotates circular movement as well as gatherings of people. Amongst the Classical Greeks, the Cyclades were perceived as forming a sacred circle around the island of Delos. Beginning with Plato, the term kyklos was used to conceptualise the political cycles of societies in terms of growth, decay and the cumulative effect of reciprocal causal processes (Shorey 1910).

[2] Value forms can be understood as those things which mediate social attention and activity in ways that generate shared knowledge about the meaning of the relationships in which they are embedded (cf. Graeber 2001, 2013).

Keros lies roughly at the hub of the canoe-based interactions that connected the major landmasses of the Aegean. Colin Renfrew first synthesised the evidence which showed that Cycladic seafarers were instrumental in developing the trade networks of the EBA (1972). Subsequently, Cyprian Broodbank's network analysis of the Cyclades revealed that the Minor Cyclades were situated at a technical and geographic confluence of Aegean EBA maritime movements (2000). The quantities and regional diversity of materials found on Keros attest to these connections (cf. The sanctuary on Keros and the origin of Aegean ritual practices, Volumes I-IV). The activities revealed at Dhaskalio-Kavos show that Cycladic communities were beginning to organise on a regional scale by the middle of the EBA in what Renfrew has labelled the "Confederacy of Keros" (2013). Sophisticated reproductions of the human form were destroyed and then ferried on voyages ranging between ten and potentially dozens of kilometres, to be deposited on a specific island. Renfrew describes the site as a "symbolic attractor" or location of ritual congregation which he considers the oldest known maritime sanctuary in the world (Renfrew 1987; Renfrew et al. 2012). Keros was undeniably a focal point of relationships on the islands that heavily influenced social interactions across the Cyclades.

This thesis will focus on the ways in which marble, and particularly Cycladic figurines, formed a critical part of an extended cognitive system that reshaped social interaction and organisation in the Aegean. The feedback generated between humans, marble and the Cycladic environment prefigured the emergent social complexity of the later Bronze Age.[3] Marble is an exceptionally dynamic pattern-generating material and its responsiveness to skilled engagement reinforces attentional focus. This capacity to transform perception and interaction was entangled with the development of the islanders' brains and bodies through intergenerational enskilment. Key aspects of Cycladic intersubjectivity emerged through the

[3] Feedback is the modification or control of a system through its own processes of cause and effect.

form-generating properties of marble. The shaping and circulation of the material provided a distributed and plastic cognitive architecture through which social relationships were experienced and mediated.

The evidence from Keros shows that marble forms helped to coordinate the social activity of thousands of humans across significant spatial and temporal scales. The development of Cycladic marble sculpting traditions over the course of roughly three thousand years reveals a relationship between long-term ecological change, scalar shifts in social organisation and the mediation of social cognition through material engagement. Cycladic sculpture can be explored as a means of integrating and mediating social relationships across multiple scales. By examining these relationships, this thesis hopes to contribute not only to the reframing of the study of social cognition, but also to give insight into rapid, self-organising scalar shifts in social complexity.[4] Such shifts can be understood as the emergent coordination and patterning of human relationships in relation to the density and intensity of energy-matter flows in the environment. It is hoped that this analysis will help to clarify the enigmatic relationship between marble and the Confederacy of Keros as well as provide insight into how humans are capable of generating complex ecological entanglements through the coordination of cognitive development and social interaction via material culture.

ii. Cycladica and Complexity

Since the early twentieth century, Cycladic culture has garnered increasing attention and prominence from both artistic and archaeological circles. Cycladic marble figurines have been celebrated as *objets d'art* for their minimalistic and highly stylised depictions of the body.

[4] This thesis considers complexity purely in terms of quantities of interacting elements, the energy density of these interactions and the scales at which they occur. Such considerations of organisational complexity should not be confused with cultural sophistication, nor interpreted as a qualitative judgement on a people's intelligence, value or importance.

This aesthetic valuation and social renown played no small part in the mass looting of Cycladic sites during the middle of the twentieth century. This catastrophic loss of context has enveloped these artefacts in mystery, with a small minority of all known forms having secure provenience (Gill and Chippendale 1993; see also Mathari et al. 2017; 2019). Our knowledge of Cycladic marble sculpture has been further hindered by the conceptual biases of traditional art historical and archaeological perspectives. For example, there has been concerted and, in the view of the author, erroneous attempts to identify individual "masters" based on stylistic similarities, reifying modern conceptions of lone artistic genius (Getz-Preziosi 1987; Getz-Gentle 2013).[5] Unfortunately, the relationship between experts, collectors and the art markets have not only incentivised looting, but have provided a veneer of legitimacy to the vast quantities of unprovenanced materials as well as exerted a corrupting influence upon scholarship by codifying speculation and unexamined assumptions within public discourse and curatorial practices (Gill and Chippendale 1993). In an attempt to sidestep the immense difficulties involving the looting and forging of Cycladica and the commensurate loss of archaeological knowledge, this thesis has strived to limit itself to examples of marble artefacts from secure archaeological contexts.

Archaeologists have largely interpreted Cycladic figurines in symbolic functionalist terms such as prestige goods, totems and charms (cf. Sotirakopoulou 2005, 71-72). Our understanding of Cycladic marble's role in the emergence of the Aegean Bronze Age has not only been heavily damaged by the historical relationship between Cycladic sculpture and modern concepts of value and prestige, but also distorted by a variety of philosophical assumptions about the material environment, individuality, symbolic cognition and social

[5] The concept of individual Cycladic masters will not be discussed further in this thesis. Given that humans have been capable of forging artworks by the likes of Giacometti, Renoir and Vermeer, it is highly suspect that similarities in six thousand year old sculptures can be used to discern the authorship of an individual. For more detailed critiques see Gill and Chippendale 1993.

interaction. The virtuosity of Cycladic sculpting that flourished some five thousand years ago is an enigma not only because of catastrophic looting, but also due to epistemological frameworks that separate humans from their environments.

This work addresses three primary dichotomies in academic thought: the dualisms of mind and matter, nature and culture, the individual and the social. In order to reconsider the relationship between human social complexity and life on earth I stake out three major ontological commitments: 1) that human cognition develops primarily through social interaction, 2) social interaction is fundamentally structured by material culture and 3) materials are energetic processes which pattern the development and organisation of cognition.

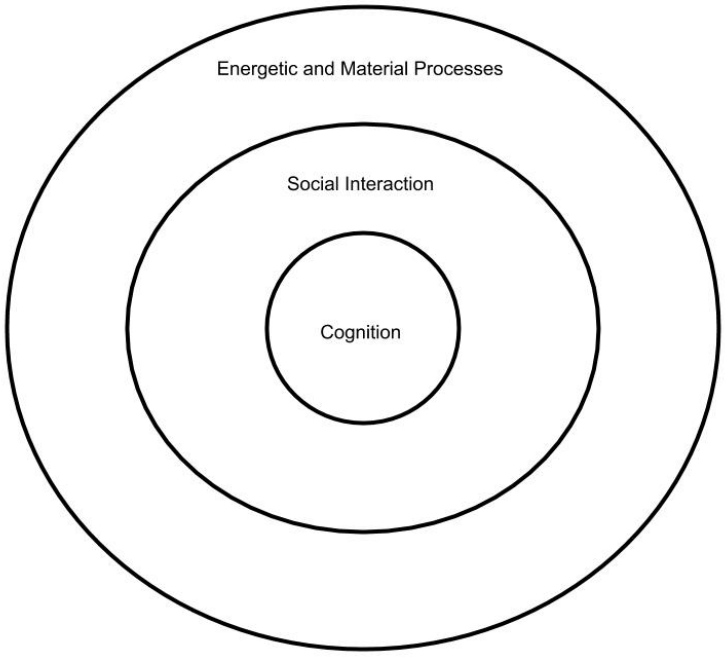


Figure 4: Nexus of Cognitive Development

I have attempted to target what I consider to be three structural relationships in the western philosophical tradition that have heavily distorted our ability to conceptualise the interdependence of self, other and world. Specifically, I will critique the scientific tradition of methodological individualism and its origins in Cartesian dualism. In contrast to conceptualising form as an essential, hypostatic unity of being, I have sought to adopt a process

ontology that prioritises becoming over being (see Graeber 2001, 49-54; Gosden and Malafouris 2015). I attempt to provide a robust methodology and explanatory framework for investigating the complexity of human environmental relationships, as well as to provide insight and clarity into the monumental transformations of the Aegean Early Bronze Age. By synthesising MET with evidence from cognitive science, neuroscience and the Cycladic archaeological record this thesis seeks to demonstrate how cognitive development and social organisation are ongoing ecological processes which subvert traditional mind-matter, nature-culture dichotomies. The various forms of evidence used in this thesis synthesise effectively to address different scales of interaction which reveal coherent developmental processes in the emergence of prehistoric Aegean social complexity.

iii. Complexity: Social or Otherwise

In *The Emergence of Civilisation*, Renfrew offered an endogenous explanation for the development of Bronze Age social organisation in the Aegean through the novel application of systems theory. Originating from first- and second-order cybernetics of the period,[6] *Emergence* is one of the great works of early systems thinking, and one of its first major applications in the social sciences. The book is undoubtedly a product of its era, and both evidence and theory have progressed beyond the original text in critical ways. In keeping with the systems thinking of the time, *Emergence* conceptualised systems dynamics in terms of strongly bounded yet interacting subsystems. Renfrew divided his analysis into five interacting subsystems which reflected traditional categories and concerns of the social sciences: subsistence, technological, social, projective/symbolic and trade/communication (1972 [2011], 22-23). The emergence of

[6] First order cybernetics emerged in the middle of the twentieth century as a means to study control, communication and organisation in technical and biological systems. Second order cybernetics began to emerge in the late sixties as an application of cybernetic thinking to the discipline of cybernetics itself, thus emphasising recursiveness in observer participation, circularity of design, self-referentiality and self-organising dynamics.

novel complexity from these interacting subsystems was understood to result from a "multiplier" effect in which:

> *Changes or innovations occurring in one field of human activity (in one subsystem of a culture) sometimes act so as to favour changes in other fields (in other subsystems). The multiplier effect is said to operate when these induced changes in one or more subsystems themselves act so as to enhance the original changes in the first subsystem.* (Renfrew 1972 [2011], 37)

The multiplier effect was conceived of as a self-reinforcing interaction between two or more subsystems undergoing internal positive feedback, generating innovation and the expansion of these processes which resulted in novel emergent behaviour. Regardless of the ground-breaking perspective that *Emergence* offered at the time of its publication, Renfrew conceptualised culture as a system of isolable component processes in which human societies take on the characteristics of complicated machines.

Renfrew of course appreciated the great complexity of cultural systems and acknowledged that placing spatial boundaries on these systems was ultimately arbitrary. Nonetheless, Renfrew's ontological framework understood cultural complexity as a result of the connections formed between people, artefacts and nature, enabling subsystems to be defined as the networks created by the interconnections of these strongly bounded phenomena (1972 [2011], 20-21). In this way, *Emergence* conceptualised social complexity as the connections and interactions between nodes formed by people and objects in the world. Material culture was described as an insulator and mediator between human beings and the environment. This perspective created the foundational dichotomy of the work, carving up a "natural" non-human world and the cultural world of humans where interactions between individuals, artefacts and natural objects could therefore be conceptually isolated into subsystems. The key assumption was that minds, bodies, artefacts, and the non-human world are fundamentally distinct phenomena with unique causal properties that emerge through interactions between these discrete entities.

Emergence largely divides material culture into two separate components, the technological and the symbolic, reflecting a distinction between an external pragmatic reality and internal cognitive sphere of symbolic/projective relationships. Likewise, cognitive systems are categorised separately from social systems which are defined as a distinct arena of "patterned interpersonal behaviour" (Renfrew 1972 [2011], 22). Thus, environment, society, and the mind are bifurcated with technics and symbols whose differential operations define the behaviour of subsystems such as subsistence or trade and communication.

This thesis takes its inspiration from the course first charted by *Emergence* and explores the self-organising dynamics that generated social complexity in the Cycladic EBA. The perspective put forward here accepts Renfrew's general thesis that the organisation of human societies can be effectively analysed and described in terms of systems. In these regards, this thesis attempts to assess fundamental patterns of energy and matter flows in the prehistoric Aegean and how patterns of self-organising feedback generated new interactions between people and their environments. Forty years of theoretical developments across multiple disciplines helps to provide a significantly different framework of analysis. Broadly, it is possible to reconsider the dynamics of the Early Bronze Age from the perspective of Complex Adaptive Systems (see Schoep and Knappet 2004). A basic definition of a CAS is "an ecology of interacting agents… moving on some complex dynamical network, and indeed their own actions and evolution may themselves affect the network's structure and future evolution" (Johnson 2009, 213). Compared to the systems thinking of the nineteen-seventies which emphasised homeostatic regulation between independent subsystems, complex adaptive systems emphasise the non-linear and self-organising properties of emergent dynamics. Instead of discrete *subsystems* operating on a two-dimensional plane, systems are seen as nested processes operating across multiple scales of interaction (Gunderson and Holling 2002). Cultures, rather than being constituted by distinct but interacting spheres of human activity and

experience, can instead be viewed as an entanglement of energetic and material dynamics.[7] In these regards, "order in an adaptive system need not be linear, hierarchical and externally imposed – order can also result from non-linear, non-hierarchical processes that are entirely self-regulating" (Schoep and Knappett 2004, 22). The organisation and behaviour of a system is not determined by initial conditions but emerges through the novel interactions generated by constituent elements in a historical process.

To understand the development of Bronze Age social complexity it is necessary to understand how non-linear interactions between a heterogenous mix of peoples, materials and ecosystems produced novel interactions and emergent behaviour. At the theoretical core of this thesis is a reconsideration of "mind" as emergent cognitive systems that develop through embodied and ecologically distributed interactions. Utilising the framework of Lambros Malafouris' theory of Material Engagement (2013), this work reconsiders the emergence of social complexity in terms of the feedback generated between the developmental plasticity of human bodies and the material plasticity of the environment.[8] Rather than seeing a world divided into environmental, social and cognitive subsystems, this thesis understands human complexity as emerging from neural systems nested within bodies that are nested in societies that are nested within ecologies of diverse material agents. The multiple and nonlinear forms of energetic and material feedback produced through human activities generates causal spreads across evolutionary, developmental, and ecological scales that subvert any easy distinctions between cognitive, social, and environmental processes. This thesis offers a description of the emergence and transformation of human social complexity that is coherent across

[7] The concept of Entanglement (following Hodder 2011a; 2011b; 2012; 2014) is as a description of material phenomena which recognises that the elements of a system and their causal effects cannot be described independently from one another and the system as a whole.

[8] Emergence is understood as a process in which lower order phenomena are organised into more complex wholes that exhibit properties and behaviours which are not reducible to component properties nor predictable from starting conditions.

developmental and evolutionary timescales by reconceptualising the ontological foundations of mind and matter as interdependent, mutually constitutive relationships of process and flow.

iv. The Material Engagement Approach

Reconsidering social complexity and the relationship between mind and matter as an energetic entanglement of developmental, cultural, ecological, and evolutionary processes supports the application of Material Engagement Theory to the field of social cognition. Renfrew made the initial case for a theory of material engagement to examine the ways in which human cognitive processes are mediated though material culture (2001; 2004). Taking up this disciplinary challenge, Renfrew's student Lambros Malafouris formulated the tenets of Material Engagement Theory (2013). Material Engagement Theory approaches the philosophy of mind with the material and temporal perspective of archaeology. Drawing from the insights of 4E cognition (Newen et. al. 2018),[9] one can understand the mind to extend into material culture as "extra-neural" structures which transform the spatial and temporal features of cognition. By altering the ecological dynamics in which behavioural and neural development occurs, material culture enables human beings to manipulate variable scales of organisation ranging from individual ontogeny to social and evolutionary processes. In this view artefacts are "capable of transforming and rearranging the structure of a cognitive task, either by reordering the steps of a task or by delegating part of a cognitive process to another agent" (Malafouris 2013, 247). Because artefacts have different rates of entropy based on their material properties, they enable human beings to engineer their epistemic environments across

[9] 4E cognition is comprised of Embodied (bodily structures and processes that shape cognition), Embedded (cognition is environmentally situated), Enactive (cognition is constituted through activity) and Extended (cognition is functionally and structurally distributed into the environment) approaches to the mind.

multiple generations and vast spatial scales. A focus upon material culture thus makes it possible to bridge the developmental and evolutionary dynamics unique to human cognition.

Material culture is an ecological intervention that reshapes the human developmental environment, producing feedback that alters cognitive dynamics. Material Engagement Theory explores cognition and material culture as "constitutively intertwined" developmental processes (Malafouris 2013, 77). The unique properties of human development are seen to generate ecological feedback that enables complex cognitive phenomena to emerge through non-linear dynamics between brains, bodies and materials. In this sense the "weaving of brain and culture is not just the way by which one influences and constitutes the other; rather, it is the way they exchange properties by crisscrossing different temporal scales of activity (neural, bodily, or cultural)" (Malafouris 2015b, 360). The external environment forms a vital, reconfigurable part of the mind's cognitive architecture. In other words, "minds and things are continuous and inter-definable processes rather than isolated and independent entities" (2013, 9). This interdependence illuminates how MET conceptualises the mind as a cultural artefact in a developmental continuum with human evolutionary ecology. From this perspective, the archaeological record can be seen as the preserved remains of a cognitive feedback loop.

Critical to MET's understanding of material culture as part of an evolutionary-developmental continuum are the ways in which artefacts can have neuroplastic effects upon the brain. In these regards, the human ability to manipulate ecological configurations of brains, bodies, and material things hinges upon the plasticity of matter. Human developmental processes are generated through embodied relationships and interventions with an animate non-human world. Material culture actively integrates conceptual dynamics with perceptual processes, providing the ability to stabilise, project, and manipulate thought in the external environment (2013, 105). By reconfiguring the physical environment and externalising their cognitive architecture, human beings afford greater collaboration with each other both spatially

and temporally. Such material scaffolding allows for the development of greater complexity by preserving the activity of previous generations. It should be clear why such a framework provides a powerful means of assessing the emergence of the Bronze Age and gives explanatory clarity to the relationship between human cognition and social complexity. If human cognitive systems develop through material culture, then the radical changes in material culture generated during the Bronze Age ipso facto mean radical changes in cognitive development. When we look at the various signs of social complexity in the Bronze Age, we observe emergent cognitive phenomena, not epiphenomenal expressions of hard-wired cognitive or genetic tendencies.

MET is comprised of three key concepts: extended mind, material agency and enactive signification. Material agency describes the ways in which the physical qualities of specific kinds of matter afford and constrain interactive possibilities (cf. Knappet and Malafouris 2008). As is obvious, the interactive properties of stone are different from wood or clay. However, this can also be appreciated in terms of synergetic interactions between different material properties that produce complex environmental dynamics such as seafaring. What is critical from a MET perspective is that the properties of materials feedback into the cognitive system to shape the development of skilled practice. The concept of material agency has powerful implications upon both the functional and structural architecture of the brain. Recent fMRI and PET studies have shown significant neuroplastic effects from habituated skills. These results include increases in grey matter in the visual-spatial and motor tracking centres of the brain with juggling (Draganski et al. 2004), decreases in brain areas dedicated to fine motor control in accomplished musicians (Münte et al. 2002), and the hippocampal enlargement of London taxi drivers (Maguire et al. 2000). Such evidence is indicative of the profound influence of material culture upon human ontogenetic development across archaeological timescales.

As humans learned to access new forms of matter such as flint, clay, copper and tin, the various material agencies of things generated novel forms of developmental feedback. The properties of matter have emergent qualities in terms of synergetic and often non-linear interactions between different materials. For example, one can consider the embodied skills of learning to work wood as well as the synergetic interactions of wood and water to create whole new interactive possibilities and associated abilities. Related to this material agency is the concept of enactive signification in which the material semiotics of artefacts are understood to substantiate, stabilise and mediate meaning-making activities beyond just representational and linguistic processes. Rather than viewing thought as the transference of propositional content, the enactive sign explores how cognition is structured by non-representational semiosis that supports embodied action (2013, 90). Malafouris explains, "To interpret the material sign is not to provide a verbal substitute for it; rather, it is to become habituated with the interactive possibilities and consequences of its performance in context… material signs do not represent; they enact. They do not stand for reality; they bring forth reality" (2013, 118). Thus, something like the prestige goods of a Bronze Age warrior do not represent status so much as they substantiate status and enact a host of relational behaviours (Malafouris 2008b). From this perspective, the transformations in material culture during the Early Bronze Age transition created new, enactive semiotic processes through which emergent forms of social organisation were navigated and habituated by communities.

For MET, what draws together the relationship between material agency, enactive signification and the extended mind is the thesis of "metaplasticity." This concept can be understood as the emergent properties created by feedback between neural, cultural and material plasticity (Malafouris 2009; Malafouris 2010a; Malafouris 2015b). Malafouris argues that the "hallmark of human cognitive evolution is metaplasticity - that is, ever increasing extra-neural projective flexibility that allows for environmentally and culturally derived

changes in the structure and functional architecture of our brain" (2013, 241). Through the manipulation and alteration of the environment, human beings reconfigure the demands placed upon their cognitive abilities, therefore altering behaviour and material engagement over time. The plasticity of the human brain synergises with interventions in the environment to provide scaffolding upon which additional complexity can accrue without the need for positing radical structural changes in the human brain or genome. Thus, Material Engagement Theory understands the archaeological record as a co-evolutionary phenomenon in which the human ability to reconfigure its cognitive environments has produced ecological feedback, affording new possibilities of thought and action that potentially lead to greater complexity and diversity. It is the synergy between material agency, enactive signification and the extended mind that gives material culture it's uniquely potent cognitive dimensions.

Through material culture, human beings entangle nervous systems and bodies into the energetic and material flows of their environment, creating the possibility for extremely dense and synergetic feedback. Therefore, "constant transformation of what is out there to be perceived facilitates further projections. Over time, these projections may construct a creative ecology of recursiveness and metacognition" (Malafouris 2013, 193). It is with the concept of metaplastic feedback that it is possible to explore the unique properties of human "ontogenetic" or developmental niche construction and the way in which "evolution is not just change in gene frequencies but change in the entire spectrum of developmental resources" (Malafouris 2010a, 52). An emphasis on metaplasticity also enables analysis to scale beyond a focus on individual cognitive development to examine ecology, ontogeny and sociality as co-evolutionary environmental structures; niches comprised of intense metaplastic feedback. In this sense, culture is conceptualised as an extended cognitive system that is scaffolded from the energetic flows of its environment. In this way, human development is understood as inherently constructed, cognitive, social, ecological and evolutionary.

An important criticism of Material Engagement Theory has been that "the scale of analysis is confined to the proximate" (Knappett 2014, 157). That is to say, MET analysis has tended to focus on the cognitive relationship between individuals and materials. This thesis attempts to remedy this issue by showing that MET provides a framework for reconsidering social cognition, providing a great deal of explanatory power to descriptions of human social complexity. As this research is primarily a theoretical elaboration of MET, the thesis draws upon a wide array of disciplinary and theoretical approaches and is substantiated through a broad array of archaeological data, experimental evidence, cognitive science and neuroscience as well as phenomenological observations derived through personal engagement with marble, excavating on Dhaskalio, and an examination of numerous sites and assemblages from the early Cyclades.

v. Structure and Methodology of This Thesis

This thesis is organised around several scalar, conceptual and chronological themes. After introducing and contextualising the theoretical perspective and philosophical purpose of this research, I apply the analytical framework of MET to a case study on the role of marble in the development of the Cycladic EBA. The aim of this analysis is to provide a strong, logically valid explanation for the emergence of the ritual deposition of marble on the island of Keros through a MET approach to social cognition. The thesis is divided into three sections. After providing the theoretical and archaeological background in the first section, the second section deals primarily with the application of MET's conceptual framework of material agency, enactive semiotics and extended cognition to the subject of Cycladic marble sculpting, followed by the concluding section.

Each chapter approaches social cognition from distinct analytical scales to assess specific organisational dynamics. The first chapter provides a theoretical critique and

examination of the relationships between the evolution and development of social cognition and the role of the material environment. Moving from this broader evolutionary perspective, the thesis then focuses in on the three-thousand-year development of Early Cycladic society. I chose this period because it involves no major evolutionary changes in the brain, but robust cultural transformations help to illuminate the material dimensions of social cognition along intergenerational timescales. Chapters two through five are each chronologically structured around the major epochs recognised by Aegean prehistorians in order to provide both narrative coherence as well as emphasise developmental priority and subsequence in the material record. The second chapter provides an overview of the broad ecological, settlement and maritime patterns to assesses the energetic and material flows through which Cycladic society was organised. The chapter concludes that the evidence suggests Cycladic sculpting emerged as a form of kinshipping technology that helped mediate the complexity of Early Bronze Age social dynamics.

Following the background context laid out in chapters one and two, chapter three narrows its analytical focus to the relationship between cognitive development and the properties of marble in terms of stylistic changes observed in Cycladic sculpting traditions over their entire duration. The development of individual and intergenerational skill is assessed through an investigation of the properties of marble in relation to the broad typologies and chronologies of Cycladic figurine production. This examination draws from experimental studies on Cycladic sculpting, phenomenological observations from personal engagement with marble shaping, and evidence from neuroscience and cognitive science on perception and attention as regards bodies and intersubjectivity. The chapter concludes that Cycladic figurines were highly effective for capturing individual and shared attention, thus providing a significant scaffold for the development of Cycladic intersubjectivity. Moving forward from this tight focus on the relationships between marble and individual cognitive development, chapter four

provides an analysis on the relationships between Cycladic marble, semiotics of value and social interaction based on the mortuary and settlement evidence of the EBA. The chapter concludes that the semiotic relationships of Cycladic marble artefacts suggest they were a locus of value through which kinshipping dynamics could be conceptualised. Chapter five then examines the relationship between value, kinship and gifting dynamics during the ECI-ECII transition, concluding with a critique of the concept of a "prestige economy," particularly as it applies to the circulation of the Folded-Arm Figurines.

The sixth chapter concludes the case study on the Cyclades by synthesising the preceding analysis of the developmental, social and ecological dimensions of Cycladic sculpting, and the perceptual and semiotic properties of Cycladic marble to assess the emergence, floruit and decline of the ritual complex at Dhaskalio-Kavos. This examination of Keros draws from archaeological data generated by the site as well as personal experience excavating there and exploring the surrounding environments. The chapter argues that the ritual activity on Keros functioned to organise long-range voyaging regimes during the Keros-Syros period, and likely played a significant role in the development and expansion of the subsequent Kastri culture. The thesis concludes by recapitulating the theoretical position of the thesis while considering the further development of Material Engagement Theory and its application to issues of social cognition and social complexity.

vi. Social Complexity Without Losing Your Marbles

If human social complexity is to be understood in terms of complex adaptive systems, then these systems emerged through the relationships between developing brains, bodies, novel materials and the ecological interventions that generate long-term cultural change. This thesis explores social complexity as inherently an issue of social cognition or the way in which humans think about and with each other. Examining the self-organising feedback generated

through the development of bodies and the material environment allows for an analysis of scalar transformations in human societies as emergent properties of cognitive systems that breaks down dichotomies of mind, society and environment.

As we will see, it was through the Cyclades that the prehistoric Aegean was bound together into patterns of local, regional and global feedback that transformed the boundaries of social cognition and interaction. As Neolithic island communities transformed into Bronze Age seafaring polities scattered across the islands, they set in motion patterns of voyage, artisanship, maritime ritual and social identity that prefigure the Aegean's later history in astonishing and profound ways. When Aegean peoples began to generate the first metallurgical economies, scales of interaction and anthropogenic changes to the environment began to rapidly intensify. Cycladic islanders reshaped the flow of energy and matter between mainland Greece, Anatolia and Crete. Relational transformations in Cycladic identity and community were expressed and conceptualised through marble over a period of roughly three thousand years, extending from the Late Neolithic through to the beginning of the Middle Bronze Age. Cycladic society, in the millennia immediately prior to the emergence of the first Minoan palaces, presents a particularly useful case study of socio-cognitive reorganisation. No longer Neolithic but not yet exhibiting the organisational complexity of Bronze Age city states, the islanders of the central Aegean developed a coherent system of regional interaction that was mediated, in part, by the properties of marble and ritual activities on the island of Keros.

Chapter One: Metaplasticity and the Boundaries of Social Cognition

1.1 Introduction: Social Cognition and Social Complexity

The ability to organise cooperative behaviour at emergent scales has led the evolution of gracile apes to develop into a geological event. These are the insights of the current, if somewhat late dawning, debate on the "Anthropocene" (Smith and Zeder 2013). The recognition that humans are affecting the biosphere at enormous magnitudes plays havoc with traditional conceptions of agency, intentionality, and humanity's relationship to the environment (Chakrabarty 2009). The great predicament of the twenty-first century is that human material culture is driving non-linear transformations in planetary ecology, permanently altering life on Earth. Human evolution has resulted in a capacity to manipulate and transform the material environment in ways that now threaten the continued existence of the species. Facing the very real threats of systemic collapse and extinction require an understanding of how human socio-technical systems emerge, self-organise and impact ongoing developmental processes.

At the core of this wicked problem is a question of how human social interactions, identities, intentions and institutions emerge through and are shaped by the material environment. The profound complexity of the current historical moment has led to a growing awareness that material relationships have been radically undertheorized in academia (Latour 2007; Ingold 2007b; Hicks 2010). It is in the context of this growing discourse, that Material Engagement Theory (MET) has been put forth as a means of resituating the ontological foundations of the mind around the cognitive-developmental feedback generated through material culture (Malafouris 2013). Specifically, the thesis of "metaplasticity" argues that feedback between neural, cultural and material plasticity produces emergent cognitive systems which are made visible through the archaeological record (Malafouris 2008a, 2009,

2010a, 2015b, 2016b). This chapter puts forward a synthesis of MET with enactivist approaches to social cognition in order to investigate the diversity and scalar plasticities of human societies made possible through the non-linear interactions of emergent cognitive systems.

The human record reveals an immense heterogeneity and malleability of human socio-cultural relationships. Human sociality exhibits what might be described as intersubjective plasticity, an ability for individuals and groups to adopt and transition between numerous social identities and behaviours at a variety of scales with profound rapidity and flexibility (see De Landa 1997; Gunderson and Holling 2002; Christian 2011; Stirner et al. 2012 for examples of these dynamics). Developments such as the reorganisation of social, economic and political relationships in a city of millions over the course of months if not days (Aston 2017), feudal societies transforming into nation states (Anderson 2016), the reconstitution of indigenous identities, communities and polities following European epidemics (Richter 2003) and the emergence of Mediterranean maritime societies (Broodbank 2013) are all powerful examples of the scalar plasticities of human social interaction. Even in the depths of prehistory, it is clear that modern humans were capable of significant "releases from proximity" (Gamble 1998), and their seasonal dynamics of aggregation and dispersal indicate a great deal of social and political creativity (Wengrow and Graeber 2015). However, despite the incredible diversity and intricacy of human social interaction, the general acceptance of cognitivist frameworks[10] in the science of the mind has produced a description of intersubjectivity from a third person perspective (De Jaegher et al. 2010; Gallagher 2017, 65-82). Traditional analysis of social cognition emphasises a strong distinction between self and other that is primarily experienced as reasoning about other people's behaviour. Likewise, the internalist and representational

[10] Cognitivism is the theoretical synthesis of computationalism, informational processing and representational content in cognitive science and philosophy of mind.

commitments of cognitivist models also generate an epiphenomenal view of material culture (Garofoli and Iliopoulos 2017). In these regards, the development of modern cognitive science, and computational theories of cognition are inherently structured around the dichotomisation of mind and environment, the individual and the social.

Cognitivist frameworks lead to significant issues when confronted with the observed scalar shifts in hominin[11] social organisation due to the representational burdens and information processing bottlenecks that such scalar changes imply for computational models of the mind.[12] Recently, partially in an attempt to grapple with these scalar changes, a number of papers have applied distributed, embodied and enculturated models of cognition to the social intelligence hypothesis (cf. Dunbar et al. 2010a). Such papers progress a view of Palaeolithic minds with internally evolved symbolic content[13] that were increasingly distributed into material culture so as to enable increased social cohesion and extension (e.g. Gamble 2010). However, if artefacts are merely an extension of cognitive processes originating from inside the head, this would mean that the cognitive properties of material culture are limited to a set of pre-evolved representational abilities. This vision of neural evolution implies that human cultural diversity results from an underlying homogeneity in the information processing abilities of pre-programmed Stone Age minds.

This chapter argues that the social intelligence hypothesis, which argues that human cognition and social complexity generated a co-evolutionary spiral, has traditionally rested upon a number of metaphysical assumptions that severely hamper its description of intersubjectivity and material culture. Principally, these shortcomings result from an

[11] This thesis follows the contemporary distinction between Hominid as the taxonomic family that includes all the Great Apes, and Hominin to refer to the specific lineage of the genus *Homo*.

[12] For example, Dunbar's number, which posits a cognitive processing limit that constrains effective and stable social relationships to group sizes with an upper limit of 150 persons (Dunbar 1992).

[13] Content is a mental state such as a belief or intention that represents an aspect of the world.

assumption that information transmits content (see Hutto and Myin 2013), a ubiquitous developmental teleology that is built upon Theory of Mind (e.g. Stone 2006), an evolutionary teleology that originates from representational apriorism[14] (Garofoli 2017) and the dichotomisation of social and ecological pressures (Sterelny 2007). The assumption in mainstream cognitive science that the brain evolved to extract information with which to run computations over representational vehicles leads to a neurocentric view of the mind focused upon mental content. This framework poses serious difficulties when considering the diversity of human socio-cultural systems and the scalar plasticities of human social organisation such as fission-fusion dynamics, kinship structures, sedentism and urbanisation.

From a cognitivist perspective, the stabilisation of brain size presents an informational bottleneck in terms of group size (Dunbar 1992). Similarly, at the developmental scale, the representational load suggested by Theory of Mind quickly leads to an iteration of the "frame" problem in which the demands of representing the beliefs and intentions of social actors become overwhelming recursive processes in any large and densely connected society (see Gallagher 2017, 86-87). Thus, informational bottlenecks at the evolutionary scale are mirrored by recursive representational burdens at the developmental scale.[15] This evolutionary teleology that moves from brain to representation to Theory of Mind compresses the complexity and diversity of human relationships into a standardised suite of cognitive processes adapted to domain-specific evolutionary pressures of which human culture is a result (see Iliopoulos and Garofoli 2016 for a critique of modular cognition). In this view, hand axes, societies and

[14] Representational apriorism holds that material culture is a derivative of pre-existing symbolic processing abilities in the evolution of the brain.

[15] To frame this in terms of the Early Bronze Age, Cycladic islanders at the height of their cultural floruit would have had to navigate a social landscape comprising thousands of people distributed amongst homesteads, hamlets, and villages on the islands, as well as numerous communities from the wider Aegean, often living in substantial settlements of thousands of people such as Manika and Troy. The sheer quantity and complexity of possible social interactions and relationships in which Cycladic islanders could potentially engage clearly exceeded the ability of any individual to mentalise these relationships as propositional content about conspecifics.

anthropogenic climate change are all just by-products of the human brain's representational abilities.

Instead of defining symbolic processing as the starting point and Theory of Mind as the expected cognitive outcome of these processes, it is more fruitful to explore how social relationships are formed, sustained and modified as ongoing interactions at various temporal and spatial scales. In these regards, enactivist approaches to social cognition which examine the self-organising dynamics that emerge through embodied interactions provide particularly useful frameworks for understanding the scalar plasticity of social cognition (e.g. De Jaegher and Di Paolo 2007; De Jaegher et al. 2010; Froese and Fuchs 2012). De Jaegher et al. have defined social interaction as "a co-regulated, self-sustaining pattern of joint activity" (2010, 443). From this perspective, emergent social complexity can be understood as the coordination of social interactions at new scales. However, highlighting the coordination of social behaviour leads to questions about how developmentally novel relationships are capable of being conceptualised at the outset. That is, in order to consider social institutions such as nationality, clan or religious community as real, existing relationships in which one participates, one must first experience these concepts as substantiated realities (Renfrew 2001). Such a consideration thus requires an examination of the evolution and development of hominin societies in the context of long-term ecological and cultural change. Enactivist accounts have focused primarily on dyadic relationships over the course of fairly limited temporal scales, usually those of childhood, or brief interactions between adults. By emphasising the self-organising properties of social interaction over long periods of cultural change, it is possible to appreciate how material engagement generates non-linear dynamics in the emergence of hominin cognition and sociality.

MET's focus upon material-culture as an integral feature of cognition provides an understanding of how scalar changes in social interaction are generated through epistemic

engagement with the material environment. In this way, the unique evolutionary and developmental properties of human social cognition can be explored as a dynamic relationship between the energetic and material flows of the ecosystems in which hominins have emerged. From a Material Engagement perspective, three key issues stand out for the study of social cognition: firstly, the diverse and complex effects of the material histories involved in a specific social context; secondly, the phenomenological dimensions of how social interaction is experienced and preformed through material culture; and finally, the ways in which material culture produces semiotic meaning in its own right without resorting to a priori propositional content.

After a review of the intellectual history of the Social Intelligence Hypothesis and Theory of Mind, this chapter will consider social intelligence through the frameworks of Niche Construction Theory (NCT), Enactivism and Material Engagement Theory. NCT explores the ways in which organisms shape evolutionary processes through modification of their environment whereas Enactivism argues that cognition emerges through dynamic interactions in the environment. These perspectives will be synthesised through the material culture focus of MET in order to examine the ways in which contemporary ontogenetic evidence and the early hominin archaeological record imply the existence of a coevolutionary relationship mediated between eyes, hands and material objects in social contexts. Through the application of the concept of metaplasticity to enactive models of social cognition, this chapter explores how human beings think through the heterogeneity and recursiveness of their social relationships and generate communities at new scales through their material cultures. This enactive, material engagement approach to social cognition seeks to counter the logics of representational apriorism and the epiphenomenal treatment of culture in cognitivist models. In contrast, this argument emphasises developmental processes by considering material culture

as a constitutive element of dynamically embodied and distributed cognitive systems that shape a continuum of evolutionary, ontogenetic and ecological relationships.

1.2 The Matter of Social Cognition

The Social Intelligence Hypothesis (Humphrey 1976; see Emery et al. 2007 for a review) and Theory of Mind (Premack and Woodruff 1978; see Schlinger 2009 for a review) have a shared intellectual history that has dominated theorisation about social cognition at both evolutionary and developmental scales. The concept of social intelligence began to take firm hold when Nicholas Humphrey used a metaphor of chess and social relationships to describe the mechanism that drove the evolution of the human brain as a process of advantage seeking competitive interactions within group living contexts (1976). Two years later, as they sought to test the mental states that chimpanzees could infer in others, Premack and Woodruff established the concept of Theory of Mind as the ability to understand beliefs and intentions from multiple perspectives (1978). The confluence of the two frameworks led to the development of the Machiavellian Intelligence Hypothesis, a theory that the human brain emerged through a co-evolutionary spiral driven by social competition over the ability to infer mental states and manipulate behaviour through benefit maximising calculations (Byrne and Whiten 1988; Whiten and Byrne 1997). Recognising that not all features of human cognition were adequately explained through social pressures, this line of inquiry also led to the articulation of the technical intelligence hypothesis, the argument that brains evolved partially through a selection process that favoured procedural cognition (Byrne 1997). It is this intellectual history that has largely defined the description and analysis of social cognition for nearly half a century.

The most widely renowned iteration of social intelligence is undeniably the Social Brain Hypothesis, which postulates that brain size increased to handle dense and complex

information (primarily linguistic) flows between conspecific hominins (Dunbar 1998). In more recent years, theorisation around the Social Intelligence Hypothesis has expanded to include enculturation (Moll and Tomasello 2007; Herrmann et al. 2007), Niche Construction (Sterelny 2007) and the contemporary flourishing of 4E approaches to cognition (Grove and Coward 2008; Coward and Gamble 2008; Dunbar et al. 2010a; Dunbar et al. 2010b; Gamble et al. 2011; Gowlett et al. 2012; Coward 2016). Common to the many iterations of the Social Intelligence Hypothesis is a tacit, often explicit assumption that Theory of Mind is the definitive characteristic of mature human intersubjectivity. Both frameworks assume methodological individualism as the appropriate level of analysis for social cognition and accept the unobservability of the mind as well as representational content as definitive of cognitive processes. Thus, social cognition has been conceived of as the ability to observe and predict the beliefs and intentions hiding inside other people's heads, thereby promoting a view of social relationships as an aggregate of calculations between individual brains. However, there is good reason to suspect that such cognitivist frameworks form a type of late twentieth century "Ptolemaic system" that obscures and distorts the relationship between mind and matter.[16]

Social Intelligence and Theory of Mind are both rooted in the cognitivist view of the mind that emerged through the convergence of information processing theory and computability theory (see Piccinini and Scarantino 2010; 2011) which reconceptualised the mind in the "image of the digital computer" (Malafouris 2013, 26), otherwise known as computationalism. Despite the different disciplinary backgrounds, compatibility between information processing, computation and representationalism has been largely presumed (Piccinini and Scarantino 2010) and constructed around numerous metaphysical assumptions

[16] Ptolemy's system, the dominant heliocentric model of the universe from the second century AD until the Copernican revolution, was mathematically consistent and exhibited a relatively high degree of predictive accuracy as regards astronomical observations.

about the internal, content bearing nature of the mind (Hutto and Myin 2013). The polysemic relationships between representation, information and computation pose serious questions about the compatibility of information theory and computationalism that are often underexamined.

Information theory developed as a way to statistically model communication within engineered systems in regard to the fidelity, transmission, feedback and reproduction of a signal (Shannon 1948).[17] This theoretical view has led to the dominant scientific tendency to conceptualise information as an independent variable that circulates "unchanged among different material substrates" (Hayles 1999 quoted in Knappett 2004, 43). In contrast, computationalism was conceived of as a way to model cognitive processes using the logical calculus pioneered by Alan Turing and the computability theorists for the formalisation of large data sets (McCulloch and Pitts 1943). Computationalist frameworks assume that the brain is *the* cognitive system which operates by performing computations, that is, processes that determine outputs based on inputs that are manipulated according to rules defined over the appropriate vehicles (Piccinini 2009). It is completely possible to model brain activity mathematically in this way; the problem comes when these dynamics are conceived of as the processing of representations which act as "information-bearing structures" (Pitt 2018). A metaphysical leap is made by assuming that perceptual inputs from the environment which covary with neural patterns in the brain (measurable as Shannon information) are transformed via computational processes into representations about the world. This is the so-called "hard problem of content" which states that covariance between external environmental and internal neural states are not sufficient evidence for the existence of representational content (Hutto and Myin 2013, 57-82; Garofoli 2017, 8-11). In the context of the contemporary study of social

[17] In the technical sense, "Shannon" information is constituted "qua selectable, physically distinguishable structures associated with given probabilities" (Piccinini and Scarantino 2010, 240).

cognition, such cognitivist assumptions posit that distinctly "social" information is transformed by human neural architecture into the propositional content of intentions and beliefs that the brain was specifically evolved to handle.[18]

In assuming a neuro-centric model of the cognitive universe, such approaches to social cognition invariably require an explanation as to how the environment comes to be encoded and decoded with propositional content by the brain at both evolutionary and ontogenetic scales. Cognitivism, when framed within the selectionist logics of the Neo-Darwinian synthesis (see Ingold 2007a, c for critiques), leads to the conclusion that the brain and its cognitive functions are preselected structures. This reasoning implies that specific genetic sequences generate distinct neural components that use representational vehicles to run computations over informational inputs from the environment. The result is a circular logic in which symbolic culture is assumed to derive from evolutionarily encoded mental representations which are confirmed by the existence of symbolic culture. Such reasoning has profoundly shaped the axioms and agendas of social cognition research.

By articulating Theory of Mind as the high watermark of human social cognition, researchers predefine the expected cognitive-behavioural package, which they then seek at the evolutionary scale. Research thus becomes focused on identifying specific neural correlates and timing of development in order to postulate specific causal mechanisms responsible for ToM abilities.[19] It is therefore assumed that evolutionary pressures produced discrete neural components that encephalised under distinctly "social" pressures, resulting in a highly specified mentalising capacity for third person observation. Relationships and interactions between conspecifics are framed as "non-ecological" pressures whose selective effects can be

[18] For example, Valerie Stone defines social cognition as "the information-processing architecture that enables us to engage in social behaviour" (2006, 103).

[19] This dynamic is clearly illustrated by a recent study that sought to correlate social network size with encephalization of specific brain areas, particularly those associated with Theory of Mind (Lewis et al. 2011).

isolated to specific, modular regions of the brain. Hominid social behaviour is thus conceived of in terms of propositional knowledge, intentional stances and conceptual relationships such as status tracking and bonds (Barrett et al. 2007). As a result, social interactions come to be seen as a cost-benefit calculation by profit maximising individuals interpreting information from a third person stance. Critiquing the social brain hypothesis specifically, Tim Ingold notes that, "on the one hand it reduces the social to the operative, and on the other hand it elevates the brain to the executive, making social life look like the aggregate effect of brains telling their owners what to do" (2010).

Through the methodological separation of the individual from the social and the social from the ecological, the study of social cognition becomes an issue of measuring content bearing information flows between these conceptually isolated domains. However, a distinction between social and ecological "problems" does not provide any causal explanation for the evolution of hominin sociality; it merely assumes an a priori division between the two phenomena as a point of departure for analysis. The assumed relationship between the evolution of social intelligence and development of Theory of Mind, when situated within frameworks which presume that genetic selection determines the (neural) phenotype resulting in domain specific cognitive processes, leads to an iteration of the "behavioural modernity" problem (cf. Nowell 2010; Shea 2011). Behavioural modernity, the point at which cognitively modern humans are hypothesised to have first emerged, is generally defined as the capacity for abstract thinking, planning depth, innovation, and symbolic thought (McBrearty and Brooks 2000, 492). This concept leads to a great deal of research and speculation as to the specific evolutionary mechanisms, chronology and neural components that resulted in cognitively modern humans. The result is a theoretical discourse that is conceptually preoccupied with issues such as genetic markers for language capacities, and the identification of specific pressures and selective events that lead to the capacity for "symbolic processing"

(e.g. Dunbar 1992; Klein 2000; Krause et al. 2007). However, the so-called "Sapient Paradox" (Renfrew 1996, 2008), that is, the temporal gap between the stabilisation of the human genome sometime within the last two hundred millennia and the radical behavioural changes that only began to accelerate in the past forty thousand years, complicates this narrative.[20]

In terms of social cognition, the paradox is particularly thorny when confronting the rapid scalar changes and complexification of human societies over the past ten thousand years. If group size and brain encephalization are positively correlated, it is difficult to explain how social complexity has increased by orders of magnitude (particularly within the past six thousand years) as a result of cognitive exaptation from the previous tens if not hundreds of thousands of millennia.[21] In these regards, the emergence of states, religions, and social media should raise serious questions about the validity of Social Intelligence postulates such as Dunbar's number. Either the forms of social complexity that begin to appear during the late Pleistocene are a delayed epiphenomenon of a priori genetic selection events,[22] or the relationship between hominin cognition and the material world requires a more nuanced investigation than representational and neuro-centric models can account for.

[20] Even if evidence such as shell beads are used to infer the existence of symbolic cognition up to 100,000 years ago (e.g. d'Errico et al. 2005), this still leaves an explanatory gap as to why the diversity and rate of change in material culture only began to drastically accelerate in the past forty millennia.

[21] A growing body of data negates the expected results of the social brain hypothesis. For example, there is a lack of any clear relationship between grooming behaviours and coalition formation (Barrett et al. 2007, 562). Likewise, some predominantly solitary species have exceptionally large brains (Holekamp 2007, 67), while other socially complex organisms such as corvids reveal no correlation between brain size (Iwaniuk and Arnold 2004). There is no correlation between the frequency of social learning and primate group size, however, there is correlation between brain size, behavioural innovation, social learning and tool use that covaries across primate species (Reader and Laland 2002). This research indicates that the distinct conceptual categories of the social intelligence hypothesis such as social, technical and ecological are far more entangled processes than have been proposed.

[22] Such a perspective invariably produces an evolutionary teleology that moves from selective pressure to neural phenotype with internal symbolic processes generating cultural by-products.

1.2.1 Social Intelligence and Material Engagement

Material Engagement Theory proposes that the pattern generating capacities of environmentally situated activity structures cognitive development by generating feedback between the plasticities of matter and the ontogenetic plasticity of hominin bodies (Malafouris 2013, 2015b). This approach recognises that the material properties and qualities of things such as obsidian, marble, clay, and uranium all have distinctive structural patterns with unique influences upon cognitive dynamics. From the perspective of complex systems dynamics (e.g. De Landa 1997; Gunderson and Holling 2002; Johnson 2009) the varieties and combinatorial possibilities of materials found on Earth can be understood to afford countless opportunities for non-linear and emergent behaviour. In these regards, environmental interactions involve "non-trivial causal spread[s]… in processes of mutual and concurrent interaction, and patterns of simultaneous reciprocal causation" between brain, body, and world (Hutto and Myin 2013, 6). The material engagement approach poses that, much as our bodies are constituted through the atomic and biomolecular structure of our environment, so too our minds are constituted through the transformative and generative capacity of energy-matter flows on Earth (Malafouris 2016b).

Traditional cognitivist perspectives treat material culture as a component process of perceptual-behavioural input/output dynamics between environment and brain. In this account, human neural architecture extracts information from the environment and transforms it into representational processes. Material-culture's role in cognition is little more than a perceptual cue for the heavy lifting of internal, symbolic processing. Representational apriorism assumes that content bearing mechanisms in the brain precede material forms, and that material-culture functions to transmit information between computational brains (Garofoli 2017). This line of reasoning inverts and externalises the conflation of semantic and technical information discussed above, such that energy and matter flows in the environment come to be viewed as

vehicles for semantic content. This conceptualisation of culture as an information-bearing structure that is encoded and decoded by the brain leads to a treatment of material-culture as inferential evidence or "proxies" for representational mechanisms locked inside the head.

In essence, the MET position states that the synthesis of computationalism and information processing at the outset of modern cognitive science leads to linguistic biases and fallacies that cause us to overlook and underestimate the potency of the material environment in the emergence of socially cooperative, developmentally plastic hominin bodies. Materials in the environment, artefactual or otherwise, are not merely passive recipients of human activity; things in the world have their own properties and qualities that dynamically constitute the complex systems in which humans are entangled.

Artefacts, as a form of ecosystem engineering, transform the flow of energy and matter in the environment. Malafouris explains that:

> Things, as dynamic perturbatory meditational means, drastically change and reconfigure the relationships between humans and those between humans and their environments. More simply, they reconfigure our cognitive ecologies or assemblies. As we know, an immediate implication of that is a change in evolutionary dynamics and selective pressures. The presence of things means that people no longer react or passively adapt to their environment; instead they actively engage and interact with it. That is, things become agents of change and culturally orchestrated interventions, generating their own unusual evolutionary dynamics (2013, 246).

It is through the malleability of material culture that human beings develop powerful energetic feedback loops that scaffold the development of cognitive abilities.

From the MET perspective, the symbolic systems of computationalism and information theory are unique artefacts that emerged through specific historical relationships and technical problems afforded by material culture. The material engagement approach understands complex forms of numerical cognition to emerge through intergenerational communities of practice manipulating material structures which enable quantitative relationships to be conceptualised and reasoned with (see Overmann 2016, 2017). Though information theory and

computationalism are undeniably capable of quantifying and modelling certain observed relationships, MET understands the mathematical and logical notation systems that they utilise as distinct, culturally derived forms of numerical cognition. In these regards, reducing all cognitive phenomena to computation and information processing risks a fallacy of composition which confuses an emergent property of human cognitive systems with a core structure or process. From the standpoint of Material Engagement Theory, the treatment of material culture as a content bearing, representational epiphenomenon looks much like Ptolemy's epicycles, that is localised complications which conform the phenomenal world to the simplifications of a model that misses the greater complexity in which it is situated. If the self-organising dynamics of society are not derived from information flows between compartmentalised, third-person social calculators it is necessary to investigate what processes support the emergent complexity of human social interaction and whether those processes are cognitive or not.

1.3 Distributed Social Brains

Recently, in keeping with the ongoing theoretical upheavals in philosophy of mind and cognitive science, a growing body of research has been put forward that examines the relationship between material culture and the evolution of social intelligence from more distributed and embodied perspectives (e.g. Dunbar et al. 2010a). These papers emphasise how cooperative cultural interactions shape ontogenesis and consider the neural, perceptual, emotive and conceptual relationships made possible via material culture. However, despite the novel and important perspectives provided by theoretical shifts in the discourse on social intelligence, these papers still rest upon metaphysical assumptions that reproduce a teleology of brain to symbol to material medium. Furthermore, though these papers emphasise embodied relationships, they still fundamentally accept Theory of Mind and higher order intentionality as the cognitive end state of socio-cognitive evolution (e.g. Grove and Coward 2008; Coward

and Gamble 2008; Dunbar et al. 2010b; Gamble et al. 2011; Gowlett et al. 2012; Coward 2016). Ultimately, while these new Social Intelligence Hypotheses make important contributions, they are still susceptible to the polysemic fallacies of cognitivism, its metaphysical assumptions and the arbitrary conceptual divisions between the individual, social and ecological domains. In accepting the necessity of content and a priori representationalism, these frameworks still submit to a teleology in which pre-evolved cognitive programs are extended into and executed through material culture as memory aids, procedural cues and proxies for emotional bonds, beliefs and intentional stances. In essence, material culture is seen as a container into which the symbolic mind can dump content. This idea of replicating and distributing internal cognitive programmes into the material environment is not only epiphenomenal but implies a kind of cognitive-historical determinism in which literacy, cities and nuclear warfare were exapted from information processing modules that evolved in the human brain sometime during the Middle Stone Age.

Though these novel approaches to social intelligence provide innovative and important discussions about the relationship between material culture and social cognition, they are still bound up with Neo-Darwinian and cognitivist logics. Drawing from distributed, embodied and extended frameworks that recognise artefacts as capable of offloading symbolic storage and manipulation (e.g. Hutchins 1995; Clark 2008a) these papers conceptualise material culture as vehicles for propositional content that result from pre-evolved representational capacities. Despite the consideration given to the affective, attentional, and intentional relationships scaffolded through material culture, artefacts are nonetheless interpreted as "material proxies for symbol-based cognition" (Gamble 2010, 27) which in the context of social cognition, has the "purpose of encoding information to make larger social networks possible" (Gamble et al. 2011, 118). This commitment to representational apriorism is largely explained in terms of the gap between the last major encephalisation event (c. 600kya) and observed technological

innovation (Gowlett et al. 2012). It is assumed that material complexity lagged behind social complexity, and that symbols were something that were first developed and exchanged between conspecific brains only later to be transmitted through material forms as symbolic content.[23]

In such frameworks, material culture still plays a relatively passive role as mnemonic devices and other functional extensions that support internal cognitive processes which are, to an extent, seen as distributed into, or scaffolded from the environment (see Malafouris 2016a for a critique of weakly embodied frameworks). This perspective reasserts the categorical distinctions between mind and matter, nature and culture that such papers are claiming to move away from. Material culture is understood to be "gradually integrated into social networks" (Coward and Gamble 2008, 1969) and social and ecological dynamics become "fused" over time (Sterelny 2007, 728). Material culture's primary role in social cognition is to identify "symbolically marked groups" (ibid, 722) while functioning as "performative cues… that compensate for weak "categorical" knowledge of the people with whom one must interact" (Coward and Gamble 2008, 1975). Artefacts fulfil "mnemonic functions, becoming externalised loci of memories which act as "prompts" for and records of the social relationships in which those objects are entangled" (Coward 2016, 80). Thus, material culture is conceptualised as a vehicle for content that is "encoded" into individual brains in ways that extend body schema, empathy and identity from a neuro-centric perspective (Grove and Coward 2008).[24] Despite their value, these papers reify numerous dichotomies

[23] This is a questionable interpretation based on the varied durability of cultural materials alone. Stone tools, for example, have a far slower rate of entropy than cordage or wood. Furthermore, much as the similarity of many modern hand tools to designs from previous centuries are not a sign of general historical inertia, the stability of the Achulean form is insufficient evidence for a lack of change in the socio-technical relationships and cognitive dynamics of the Middle Stone Age.

[24] Grove and Coward follow the weak embodied account of mirror neurons as the foundation for a simulationist account of ToM in which individuals simulate the experiences of others in order to conceptualise their mental states (e.g. Gallese 2007). This concept maintains a view of social cognition as observation and prediction, but instead of framing this as a third person theoretical stance, "second-person interaction is

within an epiphenomenal account and evolutionary teleology of material culture built upon assumptions about representation, information, computation and content.

1.4 Niche Construction and Scaffolded Minds

Distributed models of Social Intelligence should be acknowledged for giving more serious consideration to the relationship between social cognition and the material environment. The great value of the social intelligence hypothesis is the insight that cognitive and social complexity generate co-evolutionary pressures. As Kim Sterelny states, "the feedback loop between individual capacity and social complexity makes the social intelligence hypothesis a niche construction hypothesis" (2007, 720). During the past decade Niche Construction Theory (NCT) has garnered a great deal of excitement as a means of bridging the evolutionary and ecological dimensions of human existence with the more traditional concerns of the social sciences and humanities (Laland and O'Brien, 2011). NCT explores the evolutionary feedback created between environment and ontogeny by examining the ways in which organisms modify their environments to produce unique selective pressures. By considering environmental modifications as a form of ecological inheritance, NCT allows for an understanding of organisms as participants in their own evolutionary dynamics.

Given the unparalleled ability of humans to modify their environments, it should be clear why Niche Construction offers an extremely valuable and sophisticated means of approaching the biological and evolutionary dimensions of human socio-cultural complexity. Recently, considerable attention has been given to the potential for NCT to examine archaeological data (Laland and O'Brien, 2010). These analyses have combined Niche Construction with Gene-Culture Coevolution Theory (GCT) to answer a diverse set of

reduced to first person-internal activity" (Gallagher 2017, 222). There is good reason to question why mirror neurons need to be conceptualised as simulations when they can just as easily be described as directly embodied experiences of the goal directed actions and emotive states of others (Gallagher 2011, p.75).

archaeological questions with particular attention paid to agriculture and domestication. Critical to understanding the evolutionary dimensions of niche construction is the idea that developmental and behavioural plasticity will prove a successful adaptive trait under highly variable environmental conditions. Organisms with a sufficient degree of ontogenetic plasticity are capable of counteracting or precipitating environmental changes leading to increased fitness. This distinction illuminates the two general forms of niche constructing activities, inceptive and counteractive. Inceptive niche construction occurs when organisms initiate a change in their environment with downstream consequences, while counteractive niche construction occurs when an organism responds to an external change (ibid). Thus, it is seen that niche constructing behaviours can have two broad selective effects; either it can select for phenotypes and developmental traits that fit better within the modified ecosystem, therefore producing genetic changes dependent upon the constructed environment; or it can have a dampening effect against selective pressures by mitigating environmental changes and thereby reducing genetic change. Regardless of the route taken, a key feature of a niche constructing species is a significant degree of phenotypic plasticity in which the organism's ontogeny has been selected to fit within a number of successive developmental environments.

NCT has certain overlaps with the extended phenotype argument (Dawkins, 1982). the critical difference being that the extended phenotype perspective considers elements such as bird nests as the product of evolutionary selection and not a source. In other words, the nest is understood as an expression of genes, whereas NCT argues that genes and nest are co-evolutionary structures which exert bi-directional influences. Instead of viewing environmental modification as the expression of previous genetic adaptation, selection becomes a reciprocal process of continual feedback in which modification of the environment selects for traits that require niche constructing activities for fitness. Niche constructing organisms, by creating a rapid succession of developmental environments, are capable of producing evolutionary

disequilibria that drive niche constructing traits to fixation (Silver and Di Paolo, 2006). In other words, the organism becomes dependent upon the constructed environment for its survival. It can be argued that all organisms, by their very existence, partake in some form of niche construction, though not all such activities are equal in terms of scope or impact. Nonetheless, niche construction adds an important degree of sophistication to evolutionary models. The mere presence of an organism alters and modifies an environment's evolutionary dynamics in nonlinear ways. That is to say, one cannot simply observe the evolutionary dynamics of the organism or the ecological dynamics of the environment as separate phenomena without missing key properties of both.

The great value of NCT is that it eliminates the boundaries between ecology and evolution through a focus on developmental processes. In this regard, NCT is the evolutionary counterpart to Ecosystem Engineering which focuses on the ways in which organisms structure flows of energy within an ecosystem, often with impacts on organisms not directly linked to the engineering organism (e.g., Hastings et al. 2007). A clear illustration of this process is observed in the ways that beaver dams break down and produce beaver meadows, providing critical habitats for successional organisms (Wright et al. 2002). This example also clarifies an important aspect of NCT's focus on ecological modification as a form of inheritance. Persistent environmental alterations have downstream effects on the organisation of energy and matter in the environment, and therefore the evolutionary dynamics experienced by a host of organisms. Not only is the niche constructor dependent upon the modified environment but a number of subsidiary organisms as well. Thus, Niche Constructing is simultaneously an ecological and co-evolutionary process with powerful implications upon our understanding of human material cultural.

It should be clear why NCT is an appealing framework for analysing human evolution. Human beings are ecosystem engineers par excellence, from Palaeolithic trapping to the global

economy, the species radically modifies the flows of energy and matter in its environment. Logically, these interventions impact the adaptive landscape to alter the selection pressures experienced in these environments. Archaeological studies that have utilised NCT in their analyses have tended to concentrate on domestication and agriculture (see Bleed and Matsui, 2010; Riede 2011; Gerbault et. al. 2011; Sterenly and Watkins, 2015). The reason for a focus on these issues is that the domestication of flora and fauna creates strong co-evolutionary feedback that leaves significant genetic signatures upon both domesticators and domesticates.

Genetic analyses are extremely important and help to empirically validate the argument that human cultural practices and environmental interventions have powerful evolutionary consequences. Due to a strong body of pre-existing research, perhaps the most successful examples of these studies have focused on the development of lactase persistence among dairying populations and the emergence of the HbS allele that produces sickle cell anaemia as an adaptive response to malaria (O'Brien and Laland 2012). These papers are extremely valuable and NCT has proven itself a robust model for understanding the synergetic relationship between genetics and culture. However, there are limitations to the ability for measuring genetic signatures with a clear causal relation to culture. For example, much niche construction is counteractive in that it seeks to reduce environmental variability and dampen selection pressures making "potent niche constructors resistant to genetic evolution" (Laland and O'Brien 2010, 313). Thus, the genetic effect of human culture tends to only be clear in cases of inceptive niche construction. There is a further complicating factor in that it can be quite difficult to establish which genes and alleles are the result of positive selective sweeps and their actual relationship to the complex phenotypic expressions of human culture (Laland et al. 2010, 142). Nonetheless, NCT should be lauded for its understanding of phenotype as more than simply a vehicle for genetic transmission.

Human Niche Construction in its current formulation, despite its powerful insights, suffers from serious conceptual limitations in regard to its understanding of culture. Specifically, the coupling of Niche Construction Theory with Gene-Culture Coevolution Theory reifies the division of human beings from the natural environment (O'Brien and Laland 2012). GCT seeks to identify how culture can affect genetic structure while essentially ignoring the entire developmental spectrum between the two phenomena except as a vehicle for genetic evolution. Unfortunately, this simply reconstructs the division of biology and culture, albeit in a more nuanced and sophisticated manner. Culture is not viewed as inherently biological, but rather as a separate force that reacts back upon those other processes. In this view, genes and culture as separate yet overlapping systems that are roughly analogous. To confirm that culture has evolutionary properties, such analyses seek a genetic justification of culture by showing its potential to affect the genome. This reaffirms the Neo-Darwinian view of phenotypes and behaviour as genetic epiphenomena rather than understanding evolution as a developmental process played out on multiple scales of organisation and feedback. Ultimately, a far more radical approach is needed in order to understand culture as part of a developmental continuum of human societies and their evolutionary ecologies.

NCT-GCT analysis tacitly assumes a cognitivist position by conceptualizing culture as information through which specific behavioural traits are acquired and transmitted (Laland et al. 2010). In turn, information is conflated with representational abstractions which are viewed as inherently arbitrary phenomena that are somewhat whimsically attached to the material environment for the purpose of stable and consistent communication. Given NCT's focus on environmental modification, this perspective leads to a treatment of material culture as a passive epiphenomenon of human cognition, something that exists merely for the storage and transmission of symbolic information. For example, in a recent article on Neolithization and Niche Construction, the most active role ascribed to material culture occurs when the authors

discuss the way in which enclosed family homes in sedentary communities ensured that "mutual information would not flow as freely" (Sterelny and Watkins 2015, 677).[25] All of this works to reinforce a notion of culture as a conservative and stable information bearing mechanism as opposed to dynamic material relationships that entangle human development with the environment. As a result of these limitations, though NCT seeks to understand how culture modifies the environment to affect evolution, it is ensnared in a view of culture as abstract data. Culture is never understood as truly being part of the environment, but rather something that is imposed upon it by an information generating computer mind. The essential nature of cultural things is abstracted from the material object as symbolic information which is imposed upon and acquired from passive vehicles of transmission. The mind and its productive outputs, "symbolic culture", are implicitly assumed to be distinct from material reality and thus disconnected in critical ways from the organic environment.

Niche construction provides an invaluable starting point for reframing hominin social cognition as dynamic relationships that extend across brains, bodies and environment. This perspective reframes the Social Intelligence Hypothesis away from linear interactions between specified neural correlates and behaviour to an examination of the relationships between ontogeny and energy-matter flows in the environment. Importantly, social organisation itself can be understood as a form of niche construction. Cooperative relationships imply that "the evolution of hominin cognition depends on features of the environment that hominins have created themselves" (Sterelny 2007, 720). The active structuring of relationships within a group creates unique adaptive landscapes that produce powerful and often novel forms of evolutionary feedback.[26] However, if niche construction selects for developmental plasticity,

[25] This is not to say that this is not a good point, just that it is the most active role material culture is given in the article.

[26] Sterelny is also critical of the extended mind, preferring the concept of scaffolding, though his critique is targeted more toward the functionalist iterations of the Extended Mind Hypothesis (2010).

under the right conditions, the feedback between evolution, ontogeny and ecosystems should create opportunities for novel forms of complexity to emerge, such as a radical degree of developmental plasticity. In recognition of this Karola Stotz has argued that humans form "ontogenetic" or "cognitive-developmental" niches as "problem solving resources and scaffolds for individual development and lifetime learning" (2010, 483). Nonetheless, Stotz's account remains tightly focused on individuals as cognitive processors of "information" and all the conceptual problems this entails. If we wish to understand the evolution of social cognition, then we need to conceptualise material culture as something other than information that is purified into mental content through computational processes but instead as something that dynamically constitutes socio-cognitive life on its own terms.

Evolution, and that of the human brain particularly, needs to be explored in terms of non-linear, probabilistic and bidirectional processes (Green 1991; Gottlieb 2007). In these regards, the properties of heterogenous materials have diverse and often subtle impacts upon the dynamics of neural and cognitive processes. MET approaches the ways in which the behaviour of materials influence cognitive systems, not as passive input-output structures that complete an informational circuit, but as transformative bodies that alter the feedback dynamics of cognition through "the relational forging of novel combinations, exploratory and transformational connections or synergies" (Malafouris 2015a, 147). Thinking through obsidian is markedly different from thinking through marble, they afford and constrain certain technical and conceptual realities.[27] In this sense, all material forms provide distinct properties and combinatorial possibilities (or agencies) that fundamentally pattern the dynamics of cognition and the creative diversity of human cultures. Instead of conceptualising the evolution

[27] Marble and obsidian offer different perceptual affordances and involve distinct motor routines. Working obsidian is extremely algorithmic, whereas working marble is a more responsive and flowing process. These material distinctions generate important differences in procedural cognition, planning, expected outcomes, potential forms, uses and semiotic possibilities.

of social cognition as a distinct process that became fused with material culture over time, it is more useful to examine how matter in the environment has been constitutively entwined with both the evolution and development of human sociality and neuroarchitecture.

The brain is a sensitive organ, responsive to subtly changing patterns in the environment. Instead of assuming that symbols are located inside the head, MET asks, "when does a simple mark become an arbitrary sign for people to think with" (Malafouris 2013, 234). Rather than viewing material culture as a proxy for pre-evolved symbolic capacities utilised for understanding and formulating intentional states, it is possible to investigate ontogenetic relationships principally mediated through eyes, hands, material things and the bodies of others which enable complex social interactions to self-organise. From the earliest stages of human life, intersubjectivity develops through attentional focus upon bodies, primarily faces (Gallagher 2011, 65-85), a process that moves from imitation to collaboration through gaze sharing, gesticulation and the manipulation of materials in the environment (Moll and Tomasello 2007). In this light, we can begin to reframe the discussion of human social cognition around embodied interactions and their constitution through material culture.

1.5 Embodied Social Intelligence

Humanlike apes began to emerge roughly six million years ago as they began to diverge from our last common ancestor with chimpanzees. The evolution of group living is generally understood to "represent a balance between the centripetal force of predation risk and the centrifugal force of competition" (Barrett et al. 2007, 561). The broad trend of hominin species history has been largely defined by a move away from the rigid hierarchies of our primate relatives towards more cooperative social behaviour (Erdal et al. 1994; Boehm 1993; Boehm 2001). Effective cooperation can help to ensure against the monopolisation of and exclusion from resources (Ames 2010) while producing scalar effects in production and

consumption (Stirner et al. 2012). Sterelny has argued that hominin foraging altered hominin social environments, producing feedback between cooperative behaviour and resource extraction that fuelled population growth, thereby setting off a co-evolutionary spiral selecting for social complexity (2007). Ultimately, hominins that shared and reciprocated effectively with each other transformed their environments, thereby altering the dynamics and pressures placed upon social cognition.

Comparative studies on hominid cognitive development have shown that humans appear to be radically predisposed to engage in cooperative, joint attentional activities at an early age, whereas joint attentional activities with our primate relatives appear to be more driven by competition (Moll and Tomasello 2007). Though Tomasello and his colleagues advocate a representational view of the mind, and while it is important not to overstate the evidence gained from animals raised in captivity, it is possible to interpret this behaviour from a non-representational perspective. Barret et al., rejecting cognitivist descriptions of primate social cognition, argue that grooming and proximity maintenance can be understood as the active (and intelligent) structuring of space in order to maintain action-perception loops that sustain mutualistic interactions and alleviate the negative social effects of competition (2007). In this light, social interaction can be viewed as a "niche constructing" dynamic that would logically select for a high degree of perceptual attunement to the bodily affordances of others. Considering niche construction from the perspective of direct perception, "the construction of a niche requires both the perception and utilisation of affordances… if this construction is evolutionarily consequential, then the perception and utilisations of the affordances that led to the niche are not merely a result of an evolutionary process; rather they (partly) determine this process" (Withagen and van Wermeskerken 2010, 503). Thus, sufficient evolutionary

conditions favouring group sociality would logically select for the evolution of bodily perception-action systems that support collective living.[28]

Studies demonstrate that visual perception of the human form has consistent and distinct neural activation patterns that occur in the extrastriate and fusiform body areas, which are involved in proprioception, body schema, body image, the perception of others and goal directed actions (Astafiev et al. 2004; Peelen and Downing 2007). Furthermore, the fusiform and occipital face areas of the brain, also located in the extrastriate cortex, develop in close proximity to and have functional overlaps with both the extrastriate and fusiform body areas (Haxby et al. 2000; Spiridon et al. 2006). The existence of these neural networks, as well as the interbodily responsiveness to the behaviour of others suggested by "mirror neuron" studies (Bonini and Ferrari 2011) are all evidence for the brain's evolutionary-developmental attunement to the bodies of other humans.

Human development appears to involve perception action systems uniquely adapted to cooperative behaviours. From the outset, human embodiment is socially embedded and develops, in key respects, via an attentional focus mediated through the bodies of other people. This relationship is nowhere clearer than in the case of facial perception. Foetuses in the third trimester have been shown to turn preferentially toward face like patterns via projected light into the womb (Reid et al. 2017). In addition, new-born infants as young as three hours old are capable of mimicking facial expressions (Meltzoff and Moore 1983). Humans are born with a prenoetic interbodily responsiveness to other humans (Gallagher 2011, 133-152). During the earliest phases of life, the human face presents itself as the critical perceptual affordance through which social interactions are scaffolded. Focusing upon eyes developmentally

[28] From this perspective, the evidence from Moll and Tomasello that suggests chimpanzees can discern the location of hidden food through a grabbing motion, but not through purely cooperative gesturing (2007, 643-45) is possibly evidence for an evolutionary divergence between perception-action systems involved in cooperation and competition amongst humans and the great apes.

precedes broader facial recognition within infants (Itier and Batty 2009), and around six months infants begin to preferentially focus upon faces, bodies, movement and learn to mirror the emotional expressions of adults (Gallagher 2011, 69-75). Considering this developmental evidence, one can appreciate how forcefully bodies capture attention, drawing gaze and focus in both peripheral and direct observation (Downing et al. 2004). Human perceptual attunement to bodies, faces and hands supports an argument for the co-evolution of human cognition with socially embodied affordances for pragmatic engagements with the world.

Primary intersubjectivity, the fundamental perceptual-motor ability to distinguish self from others within the proprioceptive system (Trevarthen 1979) appears to be present within the first hours of birth. After the first year of life, infants begin to develop secondary intersubjectivity through joint attention upon pragmatic interactions via gaze following and monitoring (Trevarthen and Hubley 1978). In the words of Gallagher and Hutto, "before we are in a position to theorise, simulate, explain or predict mental states in others, we are already in a position to interact with and to understand others in terms of their expressions, gestures, intentions, and emotions, and how they act toward ourselves and others" (2008, 5). Critically, it is during the second year of life that humans begin to engage in communicative gesturing and, significantly, pointing behaviours (Tomasello and Rakoczy 2003, 125). As with bodies and faces, the hands form the developmental foundations through which social cognition emerges. It is in this sense that the hands co-evolved as an organ of perception and cognition in concert with the pressures that lead to hominin sociality (Gallagher 2017, 164-86). The hands are the human niche constructor's primary affordance and interface for pragmatic engagements with the world and this is where the central co-evolutionary role of material culture starts to become truly apparent. Supported by the developmental properties of primary and secondary intersubjectivity, humans engage with and manipulate things in the world as a process of social learning that substantiates identities, meaningful relationships and

enculturated behaviours. This evidence reveals how fully material culture is entangled with the perception-action systems of human embodiment, providing essential affordances through which social cognition develops.

1.6 Social Things

Modern human neural development emerged through hominin bodies collectively negotiating their environments and each other for millions of years. The earliest tool making skills developed in the context of social learning and cooperative group living at least 3.3 million years ago with stone choppers used by pre-hominin species (Harmand et al. 2015). Hand axes and even rudimentary choppers are incredibly potent affordances for ecological modification, particularly in regard to nutrient-rich packages such as bone marrow. Early tools can be understood to have provided a means for accessing previously unavailable niches, enabling hominins to support expanding populations through the novel modification of energetic and material flows in the environment. The success of these behaviours would have led to increasing local competition and population dispersal, adding to the complexity of the environment.

Tool use in conjunction with conditions favouring group living would have exerted powerful co-evolutionary pressures between social dynamics, material culture and population growth. Tools, by affording access to new ecological niches, provided the energetic feedback necessary to support the further expansion of socially cooperative tool use. Furthermore, increasing food availability also affords, in principle, an increased ability to share. Simply put, the opening up of abundant new food sources in group living contexts provides new opportunities to invite others to partake in harvesting as well as physical acts of offering food, for example, during collective acts of butchering. The fact that human cognitive development is grounded in the perception-action loops afforded by faces, hands and objects in the

environment (particularly in cooperative contexts during the second year of life) attests to the evolutionary depth of these relationships. In this light, the perception-action loops afforded by the human body, their ontogenetic expression in modern humans, and the evidence from the archaeological record support a perspective of cognitive-developmental niche construction in which social intelligence evolved and developed through material engagement.

Conventional wisdom has it that the evolution of mind reading mechanisms such as Theory of Mind fundamentally underpins the emergence of language, complex tool making, and group cohesion (Mithen 2000; Dunbar 1992, 1993). For example, it has been suggested that stone tool manufacture minimally requires second order intentionality[29] (Gowlett et al. 2012, 698) and that the elegant bifacial symmetry of Achulean technology entails a control of numerous "variables that require a level of processing… similar to that required in high levels of socially-orientated intentionality" (Gamble et al. 2011, 123). These arguments render tool production as a kind of syntactic procedure that generates forms based upon propositional knowledge and intentions inside the head. However, this framework overlooks the bidirectional influences that the material environment has upon skilled behaviours, such as a recent experimental study that suggests fracture dynamics play a more significant role than language in guiding stone tool design (Moore and Perston 2016). The exploratory and indeterminant aspects of tool manufacture and use (Chakrabarty 2018) indicates a far more fluid and dynamic process in which intentional states are distributed through and emerge from skilled engagement with the material environment (Malafouris 2013, 153-177). Furthermore, the ways in which material culture can mediate joint attention and activity (Gallagher and Ransom 2016) suggests that a metaplastic entanglement of stone tool production and early hominin communities constituted an enactive intentionality which was, "intersubjective from the start… generated in

[29] Second order intentionality is the basic ability to attribute mental states to others, e.g. I know that you know X.

our interaction" (Gallagher 2017, 81). In these regards, it is possible to explore how basic acts of mark making through material engagement can begin to generate significative meaning (Iliopoulos 2016a, b) that shapes identity formation, intersubjective awareness and social extension without an appeal to beliefs and intentional stances.

The emergence of novel tool using behaviours in group living contexts provides a coherent account of the co-evolutionary pressures suggested by early childhood intersubjective development. Significantly, our primate relatives are capable of displaying all the joint attentional abilities of humans in terms of initiating, regulating and responding to joint attentional activities (Leavens and Racine 2009). This evidence implies that the foundations of socially embedded attentional focus and activity was present before the divergences from our last common ancestors. In these regards, the evolution and development of sustained attentional focus and the ways in which it makes acts of emulation and imitation in social learning possible is of key importance.

The capacity to attend to and replicate successful behaviours, to use the traditional terminology, should confer a strong selective advantage that contributes to the overall fitness of a group. Interestingly, emulation of goal directed behaviour is more frequent in our primate relatives, whereas the phenomenon of "over-imitation" in children has lead Froese and Leavens to argue that this is a developmental response to the conventional and arbitrary relationships of their cultural environments (Froese and Leavens 2014). Importantly, the over-imitating of children requires a high degree of attentional focus and attunement to the actions of others so as to model and perform actions within one's own body-schema. This evidence fits well with Daniel Hutto's Mimetic Ability Hypothesis in which the early evolution of the brain was potentially spurred on through the establishment of a "mimetic culture" in which the "flexibility conferred by mimetic skills in conjunction with recreative imaginative abilities for practice and rehearsal would have vastly increased the developmental possibilities for social

expression and engagement" (2008, 215). Such abilities can be conceptualised in psychological terms such as working memory and executive functions (Wynn and Coolidge 2011). However, this language suggests a highly internalist model of cognition that obscures the distributed and extended dimensions of material culture. The abilities involved in tool use, and the imitation of these behaviours, would have generated numerous layers of feedback capable of ecologically reinforcing attention, memory and identity between different socially embedded and embodied action-perception systems.

In humans, the fine motor skills involved in crafting are supported by neural structures primarily located in the cerebellum. These activation patterns in the cerebellum connect through the pons into the neural networks of the temporal lobe involved in proprioception and identity (Wynn and Coolidge 2014). The crafting process thus activates bodily awareness in ways that involve the ability to distinguish self and other from the environment. What's more, the proprioceptive system neurophysically incorporates tool use into the body schema, extending the perception-motor system to encompass tools in an act of "cognitive prosthesis" (Malafouris 2012). Such extended embodiment through artefacts reveals an integration of identity and material form at the fundamental level of the "brain-artefact interface" (Malafouris 2010b). In these regards, the retaining and reuse of tools by hominins beginning around two million years before the present (Overmann and Wynn 2018, 8) suggests the emergence of a more continual and persistent identification with tools. Another way to frame this dynamic is that tools began to occupy a greater degree of attentional focus in daily life, borne out by evidence for the intentional selection of durable but easy to flake materials, the harvesting, manufacturing and use of stone flakes in separate locations and the transport of materials over distances occasionally greater than ten kilometres (Wynn et al. 2011; Toth and Schick 2018). It is in consideration of this that Manjari Chakrabarty has argued that the "Oldowan knappers' awareness of raw material quality, or their forethought in multiple aspects

of the tool manufacture and use" can be interpreted as the early signs of an emerging, distinctly hominin cognition (2018, 8).

Preferential selection of materials, transport, manufacture and use of tools all imply processes of material signification (Malafouris 2013, 89-118) involved in identity, value, and sociality that do not rest upon propositional content. Just as any animal tracks signify their cause, resource, debitage and butchery sites would have produced numerous indexical signs contiguous with hominin activity in the environment (see Knappett 2005, 85-106; Iliopoulos 2016a, 250-259 for discussion). Such sites potentially played roles in orientation and navigation, identifying the presence of known or unknown groups and the establishment of territorial ranges. Furthermore, the tools themselves, when considered in terms of brain-artefact interfaces, suggest a degree of factorality, or part/whole relationships (see Knappett, 2005, 85-106), between tools, hominin identities and intentional action. Cognitive prosthesis and its factoral dimensions also suggest that tool sharing makes possible a physically partible and exchangeable form of embodied intersubjectivity. What's more, preferential selection of materials can be understood as enactive signs of value, not as belief states held about materials, but through attention to, interaction with and recognition of distinct properties and causal relationships that motivated early hominins to travel significant distances to acquire specific objects. Thus, the very presence of the environmental marks created by knapping would have created a "rich landscape of affordances" (Rietveld and Kiverstein 2014) capable of generating new forms of recursive interaction and awareness.

The production of even the earliest flaked cores were cognitively sophisticated processes, requiring the ability to initiate, perceive and respond to transformations in stones so as to produce one tool with another. Affordances such as weight, density, mineral composition and formation shaped the processes and possibilities of interaction. Haptic and visual feedback guided individual engagement with particular types of rock such as quartzite or chert that had

proven useful through experimentation. Knapping sends reverberations through the nervous system; when a stone is struck in the correct way it produces a distinct awareness of the energy transfer between tool and material. A misplaced hit, if it doesn't deflect, will transfer more energy back into the body and produce a dull sound as opposed to the distinct ring of a well-placed strike. Such material qualities shaped perceptual attunement to the behaviour of the stone. One can intuit the impact stone tools had upon the perceptual environments of hominin communities. It is not hard, for example, to imagine the potentially syncopated rhythms produced by early Hominin groups knapping in unison and the ways this would have shaped attention, work rhythms, interbodily resonances, and possibly the emergence of hominin musicality. Preferred stone sources, flake scatter, continued tool use, all such things altered the perceptual intricacy and interactive possibilities of the environment, thereby plausibly shaping sustained attention, social memory, and identity as well as interactions at novel scales in the landscape. Thus, not only were early hominins transforming flows of energy in their ecosystems, but they also generated complex environmental dynamics as the success of these behaviours began to take root. These considerations imply processes of ecological and evolutionary change that were inherently social and artefactual from the outset.

The mediation of attention and interaction through tool, hand and body within early hominid communities can be understood to have generated novel opportunities for "world-directed" intentions that were "target focused but not content involving" (Hutto 2017, 837). In contrast to the hypothesised evolution of a "mind reading" neuroarchitecture for attributing mental states (see Fenici and Garofoli 2017 for a critique) the concept of "mind minding", in which individuals develop context sensitivity to the intentional attitudes of others through attending to their behaviour (Hutto 2017), provides a much more parsimonious account for the development of intersubjectivity amongst early hominins. Rather than viewing the evolution of social cognition as a progressive expansion of intentional orders, one can examine how

social interaction and intersubjective awareness have coevolved with material culture as an emergent, as opposed to teleological, process.

Rejecting an evolutionarily specified mind reading module requires that propositional knowledge be examined as an emergent property of cultural and linguistic constructions (Fenici and Garofoli 2017, 106). The sophisticated cognitive abilities referred to by ToM are potentially better accommodated within a framework of narrative proficiency (Hutto 2008; Gallagher and Hutto 2008). The evolutionary roots of the ability to communicate a sequence of events is more likely to be found in behaviours such as gesticulation and pantomime than an appeal to pre-evolved capacities for meta-representation (Hutto 2008, 217-227). This would fit well with evidence that the neural networks involved in tool making and language partially overlap, suggesting that they share their "foundations in more general human capacities for goal-directed action and are likely to have evolved in mutually reinforcing ways" (Malafouris 2010b, 267). The evidence for training-induced morphological changes in the neural circuitry of monkeys (see Malafouris 2013, 165-167) strongly suggests that the expansion of stone tool use effected metaplastic reorganisations within cognitive systems of early hominin communities. Furthermore, the enskilment of complex tool using behaviours, particularly with composite technologies, implies intergenerational communities of practice that generated intersubjective intentionality through training (Walls 2018). It is plausible that changes effected by tool use, by reorganising not only hominin ecological niches but their experiences of embodiment and social identity, began to generate both the energetic resources necessary for evolutionary change, as well as the cognitive-developmental pressures that selected for encephalisation. Instead of a linear teleology of propositional intentionality inscribed into the neuro-architecture of the brain, we see a patchwork or "mosaic" of intersubjective relationships in which novel ways of conceptualising self and other were generated through material-cultural interactions.

1.7 Kinshipping and the Mutuality of Becoming

An MET analysis of the cultural dimensions of social cognition must deal with kinship dynamics and their substantiation through material culture. Human sociality evolved through the interdependent relationships between immediate families and group dynamics. The reproduction and maintenance of human bodies is inherently a social process, and as the complexities of these dynamics intensified over time it is clear that kin relations emerged as a primary means through which human communities conceptualised and mediated their interactions (Carsten 2004; Bamford and Leach 2009; Trautman et al. 2011, 160-185; Sahlins 2013a; Anderson 2016). Since the nineteenth century, kinship studies have been central to anthropology, originally conceived of as a means of understanding the organisation of stateless societies through systematised categories of relatedness. At the outset, the study of kinship was focused on genealogical frameworks that emphasised descent groups and lineages with associated rights and obligations (Carsten 2004; Bamford and Leach 2009). The writings of Claude Levi-Strauss reframed research into kinship around exogamy, focusing on the creation of relatedness between unrelated peoples ([1948] 1968). Over the past seventy years debates on kinship have ranged from biological essentialism to post-structural constructivism (Carsten 2004; Viveiros de Castro 2009). Regardless of the various perspectives, what has become clear is that human kinship practices are extremely diverse and multifaceted.

Humans employ a vast range of ontological frameworks for conceptualising relatedness with the human and non-human world which are expressed through a multitude of relational logics involving shared bodies, substances, experiences and practices (Vivieros de Castro 2009; Sahlins 2013a). It is for these reasons that Marshall Sahlins has described kinship as essential to a "cultural order of intersubjectivity" (2013a, 239). Importantly, kinship is not fundamentally determined by birth, "a catalogue of commonplace post-natal means of kinship formation would thus include: commensality, sharing food, reincarnation, co-residence, shared

memories, working together, adoption, friendship, shared suffering, and so on" (Sahlins 2013b, 5). Nonetheless, kinship is still broadly viewed as a key point of intersection between biology and culture, and thus continues to be highly contested conceptual ground. It is in these regards that MET provides a strong foundation for a non-dichotomous approach to kinship.

Kinship has traditionally been conceived of as systematic relationships that are organised around propositional terminologies for relatives. Whether in their naturalist or constructivist modalities, kinship studies traditionally focus primarily on the linguistic dimensions of relatedness. This emphasis on kinship terminology relates directly to the frame problem discussed previously in that it does not provide an adequate explanation of how kinship scales into larger totalities without becoming overwhelmingly complicated. However, a focus on the metaplastic features of social cognition emphasises how the material world inherently provides the shared substances (e.g. food, semen or marble) through which signs of kinship are conceptualised and generated. Sahlins has defined kinship as "a manifold of intersubjective participations, founded on mutualities of being" (2013b, 10). Ultimately, material culture provides the fundamental medium through such mutual existence is experienced, performed, and manipulated. Sahlins recognises the philosophical problems with the term being but feels that "mutuality of being has the virtue of describing the various means by which kinship may be constituted, whether natally or post-natally, from pure 'biology to pure performance, and any combinations thereof" (ibid, 14). Ultimately, this thesis does not have any major contention with Sahlin's concept of mutuality of being. However, given that this work situates itself within a process ontology of material engagement, the concept of mutuality of *becoming* is preferred to that of *being*.

Rather than identifying kinship in terms of systematised propositional categories of identity, this perspective emphasises processes of generating kinship as an ongoing means of organising, sustaining and navigating the forms of relatedness necessary for community

survival. An emphasis on becoming is in keeping with Tim Ingold's description of "life as a transgenerational flow in which people and their knowledge undergo perpetual formation… [which] gives a way of describing ancestry and descent… in terms of the narrative interweaving of present and past lives rather than the application of classificatory schemata" (Ingold 2009, 210-211). Thus, to stress the role of material engagement and shared substances in conceptualising relatedness, this thesis articulates the idea of *kinshipping* as the practices of creating, performing and sustaining concepts of relatedness. The ability to sustain kinship dynamics across extended temporal and spatial scales undoubtedly depends upon the material mediums through which relatedness is conceptualised and enacted. Ultimately, the relationship between kinship, skilled practices and valued materials raises questions about how semiotic systems are generated and distributed in ways that coordinate development and social interaction.

1.8 Signs of Value

The semiotics of material culture are generally approached from a representational and computational point of view, which treats artefacts as representational projections that coordinate understanding about internally held beliefs and intentions. The recursion of propositional knowledge required for the most basic social interactions in traditional models of social cognition (such as orders of intentionality in "Theory of Mind") makes the explanation of large-scale self-organising social behaviour extremely difficult. Not only does representationalism obscure the material agency of artefacts by limiting their semiotic contributions to a "stands for" relationship between sign and referent but it also restricts analysis of semiosis to representational abstractions while ignoring other forms of meaning that emerge through material interactions such as iconic and indexical relationships. Ultimately, representational approaches to meaning maintain a linear model of cognition that

privileges minds as projecting on to the material environment. Cognitivism obscures the ways in which socio-material interactions generate and alter the meaning-making process and thereby fails to explain adequately how meaning originates, endures and transforms. Malafouris argues that, "for material culture, the means by which a sign is produced and the physical properties that define the sign for what it is as a physical object can be argued to have a direct bearing on the nature of the semiotic process" (2013, 94). By exploring semiotics in terms of process and material agency, a MET approach can assess how interactions with material culture generate meaningful relationships and coordinate development in ways that reconfigure the dynamics of social cognition.

The notion of the enactive sign is distinctive from representational approaches to semiotics in that it does not rely on an assumption or examination of symbolic content for its explanatory strength. Enactive signification (see Malafouris 2013, 89-118; Iliopoulos 2016a, 2016b; Iliopoulos and Garafoli 2016; Garafoli and Iliopoulos 2017), or the process in which semiotic meaning arises through dynamic interactions within the environment, shifts the focus from "what" a sign means to "how" it means (Malafouris 2013, 90). In this sense, "the meaning of the material sign is *expressive*… the material sign, in most cases, does not stand for a concept but rather substantiates a concept" (ibid, 97). A material sign concretises meaningful relationships by mediating participation in semiotic processes.

The production and circulation of value forms can be interpreted as the process through which value is conceptualised and enacted as tangible realities. Interactions with material-culture enabled communities to shape, share, manipulate and transform concepts of value and meaning. Colin Renfrew notes:

> *The respect accorded to valuables such as gold is not always based upon verbal formulations. It depends often upon contexts of use, in some cases of ritual use. The 'factuality' of value is often not based upon verbal propositions but upon the reality that artefacts of this material are valued, and that they are used in contexts where high value is implicit.* (Renfrew 2008, 2045)

Value creation is not reducible to language but emerges through material engagement within contexts of social interaction.[30] In this way, the "material sign does not refer to something existing separately from it, but is a constitutive part of what it expresses… it operates on the principle of participation rather than that of symbolic equivalency" (Malafouris 2013, 97). Examining the embodied, perceptual activities mediated through value forms clarifies how meaning-making rituals generate self-organising and coordinated activity.

To investigate how material culture coordinates new forms of interaction and meaning we must first examine how engagement with materials generates novel concepts of value. A growing body of anthropological thinking has come to "focus on the relation between action and value, and in particular on value as a way to deal with the significance of social action" (Otto and Willerslev 2013, 3). From an MET perspective, the relationship between action and meaning is substantiated through the material signs which manifest their value through their creation, circulation and performative use.

Value has three primary meanings in theoretical discourse: the sociological sense of normative understandings about the conduct of human life, the economic connotations of desire and motivation, and the linguistic sense in which value is determined by the context and relationships of a sign within a semiotic system in terms of differences, similarities and combinatorial possibilities (Graeber 2001, 1-22). Renfrew has argued that value amounts to an "institutional fact" in which, "the concept of 'value' generally implies some measure of 'agreed value' as determined between individuals: it is a social concept" (Renfrew 2001, 133-134). Value can be understood as a focus of attention that motivates social interaction which can in turn be defined as "a co-regulated, self-sustaining pattern of joint activity" (De Jaegher

[30] This argument is compatible with John Dewey's theory of valuation in which values are a means to a desired end which exist in a continuum of practical needs and physical propositions which modify each other in an ongoing process (1939).

et al. 2010, 443). Value forms, by coordinating the attention and interaction of dispersed communities, facilitate the emergence of complex social organisation.

Human mediations of activity and value through material culture necessitate an examination of intersubjectivity, interaction and social structure as interdependent processes. Piaget defined "structure" as the coordination of activity (Piaget and Frye, 1971), and it is from such a concept of coordinated activity that it is possible to bridge the relationship between individual cognitive development, social interaction and social "structure." Working from this definition, Graeber has described social structure as:

> *patterns of action… [that] not only coordinate all sorts of intentional human action, they are also the means through which actors are continually redefining and even remaking themselves at the same time as they are reproducing (and also inevitably, changing) the larger context through which all this takes place… structure is not something that exists prior to action… [it] is identical with the process of its own construction.* (2001, 59-61)

A definition of social structure as coordinated activity fits well within frameworks of social cognition that focus on social interaction and emphasise not only "understanding others but also understanding with others" (De Jaegher et al. 2010, 442). Approaching social structure as the coordination of interactions allows us to understand how attention and the development of intersubjectivity generates semiotics of value through material culture.

Social organisation, in its most basic sense, is the coordination of interactions between bodies. The embodied processes which support social interaction in terms of daily interpersonal activities are clear in terms of such things as body language (Gallagher 2011, 107-29); material mediums such as objects carried by two people (Gallagher and Ransom 2016); and environmentally situated feedback as occurs between dancers (Froese and Fuchs 2012) or people forming a queue (Kirsch 1995). In these examples the proximity and consistency of social interactions mitigate against entropy, supporting the durability and resiliency of the relationships. However, sustaining social interactions across extended spatial and temporal scales is energy intensive and, therefore, logically subject to a high degree of entropy. In other

words, the issue of social complexity is not simply a question of how large-scale social interactions develop, but also of how they persist. An enactive semiotics of value should address the formation of social knowledge that is required for social structures to emerge and maintain coherence. Graeber has written that society "is the process through which… activity is coordinated, and value, in turn is the way that actors see their own activity as a meaningful part of it" (2001, 76). Approaching social structure, interaction and cognition as interdependent processes reveals how a semiotics of value, as shared knowledge and motivation, develops and manifests through material culture to coordinate social activities spatially and temporally

The relationship between the value forms and social organisation emerges through collective attention and activities along intergenerational timescales. If we conceptualise value as the importance of human activity then we must ask, "in what ways do the actions of shaping people become embodied in value-forms… that reflect the meaning of my actions to myself in some tangible form as some object or action that I desire?" (Graeber 2001, 69). That is to say, how do the collective activities involved in the creation and circulation of artefacts generate shared meanings through which social relationships are reproduced? In the study of social cognition, joint and collective actions are traditionally framed either in terms of individuals with separate intentions and shared beliefs that form plurality through normative commitments to act jointly, or with common knowledge of intentions that integrate joint action (Gallagher and Ransom 2016, 337). In contrast, De Jaegher and Di Paolo argue that, "the relation between patterns of coordination and their implications for meaning should perhaps not be approached in terms of general mappings between the two domains but rather in terms of how the processes involved in the grasping and generation of meaning are affected by coordination during interaction" (2007, 12). Interaction has an emergent, relational identity in which feedback continually influences ongoing activity (ibid, 10).

The creation of valued artefacts and the performative actions involved in their use and circulation generated self-organising dynamics in meaning-making activities. Gallagher and Ransom note, "joint action is not simply action in close proximity accompanied by shared mental representations of goals and tasks. It's materially constrained and materially enabled interaction that redefines the affordance space and allows us to do things that we could not do on our own" (2016, 349). The value of materials not only anchors collective attention (focus upon activity) and coordinates interactions (the dynamic effects of activity); value forms actively mediated the development of intersubjectivity. It is necessary to examine the sign systems afforded through the creation and circulation of value forms to understand the relationship between material culture and social organisation.

The value of materials emerged from the properties of a given substance and its crafted forms. As Renfrew notes, "material becomes 'valuable' only when it is noticed" (Renfrew 2001, 133). The very act of investing time and energy shaping materials reveals a minimal sense of the value in learning and exploring a material's creative potential. Explaining how material culture is able to generate self-organising dynamics does not help us to understand the ways in which such relationships are structured. Instead, one might ask: how do the affordances of a material (such as the properties of marble and perceptual feedback generated by bodies and faces) transform into signs within a broader semiotic system? This question leads to a methodological issue as to what is the "starting point from which to read a constellation of material signs?" (Malafouris 2013, 96). In order to answer this question, Charles Saunders Pierce's concepts of iconic and indexical signification provide an excellent starting point for examining material semiosis (Peirce 1902; see also Knappett 2005, 85-106; Iliopoulos 2016a, 250-259; Watts 2008, 187-207). Beyond just the symbolic properties of signs, Peirce acknowledges the iconic (physical resemblance) and indexical (spatio-temporal correlations) properties of signification. Considering these sign relationships in the context of

intergenerational transformations in material culture has the potential to demonstrate how the enactive signification of value enables the coordination of complex social relationships.



Figure 5: Peircian Sign Types.

The indexical and iconic properties of material culture help reveal how meaning is generated but does not tell us how conceptions and activities of value creation transform over time. Beyond merely indexical and iconic relationships, material signs raise questions of "being and substance, questions of what is and is not, questions of quantity and quality, questions of relation and becoming, questions of place and time, questions of position and state, and questions of potentiality and actuality" (Malafouris 2013, 97). If we accept a theory of value in which, "what is ultimately being evaluated are not things, but actions" (Graeber 2001, 49) then value forms associated with kinshipping practices can be understood as a means of conceptualising the creation and relatedness of bodies. In these regards, such value forms are part of an "'economy of substance' in which the circulation of people and artefacts from place to place allowed significations that had been established in one context to be transferred to another… [this] should not be taken to infer an overarching structure, so much as a system of signification that might allow the production of meaning in a specific localised context"

(Thomas quoted in Gallagher and Ransom 2016, 112). As will be seen, the shaping and circulation of value forms generates enactive processes of signification through which distributed social relationships can be coordinated and manipulated at novel scales.

1.9 Conclusions: Metaplastic Niche Construction

What defines MET's perspective on human cognitive evolution is that it does not look for preformed structures, intentions or symbols located within the skull, but explores how materiality shapes thought as an enactive process. The metaplastic view of the mind is one of an "incomplete and unfinished process, in some sense 'blind,' and thus, potentially, in a permanent state of ongoing evolution" (Malafouris 2015b, 358). Thus, behavioural modernity does not have to be conceptualised as a point of departure from a finalised cognitive package in a completed evolutionary process. Rather, hominins, by cooperatively modifying their environments, can be seen to have generated a highly flexible and creative social intelligence that is materially enacted. By not making the metaphysical assumption of content, nor committing a linguistic fallacy that conflates information and representation, MET allows for a treatment of material culture that readily overcomes the explanatory gaps created by computational approaches to social cognition. The embodied properties of matter generate novel ecological feedback and connections within and between humans in their environments. Material things allow for the accumulation and conservation of cognitive changes by acting as "mediational, temporal and plastic" structures through which the brain develops (Malafouris 2013, 245). From this perspective, neural plasticity is the critical evolutionary feature of the brain that supports the emergence of social complexity through continuous feedback between the developmental affordances of the environment and human ontogeny. In these regards, the application of MET and enactivist approaches to social cognition within a niche construction framework support a hypothesis of embodied social intelligence.

Material culture, as a form of ecosystem engineering, transforms the flow of energy and matter in the environment. By not abstracting the relationship between mind, culture and environment to the informational processing of representations it is possible to take a dynamic systems approach, in which material culture is understood to integrate cognitive development into the energetic and material flows of ecosystems at multiple scales. Conceptualising material culture as intrinsically cognitive and social helps to reframe the concept of intersubjectivity and subverts categorical distinctions between the ecological, the individual and the social. The self-reinforcing teleology of evolutionarily a priori representations and Theory of Mind development produces a narrative of human social cognition that is stadial and homogenous. It is a description of the mind that does great injustice to the diversity of human societies and their historical processes. Human social relationships do not operate upon an interchangeable logic of recursive intentionality. Rather, human societies are spatially and temporally self-organising. Daily activities, communities, rituals, and historical events are not passively observed, inferred and predicted, they are dynamically engaged, navigated and transformed.

From the fission-fusion dynamics of hunter gatherers over the course of a single year, to processes of urbanisation over the course of generations, human social organisation is incredibly fluid and dynamic. What's more, all of these reconfigurations in social relationships imply extended reorganisations in the burdens and demands of social interaction, indicative of functional and structural changes in cognitive systems within historical timeframes. Any model of social cognition that wishes to contend with both evolutionary and developmental scales must be able to accommodate the non-linear, self-organising and emergent dynamics of human social relationships, or submit to a historical determinism based on the evolution of a metarepresentational mechanism in the brain. The alternative is to see an evolutionary process in which brains, hands and the bodies of others generated cognitive-developmental changes through environmental modifications that transformed ecological inheritance and the

possibilities of social interaction. In this light, one can explore the heterogeneity and scalar plasticities of human social relationships as processes of metaplastic niche construction which have emerged through the co-evolutionary entanglement of brains, bodies and materials since the origins of the species.

The emergence of humans has generated energetic and material transformations that are radically unique forms of complexity within the known universe. This process developed through intensifying co-evolutionary spirals between hominin communities and their environments. The ecological feedback generated by hominins has expanded and accumulated complexity for hundreds of thousands of years. However, it is only within the past ten thousand years that the scales of human social organisation began to radically transform and accelerate. A spectrum of Mesolithic and Neolithic lifeways began to massively re-engineer flows of energy and matter throughout Eurasia during the Holocene. Millennia of ecosystem engineering by foragers, co-evolution between humans and domesticates in concert with new energy transfer and capture technologies such as polished lithics and pottery began to drastically reorganise social interaction. As Neolithic people began to engineer new ecosystems with greater intensity, they unleashed novel energetic and developmental dynamics, leading to perhaps the most significant transformations in human social structures since the evolution of the species.

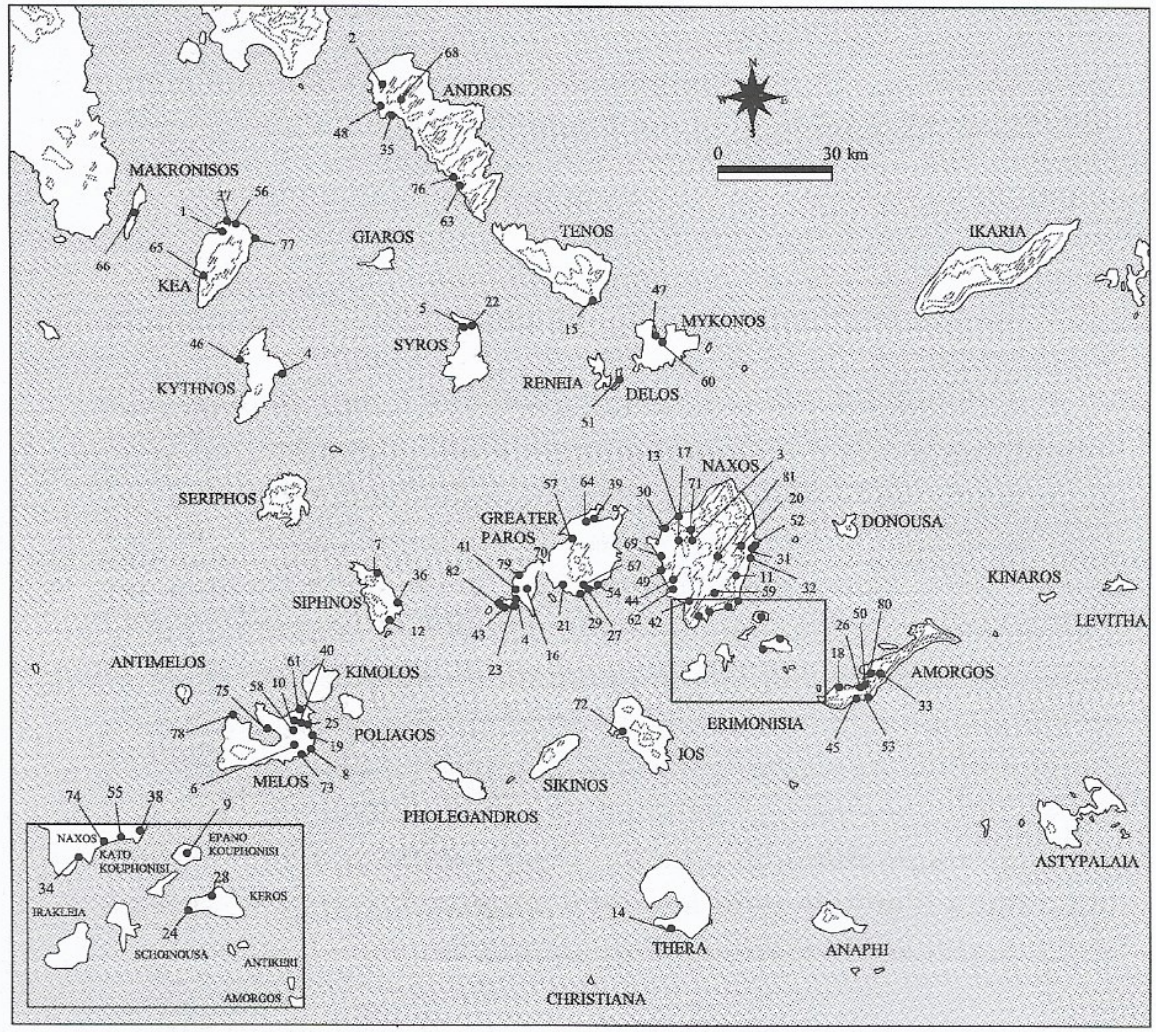
During the Bronze Age, hitherto unseen forms of complexity emerged at vast new scales such as writing, cities, bureaucracies, states, religions, armies and “international” trade networks. It is in the Bronze Age that many of the organisational features intrinsic to modern existence first began to emerge. The novel complexity of the period can be understood as a phase transition, a point at which organisational dynamics of a system break symmetry with their underlying structure and begin to exhibit new properties (Anderson 1972). The formation of new political and economic institutions as well as the growth of specialisation, stratification

and structural inequality all imply substantial reorganisations of ecosystems and social cognition. In the EBA Cyclades, these transformations were navigated in part through the shaping of marble.

Chapter Two: The Emergent Landscape

2.1 Introduction: The Prehistoric Cyclades

Some of the earliest evidence of human activity in the Cyclades comes from the distribution of Melian obsidian. Aegean seafarers navigated the islands to harvest the volcanic glass during the Upper-Palaeolithic, as early as thirteen thousand years before the present (Perlès 1987, 142-145; Renfrew and Aspinall 1990). Obsidian and a small number of Mesolithic sites discovered on islands are the only remaining pre-Neolithic traces of these early maritime activities. No materials of the original vessels survive, but their journeys are evinced by the volcanic glass that is spread throughout the prehistoric Aegean. As the Pleistocene transitioned into the Holocene, Aegean mariners began to form seaborne exchange networks that distributed Melian obsidian to Crete, the Greek Mainland, and Anatolia (Carter 2016; Perlès et al. 2011). From these early nautical relationships, the distinctive characteristic of Aegean societies first began to emerge through engagement with the sea. Neolithic occupation of the Cyclades during the middle of the Holocene substantially reconfigured these maritime interactions as well as terrestrial environments. Over time, this reorganisation of energy and matter flows began to exert novel pressures on the dynamics of seafaring and habitation in the Aegean. It is amidst these dramatic changes in the environment that Cycladic islanders began to shape marble. In order to illuminate the context in which the emergence of the sculpting traditions occurred and to understand the changing cognitive demands of social interaction at the outset of the EBA, this chapter explores the relationships between the Cycladic environment, seafaring, ecosystem engineering and settlement patterns.



Key to sites		Avdeli	20	Kouphi	40	Phyrroges	62
		Avyssos	21	Krassades	41	Plaka	63
Agia Irini	1	Chalandriani-Kastri	22	Lakkoudes	42	Plastiras	64
Agia Marina	2	Cheiromylos	23	Livadi	43	Poisses	65
Agioi Anargyroi	3	Daskaleio-Kavos	24	Louros Athalassou	44	Provatsa	66
Agios Ioannis	4	Demenegaki	25	Markiani	45	Pyrgos	67
Agios Loukas	5	Dokathismata	26	Maroula	46	Rethi	68
Agios Panteleimon	6	Drios	27	Mavrispilia	47	Rizokastellia	69
Agios Sostis	7	Gerani	28	Mazareko	48	Saliagos	70
Agios Theodoros	8	Glypha	29	Mikri Vigla	49	Sangri	71
Agrilia (Kouphonisi)	9	Grotta-Aplomata	30	Minoa	50	Skarkos	72
Agrilia (Melos)	10	Kampos tis Makris	31	Mt Kynthos	51	Skouries	see 4
Ailas	11	Kanaki	32	Moutsouna	52	Spathi	73
Akrotiraki	12	Kapros	33	Notina	53	Spedos	74
Akrotiri (Naxos)	13	Karvounolakkoi	34	Panagia	54	Sta Nychia	75
Akrotiri (Thera)	14	Kastri (Andros)	35	Panormos	55	Strophylas	76
Akrotirion Ourion	15	Kastri (Syros)	see 22	Paoura	56	Sykamias	77
Antiparos cave	16	Kastro	36	Paroikia	57	Vani	78
Aphendika	17	Kavos	see 24	Pelos	58	Vouni	79
Aplomata	see 30	Kephala	37	Phionda	59	Xylokeratidi	80
Arkesini	18	Korphi t'Aroniou	38	Phtelia	60	Zas cave	81
Asprochorio	19	Koukounaries	39	Phylakopi	61	Zoumbaria	82

Figure 6: Prehistoric Sites of the Cyclades. After Broodbank 2000: Frontispiece.

The unique feedback between maritime environments, seafaring practices and niche constructing dynamics of agriculture expanded and intensified the demands placed upon Aegean social cognition. Anthropogenic changes in the environment (e.g. introduction of domesticates, soil erosion, and settlements) resulted in long-term ecological transformations that were negotiated as developmentally situated processes that reconfigured conceptions of the body and community identity over time. The development of Cycladic sculpting is contextualised within the environmental changes, settlement patterns, social interactions and seafaring practices that emerged along a continuum of transformations from the Late Neolithic in to the EBA. By exploring these dynamics, it is possible to hypothesise the role of Cycladic figurines as a form of kinshipping technology that mediated transformations in social organisation and the environment.

After the introduction, section two of this chapter traces a general outline of the emergence of maritime culture in the prehistoric Cyclades prior to the Middle Bronze Age. The following section focuses on the cognitive dimensions of early Aegean seafaring by exploring concepts of intentionality in the context of maritime activity, as well as the developmental impacts and changing patterns of seafaring behaviour. The fourth section then shifts attention to the emergence of the Cycladic Neolithic and observed population dynamics. The chapter then moves to an assessment of the ecological impacts from the Late Neolithic in to the EBA. The penultimate section considers implications of the ecological and settlement evidence for the ECI Grotta-Pelos culture to examine the changing demands upon social cognition. This chapter concludes by contextualising the emergence of Cycladic sculpting traditions within the long-term environmental and sociological transition from the Late Neolithic into the Early Bronze Age.

The occupation of the Cyclades during the Late Neolithic was assuredly an intensive period of ecosystem engineering and niche construction. Despite the lack of pollen core

samples available in the region, the expansion of settlements in the Cyclades undoubtedly involved the clearing of land for the purposes of building settlements, watercraft, cultivation and grazing. Evidence of colonisation in the south eastern Cyclades beginning in the Late Neolithic (Evans and Renfrew 1968; Hadjianastasiou 1988; Zachos 1990; Katsarou and Schilardi 2004; Sampson 2002) and in the north west during Final Neolithic (Coleman 1977; Koutsoukou 1992; Wilson 1999; Televantou 2008) that suggests a late-stage pattern of infilling following the Neolithization of mainland Greece and Anatolia (cf. Broodbank 2000, 133-141; Phoca-Cosmetatou 2011a). Over time, as will be argued, ecological and demographic changes generated by Neolithic communities in the archipelago reconfigured the burdens placed upon Cycladic social cognition. The appearance of Cycladic figurines in conjunction with the reorganisation of settlement patterns at the beginning of the EBA indicates that sculpting played a critical role in mediating social transformations as the Neolithic came to an end. In light of the broad settlement and mortuary evidence and their patterns of change over time, this chapter argues that the figurines are best interpreted as a form of kinshipping technology that emerged as a means of stabilising and coordinating transforming social dynamics.

2.2 The Deep Emergence of Cycladic Seafaring

From early in their history, Aegean peoples adapted their communities to the unique challenges and opportunities of their environments. The first clear evidence of seasonal settlement in the Cyclades comes from the Mesolithic site of Maroulas on Kythnos (Honea 1975; Sampson 2008a). The most reliable carbon dating indicates occupation between the ninth and eighth millenniums B.C., making it contemporary with the occupation of the Franchthi cave, though occupation during the seventh and sixth millenniums are also possibilities (Sampson 2008a, 16). Maroulas would have been a key location in voyages to Melos from Attica, and likely from Euboea and the Argolid as well. More recent discoveries of Mesolithic

sites on Sikinos (Sampson 2018), Naxos (Sampson 2016) and Ikaria (Sampson et al. 2012) with similar tool assemblages to those found at Chalki in the Dodecanese (Sampson 2010) and aceramic Knossos (Kaczanowska and Kozłowski 2011) provides evidence for extensive Mesolithic networks extending across the Aegean (cf. Sampson 2019). Maritime links that are further evidenced by the presence of Melian Obsidian on Crete as well as in the Dodecanese and the Sporades (Carter 2016; Carter et. al. 2018). Notably, with a significant lithic industry focused on Melian obsidian and local flint, the settlement at Roos on Naxos is the largest of the known Mesolithic sites in the central Aegean (Sampson 2016). Such locations undoubtedly provided key frames of reference through which the exploration and conceptual mapping of the Aegean developed.

During the Mesolithic, as with later periods, the Cyclades formed a hub of interaction for communities from the major geographic regions of the Aegean. Within the archipelago, these early maritime relationships were oriented around Melos. However, it should come as little surprise that the largest and most geographically central landmass in the Cyclades appears to have played a significant role in these dynamics. The marble island of Naxos, with its diverse lithic and ecological resources, assuredly played a prominent role in any voyages connected to the eastern Mediterranean. Voyages that are attested to by the identification of Melian obsidian at the Mesolithic site of Kerame 1 on Ikaria (Carter et al. 2018, 181 table 4). Naxos is also probably the island on which Neolithic colonists first established themselves and where one can see the existence of "antecedent information networks", which helps to explain the rapid spread of Neolithic practices throughout the Aegean (Broodbank 2000, 116-7). The gap in evidence for human habitation in the Cyclades between the Mesolithic and LN potentially reflects a changing dynamic in which the demand for Obsidian increased but the need for seasonal sites diminished with the formation of agricultural settlements. Nonetheless, for thousands of years prior to the Neolithic colonisation of the Cyclades, seafaring and exchange

played a central role in the formation of Aegean societies. Many of the unique features of Aegean social cognition were anticipated in the Mesolithic. Widely distributed communities were connected at new scales, afforded by seafaring practices that mediated relationships and identities through the movement of highly valued substances across the sea.

Roughly seven thousand years before the present, the first agricultural settlements started to appear in the Cyclades (cf. Phoca-Cosmetatou 2011a). Undoubtedly, this process of colonisation emerged from the skill and knowledge of prior generations exploring the Aegean. During the Neolithic, obsidian not only continued to be harvested, but its acquisition drastically expanded to as much as 50% of assemblages in some groups (Winjen 1981; Perlès 1989; Evans 1994; Carter 1998). We find continuity in the designs of Aegean Mesolithic and Early Neolithic obsidian arrowheads, revealing that Neolithic communities were bootstrapped from Mesolithic societies (Broodbank 2013, 189). It would appear that Cycladic environments were substantially reorganised through the integration of Neolithic practices with more ancient knowledge and skills. In essence, the first agricultural settlements functioned as ecological reactors, steadily transforming energy and matter flows in the Aegean. Over the course of two and a half millennia, Cycladic ecosystem engineering generated scalar changes in organisation that shaped the movement of people and things across the Aegean.

With the onset of the Bronze Age, voyagers from the Cyclades connected and interacted with numerous communities, sometimes thousands strong, throughout the Aegean (Agouridis 1997).[31] Non-linear feedback between seafaring culture and these new energetic dynamics bound together innovative regimes of value and novel social relationships at multiple scales of interaction generating new conceptions of identity which began to form within and between communities (Renfrew 1972). At the core of these seaborne entanglements, flows of marble

[31] In the Cyclades, extended kinship networks assuredly numbered in the thousands. Population estimates for the region range from 1292 and 7749 with densities of .5 to 3.0 persons a square kilometre (Broodbank 2000, 90 table 1). Based on these values, the Minor Cyclades and the immediately surrounding islands would have been home to between 715 and 2,145 people.

within the Cyclades mediated and bound together various groups across the central islands. The material played a key role in Cycladic strategies for coping with and organising the emergent complexity of the EBA (Renfrew 2013). Through the entanglement of marble sculpting and seafaring, the Cyclades formed the core of a complex adaptive system in the Early Bronze Age that both prefigured and set in motion the dynamics of subsequent Aegean history. In order to understand how marble sculpting traditions generated transformations in social cognition, it is critical to explore the ecological and developmental pressures in which they formed.

2.3 Seafaring and the Aegean Mind

Early Aegean people were intimately shaped by their engagement with the sea. Despite occupying around a tenth of the Mediterranean's total area the Aegean comprises over a third of the basin's total coastline (Broodbank 2013, 75-76). The Cyclades, occupying around 10% of the Aegean's total sea area, contain the most complex and dense configurations of currents, coastlines, and anchorages in the entire region. Within the archipelago, distances between islands range between ten and thirty kilometres. The island chain was an ideal landscape for the "autocatalytic expansion" of seafaring cultures, that is, the self-generating process in which the discovery of islands leads to further exploration, discovery and investment into maritime activity (Keegan and Diamond 1987, 67). The unique geo-ecology of the Aegean provided the fundamental cognitive scaffolding through which the Mediterranean's first truly maritime societies could emerge.

Crewed vessels were undoubtedly among the most substantial technologies possessed by prehistoric Aegean communities. The creation and operation of such seacraft was inherently a social enterprise (cf. Van de Noort 2004; Chapman and Geary 2004; Farr 2006) and a material anchor for shared attention and intentions. In other words, crewed boats were a locus of

intersubjectivity in the prehistoric Aegean.[32] In short, human cognitive abilities were capable of being re-organised around the highly complex endeavour of exploring the sea. Given the resources and energy necessary to produce and crew vessels, in conjunction with the long-term planning required for voyages and the development of navigation skills, it is not conceivable that seafaring was simply envisaged and executed a priori as a fully formed concept.

Aegean seafaring assuredly developed from the simple to the complex as communities engaged with maritime environments over the course of generations. Seafaring behaviours are extremely ancient (1999a) with evidence for such activities in the Mediterranean possibly extending back to the Lower Palaeolithic (Bednarik 1999b; Strasser et al. 2010; Ferentinos et. al. 2012) Humans have a long history of observing and engaging with interactions between organic materials, bodies, artefacts and water. For example, it is prudent to assume that the paddle was reasoned analogically from the arm and hand while swimming. The skills and possibilities of prehistoric seafaring have been explored through several modern experiments with reed boats and wooden dugouts. In 1988, a crew of six took a reed "papyrella" boat from Lavrion to Melos on a seven-day journey of 75 nautical miles (Tzala 1989). In 1998 an eleven-person crew took a dugout, copied from an 8,000-year-old canoe excavated at lake Bracciano in Italy, roughly 750 nautical miles across the western Mediterranean (Tichy 2000). Ultimately, the specific design of these early boats is not their most salient feature. Rather, it is the distributed processes in which they were created and operated that reveals the most about these early communities.

The hundreds of labour hours required to construct seacraft, and the extended absences voyaging entailed, indicates that the pressures acting upon maritime communities to explore

[32] In consideration of kinshipping practices and seafaring, it is worth noting that the Truskee people of Micronesia have a post-natal kinship term, "'my sibling from the same canoe', referring to those who sustained each other through a life-threatening trial at sea" (Sahlins 2013b, 14-15 quoting Mac Marshall).

the sea were significant. The Aegean coastline presents itself as an excellent example of maritime "nurseries" in which complex and liminal spaces between mainland and islands encourage experimentation, exploration and habitation (Irwin 1989, 168; 1992, 31). The islands scattered across the Aegean horizon would have been curiosities to the first human groups moving along the shore while providing an important frame of reference for orienting and navigating the environment. Over time, intensifying interactions and resource competition amongst mainland communities as well as basic human curiosity would have provided powerful incentives to explore and make use of these maritime locations. Expansion into the islands falls within a general pattern of ecological "infilling" that occurs with population growth and migration. Regardless of whether competition between communities was overt or exhibited a more diffuse ecological pressure between growing populations, over time the reward-risk calculus of travelling to the islands would have transformed.

Demographic growth provided coastal populations with an incentive to orient towards maritime resources. This pattern is substantiated by the Franchthi Cave in the Peloponnese where the first obsidian deposits occur in the context of dietary shift from terrestrial game and fish to intensive harvesting of snails and molluscs (Perlès 1999; Stiner and Munro 2011). The Aegean islands undoubtedly had powerful attraction under these conditions. Due to the lack of evidence for year-round occupation and the mobility of hunter-gatherer life, the Cycladic islands were probably viewed as a seasonal resource for hunting and harvesting. Seasonal usage would explain the process of return and exploration that ultimately lead to the discovery of Melos and the regular importation of obsidian. Ultimately, maritime abilities and intentions would have organically developed through interactions with the Aegean coastline.

2.3.1 Sea Intentions

From construction to seafaring and the procurement of rare materials such as obsidian, the creation and utilisation of watercraft formed a key focus around which groups of prehistoric

Aegean peoples ordered temporal and spatial relationships. Seacraft, as has been explored in detail with Edwin Hutchins' analysis of navigation practices, are an example *par excellence* of distributed, relatively self-contained, cognitive systems (1995). Maritime travel is evidence for the organisation of social cognition into densely coupled interactions and highly distributed processes. Vessels capable of ferrying even small crews required shared attention and collective intentions, as well as the communal development of skills ranging from construction, to navigation and exploration.

Traditional conceptions of intentionality were formulated to distinguish mental states from physical behaviour. In philosophy of mind, the dominant tendency has been to conceptualise intentionality as an internally formed "stance" that directs the agent to act in a world about which they have beliefs and desires. Intentional thought is conceived of as propositional content that enables individuals to make choices about the world (Fiske and Taylor 2013, 44). It is the capacity for representing and reasoning through behaviours to effect different causal processes that is believed to give humans their unique agency. The so-called "mark of the mental" is the idea that humans form non-derived, prior intentions about the world which they can then act upon, thereby conforming the material environment to their internal thoughts. This perspective is essentially a linear model of mental production that flows into a passively reactive world. The mind is understood to generate causal changes in the environment in order to meet "conditions of satisfaction" for internal mental states (Malafouris 2013, 138). However, the assumption of a priori representational content fails to establish a satisfactory explanation for the causal origins of intentional states, unless we assume that activities such as seafaring were genetically programmed into *Homo sapiens* brains from the outset. The intention to construct boats and gather obsidian from an island beyond the horizon did not simply appear as preformed beliefs and intentions about the world but developed in a historically contingent manner.

In order to understand how Aegean peoples began to form intentions about seafaring they had to engage with their environment. The intention to cross the Aegean developed at the intersection of coastlines, horizons, and material interactions through which Stone Age communities learned to shape, and behave in, their environments. From a material engagement perspective, "intentionality should be understood as a distributed, emergent, and interactive phenomenon rather than as a subjective mental state" (Malafouris 2013, 144). That is to say, intentions develop through action as a form of operative intentionality that "is determined by what the agent is doing and what the agent is ready to do, and is constrained […] by" (Gallagher 2017, 79). The affordances and limitations of the prehistoric Aegean provided the fundamental capacities and resources, or "background", through which seafaring intentions developed. Thus, skilled behaviour in the environment can be understood to form an "*extended intentional state*" (Malafouris 2013, 142). In this sense, Irwin's voyaging "nurseries" (1989; 1992) are environments which interact with the plasticity of the human mind in ways that generate maritime intentionality.[33]

The Aegean, and particularly the Cyclades, have extremely complex winds and currents. Given the technological limitations of early seacraft, expeditions would have been most feasible between May and September. However, currents from the eastern Aegean via Ikaria and Kalymnos are more amenable during the winter than during the summer (Agouridis 1997, 15). Nonetheless, weather patterns are highly variable with long periods of calm in the winter and powerful storms in the summer that create opportunities and impediments to sea travel year-round (Broodbank 2000, 92-93). Intentions about seafaring were fundamentally structured by the seasonal patterns, which generated the temporal rhythms that sea travel was

[33] It is also important to recognise that serendipity and accident play as critical a role as human intentionality. The unintended consequences of being blown off course, establishing at one site rather than another due to chance landings, and the dangers of losing members of a society all have powerful causal implications that can shape the evolution of maritime networks, the survival of communities, as well as the norms and behaviours of seafaring cultures.

organised around. Because the voyages were arduous, there was certainly acute awareness of when to construct new boats, times to embark and return, as well as when communities should begin to worry for late arrivals. In other words, maritime social relationships were patterned by seasonal dynamics, geography and seafaring technologies. For examples, the relationship between the environmental dynamics of agriculture and seafaring afforded critical parameters of risk and reward in the Cyclades which undoubtedly patterned behaviours. There are significant structural implications for Cycladic social organisation relating to periods of absence and the demographics of villages and territories during voyaging periods, a topic that will be returned to in the sixth chapter. Nonetheless, it is from a perspective of operative intentions in action that we can understand the ways in which the Aegean world shaped the emergence of a distinctive maritime social cognition.

Traditional frameworks of cognition view intentionality as the non-derived mental contents of individuals. In contrast, it is possible to understand the mind as *ab initio* an intersubjective process in which intentionality comes "from the others with whom we interact, or more precisely, it is generated in our interaction" (Gallagher 2017, 81). Seafaring provides an excellent example of how intentionality is both socially and materially distributed. Building crewed boats required coordinated labour, from the specific temporal flow of constructing the watercraft to the deferred goal of taking to the sea and exploring. Seafaring also indicates divisions and distributions of labour, different roles in the production process as well as activities such as rowing and navigation. The planning, coordination and skilled behaviour involved in maritime activities is mediated not only through the material interactions of the environment, but also through the embodied intimacy of such activities.

Building, paddling and navigating sea vessels not only required coordination across numerous scales of interaction, but also shared experience, knowledge and trust. Consider the hypothetical situation: six people, paddling to Melos, would not have needed continuous

conceptualisation and verification each other's intentions and actions to ensure that they were in fact paddling to Melos. The very structure of the activity provided a gestalt awareness of their collective intentions in action. Shaun Gallagher notes that, "with respect to social cognition, we normally grasp other's intentions in terms of its appropriateness, its pragmatic and/or emotional value for our particular way of being, constituted by the particular goals or projects we have (or share) at the time, our implicit take on cultural norms, our social role or status, and so on, rather than reflecting inner mental states, or as consulting explanatory reasons for the other's further thoughts and actions" (2017, 78-79). Likewise, the construction of a boat substantiated the immediate intention of task completion as well as the longer-term intentions of journeying that were derived from previous exploration and interaction with the environment. Thus, it is not necessary to conceptualise intentional thought as representations locked inside individual heads, but something that is socially embodied and materially distributed along an intergenerational continuum.

2.3.2 Navigation and Development in the Deep Blue Sea

Engagement with the sea undoubtedly had significant and wide-ranging impacts upon the emergence of early Aegean communities, from diet to perception and identity formation. The development of nautical skills suggests profound impacts upon the early Aegean mind. Modern studies of seafaring societies give us a strong degree of insight into the embodied processes of traditional navigation. An illustration of such skilled behaviour comes from Polynesian navigators who will lay in the bottom of their vessels to observe the movement of stars and discern currents through the motion of the canoe on the water (Tuan 2011, 70). Though the details of Cycladic nautical techniques are lost, it is possible to appreciate their skills in proxy by considering the sophistication and diversity of other maritime practices. For example, Micronesians traditionally navigate between distant islands by conceiving of their vessels and star points as fixed while the islands are conceptualised as in motion. In this way,

canoes, constellation arcs and seascape features form a distributed system through which navigators can maintain bearing without the use of specialised instruments. This conceptual mapping reduces the cognitive burden by creating only one variable location, the island, as opposed to two variables, the position of canoe and stars. (Hutchins 1995, 66-93) Importantly, the conceptual differences between Micronesian navigation and Western methods reveals how techniques for managing the complexity of seafaring are both materially anchored and culturally contingent.

In contrast to the context of Oceania in which the Micronesians sail, the densely packed islandscape of the Cyclades is highly favourable to pilotage, thereby lessening the demand for complex navigation techniques. Nonetheless, by the time of the Early Bronze Age, with longboats ranging hundreds of nautical miles, sophisticated navigation skills were essential (Agouridis 1997). Cycladic seafarers undoubtedly had traditions through which they learned to traverse the sea, a process that was conceptually anchored by external structures and patterns such as water features, landmasses, stars and lunar cycles.

Engaging with maritime environments has potentially significant implications upon ancient Aegean peoples' physiological, perceptual and even neural development. For example, studies show that Moken children (semi-nomadic Austronesian seafarers) have significantly better underwater vision with twice the spatial resolution of their European counterparts. Moreover, eleven training sessions over the course of a month with European children resulted in underwater acuity equal to that of Moken children (Gislén et al. 2006). Recent studies on professional navigators (in this case London taxi drivers) have also revealed that the acquisition of these specific skills involves the neuroplastic enlargement of the hippocampus, which is involved in spatial memory and navigation (Maguire et al. 2000). Thus, it is not a radical move to speculate that seafaring had structural impacts, at the very least synchronically, upon the neural development of early Aegean peoples.

Aegean navigation skills developed through embodied interactions between canoes, communities and the sea, linking perceptual, behavioural and conceptual processes into relationships of emergent developmental feedback. In this light, it is possible to observe deep patterns through which Aegean maritime culture emerged. As communities learned to interact with the energetic and material flows of the sea, they began to develop novel skills that enabled Aegean peoples to formulate new intentions to undertake cooperative maritime endeavours. Untapped resources on the islands certainly enabled and encouraged this process. However, it was the agency and value of obsidian that consolidated this movement into the first observable, intergenerational maritime networks. From the outset, the development of Cycladic social cognition was entwined with seafaring and movement in the Aegean. What can be observed is an environment in which not only distinctive abilities and cultural identities were gestated, but also relationships of value surrounding voyaging and the acquisition of prized materials which persisted for millennia.

2.3.3 The Longue Durée of the Longboats

The earliest depictions of maritime technologies in the Aegean come from twelve engravings of vessels at the Final Neolithic settlement of Strophilas on Andros. Of note is a larger boat (relative to the other depictions) combined with the image of a fish, bearing a striking similarity to longboat depictions found during the Early Bronze Age (Televantou 2008, 47-48). It appears that longboat technology existed in the Aegean Final Neolithic, roughly six thousand years before the present. It is unclear whether the longboat was a new technological form. Nonetheless, longboats, with crews of possibly 25-40 people (Broodbank 2000, 99-101), provided a relatively "monumental" unit of social organisation around which Cycladic intersubjectivity developed. The maritime imagery that begins to appear in the Cyclades during the Final Neolithic and Early Bronze Age are part of a broader phenomenon of depicting seacraft that begins to occur across the Mediterranean during this period (Broodbank 2013,

327). As Broodbank argues, this new behaviour indicates an ideological shift in which seafaring came to play a new central role in community identities and the formation of social power (ibid, 329). In what Renfrew famously labelled the "international spirit", trade relations extended through the Cyclades to mainland Greece, Anatolia and Crete around four and a half thousand years before the present (1972). Long distance trade between the Cyclades and the broader Aegean world is already evident by the Final Neolithic roughly six thousand years ago (Kouka 2008; Papadatos and Tomkins 2013). However, these early exchanges appear to have been a much more stochastic affair, whereas by the middle of the Early Bronze Age a stable, multigenerational pattern of consistent, periodic long-distance voyaging and exchange was established.

Due to the environmental dynamics of the Aegean and technological capacities of the period, Broodbank postulates that Cycladic longboat voyages followed long circular arcs around the Aegean basin, utilising winds, currents and coastlines to structure long distance journeys (2000, 287-288). Such voyages likely followed the southerly winds of the summer Meltemi to Crete, returning to the Cyclades from the north by following the Peloponnesian and Anatolian coastlines. Such journeys are attested to by the distribution of Cycladic material culture throughout these regions and the likelihood of a Cycladic colony at Agia Photia in eastern Crete (ibid, 302). This evidence gives a sense of the degree to which Aegean social interactions were shaped by the temporal rhythms of early seafaring. It is also important to recognise that this seascape would have been understood in phenomenological terms. A downwind location with amenable currents was functionally closer than geographically nearby sites in less favourable positions. Distance was undoubtedly conceived in terms of orientation, movement, time, and even seasonality, providing the phenomenological grounds for conceptually mapping Aegean communities.

The Cycladic islanders were undeniably the pre-eminent mariners of the pre-Minoan world. By the Early Bronze Age, Cycladic longboats were critical in binding together maritime networks across the Aegean (Broodbank 1989). New materials such as copper and silver began to circulate through the region, catalysing significant developmental changes (Renfrew 1972). The fundamental maritime technologies and skills required for these new cultural regimes were established in the millennia prior to their expansion in the Early Bronze Age. The intersection of novel technologies and skills along with the sweeping developmental changes brought about by the occupation of the Cyclades ultimately generated a seafaring culture that was organised on a regional scale. Thus, an ancient cognitive ecology of maritime practice became entangled with novel forms of ecosystem engineering, ultimately generating the energetic disequilibria required to propel Cycladic longboats hundreds of kilometres across their low friction, liquid environments.

The likely functions of Cycladic longboats were for purposes of raiding and trading, and it is during their ascendency that large settlements and fortifications began to aggregate. Broodbank postulates that through investment into these ships, island communities were able to develop and control an emerging Cycladic political economy (1989; 1993). Crucially, these novel social interactions and configurations led to the development of new forms of meaning. Exotic materials and distant communities were bound together by the seasonal movement of longboats around the Aegean; these regional interactions imply new conceptions of identity and value. Broodbank argues that, due to the distinct trade imbalance favouring Cycladic exports during this period, long distance travel by canoe was likely implicated in a vigorous prestige dynamic.[34] He describes a world of "Ulysses without sails", in which travel and exploration began to form individual status and group identity around the acquisition of exotic knowledge (Broodbank 1993). In order to understand how Cycladic voyaging culture emerged,

[34] The concept of prestige will be critiqued in chapter five.

why it was so heavily entangled with marble and the implications upon social cognition, it is critical to look at the transformative role of the Neolithic in the Aegean. During the Early Bronze Age, a radical reconfiguration in the role of seafaring technologies, the circulation of novel materials and the organisation of communities emerged from the energetic dynamics set in motion by the Neolithic. The foundations of Aegean history can be seen in this cognitive ecology, distributed through communities, canoes, landscape and valued substances, shaping individual and social developments on a regional scale.

2.4 Emergence of the Neolithic

The emergence of small farming villages at the beginning of the seventh millennium BC heralded the advent of the Aegean Neolithic (Demoule and Perlès 1993; Perlès 2001; Shennan 2018, 55-78). It has become increasingly apparent that maritime networks played a central role in the initial neolithization of the region (Broodbank 2006; Reingruber 2011; Horejs et al. 2015). Neolithic practices were first introduced in the eastern Aegean through a south eastern Anatolian route (Shennan 2018, 63-71) resulting in the rapid establishment of agropastoralists on Crete (Broodbank and Strasser 1991). Following establishment in the eastern Aegean and Crete, Neolithic lifeways emerged in the central Aegean some two to three centuries later, and finally in the northern Aegean towards the end of the seventh millennium BC (Reingruber and Thissen 2005). The evidence indicates that early farmers followed coastal routes in a "leapfrogging" colonisation process (cf. Zilhão 1993, 37; following Arnaud 1982). Horejs et al. have argued that the gap between Mesolithic and Neolithic layers in the Aegean is perhaps best explained by the explicit choice to locate settlements in unoccupied areas (2015, 295-296). Though evidence for the Neolithisation of the Aegean strongly suggests demic expansion Aegean, genetic evidence does reveal that some forager groups either adopted Neolithic practices or integrated with agropastoralist groups (Hofmanová et al. 2016) including

communities associated with the Franchthi cave (Mathieson 2018, 201). Despite the disjuncture between Aegean Mesolithic and Neolithic cultures, the process of colonisation, rapid procurement of Melian obsidian, clear Mesolithic-Neolithic artefact evolution of arrowheads and genetic evidence all imply that foraging and agricultural groups were interacting. What is beyond question is that seafaring and the procurement of Melian obsidian played a critical role in Aegean neolithization.

Seven thousand years before the present the Neolithic was firmly established in major geographic regions of the Aegean. That early Neolithic Aegean communities were familiar with the Cyclades is attested to by their continued harvesting of obsidian during the millennia prior to year-round occupation. However, it was not until the Late Neolithic fifth millennia BC that seafarers began to colonise the archipelago (Phoca-Cosmetatou 2011a). Despite the relative antiquity of seafaring in the Cyclades, the islands were among the last environments in the Aegean world to be permanently settled. The two millennia delay between Neolithization and occupation is commensurate with the marginal environments of the archipelago. The Cyclades are rocky and arid, and only the largest islands provide the elevation and complex drainages necessary to create alluvial plains of any significance. Yet, even the most fecund lands in the archipelago are minor in comparison to the arable lands available on the Aegean's principal landmasses. The Saliagos Culture, named after the settlement discovered on the islet of Saliagos located between Paros and Antiparos, is the first group to have settled the Cyclades (Evans and Renfrew 1968). Beyond Paros, evidence for Saliagos settlements have been found on Naxos (Hadjianastasiou 1988; Zachos 1990), Mykonos (Sampson and Mastrogiannopoulou 2002) as well as Santorini (Sotirakopoulou 1990) and Amorgos (Marangou 2002). Amidst these early permanent settlement sites, we find evidence of the first pressure flaked obsidian blades and the earliest marble figurines in the Cyclades.

Naxos, the largest and most fertile of the Cycladic islands, is the most likely candidate for initial colonisation from which further expansion emanated. In consideration of Naxos' geographical prominence, Broodbank has utilised proximal point analysis to argue for an eastern Aegean origin of the Saliagos culture (2000, 129-45). With an area of over four hundred kilometres and a height of a thousand meters, Naxos is also the most visible Cycladic landmass from the greatest distance, making it an easy navigational target for voyages from the east, particularly from Ikaria (ibid, 129-141). Likewise, the island's central location when approaching the Cyclades from both the north and southeastern Aegean makes Naxos a natural convergence point for voyages originating from the east. The probability of eastern Aegean colonisation is further substantiated by the clustering of Saliagos settlements in the central Cycladic islands as well as affinities with Anatolian material assemblages (Warren and Hankey 1989, 9-10). The evidence for marble working at contemporary sites in western Anatolia provides further credence to an eastern origin for the first Cycladic islanders (Takaoğlu 2004; Takaoğlu 2005). Of particular significance are lugged marble rhytons with direct parallels in Cycladic assemblages (Takaoğlu 2005, 83 figure 2). The possibility that Anatolian peoples familiar with marble working first colonised an island largely composed of, and renowned for, high quality marble is potentially quite significant for the development of Cycladic material culture.

Colonisation efforts originating from mainland Greece did not begin until the Final Neolithic, roughly half a millennium after the first Saliagos communities. At the end of the Neolithic, the Kephala culture becomes evident in the northern Cyclades, at the site of Paoura and its namesake location on Kea as well as Strophilas on Andros (Coleman 1977; Broodbank 2000, 149-150; Televantou 2008). This settlement distribution along with a material culture that forms a distinct continuum with the mainland assemblages is possibly indicative of expansion from Attica and Euboea. Minimally, the archaeological evidence reveals intensive

and extensive interactions with the mainland which produced cultural practices that were distinct from those of Saliagos communities (Broodbank 2000, 149). Critically, the Neolithic Cyclades were a multicultural environment from early on. Communities originating from the major regions of the Aegean were interacting within the region, both in terms of colonisation as well as mainland groups that continued to move through the islands or maintained links to obsidian and other resources from the archipelago.

2.4.1 Bodies, Quantities and Densities

Colonisation of the Cyclades follows a general pattern of infilling found throughout the Neolithic. As populations brought the most fertile areas under production for sustained periods of time they increasingly spread into more marginal territories. That this is fundamentally the case for Cycladic colonisation is attested to by several factors. Firstly, the basic technologies and skill sets for island colonisation already existed long before permanent occupation. The means of occupying the Cyclades were derived from pre-existing maritime practices as well as mainland agricultural regimes that were transplanted wholesale into the islands (Phoca-Cosmetatou 2011a, 85-86). Secondly, the changing mainland dynamics prior to the occupation of the Cyclades support the argument that demographic pressure pushed Neolithic peoples into the Cyclades. In the millennia prior to occupation there is marked settlement growth, movement into upland areas, and increasing reliance upon pastoralism in mainland environments (ibid, 84). This process of infilling is observed again at smaller scales within the Cycladic context.

Primary colonisation occurred on the largest, most arable islands such as Naxos, Greater Paros[35] and Andros. It is not until roughly fifteen hundred years after the initial occupation of the Cyclades that there is clear evidence for settlement on the smaller islands

[35] Greater Paros was first coined by Broodbank (2000, 71) to describe the large island comprised of modern Paros, Antiparos and Despotiko prior to sea level rise.

(Broodbank 2000, 150). Infilling dynamics are an essentially fractal pattern of intensification and expansion that holds at several scales, from the intra-Cycladic to the Aegean and other "spread events" during the broader Eurasian Neolithic (Rowley-Conwy, 2011). Crucially, this process shows that inceptive niche construction through nucleation and migration was a key strategy for dealing with the long-term ecological pressures induced by human modification of the environment. Such "spread events" can be understood to have emerged as processes of intensification generated enough disequilibria to distribute Neolithic lifeways through new geographical regions and populations. Here we can begin to glimpse some of the processes that shaped the settlement of the Cyclades.

Early farmers altered their environments to accommodate a new energy regime that moved them to a lower trophic level. This new energy profile produced increasingly sedentary communities with far less mobility than preceding Mesolithic and Palaeolithic lifeways. These structural relationships brought about a host of powerful developmental transformations such as changes in birth spacing patterns as well as nutritional deficits and higher disease rates (Armelagos et al. 1991). Importantly, the ability to store surplus food can be understood as a form of counteractive niche construction that buffers against both consistent environmental variabilities such as winter seasons, as well as more erratic changes such as drought. This insight is commensurate with contemporary studies that show non-commercial farmers grow diverse arrays of crops as well as a tendency to aim for overproduction as ways to increase resiliency and reduce risk of failure (Halstead 2004, 191). In short, the counteractive niche construction of Neolithic communities produced highly stable growth that, upon reaching environmental limitations, resulted in bouts of inceptive niche construction through migration.

The energy capture and storage dynamics of the Neolithic radically increased the quantities and densities of humans the environment could support with concomitant effects upon the intensity of interactions within and between groups. Though there may not have been

the demographic explosion that was once believed to have accompanied the adoption of agriculture, these communities would nonetheless have experienced steady demographic expansion (cf. Gage and DeWitte 2009). The transformations in Cycladic settlements and environmental interactions during the transition from the Late Neolithic into the EBA reifies this general trend. Settlement densities for the Aegean have been estimated to have ranged between 100-200 people per hectare during the Neolithic and 200-300 in the EBA (Broodbank 2000, 146 following Whitelaw 1983, 1991; see also Whitelaw 2004). While data specific to the Cycladic Neolithic is lacking, it has been estimated that between the ECI and ECII population densities increased from 0.5-1.5 to 1.5-3.0 per square kilometre (Broodbank 2000, 90 table 1; following Cherry 1979; Wagstaff and Cherry 1982). Despite the lacunae in Cycladic demographics, there was nonetheless significant increase in population density, both throughout the region and within settlements following the onset of the EBA.

Focusing on transformations in population and settlement patterns is not meant to reify some linear, neo-evolutionary scheme based on demography. Rather, it is to recognise the ecological dimensions of population dynamics. As Renfrew noted in *Emergence*, population forms a fundamental "parameter" in which human systems operate (1972 [2011], 225). The population dynamics of agriculture should not be viewed as a "prime mover" but as a unique ecological pressure that sparked non-linear changes in the environment. In other words, one of the critical elements of understanding the emergent complexity of EBA is to understand how human beings adapted to environments through the aggregation and dispersal of populations intensively modifying their ecosystems. Due to the ontogenetic plasticity of humans, increasing population density implies powerful forms of developmental feedback within communities. Primary strategies for dealing with these pressures include migration and dispersal; however, short of catastrophic population collapse, sustained demographic growth inevitably requires new ways of organising relationships between individuals, communities and the environment.

Population dynamics are not merely about quantities of bodies in the environment; every additional human body greatly increases the possibility for non-linear dynamics to take hold. Demographics are not simply about the density of bodies, but also the intensity of their interactions. In other words, population dynamics are a matter of *how* communities occupy their environments.

Over time, Neolithic practices fundamentally generated more bodies in the world – bodies that developed and interacted with the environment in new and intensive ways. In this sense, the inceptive niche construction of the Neolithic can be understood to have produced nonlinear and self-organising dynamics in a patchwork of local and regional transformations that generated the emergence of the Bronze Age. The transforming energy dynamics and habitation patterns of Neolithic practices subjected humans to the growing ecological and developmental pressures created by the expansion of these activities and communities. Some of the strongest indications of population pressures during the Neolithic come from the evidence of conflict as Neolithic groups expanded into Mesolithic territories as well as signs of struggle between Neolithic communities (cf. Golitko and Keeley 2007). The most pronounced responses to these dynamics came in the form of the defensive fortifications that appear throughout the European Neolithic (ibid; Parkinson and Duffy 2007). In the Cycladic context, the Neolithic settlement of Strophilas is the earliest known fortified site on the islands (Televantou 2008). Andros is the second largest island in the Cyclades, and only ten kilometres off the coast of Euboea. The site was well situated for interactions between mainland populations and the islands. Longboats, as have been depicted at Strophilas, were designed primarily for speed and a large complement of personnel rather than the transport (Broodbank 1989), which suggests such vessels played an important role in organised, inter-community violence. The evidence for violent competition at Andros, and the dynamic regional interactions between the Attic peninsula, southern Euboea, and the northern Cyclades during

the Final Neolithic suggests that demographic pressures potentially motivated further colonisation of the Cyclades.

Permanent occupation of the Cyclades appears to have occurred in two major waves of colonisation, one of Late Neolithic Anatolian origin and another from the Greek mainland during the Final Neolithic (Broodbank 2000, 107-143; Phoca-Cosmetatou 2011a). It would seem that intensifying interaction between mainland communities incentivised coastal populations already familiar with the maritime environment to spread into the islands. Adaptive responses to demographic pressures through migration have two serious limitations. First, ecological/climatic limits, in which cultural methods of production do not readily transfer to new environments, impede rates of expansion. Second, barriers to relocation form when the scale and intensity of demographic expansion have reached saturation point and available lands have already been occupied. The first issue only applies in the Cyclades to a limited degree in the context of small islands that did not support Neolithic villages. However, bottlenecks upon demographic expansion due to pre-existing populations do present themselves as an issue. The creation of villages on prime lands on larger islands by fissioning Neolithic populations was not a strategy that could be replicated indefinitely. When expansion is circumscribed by other populations and geographical boundaries, the only possible options, short of population decline, are conflict or reorganisation.

2.5 Engineering New Ecosystems

The colonisation process undertaken by the Saliagos culture appears to have transferred village-sized communities to specific ecological niches on the major islands. Saliagos communities show a clear pattern of settling at the nadir of large bays near alluvial plains suitable for introducing their polyculture of cereals, pulses and domestic fauna (Broodbank 2000, 147). The most significant adaptation of this biological package to the islands, relative

to mainland practices, was a far heavier dependence on barley (Renfrew 1972 [2011], 274-80) and a radical increase in the proportion of goats and sheep (Phoca-Cosmetatou 2008). Across the Cyclades, small ruminants average about 80% of domesticates compared to roughly 50% at mainland Neolithic sites (Halstead 1996; Broodbank 2000, 82; Phoca-Cosmetatou 2011b 85-6). This change seems to have been an early adaptation in the Saliagos sequence, which exploited the rocky and rugged terrain more effectively than cattle or swine. Site occupations lasted between two and four centuries with populations estimated to range between 70 to 150 people (Broodbank 2000, 145-149). It appears that during a settlement's growth, groups would fission and leapfrog to large and midsize islands with the desired ecological configurations.

During the nearly two millennia of Neolithic expansion, the peoples of the Saliagos and later Kephala cultures began to steadily modify the islands' ecosystems, clearing areas for planting and opening areas to grazing. Their settlements concentrated solar energy in their crops and domesticates, further focusing these flows of energy into the bodies of villagers. Saliagos people engaged in extensive ecosystem engineering to construct niches that afforded stable communities over the course of centuries. The arid climate and small size of the islands are not amenable to pollen core analysis, so it is difficult to assess the island vegetation beyond proxy examples (Phoca-Cosmetatou 2011b, 82). However, general analysis of the Aegean has revealed a consistent pattern of major erosion events within five hundred to a thousand years after the introduction of agriculture (van Andel et al. 1990). That this dynamic was specifically occurring in the Cyclades is attested to from an intensive micromorphological analysis of the Early Bronze Age site of Markiani at Amorgos (French and Whitelaw, 1999). Despite the difficulties in assessing the prehistoric environment of the Cyclades, it is logical to infer several patterns in the Neolithization of the archipelago. The modification and introduction of new species began to set off new co-evolutionary patterns within the islands' ecosystems.

Saliagos communities introduced new ecological relationships to specific, highly fertile niches on the major islands. Neolithic ecosystem engineering transformed the Cycladic islands and, over time, entropy in terms of soil erosion and fertility likely influenced the organisation, use and longevity of settlements. The heavy reliance upon Caprovines would have generated novel ecological pressures through selective grazing patterns. These stresses, in combination with the clearing of vegetation for farming and construction inevitably had significant long-term impacts upon the local ecology. These dynamics should be considered in the context of Cycladic Neolithic sites lasting between two and four hundred years and the practice of island hopping to specific, similar environmental niches. Saliagos niche construction was a highly selective and consistent developmental pattern that nonetheless generated significant ecological changes which assuredly stressed that particular form of organisation.

The simple strategy for diminishing returns amidst abundant territory is abandonment and relocation (Dawson 2016). This possibility can only be clarified by establishing clear chronological relationships between nearby Neolithic settlements, specifically Koukounaries and Sklavouna on Paros (cf. Kastrou and Schilardi 2004) and Mavrispilia and Phtelia on Mykonos (Belmont and Renfrew 1964). If significant gaps are shown to exist between these proximate settlements, this strongly suggests abandonment and reoccupation. Nonetheless, Saliagos people managed to form relatively large, stable communities for centuries (cf. Evans and Renfrew 1968). Demographic growth during such long occupations suggests the fission and migration of kin groups likely punctuated a settlement's use life. Such processes lend explanatory power to the highly dispersed pattern of Saliagos settlements. Groups appear to have leapfrogged across the archipelago selecting specific locations rather than merely spilling over in a straightforward demographic wave (cf. Broodbank 2000, 145-149). This possible settlement strategy would have opened up new locations to expanding kin groups while

simultaneously relieving local resource pressures. However, such a strategy would have been hampered by the proliferation of communities and the prior usage of space.

Over the nearly two thousand years of the Cycladic Neolithic, other humans would have become an increasingly powerful environmental pressure. There are indications of such stresses in the Final Neolithic with the fortification at Strophylas and possibly from the lack of evidence for wild food sources at Kephala (Coy 1977, 132). At Kephala we also observe the first cemetery in the Cyclades, which potentially indicates new social claims on resources and territory (Coleman 1977; Talalay 1991). From the start of the EBA there was a rapid reconfiguration of settlement structure throughout the Cyclades. The large village centres of the Saliagos and Kephala cultures disappeared and were replaced by the patchwork of homesteads and hamlets of the Grotta-Pelos culture (Broodbank 2000, 150). It would take another half millennium before large central villages began to aggregate again in the Cyclades. It is during this dispersal that the smaller islands of the Cyclades were first occupied (ibid, 150). In short, the Neolithic ends in the Cyclades with a radical reorganisation of settlements and social interactions.

The early phases of Cycladic occupation evince rapid growth and steady infilling of the region. Aegean peoples had begun to radically modify the islands' ecosystems to tap new energetic resources. They constructed niches that supported villages of potentially more than 150 people (Broodbank 2000, 145). Mainland domestic packages were attuned to the new environment primarily through dramatic shifts to sheep, goats and barley. As the region was colonised, canoes circulated kin relations through extended networks connected by the thermal currents flowing through the sea. After roughly sixteen hundred years, the pattern of long-lived central sites disintegrated. People's relationships to their ecosystems were reorganised around families and small communities that shifted across the landscape on a generational basis (ibid, 86). This dynamic persisted for roughly half a millennium before villages began to re-emerge

amidst a continuing landscape of small farming communities. It is from these sites that Cycladic islanders began to circulate canoes, bodies and things along the currents of the Aegean at new scales.

2.5.1 Global Complexities and Local Simplifications

The general picture of the Neolithic occupation of the Cyclades is one of periodic settlement fissioning punctuated by site abandonments. This settlement pattern, beginning with the Saliagos peoples, was essentially a process of inceptive niche construction through fission and relocation that remained viable for roughly two thousand years. However, two significant factors inevitably complicated this strategy: demographic growth and environmental change. As has already been noted above, severe erosion trends are evident in the Aegean within a millennium of the introduction of agriculture. It is also salient to note that the third millennium BC was a period of general aridification throughout the entire Mediterranean basin (Broodbank 2013). Likewise, the expansion and fissioning of communities generated an increasingly complex web of kin relations spreading across the islands while steadily reducing the amount of land available for new settlements. Over time, infilling likely created pressures to extend the use life of settlements as well as reoccupy abandoned areas more rapidly. Thus, towards the end of the Neolithic, Cycladic islanders were undoubtedly experiencing both a more complex social reality as well as downstream impacts from millennia of ecosystem engineering among other potential environmental pressures.

Final Neolithic Cycladic communities were probably not only experiencing significant demographic stresses, but also beginning to face significant ecological transformations induced by agriculture as well as climate change. Fortifications and the move to fully domesticated food sources suggest increasingly intensive effort expended to maintain the stability of a specific pattern of organisation amongst the transitionary Kephala culture. Importantly, the sites of Poura and Kephala on Kea are on marginal lands and appear to be more directly focused on

external maritime connections for their support (Broodbank 2000, 153). Kea is the first island along the route from Attica to Melos, and mainland communities were most likely continuing to harvest the obsidian themselves, suggesting the seafaring was a potential means of buffering against environmental stresses in the Final Neolithic. These new factors, in combination with the appearance of the first burials in the Cyclades, all reveal significant changes in the organisation of bodies towards the end of the Neolithic. What is undeniable is that demographic pressures, environmental changes, and ecological limits placed increasing burdens on the organisation of Aegean communities.

These environmental factors are significant because Neolithic lifeways that had persisted on the islands for nearly two millennia were drastically reorganised with the onset of the Early Bronze Age. Abandoning their central villages, Cycladic peoples of the Grotta-Pelos culture dispersed into farmsteads and small hamlets scattered across the landscape. The relatively rapid dispersal of Cycladic communities into small groups indicates a systemic response to ecological dynamics. Simplification of group size, mobility and efficiency are all ways of increasing resiliency and reducing impact. It is noteworthy that projectile points disappear during this period, indicating the likely abandonment of wild food sources and possibly a decrease in group tensions (Broodbank 2000, 151). It is also during this period that the smaller islands of the Cyclades were first occupied, and communities generally began to access more marginal niches (ibid 2000, 150). Grotta-Pelos settlements likely ranged between one and five families and appear to have been abandoned and relocated every few generations (ibid, 86). Frequent site abandonment by small, mobile groups would have significantly scaled down the demands placed upon the environment by any single group. An intensified focus upon herding in conjunction with small-scale horticulture provides a sound explanation for the mobility and flexibility of these communities (Broodbank 2000, 153; following Halstead 1996). However, this economic shift also indicates a substantially increased reliance upon

caprovines, which implies a significant redistribution of ecological pressures due to selective grazing. Critically, dispersal exposed individual groups to increased risk while reducing the aggregate danger to the population (Broodbank 2000, 87). The emergence of the Grotta-Pelos culture can be understood as a period of inceptive niche construction and social reorganisation in response to ecological pressures.

The organisational changes of the Grotta-Pelos phase functioned to redistribute ecological impact and risk more evenly, while raising the overall productive capacity of the region. This pattern of habitation persisted for roughly five hundred years before large central villages with substantial populations began to reemerge and the voyaging cultures of the Early Bronze Age were established (Broodbank 2000, 176-80). It should be noted that on Melos, the island subjected to the most intensive site surveys (Renfrew and Wagstaff 1982; Cherry and Torrence 1982), it is estimated that at least thirty-five Grotta-Pelos homesteads, the equivalent of roughly two Saliagos villages, existed (Wagstaff and Cherry 1982, 138). These population estimates provide a significant contrast with the average of a single settlement per island during the Saliagos period. In other words, despite the reduced local complexity of Grotta-Pelos settlements, the global complexity of the social environment likely increased. It is significant that during the Grotta-Pelos phase the first widespread mortuary activities began to develop in the central Cyclades in conjunction with the first major innovations in Cycladic marble sculpting traditions. These facts indicate shifting conceptions about bodies and their relationships to the environment.

Dispersal into farmsteads implies significantly reconfigured dynamics and burdens upon social cognition. Under these conditions, group life became more intensely localised within the family and highly dependent upon exogamy, while issues of territory and use rights, particularly in terms of pasturage, required negotiating. In short, the distributed, fluid and interdependent structure of Grotta-Pelos communities sharply increased the difficulty and

necessity of orienting, tracking and maintaining social relationships in the environment. As marble forms were increasingly circulated throughout the islands and communities began launching expeditions into the far reaches of the sea, the emergent complexity of the Cycladic EBA began to develop.

2.6 Reorganising Bodies

Although the central village systems of the Saliagos period appear to have been largely self-sufficient, some degree of intermarriage, group alliances, and reciprocal obligations is certain. By the end of the Neolithic, communities that had established themselves on the islands were assuredly entangled within complex webs of consanguineal, affinal, affiliative, and competitive relationships. However, the emergence of the Grotta-Pelos society drastically reconfigured these relationships, placing a new emphasis upon the maintenance of periodic and extended social relationships. Broodbank has forcefully argued that the dispersals of Grotta-Pelos communities and the successful occupation of marginal Cycladic environments relied upon robust social storage systems understood as a diverse array of behavioural strategies for distributing risk more evenly throughout the community (Broodbank 2000, 84; see also O'Shea 1981; Halstead 1981; Halstead and O'Shea 1982). Social storage can be understood as a form of counteractive niche construction through the cultivation of social relationships, obligations, responsibilities and debts that offset environmental risks. Thus, disruptive events such as crop failures could have been mitigated through such practices to increase overall community resiliency.

The maritime networks of Neolithic communities appear to have been reconfigured around more intensively localised interactions during the Grotta-Pelos period. Daily life would have been dominated by small, intimate familial relationships organised around small, impermanent settlements. A broader context of intermittent and extended community

interactions was linked through the movement of herds, canoes and a limited range of shared ceramic forms involved in transport and consumption (Broodbank 2000, 166-174). During the ECI, social interactions beyond the immediate household necessitated the patterning of spatial and temporal relationships in regard to the orientation and tracking of scattered familial groups and episodes of gathering. Furthermore, the increased tempo of site formation and abandonment in conjunction with a heavier reliance upon pastoralism suggests heightened issues of territory and access amongst communities. In contrast, the durability of Neolithic villages over centuries of occupation provided a highly stable means of asserting territorial claims as well as geographically anchoring the movement of people on the islands. The move to generationally shifting farmsteads and hamlets loosened these spatial and temporal bonds, making ancestral claims and use rights harder to establish and maintain. The appearance of the first cist graves in the Cyclades during these transformations supports the argument that cemeteries were involved in new forms of group identification and territoriality through lineage. Gravesites likely functioned to anchor kinship groups to territorial ranges, enabling sites to fluctuate across the landscape while maintaining a centre of gravity for group identity and cohesion.

It is important to recognise that the transformations of the Grotta-Pelos phase generated several developmental pressures supporting the growth and consolidation of asymmetrical social relationships. These settlement patterns reoriented Cycladic peoples away from group level dynamics to the household level in which relationships are more prone to be structured hierarchically by age and gender (see Boehm 2001). Such organisational focus on small family groups is also likely to be critical for the development of persistent social inequalities through the loosening of social controls and prohibitions on individual accumulation while simultaneously creating a locus around which resource differentials could be generated (Sterenly and Watkins 2015). The stochastic distribution of groups along a spectrum of more

resilient and marginal Cycladic environments implies asymmetries between those more and less exposed to risk. Ecological variability between households would have been reinforced by periodic environmental crises which quantitative research has shown occurred regularly with the introduction of agriculture (Shennan et al. 2013). Unevenly spread disruptions, such as crop failures or raids, in which specific individuals and families suffer heavier losses than others can be viewed as a kind of "sorting mechanism" with significant impacts upon social organisation over time.

Repeated crises within marginal groups created the potential for structural dependencies with affiliated, luckier groups. In other words, groups occupying more marginal niches within the Cyclades that were dependent upon social storage for survival potentially experienced compounding social debts and obligations.[36] Likewise, such environmental variability potentially incentivised some marginal or otherwise highly pressured groups to orientate toward maritime links and exchange to offset the shortcomings in their local environments. The dispersal of settlements at the end of the Cycladic Neolithic reduced aggregate risk and brought marginal areas under production, but simultaneously helped create structural conditions for net "winners" and "losers." Thus, the reorientation around small kin groups, the partible wealth of herds, and ecological variability potentially contributed to the growth of material asymmetries between groups.

During the Grotta-Pelos phase, niche constructing activities that diversified and increased sources of ecological resilience can be seen to have occurred in two primary arenas. Firstly, the reorganisation of the fundamental system of production into a smaller scale,

[36] Importantly, for the purposes of this thesis, a recent paper has shown that the accumulation and storage of wealth can be understood as a niche constructing behaviour (Shennan, 2011). This dynamic can be seen on an individual level as the storage of heritable developmental resources, as well as on the social level as a way of ensuring collective stability in the face of environmental challenges. From a bodily standpoint many of the developmental impacts of a stratified hereditary elite are relatively clear. Elite social status demonstrably translates into a distinct reproductive advantage (ibid, 2011). Thus, the niche constructing properties of wealth can have significant impacts upon genetic inheritance (Voland 1995, Pettay et al. 2007).

dispersed household economies, and secondly, concomitant investment into social ties that facilitated social reproduction and acted as buffers against adverse conditions. Clearly, by the onset of the Cycladic Bronze Age, relationships between individuals, families and communities were radically reorganised. The evidence for these transforming relationships is clear with the change in settlement patterns as well as the introduction of burial and cultural forms implicated in new ritual practices. Moreover, certain individuals in this period were, at least in death, accumulating substantially more material goods than others (cf. Doumas 1977). The reorganisation of Grotta-Pelos communities generated novel resiliency, connections and energetic potential. As the third millennium progressed, the transformations of the ECI provided the foundation upon which new forms of social organisation were able to emerge through a nexus of marble and seafaring.

2.7 Conclusion: Cycladic Patterns of Emergence

The pattern of distributed farmsteads and hamlets remained the primary form of settlement throughout the Early Bronze Age. Nonetheless, over the course of the Cycladic EBA, dispersed communities began to aggregate and large central villages began to re-emerge. Multiple sites with populations estimated to be in the range of 300 strong began to appear during the first half of the third millennium (Broodbank 2000, 212-221). The clearest forerunner of these communities is found at the late ECI community of Agrilia on Ano Kouphonisi. The site, comprised of ninety rock-cut tombs, contains the earliest example of a bronze mid-rib dagger found in the Cyclades, among other cultural forms from the wider Aegean world, and it appears that the community was one of the first to establish long range voyaging practices (ibid, 221-222). The subsequent floruit of the Keros-Syros culture generated the first stable regimes of long-distance voyaging that connected Aegean communities into an intensive and extensive maritime interaction network. This pattern

persisted for roughly six hundred years, including a period of aggregation into fortified settlements and the emergence of the Anatolianising Kastri culture towards the end of the epoch. The end of the Cycladic EBA follows a period of abandonment, destruction, and significant lacunae in the record, indicating dramatic reorganisations were taking place on the islands.

The reorganisations of the Grotta-Pelos culture led to a period of sustained growth and increasing complexity with the emergence of the Early Cycladic voyaging cultures; likewise, the establishment of ritual practices and the creation of fortified settlements all imply efforts to conserve the organisational relationships of these societies in the face of systemic pressures. The decline of Early Bronze Age sites, evidence for conflict and the disruption of exchange network along with our gaps in knowledge, reveal the breakdown and reorganisation of ECII societies (Broodbank 2000, 309-49). The Cycladic Middle Bronze Age begins with the emergence of what are truly the first towns in the region, located near ideal harbour sites with the Phylakopi culture. There is significant lacuna in evidence between the ECIII and MCI (Rutter 1984; Broodbank 2013b). Recent evidence suggest disruptions in the organisation of Cycladic communities around the last few centuries of the third millennium BC. Possible explanations for the gap include climatic shift, demographic changes as well as the introduction of sailing technology and new regimes of connectivity (Broodbank 2002, 341-349; Broodbank 2013, 4-6). Whatever the ultimate and proximate causes of the reorganisations at the end of the EBA, it is undoubted that systemic changes once again transformed Cycladic social relationships and material culture.

As the Aegean transitioned from the Neolithic into the Bronze Age, interactions were growing in intensity across the islands and scalar changes in social organisation were beginning to emerge. After the breakdown of Neolithic systems in the Cyclades, the reorganisation of Grotta-Pelos communities generated the conditions for a new growth phase. Within half a

millennium of these Early Bronze Age reconfigurations, Cycladic longboat societies emanating from large villages, supported by networks of Grotta-Pelos-like hinterlands made an indelible mark on the emergence of Aegean social complexity. Over millennia, Cycladic peoples transformed their environment at numerous scales. One of the most important ecological pressures Early Cycladic peoples faced was the growing burden created by the presence of their own species, and ultimately, the growing number of bodies that required mediation and organisation. Cycladic peoples appear to have responded to these stresses by intensively modifying energy and matter flows in their environments through new settlement and seafaring practices. In other words, Cycladic islanders created novel cognitive-developmental niches that reshaped the boundaries of social cognition. It is the mediation of bodies and social interactions through innovative practices that enabled EBA societies to generate novel social complexity.

It is in the Early Bronze Age that we begin to observe the first truly radical, non-linear effects of Neolithic activities in the Cyclades. Neolithic niche construction transformed energy and matter flows in the environment. The resulting developmental pressures placed new cognitive burdens on individuals and communities. During the transition into the Bronze Age, radical transformations in embodied relationships were mediated through new material forms such as gravesites, monumental construction, and bodily presentations. By the middle of the Early Bronze Age, Cycladic intersubjectivity was operating across multiple scales. These dynamics ranged from individual households, large village communities, and networks of other settlements that were bound together in complex relationships of social solidarity and competition. Crucially, these interactions were set within the global context of the broader Aegean communities with whom Cycladic peoples regularly interacted. Thus, Cycladic identity formation required mediation at what can be broadly described as local, regional and global scales. Of further importance, identity formation at these various scales would have been shaped by substantially different temporal frequencies of interaction. The development of

Cycladic social cognition was structured by daily interactions within communities, year-round local networks, and the seasonal movements of groups in the wider world.

From the advent of the Neolithic to emergence of the Bronze Age, people were constructing new cognitive-developmental niches to navigate the pressures created by their ecosystem engineering. It is not surprising that Cycladic peoples tapped the affordances of their environments to create a unique form of metaplastic feedback to mediate these dynamics. Given the geology of the islands and the abundance of marble it should come as little surprise that the material played such a central role in Cycladic social organisation. As we will see in the following chapters, it is abundantly clear that the sculptures were deeply implicated in identity formation and social interactions within and between communities. It is in light of the evidence for transforming settlement dynamics and social interactions that this thesis argues that Cycladic sculpture was as a kinshipping technology. That is to say, they were artefacts that enabled Cycladic islanders to conceptualise their "mutuality of becoming" and mediate the creative tensions of consanguineal, affinal and affiliative relationships. Marble, whether in graves, settlements or ferried between communities, shaped the cognitive-developmental niches in which Cycladic minds emerged, providing a material scaffold through which social cognition could be anchored, enabling social interactions to self-organise in a dynamic environment. In order to understand the developmental role and impact of Cycladic sculpting traditions and their relationships to kinship dynamics it is therefore necessary to explore the material agency of marble and the unique forms of metaplastic feedback it supported.

Chapter Three: Identity and the Agency of Marble

3.1 Introduction: Marble and the Body

Marble sculpting was central to the shaping of a cognitive-developmental niche through which Cycladic islanders learned to navigate their transforming worlds. This chapter will explore the agency of marble in relation to these processes. In particular, applying the notions of material agency and enactive signification, it will investigate marble as a medium through which intersubjectivity and social interaction could be expressed and negotiated at new emergent scales. The chapter also serves to link the long-term ecological changes in which Cycladic sculpture emerged (explored in chapter two) to the ways in which the distribution of the figurines enactively signified concepts of value and kinship, as will be discussed in chapters four and five. To accomplish such a connection, this chapter examines how the properties of marble interacted with individual perception and kinaesthetic experience, specifically focusing on the attention-capturing effects of bodies and the ways in which Cycladic sculpture articulated between individualised and generalised conceptions of the body. Through investigating the perceptual and conceptual properties of the figurines, this chapter will lay the foundations for examining the role played by the figurines in organising the Cycladic social relationships that will be explored in the subsequent chapters. Cycladic sculpture emerged through metaplastic feedback between bodies, tools, and marble in the context of the Aegean Bronze Age. By considering the developmental pathways afforded by marble and the body, it is possible to identify some of the core dynamics which enabled the figurines to mediate the development of Cycladic intersubjectivity.

Following the introduction, there is a short subsection on the general chronology and development of the Cycladic sculpting traditions. The second section explores the deep history of material engagement with marble, from the first experiments to the early schematic and

naturalistic pieces of the Neolithic. It investigates both the contextual relationships of marble in the Early Cyclades as well as antecedent traditions of depicting the human form. The third section examines the sculpting traditions of the Grotta-Pelos culture during the ECI. This discusses the potential relational meanings embodied by marble amidst the social reconfigurations of the Early Bronze Age (EBA). The chapter moves on to a detailed examination of the two major ECI traditions, traditionally labelled the "Plastiras" and "Louros" type figurines. This includes an exploration of how the aesthetic differences of the two styles reveals a conceptual distinction between individuation and the collective sublimation of bodily identity. The fourth section analyses the traditions of the Folded-Arm Figurines (FAF) during the emergence of the ECII Keros-Syros culture. This follows with a discussion on the attention-capturing effects of bodies upon perceptual and neural processes. The section finishes with an analysis of the painted details on the figurines, and the way in which they functioned to both individuate and generalise identity as a focus of collective attentional space. The fourth section is a brief account of the extinction of the Cycladic sculpting traditions. The chapter concludes with an assessment of the evidence and how the material agency of the figurines made them an effective social technology for mediating the scalar stresses of the EBA.

Examining the emergence of Cycladic sculpting in relation to the transforming social interactions of the EBA necessitates an exploration of how body perception and attention capture shape the development of human social cognition. Interpretations of the perceptual dimensions of Cycladic figurines have been dominated by art historical perspectives which emphasise the visual appearances of the objects as isolated expressions of typological groupings (e.g., Getz-Preziosi 1994). To date, Athena Hadji has been the only scholar to approach the perceptual dimensions of the figurines explicitly from the standpoint of cognitive science (2016). Hadji examines the broader multi-sensory relationship that incorporated the figurines into the contexts, performances and experiences of Cycladic society. She observes

that learning to create such artefacts can "shape individual cognition literally through muscular training and neuronal adaptation; thus, they open new gateways to some of the statistically possible trillions of synapses in the human brain" (Hadji 2016, 35). Though Hadji's paper explores very important features of perception and cognition, the examination of these dynamics is largely relegated to individual experiences of crafting and social contexts. Cycladic sculpture has not been examined with regard to body perception, attention capture and the development of intersubjectivity. The attention-capturing properties of bodies reveals how Cycladic figurines focused collective attention and enabled the coordination of social interactions across multiple scales of organization.

Cycladic sculpture developed in conjunction with profound changes in the organisation of communities and the environment during the transition into the EBA. At the onset of the third millennium BC, energy and matter flows within and between Aegean communities and Mediterranean societies more generally were being profoundly restructured (Broodbank 2013). Cycladic figurines emerged amidst drastic reconfigurations in settlement patterns and as new technologies, materials and practices began to circulate throughout the Aegean world. To comprehend how the figurines came to mediate social cognition on a regional scale, it is critical to explore the deep history of human-marble interactions on the islands. This analysis necessitates a detailed examination of the ways in which skilled engagement with the properties of marble generated changes in the developmental affordances of the Early Cycladic environment. Cycladic sculpting traditions emerged through nested, multi-scalar interactions ranging from individual enskilment, shared attentional and intentional spaces, to the spatial and temporal organisation of social interactions across the region. For the individual sculptor, the motions of carving, cutting, percussion, grinding and polishing involved in shaping marble trained new fine motor skills and perceptual abilities. To understand the ways in which these dynamics facilitated conceptual changes in the development of Cycladic intersubjectivity, it is

necessary to explore how marble, the body, crafting and the finished figurines shaped perception, attention and the shared environment as a process of long-term ecological change and modification.

3.1.1 The Evolution of Form

The first clear evidence for marble shaping in the Cyclades comes from schematic and naturalistic pieces found in the Saliagos and Kephala cultures during the Late Neolithic (c. 5000-3500 BC). Evidence for figurine production drastically increases with the development of mortuary practices during the transition into the Early Bronze Age. Schematic figurines became important and relatively common burial goods alongside the early naturalistic styles of the Grotta-Pelos culture during the ECI (c. 3300-2700 BC). Over the course of the second millennium BC, and as Cycladic islanders began to develop seasonal regimes of long-range canoe voyaging, the varieties of Folded-Arm Figurines began to emerge (Figure 7). These iconic and predominantly female depictions of the body played a central role in the rituals that were centred on the island of Keros.

The most sophisticated pieces of the Cycladic traditions were created at the height of the ECII Keros-Syros culture (c. 2800-2300 BC). During this period, marble sculpting diversified into rare and skilfully crafted pieces such as musicians, double and triple figurines, pieces perhaps as large as one-and-a-half meters in size, as well as many other elaborate forms. The sculpting traditions began to lose coherence as Cycladic society began to transform into the Kastri culture of the ECIII (c. 2500-2200 BC). As Cycladic islanders increasingly fortified their settlements, we begin to observe disruptions in the stability of the FAF traditions. There is a substantial increase in the numbers of male figurines, pieces with reversed arm positions, significant asymmetries and a general decline in the sophistication of sculpting techniques (cf. Mathari et al. 2017). With the onset of the Middle Bronze Age, Cycladic sculpting phased out with the schematic pieces of the Phylakopi I culture (c. 2300-1900 BC). The figurines emerged

in a period of reorganisation, peaked in complexity as part of a regional social order and returned to their simplest form before disappearing as a tradition entirely.

Although the specific cultural reasons that inspired Cycladic peoples to carve human forms into marble are undeniably lost to us, islanders began to form distinctive traditions as sculpting spread across the islands. In the 1960s, Colin Renfrew created a chronological framework for the development of Cycladic sculpting traditions that has been proven resilient (1969), albeit not without criticisms due the lack of provenience and fine resolution of dating for most know figurines (cf. Gill and Chipendale 1993). Renfrew's schema organises the figurines into two major stylistic categories, schematic and naturalistic pieces, which subdivide into typological traditions. The division between naturalistic and schematic is the most robust of Renfrew's categorisations, due to the clear and long-lasting distinctions in visual appearance, scale, as well as cultural roles.[37] Renfrew further organised these types into cultural groupings associated with distinct chronological phases of the early Cyclades. Schematic pieces are the oldest, and most persistent sculpting style. However, the first uniquely "Cycladic" naturalistic pieces began to emerge with the onset of the Bronze Age.

[37] Distinctions in the cultural uses of schematic and naturalistic figurines are most evident in the excavations at Skarkos and on Keros. Schematics appear frequently within the settlements, but naturalistic styles are absent with the exception of an unfinished naturalistic piece found at Skarkos (cf. Mathari 2017a; Renfrew et al. 2018a)

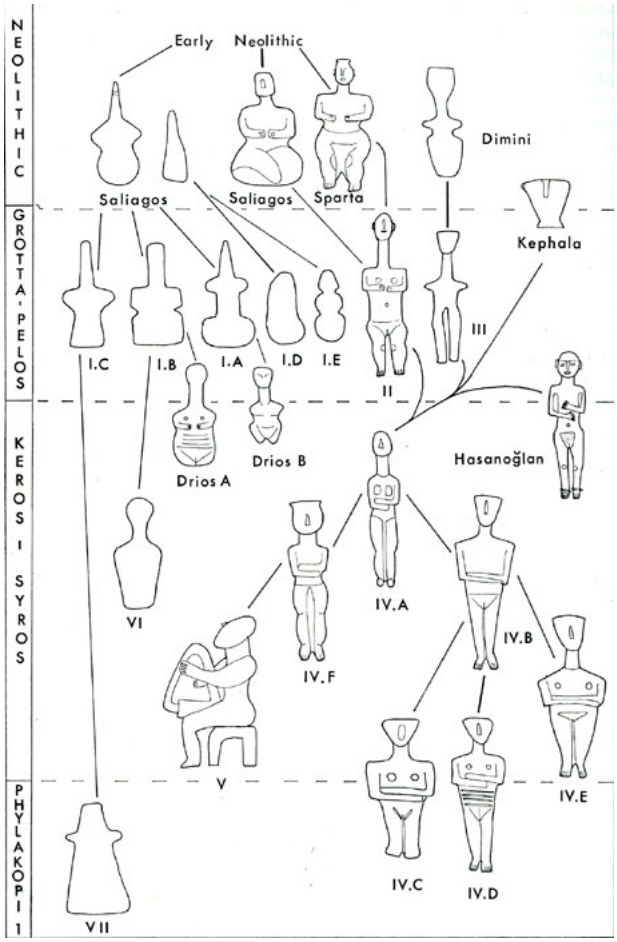


Figure 7: Major Typologies of Cycladic Figurines, After Renfrew 1969: Ill. 4.

Renfrew's classification scheme has eight principal typologies of naturalistic figurines that developed over the course of three major cultural phases. This chronology is comprised of two styles that emerged during the ECI (c.3300-2700 B.C.) and five that developed, spread and declined during the ECII (c.2800-2300 B.C.) and ECIII (c.2300-2000 B.C.). The earliest types, the Plastiras and Louros figurines, are distinctly associated with the Grotta-Pelos cultural phase, the period during which Cycladic communities began to decentralise their settlements. The Folded-Arm Figurines are diagnostic of the Keros-Syros phase with the Kapsala, Spedos, and Dokathismata varieties. The Koumasa variety appears solely in Crete and demonstrates the significant cultural reach of Cycladic society during the ECII. In the Cyclades, the Chalandriani form is associated with the Kastri culture and exhibits less consistency than the other FAF's in terms of arm positions and gender. Schematic figurines from the Phylakopi I culture are the

final marble pieces created before the extinction of the tradition entirely. In other words, the oldest form of marble sculpture was the last to disappear as the Cyclades transitioned into the Middle Bronze Age.

Renfrew's general typologies are a reasonable simplification of the stylistic varieties that have been discovered. However, excluding the more recent finds from Keros, the "framework depends on the 10% of the corpus that has been found in secure archaeological contexts" (Gill and Chippendale 1993, 627). The exclusion of non-conforming examples, and assumptions about aesthetic evolution have to an extent generated a circular logic in which the chronology of the figurines have been derived from these schemas, and the validity of the schemas rest up their chronologies (ibid, 628). However, two broad chronological relationships are quite robust. First, schematic styles are the longest lasting of all types and continue to be produced after the creation of the naturalistic pieces appears to have ceased. Second, the chronological distinction between the naturalistic styles of the ECI and the FAFs of the ECII are sound, and form part of distinct cultural assemblages in grave sites.[38] However, due the general dearth of securely provenanced complete figurines, for the purposes of this thesis, Renfrew's distinctions of Kapsala, Spedos and Dokathismata types will be largely subsumed under the more generic label of Folded-Arm Figurines. This is due not only to the shaky chronological associations and issues of provenance, but also because such stylistic distinctions do necessarily reflect how Cycladic islanders conceptualised and categorised such objects.

Modern typologies of Cycladic figurines provide a convenient shorthand for discussing the object but risk a perception of clearly defined processes of linear development between strongly bounded categories of style. Typologies are useful means of describing similarities and consistencies observed in the artefacts, but the boundaries of such categories are inherently blurry. The Cycladic styles developed within a wide spectrum of forms and these traditions

[38] This fact is further supported by the lack of ECI style sculptures amongst the figurines found on Keros.

overlapped with each other at various times. Many pieces are potentially hybrid, transitional and "microsytlistic" variations upon common themes (Renfrew 2017a), and yet the chronology of interaction and development are frustratingly unclear. Although there is a distinctive chronology between the ECI and ECII traditions, these practices emerged along a continuum of recursive interactions that influenced the development of form. Such interactions are attested to by the discovery of different styles in related domestic and burial contexts (cf. Marthari et al. 2017). Significantly, the discovery of an ECI "Plastiras" piece in an ECII settlement context on Kea indicates that some figurines potentially endured for centuries as heirlooms (Wilson 2017, 101). The production, circulation and use of the figurines provided forms through which styles were developed, competed against, merged, and used as inspiration. The archaeologist John Robb has compared the self-organising dynamics involved in the emergence and spread of European stelae traditions to a murmuration of starlings (2008, 332). Similar to these dynamics, Cycladic sculpting traditions were an energetic, spatial and temporal patterning of body images in stone.

Cycladic sculpting emerged through millennia of interactions between humans and marble. Ingold writes that skill brings together "the resistances of materials, bodily gestures and the flows of sensory experience, [and] rhythmically couples action and perception along paths of movement" (2011, 16). Clearly, the immediate relationship between artisan and material is fundamental to the development of skill, but these interactions alone do not sufficiently explain why artefact forms change over time. Cognitive archaeologists Thomas Wynn and Frederick Coolidge claim that craft working has three major sources of innovation: procedural drift, serendipitous error and fiddling (2014, 45). Technical cognition gives insight into mechanisms through which crafting traditions expand and diversify, but it does not answer how individual enskilment translates into shared meaning and collective identity. Undeniably, there are significant relationships between skilled performance, neural architecture and identity

formation (see Malafouris 2008c; Malafouris 2012; Wynn and Coolidge 2014). However, these insights do not provide an explanation for the relationship between individual development and the ways in which intersubjectivity is mediated through material culture. John Robb has contended, "traditions should be understood as having an emergent quality that makes them more than the sum of the individual creative acts generating them and gives them qualities of agency" (2008, 332). Understanding how Cycladic sculpting generated self-organising dynamics that influenced the emergence of Aegean social complexity requires an account capable of integrating developmental, cultural and ecological timescales.

Cycladic engagement with marble worked to reshape intersubjective concepts of the body, identity and community, not as preformed ideas that were imposed upon the material but as an outcome of these interactions. Tim Ingold argues that making should be viewed as a "form generating – or morphogenetic – process". Using marble sculpting as an example he writes:

> *The difference between a marble statue and a rock formation such as a stalagmite… is not that one has been made and the other not. The difference is only this: that at some point in the formative history this lump of marble, first a quarryman appeared on the scene who, with much force and with the assistance of hammers and wedges, wrested it from the bedrock, after which a sculptor set to work with a chisel in order, as he might put it, to release the form from the stone. But as every chip of the chisel contributes to the emergent form of the statue, so every drop of supersaturated solution from the roof of the cave contributes to the form of the stalagmite. When subsequently the statue is worn down by rain, the form generating process continues, but now without human intervention. (2013, 21-22)*

Thus, he claims making should be understood as a dynamic of "growth." Cycladic sculpting, as form generating interactions between marble and human bodies, can be understood as a recursive dynamic of environmental modification that reshaped the social and developmental contexts in which enskilment occurred. These multiscalar relationships can be investigated through the application of a "process archaeology" that examines the "oscillations between the energies and matter of the human body and the energies and matter of materials in the process"

(Gosden and Malafouris 2015). Through exploring the deep history of human-marble interactions as transformations in energy and matter, it is possible to appreciate how material culture mediates human development as an ecological process.

3.2 Finding their Marbles (c. ? - 3200 BCE)

Outcrops of marble are scattered across the Cyclades, lining the beaches with sea stones and forming terrestrial deposits that extend deep into their interiors. As the first Cycladic islanders explored their new homes, they would have quickly encountered the material, beaching their vessels atop pebbles that were radiant in the sun and luminescent beneath the moon. Investigating the islands, they would have rapidly discovered the weathered and red-tarnished stones with glittering cores that are scattered across the landscape. Colonists, whether originating from mainland Greece or from the eastern Aegean would have already been familiar with working marble (Mavridis 2019; Takaoğlu 2005; 2016). The pure, translucent and white marbles of the Cyclades surely invited experimentation.

The prehistoric cultures of the ancient Aegean had numerous techniques that enabled them to think through the potential uses of the materials in their environment. It is likely that the first forms of engagement with marble, following physical inspection, were attempts to knap the stone. Through knapping, individuals would have been trying to discover if they could produce consistent patterns with well-honed behavioural routines. Observations about weight, durability, hardness, texture, breakage and surface features informed how Aegean people began to think through the uses of marble. These patterns supported analogical reasoning about marble's potential uses in relationship to knowledge about other materials in the environment. Aegean people would have quickly learned that marble does not produce the conchoidal fracture patterns necessary for lithic industries. The porous and homogenous structure of marble randomly distributes the energy of knapping blows, leading to irregular breakages.

However, the rough, crystalline faces formed from such breakages probably encouraged examination of the stone's suitability for grinding and polishing. Such experimentation would have quickly revealed marble's suppleness, suggesting new interactive possibilities. Steady and relatively light applications of consistent pressure can shape and smooth marble, allowing for intricate detail through steady, rhythmic motor routines. Within minutes, an individual can easily produce changes in the marble.

Marble's properties can be seen as more analogous to working clay or metal than obsidian or flint. The material exhibits a comparable plasticity and durability to ceramics and metallurgy, capable of taking on and maintaining a diverse and stable array of forms. The presence of both marble and clay figurines at Saliagos (Renfrew 2017b) suggests that the villages perceived the two materials as conceptually related and that clay figurines provided the cultural template upon which early marble figurines were based. The key difference between marble, ceramics and metal is that marble requires less technical mediation and is far less energy intensive than the high-temperature crafting processes necessary for metals and ceramics. Small marble pieces would have been quicker to produce than fired ceramics, while the more complicated designs such as seated harpists would have required a planning depth comparable to the manufacturing of metal objects.

Marble's malleability, luminosity and sturdiness support distinctive patterns of physical and perceptual feedback with human activity. Marble is a metamorphic rock with fine grained, isotropic crystalline structures that are relatively homogenous depending on the purity of carbonate rocks from which they are formed. Recrystallization during metamorphosis gives the rock a porous configuration that is water absorbent, softening the marble in situ and leading to its gradual hardening through evaporation when exposed (Tambakopoulos and Maniatis 2017). These physical properties make marble a highly malleable, translucent and robust substance. Supple and receptive to skilled engagement, marble efficiently and predictably transfers energy

through its form, transforming the artisan's subtle and detailed shaping into low-entropy patterns.

A limited number of experimental studies on the production of Cycladic figurines have been undertaken. Elizabeth Oustinoff conducted the first experiments, in which she replicated, with no prior experience, a schematic violin piece as well as a naturalistic ECI Louros (c. 3200-2800 BC) and ECII Spedos (c. 2800-2300 BC) type figurines (1984; 1987). Oustinoff utilised obsidian and emery for the shaping and pumice for polishing. She found that an inexperienced sculptor could quickly learn to work the marble, as she took five hours to work a violin schematic and thirty hours for a Louros type. The Spedos figurine took sixty hours, and the result was an imperfect approximation (1984, 39-42). A more recent study with an experienced sculptor using harder sea marble and only emery completed a Spedos figurine in half the time as Oustinoff (Papadatos and Venieris, 2017). Emery is a granular and extremely hard metamorphic rock that is found in abundance on Naxos. The material provides excellent surfaces for all the actions required in shaping Cycladic figurines, as demonstrated by recent experiments. However, the stone has irregular breakage patterns that makes it impossible to produce standardised forms with the material (ibid). Due to these properties, the use of emery for sculpting provides a sound explanation as to why no Early Bronze Age tools kits have been discovered. Critically, these studies show that it was reasonably easy to learn the basics of sculpting, that the necessary materials were readily available, and that production was fairly quick for a skilled crafter. However, these experiments bridged a developmental process measured in centuries, whilst the Cycladic islanders had to develop these skills from scratch.

Despite intensive surveys, no evidence for marble quarrying during the prehistoric period has been discovered (Tambakopoulos and Maniatis 2017). Furthermore, only one probable workshop, at the settlement of Skarkos on Ios, has been plausibly identified in the Cyclades (Marthari 2017a), making the relationship between resource procurement and

production unclear. The probable use of emery in conjunction with the likelihood that marble was harvested from easily available surface sources helps explain why detecting locations for marble production has been difficult. However, we do know from the deep history of the Melian obsidian trade (discussed in chapter two), that relationships of value existed between Aegean peoples and the geology of the Cyclades for millennia.

Abundant throughout the Cyclades, marble is most prevalent on the central islands of Paros and Naxos, the likely epicentre of Early Cycladic colonisation. The presence of the large Mesolithic site at Roos on Naxos implies that the island was a well-known and important feature of prehistoric maritime knowledge (Sampson 2016). It is highly doubtful that these early lithic communities were completely unaware of the stone. Notably, detailed analysis of later finds from Dhaskalio-Kavos in the EBII indicate that Naxian marble sourced the lion's share of naturalistic figurines during the height of the Early Bronze Age (Tambakopoulos and Maniatis 2017, 478). Given these considerations, one can conclude that there is a distinct possibility that Cycladic sculpting originated on Naxos. Furthermore, major emery sources are located in close proximity to the islands' marble deposits, suggesting a strong ecological correspondence between tool and media. Regardless of the specific location in which Cycladic sculpting first emerged, it is clear from these finds that people rapidly began to interact with the material upon their occupation of the islands.

3.2.1 Shaping the Earth

Some of the earliest marble figurines found to date come from the settlement on Saliagos, a small promontory on Greater Paros located at the junction between Paros and Antiparos. The site is believed to have been occupied for possibly five hundred years with radiocarbon dates placing the settlement between 5,200 and 4,500 BC (Evans and Renfrew 1968, 144). Collections of stones found at Saliagos, as well as other sites, suggest that Cycladic people first experimented with the marble sea stones most likely harvested from the bays in

which they located their villages. Renfrew separates marble pieces found at the original site into three categories, “pebbles, schematic and naturalistic.” The pebbles are flat, oblong stones that have been “polished”, but it is unclear whether this is due to human action (Renfrew 2017b, 28). The great abundance of marble sea stones in the Cyclades indicates that they were probably harvested. If the pebbles were rounded by hand, their similarity to sea stones would hardly have gone unnoticed. Though other explanations are possible, Occam’s razor leads to the hypothesis that the clear majority if not all the pebbles found in Early Cycladic contexts are indeed sea stones. Similar rounded stones appear to have held significance to some degree or another throughout the EBA. Marble pebbles were deposited with relative frequency in the succeeding Grotta-Pelos cemeteries of the ECI (Rambach 2017). The recent detection of a painted eye on a pebble from a grave on Despotiko from this same period is indicative that these relatively innocuous forms embodied a fair degree of meaning and were clearly associated with the body (Hendrix 2003, 430). Of final note are the enigmatic collections of similar limestone pebbles found throughout Dhaskalio-Kavos (Nymo et al. 2013). Regardless of the original meanings or uses of such smoothed stones, there can be little doubt that they were objects of significance.

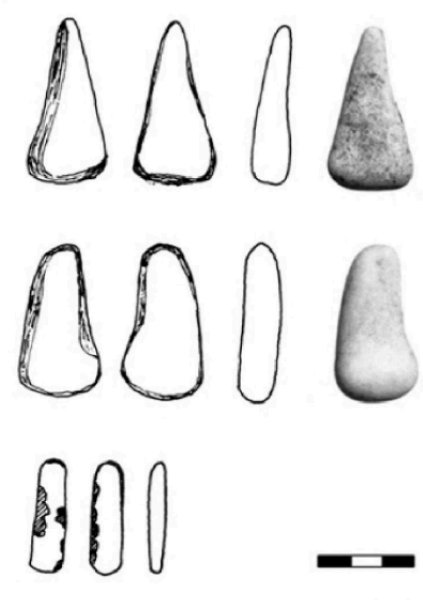


Figure 8: Marble Pebbles from Saliagos. After Renfrew 2017: Fig. 3.10.

The finds from Saliagos reveal much about the origins of Cycladic sculpting. At the original site, three schematic figures were found alongside the marble pebbles (Renfrew 2017b). One of the clearly crafted forms is a thick symmetrical piece that conforms generally to the shape of more delicate schematic figurines. Its general dimensions are quite similar to the three oblong pebbles that were found. However, it has two protruding nubs that are reminiscent of the "arms" found on other schematic pieces, protrusions that were made predominantly through scraping and grinding motions. It is equally plausible that this piece was produce by an individual learning to craft or was simply unfinished. The clustering of pebbles and schematics in the same archaeological context is indicative of a conceptual relationship between an ostensibly raw, sea formed material and the manufactured schematics. The dimensions and characteristics of marble sea stones provide an excellent template for schematic figurines, and utilising sea stones significantly reduces the labour required to acquire and process the material. Numerous pebbles with the general proportions and smooth features of schematic pieces were readily at hand with a quick stroll on most beaches in the Cyclades. The simplest hypothesis, given the evidence, is that significant aspects of Cycladic marble sculpting originated through engagement with sea stones. Indeed, it is possible that the oblong and rounded forms found on Cycladic beaches first suggested the human form to Saliagos peoples. In short, pebbles provided abundant, symmetrical templates upon which to learn sculpting techniques and rapidly generate forms.

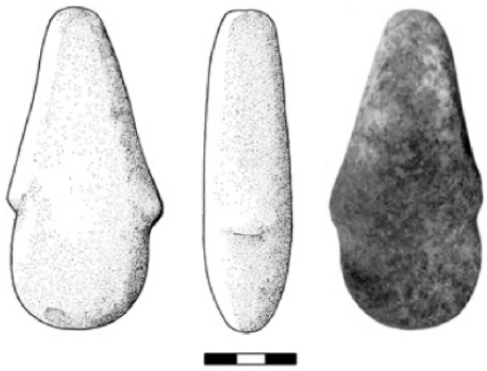


Figure 9: Shaped Marble Piece from Saliagos. After Renfrew 2017: Fig. 3.9

3.2.2 Eliciting form

The first sculptures were produced from pieces that could be held in the hand, forming the locus around which the rest of the body engaged with a repertoire of pecking, cutting, scraping, drilling, abrading, grinding, and polishing techniques. Individual motor routines initiated specific changes in the marble, and by shaping recognisable patterns in marble, the crafter directed perception and fine motor skills to further elicit form. In this way, crafting provided perceptual feedback that elicited behavioural responses, resulting in a recursive process of transformations in stone, perception and behaviour. As Malafouris notes, "the tool guides the grip, the grip shapes the hand, the hand makes the tool, and engaging the tool shapes the mind" (2013, 174). The first experiments with marble were probably acts of "fiddling", activities undertaken in free moments. As individuals became more habituated to the stone's interactive possibilities, exploratory actions coalesced into work rhythms and behavioural sequences that structured the flow of production. Wynn and Coolidge have argued that novelty requires craft workers to free up working memory via procedural cognition, thus enabling experimentation with habituated skills and fine motor routines (2014, 54). Over time, individual learning coheres into the procedures and methods that are the hallmarks of expert performance and teachable experience.

At Saliagos there were two, more delicately shaped, schematic figurines. One is only a fragment of an elongated neck, however, the other is a fully intact "violin" piece, that is by far the most impressive schematic found at the site. Finely crafted with a rounded torso, arm stumps and an extended neck baring a notch, the piece shares a striking resemblance to the schematic figurines that were created throughout the entire phase of the Cycladic sculpting traditions. The piece is small but elegantly symmetrical, combining rectilinear and curvilinear lines to suggest a body and appendages. The long arms and necks, round waists, deep grooves, angles and curves that form the schematic pieces required the full repertoire of motor skills

necessary to create Cycladic sculpture. The symmetry of the piece shows that individual characteristics were subordinated to the perceptual unity of the entire piece. Symmetry indicates sequences of production that helped maintain the similarity of the left and right sides. Humans have heightened perception of symmetry (Sasaki et al. 2005) involving a distinct neural network that extends from the extrastriate areas of the brain (Bertamini and Makin 2014). It is worth noting that, "cells in the primate visual cortex evolved to be sensitive to bilateral symmetry (symmetrical things are almost always living organisms), and arousal of these cell groups also elicits arousal of opioid releasing cells in the pleasure centres of the brain" (Overmann and Wynn 2018, 472). This early violin schematic reveals not only significant attentional focus directed towards marble and the development of procedural techniques for the purpose of sculpting bodies, but also pleasurable affective states elicited from the creation of symmetry.



Figure 10: Saliagos Violin Piece, Archaeological Museum Paros. After Renfrew 2017: Fig. 3.7.

Neuroimaging studies have shown that the cognitive architecture of the brain is extremely responsive to perception of the body. The human form triggers activity across areas of the brain involved in perception, proprioception, body schema, attentional focus, self-concept and individuation (Peelen and Downing 2007; Downing et al. 2004; Haxby et al. 2000). In this context, Ramachandran and Hirstien's discussion of peak shift phenomena and neuroaesthetics (1999) is valuable for exploring why bodies were first elicited from marble.

Peak shift is well attested phenomena that describes the directional biases of behavioural responses to the perception of exaggerated characteristics. Given that human bodies and exaggerated features both capture attention, it is possible to posit an important feedback loop for the development of sculpting. The more that the first experiments produced distinctly recognisable patterns, particularly those that resembled the body, the more these activities reinforced curiosity, exploration and experimentation. However, a shortcoming of neuroaesthetic accounts is that they tend to view material culture as an epiphenomenon of neural activation patterns. Peak shift phenomena should not be viewed as a source of behaviour, but as a pattern of attentional reinforcement that enables the humans to engage with the world. It is important to emphasise that marble was not merely a passive substance upon which the brain imposed itself, but an active participant that helped structure attention and suggest patterns of engagement to the first sculptors.

The growth, diversification and decline of Cycladic sculpting traditions essentially forms a bell curve with schematic figurines comprising the tails. This growth and loss of complexity indicates that the relational dynamics that brought marble sculpting into such a central cultural position were increasingly displaced as the Bronze Age progressed. The persistence of schematic figurines in the Phylakopi I culture gives some insight into the form's foundational role in the sculpting traditions. They were the simplest yet most durable form of Cycladic sculpture and appear to have been central to the enskilment process which supported the traditions. Developmentally this makes intuitive sense; the schematic figurines would have functioned well as a means of training the basic motions, techniques and forms of the craft.[39] These simple figurines likely blurred the lines between learning and play, training device and toy (Bailey 2014). This is not to say that the schematics present as a static form from the

[39] In my own experimentations with marble, with no previous experience I was able to use a piece of emery to shape a schematic form from a Parian marble sea pebble measuring 2.5 x 3.5 cm in roughly thirty minutes.

Neolithic to the end of the EBA, but that the size (with the exception of very large examples from the ECI), basic features (neck, torso, arm stubs) and production techniques remain remarkably consistent over the course of this period.

That schematic figurines provided the developmental locus around which Cycladic people learned to sculpt, historically and individually, explains their duration long after the cultural centrality of the figurines had been displaced. Several roles for the schematics have been discussed, such as charms, or other ritualistic devices (cf. Hoffman 2002). The multiplicity of meanings and relationships that the schematic pieces were likely to have embodied are ultimately unknowable, though it will be argued in chapter four that they are best understood within the context of a gift economy. However, it is an important insight that such pieces formed part of the environment in which Cycladic children developed. In this way, the schematic pieces can be understood as critical training devices for learning about the meaning, uses and creation of marble forms. It is also important to note that the schematic pieces have terracotta corollaries that are found throughout Neolithic Anatolia and mainland Greece. This reveals a shared history of ancient body concepts through which Cycladic sculpture emerged.

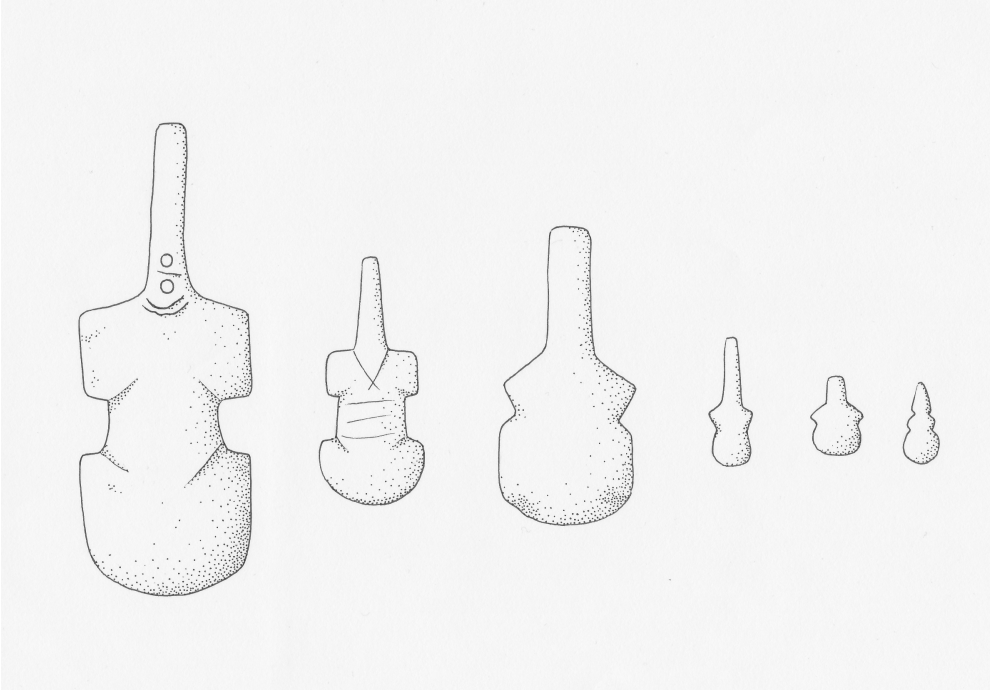


Figure 11: Grotta-Pelos Schematic Figurines (Drawing adaptation by Dr Céline Murphy.)

3.2.3 The First Naturalistic Pieces

One of the earliest naturalistic marble pieces from the Cyclades was also found on Saliagos. The so-called "fat lady of Saliagos" includes a head fragment as well as the seated legs, torso and left arm of the figurine. The connection between Cycladic sculpting and older traditions are readily observed in the piece, which shares a similar form with the terracotta and stone figurines that were abundant throughout the Aegean Neolithic (Talalay 2018; Renfrew 2017b). There are also fragments of a terracotta figurine at Saliagos, indicating a direct conceptual relationship with the fat lady. In these regards, Cycladic sculpting can be seen as an elaboration upon ancient practices rather than a radical innovation.

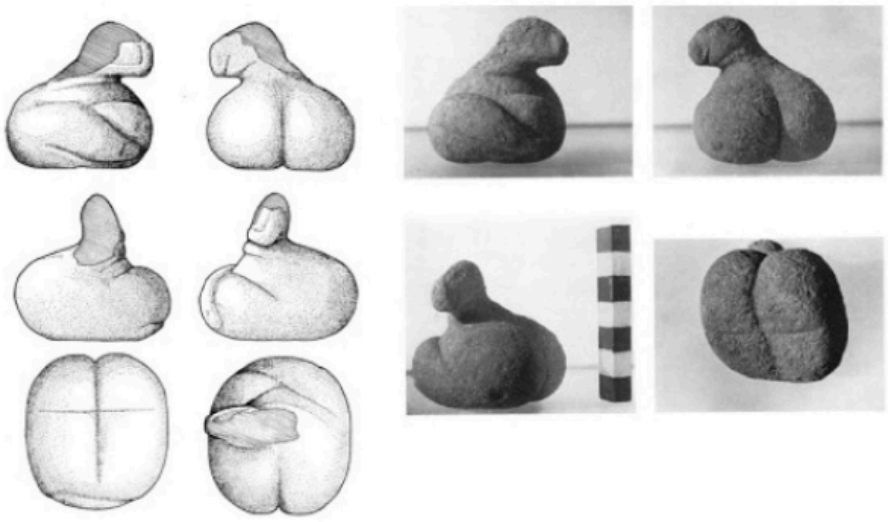


Figure 12: Fat Lady of Saliagos, Archaeological Museum Paros. After Renfrew 2017: Fig. 3.5.

The Fat Lady of Saliagos appears to have transposed extremely ancient behaviours into a new material form. As mentioned above, humans have powerful responses to the perception of bodies (Downing et al. 2004). Significantly, female bodies were the first stable depictions of human bodies to appear in the archaeological record (Robb and Harris 2013). It is not necessary to ascribe any specific function, such as fertility charms, to understand why the female body would be considered uniquely potent. Descriptors such as "Venus figurine" and "mother goddess" reflect our own cultural logics far more than they explain the role of these artefacts in prehistoric lives. Nonetheless, the generative capacity of the female body, human

sexual dynamics, the bonds of motherhood and family should not be disregarded. These are fundamental parameters of human existence, despite the great variety of historically contingent and culturally specific ways in which these realities are expressed. There are clear reasons that the female form is a source of powerful meaning in human relationships. Of course, we can never fully know the nuanced concepts and values in which such pieces were embedded, but their form and prevalence cannot be disentangled from the inherent significance of the body as the locus of human evolution and development.

Though Cycladic marble sculpting was certainly predicated upon antecedent relationships and practices, it nonetheless required new abilities and exhibited new dynamics, particularly in terms of scalability and durability. For example, the two largest Folded-Arm Figurines that possibly originate from the ECII, measure 1.5 meters, and 1.4 meters.[40] These pieces demonstrate considerable social commitments to marble crafting. The growth in the production of figurines during the Neolithic-Bronze Age transition clearly involved a significant expansion of time, energy and resources dedicated to supporting sculpting practices. In these regards, Cycladic sculpting is in keeping with the broader pattern of scalar shifts that began to occur in Bronze Age societies. Novel configurations of people, settlements, materials, and technologies transformed ancient behaviours of depicting the body through an increasingly intensive relationship with marble.

[40] Though the provenience of the two exceptionally large figurines in Athens are unsecure, large fragments from Kavos and the very large Cycladic head in the Louvre which was acquired in 1873 all support the case that the islanders were carving exceptionally large pieces.

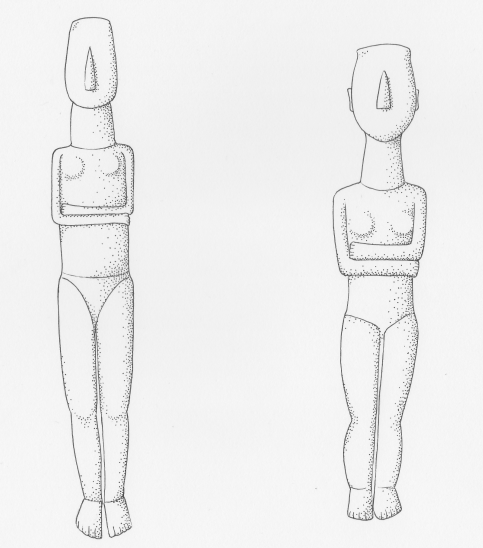


Figure 13: Large Figurines (Drawing adaptation by Dr Céline Murphy).

3.3 Figuring Through Stone (c. 3300 - 2700 B.C.)

As Cycladic people abandoned their Neolithic villages and dispersed into homesteads during the early phases of the Bronze Age, they began to regularly place marble forms in their newly created cemeteries. From pebbles and schematic pieces to a variety of naturalistic figurines, marble had become powerfully associated with the body and the life cycle amongst Cycladic communities. Several important things can be inferred from the burial evidence about the conceptual relationships in which marble was embedded. Significantly, marble pebbles like those discovered at Saliagos are relatively common depositional objects during the ECI (cf. Rambach 2017). The frequent placement of such pebbles in Grotta-Pelos graves shows that the material itself, at least in sea stone form, held significance. Furthermore, the deposition of pebbles alongside schematic pieces in EBA cemeteries indicates there was a conceptual relationship between the two forms. It is possible that this behaviour originates from older traditions that only became visible with the advent of cist graves. Nonetheless, the evidence is clear that by the Grotta-Pelos phase marble was a valued substance. The ubiquity of the material's deposition suggests that the properties of the stone embodied a potent source of value and meaning for Cycladic people. The conceptual blending of marble and bodies is the most obvious example of the ways in which meaning emerged through the material. Marble,

bodies, and their burial are indicative of a relational dynamic that helped articulate social knowledge about identity, community and memory. To understand how marble could effectively mediate these relationships it is critical to examine how the material potentially influenced the development of meaning.

The schematic and naturalistic pieces of the Early Bronze Age show clearly that bodies were conceptually entwined with marble. In these regards, Cycladic sculpting can be viewed as acts of metaphoring through the material. Malafouris writes, "material metaphors objectify sets of ontological correspondences, making possible the construction of powerful associative links among material things, bodies and brains" (2013, 65). In these regards, marble provided a medium with which metaphors of the body could be conceptualised through semiotic connections between Cycladic geology, female bodies, burials and more. Of course, the detailed nuances of how such meaning was experienced is lost to us. Nonetheless, if we consider marble both in terms of its qualities and relationship to the Cycladic environment, it is possible to infer several potential sources of meaning embodied by the material. Marble was not simply a passive recipient of human ideas; rather, it was a participant that contributed to the formation of these Cycladic identities. The plasticity of marble is what made the sculptural traditions possible, but there is some indication that the luminescence of the material was prized. The next most common, though still relatively rare, substance used for creating schematic figurines were seashells, whose reflective properties are comparable to a degree with marble (Papangelopoulou 2017). This indicates that qualities of light were potentially an important source of value. Marble's plastic and luminescent attributes certainly helped embody the substance's value; however, this value existed in relational contexts which extended meaning beyond the boundaries of the immediate material.

The fact that marble occupies large swathes of the Cycladic landscape implies a connection between the islands as the basis of Cycladic lifeways and the substance's unique

properties. If it is accepted that the pebbles are indeed sea stones and likely the raw material used for schematic pieces, there is a clear conceptual link to the sea. The use of seashells to create schematics further supports the argument that the Aegean was a source of meaning for the figurines. It is also noteworthy that the mysterious Cycladic "frying pans" that have been found in wealthy graves, often alongside figurines, depict sea spirals, fish, suns, longboats, and vulvas in a variety of combinations revealing cultural logics operated which connected the sea, sun and female body (cf. Broodbank 2000, 249-250). Furthermore, the discovery of marble frying pan skeuomorphs in the cemetery of Aplomata on Naxos reinforces the argument that the material was linked to this conceptual framework (Doumas and Lambrinoudakis 2017, 191). Marble's terrestrial properties should also be emphasised, as the materials that sourced the larger naturalistic sculptures undoubtedly came from the islands themselves. Importantly, the two islands on which Cycladic peoples most likely first began to establish themselves, Naxos and Paros, are formed of roughly 50% marble (Tambakopoulos and Maniatis 2017, 471-74). The islands were major centres of the EBA and as people learned to harvest the stone in order to sculpt, the ubiquity of the material would not have gone unnoticed. The identity of the substance is intimately linked to the very landscape upon which many Cycladic people lived or had ancestral ties, quite literally forming the ground upon which communities lived. These possible conceptual links help us to consider how Cycladic islanders perceived and thought through marble as a valued substance, a material that emerged from both sea and earth with unique qualities of light and form.

3.3.1 The First Cycladic Styles

As Neolithic villagers dispersed into the homesteads of the ECI, the islanders began to place marble bodies in their new cist graves. What first began with violin and tripartite schematic pieces, developed during the latter half of the ECI into detailed depictions of the body. The early naturalistic pieces of the Bronze Age show that marble commanded a far

greater degree of attention and effort than in the Neolithic. The first, distinctly Cycladic form is believed to be the Plastiras type, named for the Grotta-Pelos cemetery on Paros where they were first discovered (Doumas 2017). The pieces generally range between 7 and 10 cm, though pieces over 30 cm are known. The Plastiras type is the most internally diverse category of Cycladic figurines. Of all the naturalistic styles, they are the most clearly related to the Neolithic traditions within which the Fat Lady of Saliagos was enveloped, though some pieces exhibit particularly distinct influences from schematic styles.

The Plastiras figurines generally have rounded heads with relatively detailed facial features and elongated necks. The shoulders and arms almost always form a rectangular shape around the breasts with clasped or opposing hands. The hips are often accentuated, the buttocks rounded, and the legs always separated. A substantial number of the figurines have male genitalia. These characteristics share stylistic similarities with Neolithic figurine traditions across the Aegean. Nonetheless, the intensive focus upon marble was a qualitatively new phenomenon. The early figurines show new attention to detail, with the angles and curves of the body more clearly defined than Neolithic antecedents. Many of the Plastiras figurines are small and rudimentary compared to the ECII traditions; however, a number of Plastiras pieces are quite technically sophisticated. Figurines such as the one found in tomb 23 at Glypha on Paros exhibit the greatest skill of the early styles, showing a new awareness for proportion and symmetry. From a developmental perspective, it would be logical to infer that the more demanding Plastiras types are later pieces in which new technical repertoires and styles were being consolidated and experimented with. Nonetheless, what first began with pebbles and schematics in the early Grotta-Pelos period, began to rapidly acquire new complexity in the latter half of the cultural phase.

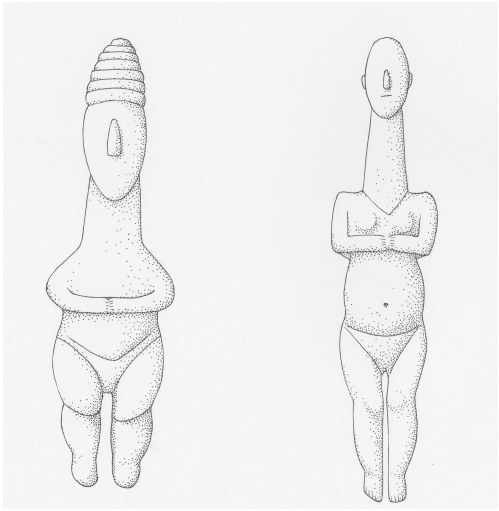


Figure 14: Plastiras Pieces (Drawing adaptation by Dr Céline Murphy).

The Plastiras pieces are the first direct antecedents of the FAF sculptures, however, the somewhat later Louros figurines are perhaps the more revolutionary of the two early styles. The sculptures have a similar range of size as the Plastiras styles, but the pieces were finely polished and completely lacked any incised details, with the exception of simple pubic triangles etched on some figures. The legs are found both separated and joined to various degrees. Prefiguring the curves and lines of the FAF forms, the heads are oblong and varyingly ovoid or triangular. Their forms, with elongated necks that extend into rounded stubs at the arms, distinctly resemble the patterns of violin schematic figurines.

These stylistic patterns indicate an important change in the way Grotta-Pelos people were thinking through marble. The Louros pieces suggest a scalar shift in the techniques and aesthetics developed with the schematic pieces. Sculpting the arms, necks and torsos of the figurines would have been highly similar processes to the shaping of schematic pieces. The cleft legs and heads harken to the Plastiras style, but the lack of any facial detail seems to be more in keeping with the simplified aesthetics of the schematic form. This simplicity of design leaves the figurines unhindered by detail, thereby emphasising perception of the whole form.

The Louros pieces indicate several important conceptual changes beginning to emerge in Cycladic traditions. Firstly, the style suggests that the technical procedures used in schematic

production could be scaled up. This increased scale implies that skills and concepts which likely developed through sea stones were being transferred to bulkier pieces of terrestrial marble. The elimination of details would simplify this scaling process by focusing on the overall symmetry of the piece. This attention to general symmetry further aided the development of procedural skills, streamlining task organisation by subordinating detail to the unity of the completed piece. These factors also indicate that learning and training was more fluid and rapid with Louros pieces. It is therefore not surprising that the largest single find of figurines in the ECI was a set of seven figurines interred at Louros Athalassou, Naxos (Papazoglou-Manioudaki 2017). Ultimately, what is critical about these figurines is that they appear to show the formulation of a generalised body schema.

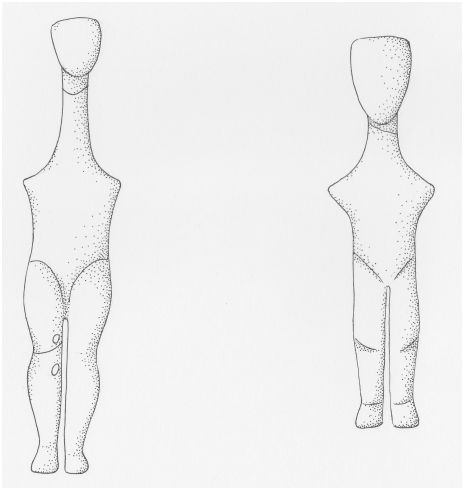


Figure 15: Louros Figurines. (Drawing adaptation by Dr Céline Murphy.)

The developmental significance of the Plastiras and Louros traditions should not be underestimated. The existence of possible Plastiras and Louros hybrids implies that both forms played a crucial role in developing the technical and conceptual foundations of the FAF period (Legaki 2017, 232-34). It is in the succeeding ECII that the position, proportions, and details of marble-sculpted bodies stabilised and, in a limited sense, standardised into the Folded-Arm Figurine. Preceding this stabilisation there is evidence of hybrid or transitionary figurines that anticipate the consolidated iconic form (Renfrew 1991, 79-87). These pieces feature general

principles such as folded arms, bent knees, ovoid heads, but with variable admixtures as well as deviations and details absent from the FAF pieces. In key regards, the FAF forms appear to have been a synthesis of the stylistic techniques developed in the ECI traditions.

Aspects of all the antecedent sculptural groups (schematic, Plastiras and Louros styles) contributed to the development of the FAF forms, with their emphasis on symmetry, gender and posture. Louros pieces with etched pubes, fused legs and lyre shaped heads indicate that the form contributed to the generalised body schema of the Folded-Arm Figurines. Unlike the Louros pieces, the Folded-Arm Figurines do have facial features, implying influence from the Plastiras traditions. However, unlike the Plastiras styles with their detailed eyes, mouths, noses, and ears, the FAFs almost only ever have the nose depicted in marble and very rarely ears. Perhaps the most important contribution of the Plastiras traditions is body posture, of which the often-clasped hands distinctly prefigure the later folded arms. One of the key changes between the ECI and ECII styles is the fusing of the legs, giving the FAFs greater bilateral symmetry while balancing the head and feet, thus increasing the transverse symmetry of the pieces. The attention to the perceptual unity of the body revealed by the schematic pieces and first articulated at new scales with the Louros forms achieved new conceptual and technical coherence in the FAF forms.

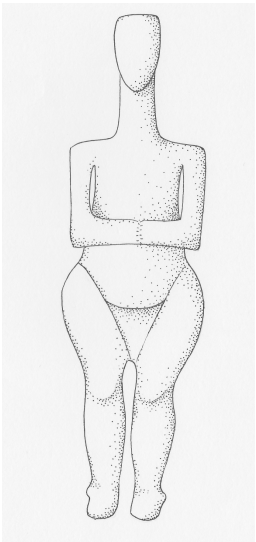


Figure 16: Possible Louros-Plastiras Hybrid (Drawing adaptation by Dr Céline Murphy).

Through haptic and visual feedback, the crafter could elicit two fundamental patterns in marble, curvilinear and rectilinear contours. It is from these basic shapes that Cycladic sculptors could create depictions of the body as a whole and as an assemblage of individual parts. In these regards, the two styles subtly emphasise different aspects of form and the human body. Plastiras figurines, with their diversity of bodily shapes and details, exhibit the least consistency and the greatest variety of form of all the naturalistic styles. Their production process was more individualised, involving greater variability in motor routines, procedures and outcomes. In contrast, the flowing lines and curves of the Louros pieces and the lack of details emphasised the symmetry and unity of the body by employing techniques and procedures honed through the production of schematic pieces. The schematic appearance of the Louros pieces accentuate a generalised body. These features indicate that the style stressed the self-similarity of bodies as a category of experience and, at least for the artisan, procedural techniques for creating consistent forms. In other words, relationships of identity are far more abstracted with Louros pieces and far more specified in the Plastiras figurines. The two styles appear to have emphasised skill sets, routines and perception in distinctive ways that contributed to Cycladic understandings of bodily identity. Specifically, the Plastiras and Louros styles indicate that Cycladic people were utilising marble to express a conceptual distinction between the individual and the collective – a distinction that appears to have found synthesis in the Folded-Arm Figurines.

The Folded-Arm Figurines blend the configurational symmetry of the schematic and Louros pieces with the emphasis on bodily details found with the Plastiras form. The regularity of form in the FAF pieces express a procedural consistency that is first clearly observed with the schematic and Louros pieces. The marble facial features of the Plastiras pieces were largely supplanted with paint in the Folded-Arm Figurines. However, the significance of posture and gender in the FAF form is most clearly derived from the Plastiras pieces. The Folded-Arm

Figurines undeniably emerged from the skill sets, procedures and perceptual routines developed with the ECI traditions. However, it is not merely these technical and aesthetic contributions which supported the emergence of pan-Cycladic ritual. The Plastiras and Louros types emerged as Cycladic settlements, habitation patterns, community structures and the burdens upon social cognition were being drastically reorganised (as discussed in chapter two). It is in these contexts that Cycladic islanders began using marble to articulate a conceptual tension between the individuality and commonality of the body – a tension that was resolved in the Folded-Arm form, with significant implications upon the ways in which the figurines shaped attentional space and contributed to the development of intersubjective identity.

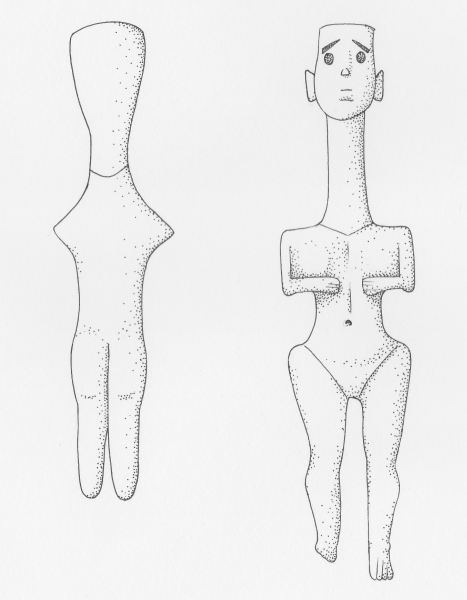


Figure 17: Louros and Plastiras Piece (Drawing adaptation by Dr Céline Murphy).

3.4 Bodies from the Sea (c. 2800 - 2200 B.C.)

During the Keros-Syros cultural phase, depictions of Folded-Arm females dominated images of the body in the Cyclades. While there are a great variety of micro-styles within the FAF forms, there are several characteristics that are universal across the typologies of the ECII. Generally, the only marble feature on the face was an angular nose. The pieces are clearly sexed with individually rounded breasts above the folded arms and subtle incisions along the

pubis. The legs are differentiated but undivided and slightly bent at the knees. The Kapsala, Spedos, and Dokathismata varieties form the core typologies of the FAF styles (Renfrew 1969). The Kapsala type is generally considered to be the earliest of the FAF figurines, a possibility that finds its best support due to the absence of the form on Keros (Renfrew 2018). Their ovoid heads and elongated necks are reminiscent of the Plastiras varieties, and unlike all the other FAF styles, their feet are flat like the Plastiras types (Renfrew 1991). The Spedos style is a fuller figure than the Kapsala types, with more rounded features and the diagnostic "lyre" shaped heads and appears to be chronologically in the middle of the three traditions. The Dokathismata pieces are delicate with wide shoulders that create a well-defined angular narrowing of the body towards the feet. Despite evidence for principles of proportionality, studies have failed to uncover the use of any universally formalised proportions (Broodbank 2000, 62-62; Gill and Chippendale 1993, 640-647). Nonetheless, the stability and consistency of posture, bodily details and gender clearly express common aesthetic principles and a shared conceptual development. The consistency of the FAF styles unequivocally demonstrate a collectively held female body schema that was generated through marble.

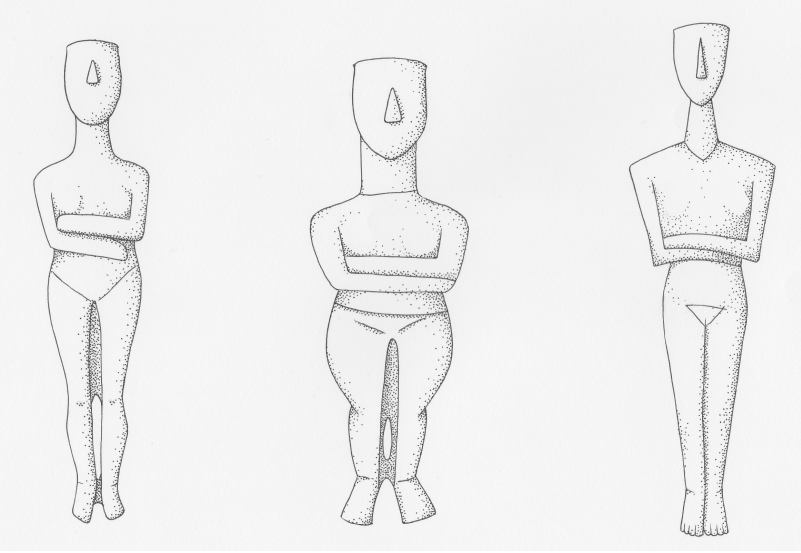


Figure 18: Kapsala, Spedos and Dokathismata Figurines (Drawing adaptation by Dr Céline Murphy).

The only other major styles of FAF figurines are the Koumasa and Chalandriani varieties. The Koumasa pieces are small and flat, averaging between 7 and 10 cm. They share

a distinct stylistic similarity with the Dokathismata types' angular shoulders and heads. However, the Koumasa variety is the only Folded-Arm sculptural tradition found solely outside the Cyclades on Crete. This is consistent with the evidence for colonies on the island and indicative of the significant reach and potency of Cycladic "ideologies" during the Early Bronze Age. The Chalandriani variety is the most inconsistently shaped of the FAFs and was potentially a form that emerged on the periphery (i.e. Syros) of the core sculpting communities. They are compact, rectangular pieces and exhibit the most variability of the Folded-Arm styles. Most pieces with reversed arm position come from the Chalandriani style and overall, the pieces are less delicately crafted than the other major Cycladic traditions. The variety also contains the largest number of male figures bearing daggers.

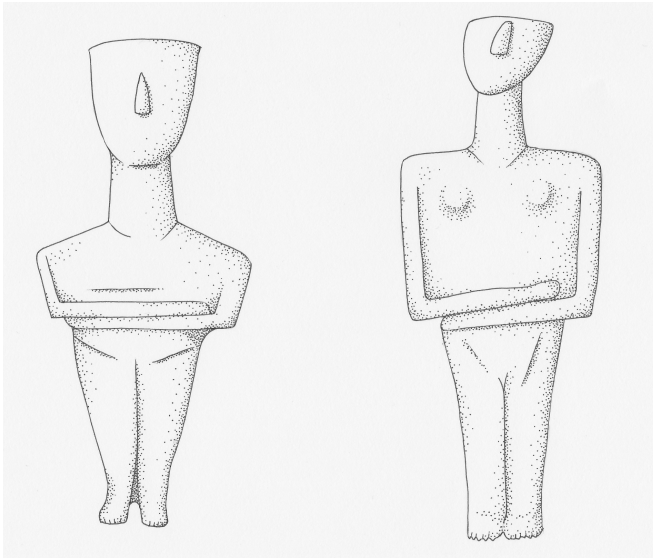


Figure 19: Koumasa and Chalandriani Figurines (Drawing adaptation by Dr Céline Murphy).

During the EBA, Cycladic experimentation with marble coalesced into communities of practice with durable and stable traditions. Generations of sculpting had produced developmentally rich environments through which expert performance could be learned. It is through the establishment of skilled procedures coupled with the reproduction of specific forms, skills first visible with the Neolithic schematic pieces, that the stylistic traditions were seeded. By the ECII these practices had developed a stability and technical precision that enabled the intensive and extensive production of the FAF form. Wynn and Coolidge have

argued that artisans distribute technical cognition through tools, materials and workspace in ways that free up "working memory," thus enabling expert performance and affording the possibility for innovation (2014, 52). Through repeated iterations, chance mistakes and idiosyncratic differences in crafting, "procedural drift" generates new skills and forms that guide future activity.[41] A key means by which artisans streamline the cognitive burden of making is through the organisation of crafting space to facilitate task performance (ibid). This "intelligent use of space," structures the environment by creating visual, categorical, and sequential mnemonics that help generate procedural dynamics (Kirsh 1995). In the case of Cycladic sculpting, the general lack of identifiable workspaces, other than those found at Skarkos, complicates this discussion to a degree. However, the act of marble carving itself is self-structuring, with the material providing an intelligent space through which the crafting process can be organised.

Production would have been initiated through an established set of principles coupled to well defined motor routines with marble. In this way, the sculptor could use the emerging form of the piece as a template for grounding crafting procedures. By eliciting certain defined forms such as heads or shoulders, the sculptures indicated a new stage in production with concomitant changes in behavioural routines. Thus, sculpting itself redistributed the cognitive burden of tracking progress and conceptualising the finished form by simplifying crafting processes into a series of discrete steps. As individuals became more habituated to the stone's interactive possibilities, activity coalesced into work rhythms and behavioural sequences that structured the temporal order of production. In turn, finished pieces provided stable frameworks upon which further creations could be modelled and copied, ultimately allowing for the highly streamlined, consistent and stable generation of form.

[41] Possible hybrid and transitionary figurines are indicative of such processes at work.

There is limited evidence for such organisation of the FAF sculpting process. Much effort has been expended to discover geometric principals upon which the figurines were based (e.g. Getz-Preziosi 1987; Renfrew 1991, 137-141) The search for such a "cannon" largely reflects a modern association with classical marble sculpting and tends to assume its existence prior to proving it (Gill and Chippendale 1993, 647). The presence of a standardised schema is ultimately less relevant than the existence of general principles of proportionality for producing figurines. Such principles of crafting simplified task recall facilitating procedural cognition, particularly in terms of larger pieces that intrinsically required more planning. If, as Renfrew has suggested (1991, 137-141), the head was used to conceptualise the proportions of larger sculptures, it functioned as a mnemonic that helped to ground and generate skilled practice. Nonetheless, the technical precision with which the Folded-Arm Figurines were reproduced reveals consistent and accepted methods for creating self-similar forms.

The process of making allows us to understand how energetic exchanges between humans and marble generated self-organising dynamics over time. Cycladic sculpting techniques were embedded in broader practices of training, stone selection, works in progress, finished pieces, demonstration, gesture, language, facilitating the development of motor routines, technical skills, procedural operations and traditions as a form of ecological inheritance. Though these aspects of technical cognition do not directly explain why the specific form of the Folded-Arm Figurines held significance, it does help to clarify and contextualise the emergence of the traditions. The training of technical and procedural cognition through the properties of marble was necessary for the emergence of meaningful relationship with the figurines. The agency of marble shaped sequences of production – the dimensions and perceptual qualities of the figurines – to create shared depictions of the human form as objects of collective engagement.

3.4.1 Perceiving the Body

Stylistic and aesthetic interpretations of Cycladic figurines have been dominated by an art historical perspective since the middle of the twentieth century, particularly in the context of growing esteem for the artefacts by modern artists. This has led to a general focus on the visual presentation of individual pieces and the search for stylistic similarities for the purposes of categorisation (e.g. Getz-Preziosi 1994; Renfrew 1991). Athena Hadji has eloquently critiqued these approaches for their susceptibility to anachronistic values and theoretical concerns such as methodological individualism as well as an emphasis on the passive visual presentation of modern curatorial practices (2016). This ignores, as Hadji notes, "that this class of artefacts were probably destined for a broader somatic experience" (ibid, 34). The embodied and socially distributed perceptual relationships in which Cycladic figurines were entangled requires appreciating "human cognition (and the human condition) as multifaceted, varied, variably manifested, resilient and adaptable" (ibid, 39). Other than the critique and considerations outlined by Hadji, there has been little or no consideration of Cycladic figurines in the context of the cognitive science of perception. Significantly, the figurines have never been examined in relation to the dynamics involving bodily perception in both the brain and the development of intersubjectivity in humans.

As discussed in chapter one, the evolution and development of the human brain is deeply entangled with social living, cooperative behaviour and material engagement. Children as young as six months will mirror emotional expressions when interacting with an adult. (Gallagher 2011). Infants, within their first year, engage in gaze following, communicative gesturing and imitating adult behaviour as social references (Tomasello and Rakoczy 2003, 125). Children scaffold the development of joint attention on objects and shared attention between individuals by focusing upon and mimicking adult bodies (Tomasello et al. 2005; Tomasello and Carpenter 2007). From the outset, human embodiment is socially embedded and develops, in key respects, through attentional focus that is mediated through the bodies of

others and things in the environment. As noted in chapter one, bodies capture attention, drawing gaze and focus in both peripheral and direct observation (Downing et al. 2004). Studies have demonstrated that visual perception of the human form has consistent and distinct neural activation patterns that occur in the extrastriate and fusiform body areas of the extrastriate cortex (Peelen and Downing 2007). These functional areas of the brain are involved in the perception of bodies, proprioception, body schema and body image. The key difference between the extrastriate and fusiform body areas appears to be attentional focus upon body parts versus the configurational relationship of the whole body (Taylor et al. 2007). The form of the body itself is one of the clearest examples of how the mind is both embodied and distributed, entangling individual perception and proprioception with other bodies.

The existence of neural architecture that supports perception of the body has several implications upon the feedback dynamics involved in Cycladic sculpting. However, areas of the brain that are responsive to bodies should not be viewed in a bounded and linear sense of interactions and functions. Body selective neural networks are integrated into the nonlinear dynamics of brains, bodies and environments, enabling humans to engage in complex behaviour. Hadji articulates this well: "objects are made by a conscious subject, they also shape individual cognition literally through muscular training and neuronal adaptation; thus they open new gateways to some of the statistically possible trillions of synapses in the human brain (2016, 35). For example, the extrastriate body area is involved in the perception of the body parts of the self and others, but also goal-directed motor actions (Astafiev et al. 2004). This relationship indicates that kinaesthetic and visual feedback from sculpting was interacting with the ability to distinguish between self and others. Of further note, studies have revealed that the extrastriate body area integrates haptic perception of bodies even when visual perception of the body is obscured (Costantini et al. 2011). In other words, shaping marble bodies elicited dense neural feedback in regions of the brain that support the perception, identification and

engagement of the body. The significance of haptic perception is obvious during the crafting process, but the importance of tactile interactions with finished pieces should not be overlooked. The physical handling of the objects was an important means through which associative learning and affective attachments developed. The way in which adults engaged with the pieces shaped the attentional space through which meaningful and culturally appropriate interactions with the sculptures were learned. Individual engagement with figurines supported bodily communication to shape joint and shared attentional space. It is therefore particularly fruitful to focus on how the figurines interact with the visual system.

The figurines were elicited in marble through curved and angular lines that define the form and features of the body as a whole. One of the most striking aspects of the FAF pieces is their symmetry and balance. The Folded-Arm Figurines visually present as self-contained wholes; all sculpted details are subordinated to the unified body schema. The other most significant perceptual quality of these figurines was the consistency and self-similarity of form during a half millennium of production. Beyond the aesthetic qualities of the total form, there are two key features of the figurines that enable us to explore the conceptual relationships in which they were embedded: sex and posture. The generative capacity of the female body has embodied meanings that are undeniably universal to all human communities. However, sex alone does not reveal the broader relationships in which Cycladic female bodies operated (a topic that will be returned to in the following chapter). The posture of the bodies perhaps gives some insight into the conceptual dynamics of the figurines. The folded arms neatly divide the breasts from the belly, defining focus between the two areas. However, the breasts are not accentuated and only a very limited number of figurines have been found that depict pregnancy or post-partum folds. These characteristics indicate that the birthing capacity of the female body was an inherent yet latent meaning that was rarely emphasised. The folded arms could be indicative of a posture of authority, a protective gesture, or even a position of relaxed comfort.

Furthermore, these possible meanings could have shifted depending on whether the sculptures were placed horizontally or propped up vertically, and the sculptures were probably displayed in a variety of positions. Nonetheless, the figurines provided a powerful tool for shaping intersubjective forms of meaning, from the implicit attention-capturing effects of bodies to the broader dynamics in which marble and gender were embedded in the ancient Cyclades. However, perhaps the clearest conceptual relationship the figurines embody is the tension between the collective and the individual, a juxtaposition that is made clear by the generalised marble schema of the FAF form and the details that were painted upon them.

3.4.2 Shared Attention and the Application of Eyes

The application of paint is a crucial feature for understanding the agency of the figurines and their effects upon perception. The figurines were predominantly painted with red pigments, most likely of iron oxide, and potentially of cinnabar. Blue from azurite is the next most common pigment, followed by green, likely from malachite produced through the oxidization of azurite (Birtacha 2017). Marble provides a distinct and relatively uniform colour with which the paints could contrast. In this way, stone and paint emphasise each other's properties, reinforcing their perceptual qualities. It is possible that other colours were employed; however, if this was the case, the colours were not durable enough to remain in the archaeological record. The burial of pigments with tools used in their production and application alongside several figurines in cist graves indicates that the painting of figurines was inextricably linked with the use of the sculptures. There is a degree of variation in the usage of the paint, which can partially be accounted for by differences in preservation. However, some uses of the paint appear to be relatively standardised, while other aspects are highly specified. Individualised aspects include the reproduction of jewellery, body marking (such as zigzags), lines and groupings of dots (Birtacha 2017; Hendrix 2003). The FAF form thus provided a matrix upon which fluid aspects of identity could be individuated and detailed.

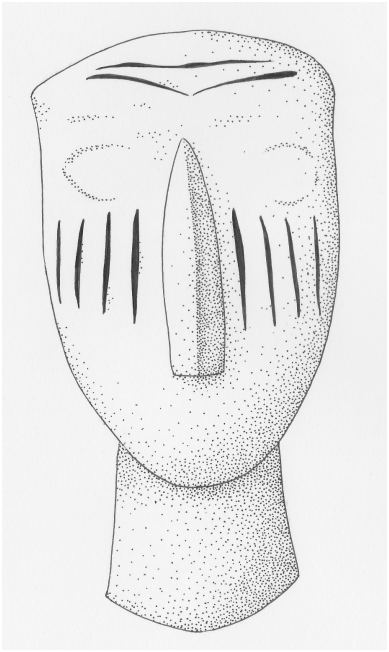


Figure 20: Head with Painted Details (Drawing adaptation by Dr Céline Murphy).

The standardised usages of paint further illuminate the attention capturing properties of the figurines. Iron oxide was employed to distinguish body regions such as the neck from the head, while azurite was generally used to detail hair (Hendrix, 418; Birtacha 2017, 494-96). The most standardised application of paint was the depiction of large, almond shaped eyes with red pigment. This was a "dramatic" development in the Cycladic traditions, marking a radical departure with all prior Aegean sculptural traditions which either lacked eyes or indicated them with small incisions (Hendrix 2003, 416). The application of painted eyes has important implications upon the neural processes involved in facial perception. The fusiform and occipital face areas of the brain, located in the extrastriate cortex, develop in close proximity to and have functional overlaps with both the extrastriate and fusiform body areas discussed above. The fusiform face area is crucial for the perception of facial configurations whereas the occipital face area is involved with the individuation of facial features; however, both areas are necessary for facial detection and recognition (Spiridon et al. 2006; Haxby et al. 2000). The existence of these neural networks underlines how perception of the human form has played a

critical role in the evolution and development of the structural and functional architecture of the brain.

The emphasis placed upon the eyes by Cycladic peoples has particularly important implications. Perception of eyes is central to neural activation patterns involved in attentional capture and facial recognition (Itier and Batty 2009). Focusing upon eyes developmentally precedes broader facial recognition within infants and is central to gaze following that scaffolds the development of joint attentional behaviour (Itier and Batty 2009; Tomasello 2014; Gallagher 2011). Depictions of eyes are shown to activate attentional focus even in the absence of other facial features (Itier and Batty 2009, 847). In this context, the discovery of an eye painted on a marble pebble found in a Grotta-Pelos cist grave is noteworthy, indicating the importance placed upon eyes as well as their conceptual blending with marble prior to the ECII (Hendrix 2003, 430). Regardless, the emphasis on eyes in Cycladic sculpture indicates that they were crucial factors in the attention-capturing properties of the figurines.

The evidence from neuroscience reveals a series of nested patterns of attentional focus in body perception that moves from the body in general, to the face and the eyes specifically. It is noteworthy that the only facial feature universally elicited on FAF sculptures is the nose, as this is where the eye saccades involved in facial recognition processes are centred (Hsiao and Cottrell 2008). In addition, perception of the colour red, accounting for most known pigments used on the figurines, has unique neuro-physical and cognitive properties. Several studies have shown that red has a unique ability to capture attention, and particularly in emotionally charged (both positive and negative) circumstances (Maier et al. 2009; Elliot and Maier 2014; Kuniecki et al. 2015). These properties of faces, colour and the visual system show that the painted marble figurines exerted powerful effects upon perception and attention. The non-anatomical depiction of eyes that often appear on the throats, abdomens and legs of FAF figurines further attests to this attentional role (Hendrix 2003, 425-26). If the human perception

system involves a biological commitment to concentrating upon eyes, then painting eyes upon various body parts is an effective way of drawing focus to specific parts of the body. These aspects of the human visual system lend credence to Elizabeth Hendrix's speculation that these patterns were intended to draw attention symbolically or ritualistically, perhaps to aid healing or to facilitate biological processes such as pregnancy (ibid). Nonetheless, the depiction of large, open eyes and the use of red pigments suggest several reinforcing layers of neuro-physical feedback shaping individual and group attention. Marble provided an ideal base not only for various coloured media, each with unique physiological effects upon the visual systems, but also for focusing attention upon the eyes. The interactions of marble and paint helped to both standardise details of the FAF form and allow for a degree of individuation within the generalised body schema. This plasticity indicates that the figurines could articulate between individuated and abstracted conceptions of the body by capturing individual, joint and collective attention.

3.5 Losing Their Marbles (c. 2300 - 1900 B.C.)

The finds at Dhaskalio-Kavos reveal that the FAF figurines played a central role in the organisation of social relationships between Cycladic communities. By the end of the Early Bronze Age, marble sculpting was a cultural behaviour that extended back thousands of years. It is thus not surprising that it persisted in the form of schematic figurines for several centuries after the cessation of the Folded-Arm Figurines. The simplest forms of the sculpting traditions sustained into the early Middle Bronze Age possibly as trinkets, toys, talismans, gifts or just a simple pastime. Perhaps the pieces helped to articulate and transition Cycladic identities and histories into the new realities of an increasingly Minoan world.

For centuries, marble provided a critical scaffold through which the islanders learned to navigate the emergent complexity of the Early Bronze Age Aegean. The collapse of the

social order that had been partly mediated through the FAF forms did not immediately obliterate the meaning and value of marble working in its entirety. Even as the people of the Phylakopi I culture aggregated into the first Cycladic towns and adopted sailing technology, they continued to shape marble. The schematic pieces were the lingering memories of a past world, reduced to the most basic techniques of the crafting traditions. The pieces of the Phylakopi I culture make explicit the powerful sway that marble held in Cycladic society for millennia. Even after the settlements, technologies, traditions and institutions of the EBA had largely been displaced, marble sculpting persisted for a while longer.

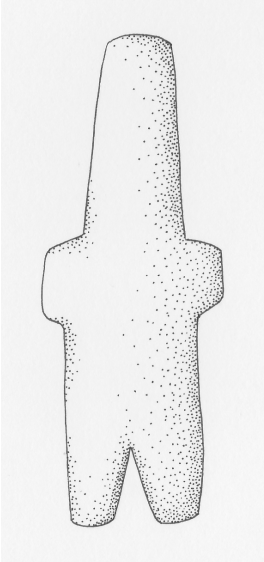


Figure 21: Phylakopi Figurine (Drawing adaptation by Dr Céline Murphy).

3.6 Conclusion: Embodied Skill, Identity and the Cognitive Developmental Niche

Aegean peoples began to manipulate marble as they first started to settle the Cyclades. From its earliest origins in the Neolithic until its disappearance early in the Middle Bronze Age, Cycladic sculpture transformed from simple schematics pieces into the complex and elegant forms of the Early Bronze Age through individual learning and community enskilment. It is within the continuum of individual engagement and shared developmental environments that, over the course of centuries, the properties of marble enabled Cycladic islanders to articulate new relationships between bodies and communities. From the subtleties of gaze-

following and bodily attention to the complexities of emotional intelligence and collective intentionality, the body is the locus through which human intersubjectivity emerges.

Cycladic islanders expended enormous effort coordinating flows of energy and matter in order to shape marble bodies during a time in which scales of interaction were intensifying within and between communities throughout the Mediterranean world. In these regards, we can begin to understand how engagements with marble helped to shape a cognitive-developmental niche capable of organising the growing complexity of the Cycladic world. Neolithic lifeways changed how humans occupied Aegean environments. Millennia of ecosystem engineering led to downstream effects that exerted novel developmental pressures upon Cycladic communities. The dispersal of villages during the ECI reveals that new energetic dynamics had taken hold in the organization of communities – dynamics with concomitant implications upon the burdens of social cognition. These burdens were clearly mediated in key regards through burials, rituals and figurines.

During the ECI the new burdens placed upon social cognition involved maintaining relationships between dispersed households and kin relations. These cognitive demands involved the spatial orientation of communities, use rights, and alliances based upon intermarriage and social storage. Two parallel body concepts appear to have been operating in the naturalistic styles of this period. The Plastiras pieces emphasised the individuality of the body while the Louros figurines accentuated its self-similarity. During the ECII, the burden placed upon social cognition had scaled up into a predicament of mediating relationships between multiple island polities, with large central villages supported by hinterlands of hamlets and homesteads, all in the context of broader Aegean interactions. Under these conditions, the Folded-Arm Figurines appear to have conceptually synthesised the preceding ECI styles, providing a "universal" icon of the body that could be expanded upon and individuated through paint. By looking at this interplay between the universalising and individualising properties of

the marble figurines, it is possible to understand how the sculptures helped Cycladic people articulate between the various relational scales of self-hood and community. The figurines provided a perceptual target upon which relationships of identity could be associated, conceptually blended and preformed as a shared metaphor of mutual being and becoming.

For Cycladic artisans creating the figurines, identity would have developed, in part, through the process of sculpting. At a fundamental level, this process involved the neuro-physical incorporation, or "cognitive prosthesis," of the tool and marble pieces into the body schema during the crafting process (Malafouris 2012). With emery in one hand and marble hefted in the other, tool, surface and body became increasingly responsive to one another, producing fluid interaction between the material, the hands and the nervous system. The fine motor skills involved in crafting are supported by neural structures primarily located in the cerebellum. These activation patterns in the cerebellum connect through the pons into the neural networks of the temporal lobe involved in proprioception and identity (Wynn and Coolidge 2014). In other words, enskilment was a process of incorporating the act of marble sculpting into the crafter's body schema and self-awareness. As Gosden and Malafouris note, "Identity is a constant dynamic, not an end state. Identity, like self-hood, is not an entity but a process" (2015, 9). The shaping of a body through haptic, kinaesthetic and visual feedback generated activity in overlapping areas of the brain involved in bodily perception, awareness, identification, individuation and sociality. This dynamic reveals a fundamental entanglement of Cycladic self-awareness and marble sculpting.

The attention-capturing effects of bodies allow us to understand how this process of identity formation scaled up through ritual behaviours based upon intersubjective knowledge of a shared semiotic of bodies. From infancy, the bodies of others shape the attentional processes through which the identities of people and things are learned. The development of intersubjective awareness undergirds human abilities for collective attention, intention and

cooperation. In this way, the perceptual and cognitive properties of the marble bodies, reinforced with the presence of large colourful eyes, made the figurines an ideal technology for capturing group attention. Indeed, the size of the sculptures suggests a scalar relationship with the group sizes in which they functioned. The average 30 cm for FAF pieces would have been effective within smaller groups, whereas the largest pieces, measuring just under two meters, conceivably shaped the attentional focus of groups numbering in the hundreds. In this light, the figurines might be understood as cognitive technologies which mediated the development of shared attention, social knowledge and collective intentionality, enabling the formation of communities far larger than their predecessors.

By the ECII, technical skills, community usage, and conceptual relationships coalesced into highly-ritualised interactions with the Folded-Arm Figurines. The styles of the ECII indicate a scalar shift in production and new significance within the communities. The Cycladic figurines provided several reinforcing layers of perceptual, neuro-physical and cognitive feedback. The shape of bodies, the presence of eyes and the colouration of the sculptures all had the ability to draw visual and haptic attention. This material agency enabled sizable groups to focus upon a communally held body schema that distributed conceptual meanings through the material relationships of the Cycladic world. By capturing collective attention in large group sizes, Cycladic people could begin to organise and scale up collective behaviour through ritual activities. By centring group attention upon a sacred object, it is possible for performative behaviours to develop into procedural relationships of collective behaviour. In these regards, ritual objects can be viewed as a means of intelligently structuring space in ways that facilitate the performance and maintenance of collective identity.

Cycladic sculpting traditions were persistent ecological formations that reshaped perception and engagement with bodies over the course of generations. The figurines, by forming part of the environment in which shared attention developed, provided a form of

distributed memory and enactive semiotics through which collective behaviours and meaning could self-organise. Thus, Cycladic engagements with marble created a recursive process of intersubjective identity formation that was self-reinforcing across multiple scales of social interaction. To understand how the figurines mediated Cycladic social cognition, it is crucial to investigate the relational contexts in which archaeologists have discovered the figurines and the social knowledge that they imply. By examining the semiotic relationships generated through material culture, one can shed light on the ways in which the figurines enactively signified Cycladic identities within increasingly complex and asymmetrical social environments.

Chapter Four: Valued Substances and Enactive Signs

4.1 Introduction: Marble, Meaning and the Material Sign

The previous chapter illuminated how the creation of marble bodies provided a powerful technology for capturing individual and collective attention. Nonetheless, technical cognition and shared attention, though extremely important, do not thoroughly explain how meaning scales from individual experience into social knowledge, collective intentionality and coordinated activity. Instead, as I will develop in this chapter, the semiotics of value that structured Cycladic social relationships can be examined through the hypothesis of enactive signification. Investigating the transformations in the production and circulation of the material in domestic and funerary contexts while considering the embodied and relational dynamics implied by the evidence enables an analysis of the sign relationships that substantiated the value of Cycladic marble. Through an exploration of the material affordances and interactions of Early Cycladic life it is possible to reconstruct some of the recursive dynamics and cultural logics through which meaning was generated and experienced.

By the middle of the third millennium BC, marble motivated intensive efforts to shape, paint, circulate, fracture and deposit the substance in a variety of contexts across the islands. The sustained attention upon marble reveals a widely distributed and long held perception of value. During the three-thousand-year development of Cycladic marble sculpting, social organisation on the islands underwent a number of scalar transformations in community size and interaction, reaching a floruit with the region-wide activities focused on the island of Keros. Marble's role in mediating Cycladic social relationships raises the issue of how nonlinear dynamics within and between communities are coordinated to generate novel organisational complexity. In other words, how do social interactions generate social structures? This question is made all the thornier when considering that the coordination of

complex, multiscalar social interactions requires the distribution and maintenance of social knowledge across extensive geographical areas and time scales. In the context of Cycladic marble sculpting, the development of technical cognition is entangled with changes in social cognition, and it is this transformation of skill into meaning that requires examination. To appreciate fully the emergence of ritual activities on Keros, it is necessary to comprehend how Cycladic marble participated in a distinctive semiotics of value that coordinated social interaction along a developmental continuum extending from individuals to households, villages and regional communities.

There are two main categories of Cycladic marble artefacts, figurines and vessels. Both groups display clear iconic relationships between bodies (primarily the bodies of women and their similarities between their depictions in marble) and domestic objects (e.g. bowls, jars, etc.) respectively. In these regards marble is implicated in the reproduction of bodies and the domestic materials that sustained bodies through storage, transport and consumption. Cycladic marble forms have direct associations with fundamental features of social relationships and reproduction. There are numerous indexical properties that can also be readily observed. The raw forms of marble certainly suggest a degree of factorality (part/whole relationships, see Knappett 2005, 85-106) with the islands (terrestrial deposits) and sea (pebbles), which thus forms a link between environment, material and community. As Malafouris notes, "ontological correspondences primarily involve connections of identity, analogy, similarity, causality, change, time, intentionality, space, role and part-whole, and in some cases also of representation" (2013, 100). The ontological correspondences of Cycladic sculpting provided a perceptual target for social knowledge about bodies and the relationships mediated by vessels to be integrated with and transformed through shaping marble.

All crafted marble forms were intrinsically indices of the causal relationship between sculptor and crafted piece. Likewise, these indexical relationships reveal contiguity between

the physical environment, the crafting process and artefact. Furthermore, this contiguity suggests a potential factoral association between the identity of the crafter and the sculpted form, that is to say, specific sculptures were potentially associated with specific sculptors. The possibility of such a factoral relationship is strengthened by the nature of cognitive prosthesis discussed previously. Thus, it is reasonable to posit numerous indexical signs that formed organically through creative acts of marble shaping. The semiotics of Cycladic marble was generated through indices of contiguity, causality, and factorality that were enmeshed with icons of the body and domestic social life. Marble sculpting was implicated in causal relationships between environments, individuals, and finished forms as well as the similarities and continuities between the people that produced and circulated the artefacts.

Marble, as a valued substance of the Early Cycladic world, was a locus of attention through which islanders conceptualised their relationships and coordinated their activities with one another in ways that were embodied, ecologically distributed, and durable. The material substantiated and disseminated activities of value creation as part of a shared semiotic system. Sculpting activities were enactive signs of value that entangled material agency, perception and interaction to generate shared meaning and coordinate activity through further skilled engagements. Cycladic marble in its spatial and temporal contexts reveals the value and meaning that emerged through the integration of material and conceptual relationships. In this way, shaping and circulating marble provided an embodied, enactive and distributed semiotics through which social structure was coordinated at emergent scales.

4.2 Far Horizons (Neolithic c. 5000-3000 BCE)

There are two key settlements of the Late Neolithic that reveal the most about the early contexts of marble shaping in the Cyclades: Saliagos and Ftelia (Renfrew 2017b, Sampson 2002). Both sites appear to be roughly contemporaneous, though Ftelia is considered to have

continued longer based upon the assemblages discovered. The settlements form part of a related but distinct cultural continuum of mainland practices and local interactions. The first known marble pieces in the Cyclades undoubtedly emerged from the semiotic relationships in which the terracotta and stone figurines of the Aegean Neolithic were situated and are unlikely to have significantly diverged from those broader meanings at this time. The figurines of the Cycladic Neolithic have been found almost entirely in settlement contexts (Mathari et al. 2017, 23-51) with the exception of Terracotta figurines found around the grave sites at Kephala during the Final Neolithic (Coleman 1977, 44-97). The archaeological record shows that the emergence of Cycladic marble sculpting was predicated upon the environments and social interactions of village life in the Neolithic.

If the best contemporary population estimates are accepted (Broodbank 2000, 87-89), then the villages of this period were likely to be home to between 70-150 people, or groups of roughly ten to thirty families. The Neolithic villages were intimate communities, undoubtedly composed of overlapping kinship relations and personal affiliations. Though interactions between groups undeniably lacked the intensity of later periods, it is nonetheless becoming clear that Neolithic communities voyaged and interacted to a far greater degree than previously thought (Televantou 2008, 43-53). Regional communities emerged through complex webs of kinship, exchange and competition as groups fissioned, migrated and established themselves. Likewise, groups from the broader Aegean were undoubtedly continuing to ply the Cyclades during this period, whether for obsidian or other reasons such as exchange and communication. Some of these groups probably came from closely related mainland cultures, while others were feasibly more alien and relatively novel to Cycladic communities. Thus, we can begin to assess the numerous scales and modalities in which social interactions were placing novel demands upon Cycladic social cognition in the Neolithic. The village group of intimate connections and dealings within and between families and neighbours, the local community of villages with

varying degrees of relatedness and distinctiveness, and the regional groups both internal and external to extended kinship structures which provided various opportunities for cooperation and competition. In these arenas, we can begin to observe layers of identity emerging in contrast to various scales of interaction with different groups.

4.2.1 Saliagos

It is amidst the interactions of the Aegean Neolithic that the islanders began to shape marble in earnest. The establishment of villages, exogamy, animal exchanges, periodic journeys and acquisitions of materials such as obsidian structured the temporal and spatial relationships of Neolithic Cycladic life. The earliest pieces from Saliagos (pebbles, schematics and naturalistic figurines) were easily held in the hand, affording a high degree of mobility. This ease of movement also implies a fluidity of interpersonal exchange. Given the attention-capturing properties of bodies discussed in the previous chapter, the capacity of figurines to act as perceptual anchors and foci of interaction implies a dynamic of shared attention through acts of inspection, display and circulation of these artefacts. This capacity for feedback between figurines, individuals and others reveals an intimate form of shared understanding and the coordination of social interactions.

Schematics and pebbles were easily held in the hand, indicating sensitive haptic relationships between the objects and individuals. There is also clear evidence, such as drill holes and notches, that suggests the use of cordage to attach schematic figurines to the body as ornamentation (Renfrew 2017, 26-27). These properties reveal not only a capacity for display, but also something readily accessible to the person carrying the object, indicating a recursive relationship between visual and haptic perception, attentional focus, identity, presentation and exchange. The size of the pieces suggests that the interpersonal interactions mediated by the artefacts were intimate in terms of physical contact, facial expressions and speech patterns. These affordances demonstrate the intersubjective familiarity involved in the creation and

circulation of the figurines. The intimate value of marble artefacts kept upon one's person was transformed into shared attention through performance, display and exchange, thereby generating social knowledge through a collective value form.

The naturalistic figurines of the Neolithic Cyclades reveal a subtly different scale of display. While such objects were easily held and passed between peoples, their sizes, heft and spatial affordances imply an emphasis upon placement and observation. For example, the Fat Lady of Saliagos was clearly designed in a seated position with a flattened underside. Likewise, standing pieces of sculpted marble from the mainland during this period indicate a similar role of presentation (Renfrew 1969). The affordances of the naturalistic pieces imply that they were designed to be placed in observable contexts of the shared environment. Whether in a household or some other social setting, perception of the object was more distributed within an intimate group. Though naturalistic figurines of the Neolithic were relatively small (6.5 cm for the Fat Lady of Saliagos), such figurines were more readily distanced from associations with specific individuals. This also indicates that the naturalistic figurines could provide a more general locus of attention within small groups. It seems unlikely that such figurines were regularly carried upon one's person. In contrast to the more intimate relationships expressed through schematic pieces, the naturalistic figurines suggest a more collective experience.

The naturalistic pieces could be viewed in contexts more readily separate from a given individual, and capture attention more effectively beyond direct interpersonal dynamics. The dimensions and details of the figurines allow for more dynamic ways of displaying and handling the objects in groups as well as providing more versatile possibilities for gesture and body language within small groups. In these regards, the naturalistic figurines afforded the possibility for display as narrative props or mnemonic devices. The artefacts supported distinct patterns of gesturing and handling in collective engagements that provided direct perception of shared meaning. Such patterns of interaction can be understood as a form of "participatory

sense making" or "the coordination of intentional activity in interaction, whereby individual sense-making processes are affected and new domains of social sense-making can be generated that were not available to each individual on her own" (De Jaegher and Di Paolo 2007, 13). That is to say, performative action with and around figurines in settlement contexts provided the opportunity for developing attentional focus, behavioural coherence and mutual understanding through social interactions with figurines.

4.2.2 Ftelia

Unfortunately, the evidence from Saliagos does not reveal much more about the specific contexts in which the figurines were utilised. The site of Ftelia on Mykonos contained numerous terracotta figurines that do tell us something about broader social contexts in which naturalistic figurines were conceptualised during the Cycladic Neolithic. The lack of marble artefacts at the site indicate that the materials value was nascent and not widespread during the Late Neolithic. However, the many large terracotta figurines found at the site do reveal the attention paid to depicting bodies. Ftelia is divided into four main architectural phases (Sampson 2008b, 29-35), with C^{14} dating indicating occupation between 5050-4600 BCE (Facorellis and Maniatis 2002, 309-316). Figurines have been discovered in all phases of occupation. However, two locations stand out most prominently: a "megaron-like" structure dating to the first phase and an ellipsoidal structure dating to the second architectural phase (Sampson 2008b, 34). The building is made of two rooms that cover a total area of nearly twenty-eight square meters (Ibid, 29). Situated at the highest point of the settlement, with the upper parts of the structure also built from stone, the building clearly occupied a place of prominence from the origins of the village. The finds from the building indicate domestic functions such as a millstone and grind stones (ibid, 30-31). The discovery of terracotta figurines in this context reveals their presence in settings of domestic activity, denoting an association with more quotidian activities of village life.

To the south of the aforementioned building is a highly unique, ellipsoidal structure dating to the second architectural phase which contained fine ceramics and figurines (Sampson 2008b, 31-32). The building was clearly a locus of highly specialised activity and held the greatest density of polychromatic pottery and pedestalled basins at the site, which were only found in small quantities outside of the structure (Voutiropoulos 2002, 131-47). Some of the pedestalled vessels have been found with the possible residues of beeswax, potentially indicative of burning aromatic substances (Sampson 2008b, 35). Furthermore, the large number of figurine fragments discovered imply impressive sizes of perhaps 80 cm (Sampson and Mastrogiannopoulou 2017, 33). The discovery of the relatively intact, 26 cm, "Lady of Ftelia" within this context reveals that these large pieces were probably placed in standing positions. In this context, a musical wind instrument and metal ornaments have been discovered, lending further credence to the interpretation that the circular building was of ritual importance (ibid, 36). The large area of the building and the unique materials reveal a place of congregation around a highly distinctive material assemblage which heightened perception.

Within the uniquely rounded walls, people observed and interacted with polychromatic vessels, bichrome tableware, figurines and metal objects, while the possibility of basins filled with aromatic substances suggests a heightened relationship between perception, memory and space. Likewise, music intensified these dynamics by providing a medium of intersubjective attention and collective engagement. Furthermore, the presence of tableware and food processing objects indicate acts of communal consumption. All these factors show that the ellipsoidal building can be understood as a synesthetic space in which multimodal resonance and coherence was sought between the senses (see Hodder 2012, 124-125). What this evidence reveals is that already in the Neolithic Cyclades, figurines were implicated in distinct behaviours of communality and commensality. At Ftelia, figurines both participated in and were objects of focused collective attention and activity in a heightened sensory environment.

The architectural features of Ftelia reveal an intelligent organisation of space that facilitated village life and structured various loci of activity, such as domestic and ritual gathering areas. Furthermore, the presence of granaries and an obsidian workshop shows that specific activities were conceptually integrated with specific architectural environments of the settlement (Sampson 2008b, 31). These specialised areas also indicate that members of the community identified particular locations with specific roles in the village, providing a scaffold for distinctions in social identity. The associations between both the context and materials of figurines and specialised vessels reveal the conceptual integration of ceramics, bodies, gathering, commensality and performance. To a limited degree, the discovery of a talc schematic figurine extends this relationship into the geology of the islands, particularly given that it was likely sourced from Tinos (Sampson and Mastrogiannopoulou 2017, 33) Nonetheless, in the Neolithic period we observe patterns of behaviour with significant implications as to the development of Cycladic sculpting traditions. The curved legs, triangular body and ovoid head of the "Lady of Ftelia" distinctly prefigure the styles of the Early Bronze Age. However, the figurines of Ftelia have no well-defined typology, and this variability shows that figurine production and conceptions of the body did not exhibit the kind of coherence and consistency found in the later Cycladic phases. Critically, the evidence from Ftelia shows that figurines were already implicated with individual and communal identity in both domestic and ritual spaces. During this period, the value of figurines generally appears to have been interpersonal with schematics and ornaments whereas standing and sitting pieces, though variable in appearance, seem to have been more involved in group acts of value creation.

4.2.3 Strophylas

Evidence for an emerging Cycladic semiotics of figurine production and use are next found in the Final Neolithic settlement of Strophylas on Andros, centuries after the abandonment of Saliagos and Ftelia. During the fourth millennium BC, the site formed part of

the Kephala cultural assemblage that preceded the dispersals of the Grotta-Pelos culture. Clay figurines, pendants, pebbles, and schematics have all been discovered amidst extremely complex pictographic iconography within the dense and well-planned settlement. The site contains the oldest known defensive wall in the Aegean, as well as numerous ceramics that attest to links across the Aegean (Televantou 2008, 43-59). The people of Strophylas were clearly participating in intensifying interactions at the end the Neolithic. At the entrance of the site, on either side of the gate in the fortification wall, there are rock depictions of boats orientated toward the opening of the settlement with four boats engaged in maritime activity on the western side, and a single larger boat and fish on the eastern side (ibid, 48). The site contains what appears to be the oldest image of a longboat in the Aegean, along with eleven other pictographic depictions of ships (ibid, 47). Undeniably, the communal identity of Strophylas was enmeshed in a maritime ideology that distinctly prefigures the semiotics of the Early Bronze Age.

The most prominent area of the site consists of a set of "monumental" structures that clearly played central roles within the life of the community. This area consists of two of the earliest apsidal structures in the Aegean and a rectangular enclosure of roughly a hundred square metres. The area was clearly a place of great significance for the community. It consists of a raised floor of thirty square metres containing a circular stone construction and bench. The lower level covers seventy square metres and is dominated by the most complex pictographic composition known in the Aegean (Televantou 2008, 48-49). Consisting of spiral motifs, ships, animals and various other unique patterns such as figures of eight and rings, it forms a complex iconography of maritime, domestic and more abstract themes. Furthermore, cavities around the engravings have been found with organic substances of possible ritual offering. The location was clearly a centre of collective activity in the village with unique and powerful effects upon perception and behaviour.

Numerous figurines have been discovered scattered across the site, appearing in walls, as surface finds and within or near various structures showing that they circulated through the community. However, several finds within the central area of the pictographs and apsidal buildings are particularly revealing. A pebble figurine was found near the apsidal buildings as well as a delicate ovoid head with an elongated neck made from marble. Within one of the apsidal buildings a triangular marble head was discovered in the destruction layer (Televantou 2017, 45). In another building near the pictographs, a schematic piece of marble was found along with a multipartite figurine of green stone (ibid, 43-44). In the destruction layer above the rock art was found a "ring idol" of similar green stone (ibid, 39). This pendant-sized object not only shares a direct iconic relationship with some forty rock engravings from Strophylas of rings with two pronged protrusions, the images also bear a distinct resemblance to the outline of the Cycladic EBA frying pans (ibid, 42). This evidence not only strongly suggests that Strophylas participated in the emergence of a distinctively Cycladic iconography of maritime life, but also that from the outset materials and forms reveal spatial and conceptual links between this iconography, the shaping of stones, the depiction of bodies, and acts of communal gathering.

The materials and forms from Strophylas reveal commonalities with the more ancient sites of Saliagos and Ftelia. The organisation of space and the flows of peoples and other materials through them show that figurines participated in acts of communality and commensality central to the formation of social identity. The enclosure with the pictographs was clearly a space of collective attentional focus, particularly in relation to the images depicted onto the rocks. It is clear that figurines circulated and captured attention in contexts of collective gathering and particularly those associated with sacred or ritual space. The figurines discovered at Strophylas are of a more personal size than the larger ceramics of Ftelia or the later sculptural traditions, suggesting a more intimate role in social interactions compared to

the collective attention generated by the pictographs of the large hall. After the abandonment of Strophylas and the relocation to nearby Plaka, the tradition of rock engraving continued, including depictions of hands, feet, ring idols, and most significantly a triangular head with a rounded chin that bears a distinct similarity to the outline of a Cycladic figurine (Televantou 2017, 47-48). The materials and iconography of the final Neolithic on Andros suggests a dynamic in which the built environment, the demands of maritime life and the working of stone prefigured the dynamics observed in the EBA.

Strophylas was part of a broader regional dynamic in the Final Neolithic that potentially lay at the cultural foundations of the Cycladic Early Bronze Age. Roughly contemporary with the village is the site of Kephala, situated in the liminal boundary between Attica and the Cyclades on the island of Kea. The site shows a clear orientation towards maritime connections (Broodbank 2000, 149). The settlement is also the location of the earliest known cemetery in the Cyclades, consisting of stone lined pits and two examples of cist graves (Coleman 1977, 45-51). Fragments of terracotta figurines with triangular heads similar to those of the later marble figurines were found around the grave sites, while two marble vessels came from inside graves, one with a complete marble rhyton and another containing a rhyton fragment (Renfrew 1972 [2011], 371; Coleman 1977, 64-66). The evidence of the Final Neolithic strongly suggests that communities were actively experimenting with materials, figurines and the built environment in ways that prefigured distinctively Cycladic practices and identities.

4.2.4 Closing the Distance

Unlike the overwhelming focus upon marble found in the EBA, during the Cycladic Neolithic marble was one of many materials deemed appropriate for the production of body images. Of the available evidence, marble figurines were overwhelmingly created at the scale of personal and interpersonal interactions. Most stone figurines were probably carried on the person or resided among their personal effects. These artefacts clearly circulated within

contexts of both daily life as well as activities of focused social interaction and collective attention. The evidence implies dynamics in which sculpted forms were produced, possessed, carried, displayed, gifted, and kept present during acts of public gathering. In the light of these embodied relationships, we can begin to explore the ways in which marble artefacts were beginning to enactively signify value.

The personal sizes of the marble pieces from the Neolithic indicate individual identification in terms of personal interest and appreciation as compared to the overwhelming focus and investment of Cycladic society in the EBA. The use of the material to shape relatively similar schematic forms reveals that the ability to produce marble objects was easily integrated into pre-existing conceptual values surrounding the production of body images. Such spatial and temporal consistency suggests that intimate interactions with marble figurines were entangled with the capacity to perceive, identify, and differentiate self and other, providing a locus through which object recognition, self-awareness, body perception and social interaction could be conceptually blended. In other words, these icons of bodies provided a stable, perceptual target upon which the body could be experienced and conceptualised as a category of identity that both included and transcended the individual.

The evidence for the display of some figurines, possibly as pendants or other forms of adornment, further reveals this dynamic of bodily icons, self-awareness and intersubjectivity. As noted, figurines shared an indexical relationship with their crafters as well as the contexts through which marble was acquired. The display of these figurines thus suggests a recursive relationship between the production process, the environment and the value of the schematic form in a self-reinforcing semiotic dynamic. Figurines as personal adornment provided a perceptual locus of indexical and iconic relationships that could be associated with the individual displaying the object by drawing attention during interactions. In these regards, a particular piece could become indexically linked to an individual, and thus capable of

functioning as an abductive index through the conventional association of the individual and the artefact (Iliopoulos 2016b, 116). It is possible that the wearers of the objects were also their creators, but if the object was gifted it would extend the indexical relationships of identity presented by a given figurine. Gifts emphasise not only personal identity but also a social relationship between crafter, possessor and recipient while also providing opportunity for further extension of these indices through continued circulation.

The schematic figurines are highly portable, meaning that they could readily be transferred between people. Gifting or exchanging schematics made the figurines indices of their transmission, thus enabling the artefacts to enactively signify social interactions and affiliations. While marble was not valued during the Neolithic in the ways seen during the EBA, the material was clearly viewed as useful and aesthetically interesting. This use value was blended with the conceptual values embodied by both anthropomorphic images, and at least at Kephala, as vessels. The schematic pieces exhibit a sense of more intimate, personal value and identification that shaped knowledge of self and other through acts of display and exchange. The agency of these material forms, as loci of attention, enabled shared understanding through the iconic and indexical properties generated by their creation, display, and circulation. These dynamics reveal a semiotics of bodily identity that entangled intersubjectivity and social interaction with marble shaping to generate emergent concepts of value.

The presence of figurines within ritual contexts of the Cycladic Neolithic reveals that anthropomorphic imagery played a strong role in communal activity and identity. However, the figurines from Ftelia and Kephala show that these traditions were not conceptually blended with marble, and Strophylas shows that schematics were present but not necessarily central to such contexts. In other words, marble was a participant in community and ritual dynamics but still in the early phases of being integrated into Cycladic conceptions of value amidst a broader

and more ancient semiotic ecology. Neolithic village life was intensely interpersonal, consisting of continual face-to-face interactions between dozens of families, in which self-awareness and social knowledge was generated through the immediacy and intimacy of these relationships. Already in the Neolithic, figurines formed part of a semiotic web that connected individuals into both interpersonal and collective activities and identities. Though marble played a relatively minor, albeit growing role in these dynamics, it is significant that the material's value began to emerge at an interpersonal scale. While Cycladic Neolithic settlements reveal variations upon certain cultural themes across the region, the communal behaviours within which the figurines operated appears to have been highly localised to specific groups. It is not until the acceleration of the EBA that we begin to observe a consistent distribution of forms and behaviours that implies a more broadly coherent sense of value and shared meaning that connected communities across the islands.

4.3 Setting Out (ECI c. 3300-2700 BCE)

The onset of the Early Bronze Age saw the dispersal of the Neolithic villages into small, distributed groups likely ranging between one and five families. Little can be discerned of the settlement patterns of this time due to what appears to have been a move towards more intergenerationally mobile habitation and more temporary constructions. This settlement impermanence is attested to by domestic wares found in ECI layers at Koukounaries, and the lack of evidence for built structures (Katsarou and Schilardi 2017, 410-414). Markiani on Amorgos, a site that was episodically occupied until the end of the EBA is the only settlement with a well-documented ECI phase (Marangou et al. 2008, 97-105). Though a relatively small settlement, it appears to have been fortified since its earliest phases (ibid, 104). These defensive features indicate competitive interactions between communities even at the earliest phases of the Grotta-Pelos dispersals. Nonetheless, Markiani does reveal that people were aggressively

interacting on the islands. However, the circulation of bodies did not occur in a purely competitive social environment; exogamy, kinship networks and social storage were central to survival in the ECI (Broodbank 2000, 153). The uniformity of Grotta-Pelos assemblages, particularly in terms of transportable containers, suggest intimate networks in which small groups regularly travelled and aggregated to maintain extended and periodic social relationships (ibid, 166-170). In these regards, the intimacy of social relationships in village life are liable to have transformed during the ECI into dynamics of visiting and hospitality, particularly across short-range maritime connections. Such an interdependence of seafaring and social reproduction suggests how canoes formed a foundational locus of Cycladic intersubjective development. A group's access to maritime transportation was liable to have played a central role in its ability to interact and survive in the ECI. Canoes were integral to the formation of collective identity as the key affordance through which larger social interactions were made possible. It is in this context of movement, competition, cooperation and mutual interdependence that Cycladic islanders began to generate their semiotics of marble.

Despite the lack of nearly any settlement evidence, the fact that marble artefacts enjoyed a significant use-life above ground can be inferred from the existence of nine repaired Plastiras figurines and five repaired violin schematics known from secure ECI contexts (Sotirakopoulou 2005, 68). Given that schematic figurines are present in settlement contexts of the preceding Neolithic, the subsequent ECII and the transition into the Middle Bronze Age it is reasonable to assume a continuity of use in ECI settlements. Nonetheless, the Bronze Age dynamics in which marble participated and mediated attention were dramatically different kinds of social interactions from those observed in the Neolithic. Daily social interactions were dominated by close familial relationships. Identification with specific objects would be far

more intimately recognised and this knowledge far less socially distributed than in village settings.

The diffuse settlement pattern of Grotta-Pelos groups was dependent upon extended kinship networks which necessitated consistent patterns of aggregation and dispersal to sustain their communities. The interdependence of these scattered communities means that during periods of aggregation, dynamics of hospitality, ceremony, and negotiation (as undoubtedly occurred with marriage arrangements) would have emphasised the semiotic relationships between circulating persons and materials. Broodbank notes that, "between the periods of the Saliagos and Grotta-Pelos cultures, Cycladic interaction networks appear to move from an emphasis on medium and long-range communication through decorative style and the acquisition of exotica towards an investment in local exchange of a limited suite of standard, readily recognisable forms" (Broodbank 2000, 169-70). A shared repertoire of forms and behaviours would have functioned to overcome the spatial and temporal constraints upon Grotta-Pelos intersubjectivity. The decentralised and periodic organisation of ECI communities precluded large group social interactions on a daily basis, thereby decreasing familiarity between people outside the immediate family group. The standardising of material forms potentially compensated for the weakened interpersonal knowledge of Grotta-Pelos life by providing distributed and stable forms of shared understanding that coordinated activity.

Group dependence upon extended kinship networks necessitated a means of increasing the temporal and spatial durability of these relationships in order to reproduce Cycladic society. Ensuring coherence between communities required ways of organising and maintaining regular interactions despite sustained periods without direct communication between groups. In these regards, "the focus on pottery decoration shifts between the Saliagos and Grotta-Pelos cultures from bowls to closed shapes, principally pyxides and collared jars, in short from food consumption vessels to small transportable containers" (Broodbank 2000, 167-69). These

forms indicate a shift in economic value that emphasised storage and transport to a greater degree than acts of consumption. Likewise, Grotta-Pelos vessels demonstrate a highly localised "tradition without close external referents, and which is limited in terms of design almost to the point of uniformity" (ibid, 167). The restricted repertoire of forms implies an emphasis on continuity and coherence between local groups, enabling greater mutual recognition and knowledge of shared value within an internal economy uniquely dependent upon maritime interaction. Broodbank argues that the changes of the ECI should be conceptualised as an "active means of engineering the shift from established villages engaged in elaborate contacts with each other and the surrounding Aegean, to an exchange culture of sufficient flexibility and locally shared currency to enable the dense small-scale interactions required for internal colonisation of marginal areas in the Cyclades" (ibid, 170). The commonalities in the Grotta-Pelos assemblage supported greater social extension in the face of weakened interpersonal knowledge, enabling social relationships to be conceptualised and maintained despite the lack of daily intimate contact outside the immediate family unit (see Gamble 1998 for discussion on social extension). Thus, we can begin to see how activities of dispersal, aggregation and circulation in the Grotta-Pelos era brought individual families, extended kinship networks, and social identities into sharp contrast. In this way marble provided a valuable medium for the generation of coherent and self-reflexive social interactions during the transition into the Bronze Age.

4.3.1 Bodies and Vessels

It is readily apparent why marble began to take on an increasingly central role in the articulation of an extended Cycladic identity. The plasticity and durability of the material, its abundant access, heightened perceptual impact and receptivity to skilled engagement made it a highly potent and valuable substance for substantiating Grotta-Pelos relationships. It is during the ECI that the production of marble artefacts began to take on a regularity of form. In

particular, violin schematics are the most common and consistently shaped form of securely provenienced ECI figurines. It is also significant that marble and ceramic skeuomorphs of vessels such as kandilas, high collared jars and bowls became special, but relatively common artefacts at this time.[42] Marble icons of standard Grotta-Pelos ceramic styles reveal that the material was being conceptually integrated with the basic forms of ECI interaction, communality and commensality. The fluid distributed and interdependent social interactions of the period enabled the indexical relationships generated by the circulation of artefacts to extend across greater spatio-temporal scales. The use of marble to create icons of bodies and Grotta-Pelos vessels indicates a recursive relationship between the material, individuals, families and social groups. The circulation of a "standard suite" of cultural forms enabled indices of social interaction, that is, signs of particularly relational activities, to cohere within artefacts that formed secondary icons[43] of communal identity.

The grave assemblages of the Grotta-Pelos phase reveal the most about the semiotics of value enactively generated by marble during this period. Over the course of the ECI there is an increase in both the quantity and diversity of forms deposited in numerous graves. As Broodbank argues, it is appealing to explain the "investment in cemeteries as a means of claiming association with a tract of land through burial of the ancestors, at a time when in reality this association was more temporally fragile and open to dispute than in the established shadow of a larger Saliagos culture village" (Broodbank 2000, 153). The material evidence does imply changing concepts of identity and kinship structure within the broader interactions of Cycladic communities. With the notable exceptions of a few large cemeteries on Naxos and Greater Paros, most ECI cemeteries ranged between ten and twenty graves, probably comprised

[42] Though the direction of skeuomorphic referencing is not always clear, it is reasonable to assume the primacy of ceramic forms due to their relative ease of production and more common appearance during excavation.

[43] Secondary icons or "objects that become significative… in particular situations, and according to specific conventions" (Iliopoulos 2016b, 116), in these regards, the ring idols from Strophylas are clearly secondary icons, though very abstract ones.

of one or two families over the course of a century or two (Broodbank 2000, 152-53). Clusters of grave groups in cemetery contexts (Doumas 1977, 29-36; Rambach 2017, 65-87) reveal a spatial arrangement that further organises relationships, perhaps on a familial or generational basis. The development of cemeteries during the ECI clearly indicates that the sites scaffolded categories of social organisation.

Most ECI cemeteries involve the activities of only one or two families, and even the largest represent a population of roughly five families over a similar duration. In many cemeteries the clustering of between three and six graves reveals further internal distinctions within social structure, possibly delineating intergenerational continuities or generational contemporaries. At Lakkoudhes on Antiparos, the presence of four skulls found in tomb II and two found in tomb III within single grave contexts indicates further organisational complexity within groups (Doumas 1977, 57). Numerous burials in the same grave context reveal close conceptual relationships between the individuals interred. The spatial organisation of cemeteries and various depositional practices indicate internal distinctions and associations in ECI social structures. The aggregate social unit of the cemetery, distinct grave clusters, and occasional multiple inhumations imply that burial rituals were a key means of spatially categorising and mapping social relationships. Furthermore, the presence of low platforms within cemetery contexts, ostensibly for the performance of burial rituals (ibid, 35-36), implies the existence of ritualised behaviours that unified these relationships into shared social practices. Thus, not only did cemeteries help to organise relationship in the broader landscape, but they were intelligently structured in order to facilitate collective understanding. The cemeteries of the ECI Cyclades were emergent spaces through which islanders were able to conceptualise kinship structures amidst the shifting dependence upon decentralised and dynamic social interactions of Grotta-Pelos life.

4.3.2 Identity and Asymmetry

In conjunction with the re-organisation of community and kin relations during the ECI, the burials also reveal growing material asymmetries between individuals. Of the 182 intact graves excavated by Christos Tsountas on Greater Paros most certain to date to the ECI, fifty-one contained no offerings at all (Rambach 2017, 80-81). Moreover, the ECI cemeteries of Zoumbaria and Krassades on Greater Paros, with thirty-four and at least fifty-one graves respectively, contained only four and nine graves with offerings (see Doumas 1977, 29-36; Rambach 2017, 69-75). Even amongst the graves that do contain offerings there are drastic differences between quantities of materials and variability of the artefact assemblages.

The cemetery of Pyrgos on Greater Paros provides an excellent case study of the material variability within communities. Of the fifty-eight graves at Pyrgos, only fourteen contained offerings (Doumas 1977, 59; Rambach 2017, 67-69). Among these furnished tombs, three graves (82, 84, and 104) contained one object each, an incised pyxis, a spherical pyxis and a marble pallet. To this list of single artefact depositions it is possible to include another two graves (90 and 102) which held two and eight stone beads respectively, if it is assumed that these originally belonged to single pieces of jewellery. Thus, of the fourteen graves, five can be interpreted as containing single objects. Following the same criteria, a further five tombs contained only two objects (tombs 88 and 91, 93, 96, 101).[44] Grave 105 with an incised pyxis and nine beads of which two are shaped as birds, also feasibly representing a single piece of jewellery, can also be included in this list. Therefore, of the fourteen furnished graves at Pyrgos, eleven contained two artefacts or less, or 78% of the furnished graves. Of the remaining three tombs, two qualify as well furnished (tombs 98 and 100).[45] Finally, grave 103 stands out as an

[44] This includes one grave with eight beads and a spherical pyxis, another with a collared jar and a sherd, a further grave with an incised pyxis and three beads, one with a collared jar and an incised pyxis and the last with two incised pyxis.

[45] Grave 98 containing an incised pyxis, one spherical pyxis, a marble bowl and two stone rubbers and grave 100 with two clay pyxis and two violin figures.

extremely “rich” grave in comparison to the rest of the cemetery. The tomb contained a clay collared jar, a seashell necklace, two pendants, five stone beads and fourteen schematic marble figurines. The example of the Pyrgos cemetery reveals the development of significant gradients in material wealth between individuals within communities (at least in regard to their burial depositions), a dynamic which is apparent throughout ECI cemeteries.

A number of important semiotic relationships can be inferred from the grave assemblage at Pyrgos, which can be extrapolated to the wider context of ECI burials. First, the most universally common objects placed in graves were ceramic pieces. The emphasis on common ceramic forms fits well within the dynamics of Grotta-Pelos culture, in which individuals and families became far more reliant on distributed social networks, and the evidence for an increased emphasis on internal exchange within the Cyclades (Broodbank 2000, 167). Secondly, the creation of value in the ECI was dependent upon the circulation of persons and materials. In these regards, acts of hospitality, gifting, solidarity, exchange, and competition generated webs of affiliation, mutual obligation, and social debts. Social identity and economic value were entangled with the broad circulation of materials and the relationships they manifested. For instance, the positioning of a body clutching a pyxis in grave 145 at Akrotiraki on Siphnos implies a powerful association between the individual and an everyday artefact (Tsountas 1898, 74). Importantly, the most common practice of deposition was the placing of objects in front of the head (Doumas 1977, 63). Considering the emphasis on depicting faces and attention given to skulls in cases of multiple inhumations during the subsequent Keros-Syros cultural phase (Doumas 1977, 56-57), this behaviour suggests the emergence of a close association between artefacts, social relationships and individual identity during the Grotta-Pelos phase.

Beyond the artefacts of general use, Pyrgos also shows us that special objects of a more individualising nature formed an important part of this semiotic dynamic. The prevalence of

beaded jewellery is suggestive of an intimate association between individuals, ornamentation and social identity (Iliopoulos 2016a) that implies nuanced differentiation of self and other within the commonalities of the Grotta-Pelos cultural matrix. The similarities of certain forms, the differences in depositions, and the presence of personal adornments show that the Grotta-Pelos phase was not only a period of the "growing archaeological visibility of individuals" (Broodbank 2000, 170) but also one of diversifying and strengthening categories of social identity. The burial evidence of the ECI implies variable social identities within the organization and interactions of Grotta-Pelos communities. In these regards, the presence of unusually "rich" grave deposits indicates that particular individuals were the focus of uniquely intense social attention. It is also in these contexts that we begin to observe an increasing emphasis being placed upon marble objects. What is critical is that these marble objects occupy a middle ground between the universalising and individuating artefacts of Grotta-Pelos burials. Sculpted marble is rare enough generally to be associated with larger depositions and the burials of specific individuals. Marble vessels were icons of common ceramic forms, but with a higher quality of manufacture, simultaneously expressing commonality and specialness.

During the Grotta-Pelos phase, schematic figurines were a regular part of well-furnished graves, but not necessarily so. For example, grave 56 at Panayia contained five obsidian blades, three cores, two marble pallets, a marble bowl, a stone bowl, four stone beads, one stone rubber, one murex seashell and four pieces of copper wire (Renfrew 1972 [2011], 372). These artefacts reveal a number of important aspects about the semiotic relationships of these burials. Firstly, the presence of Melian obsidian and what is almost certainly Kythnian copper indicates an ability to command flows of materials within the broader exchange networks. The presence of the seashell suggests both an index and icon of maritime relationships. Interestingly, the deposition of bowls and not containers imply a greater emphasis on consumption and commensality. It is clear that though marble vessels and

figurines were conceptually linked, they were also conceptually distinct. For example, the assemblage of grave 24 at Glypha on Greater Paros consisted of two marble kandilas and a violin figurine, while the assemblage of grave 22 at the same site was comprised of three marble kandilas (Rambach 2017, 65-66; Doumas 1977, 59). These examples suggest that the value of marble could be expressed through a variety of forms that did not require direct association in burial contexts. The differentiation and variable associations of sculpted forms indicates that marble held a primary iconic value as a material that was distinguished from specific forms.

The growing numbers of marble objects during the ECI show that concepts of value surrounding the material were becoming increasingly important at a time of intensifying local interactions and growing distinctions in social identities. The effort of producing all but the most basic marble artefacts from the Grotta-Pelos culture contrasts significantly with the abundance of the material. The creation of marble vessels was highly time consuming, probably requiring weeks if not months of activity, an attentional focus revealing the strong degree of value placed upon the creation, use and display of the objects. However, the ability to participate in sculpting practices was, in principle, available to essentially anyone willing to learn. Marble provided a unique but popularly accessible resource through which local communities could generate social value. As the raw material would have been impossible to control by any single group, the only available arena for contestation around marble would have been through competitive acts of display or gifting. However, one should be careful not to overemphasise these competitive possibilities in contrast to the dynamics of shared understanding and social solidarity made possible by easy access to a perceptually impactful and highly malleable material. The tendency of marble vessels to appear in well-furnished graves should not be interpreted from modern, individualising concepts of wealth or property. Rather, “rich” graves appear to reflect the ability of individuals to capture attention and organise flows of materials within their extended kinship groups. The Grotta-Pelos emphasis

on a limited and consistent repertoire of marble forms shows that, whatever the competitive dynamics surrounding marble may have been, they were decidedly focused upon concepts of shared value as opposed to individual aggrandisement.

4.3.3 Fiddling Away

It is during the early phases of the Grotta-Pelos culture that we begin to observe significant emphasis on schematic pieces, and particularly violin figurines. The grave contexts of these marble bodies reveal associations with materials that imply both individualising and social concepts of value. Significantly, marble artefacts are frequently found along with (usually red) pigments. The associations between marble and the application of colour so common in the ECII was clearly developed in Grotta-Pelos communities. For example, grave 129 from the cemetery of Livadh on Greater Paros contained a marble Kandila and palette with red pigment, three violin schematics, a pebble with pigment and a chip of marble (Rambach 2017, 72). Here we observe a heavy emphasis on marble objects that reveal a number of important semiotic relationships. If the marble chip was not the result of poor excavation practices and was intentionally placed in the grave, this suggests factoral associations between the material, production processes and its various forms. The chipped piece, plausibly a by-product of the crafting process suggests continuity between material, process and form. It is not unreasonable to speculate that the presence of the chip in the grave indicates a close relationship between the interred individual and the crafting process. The presence of both a palette and pebble bearing pigment implies a process in which the production and application of paint were intimately associated with marble, and that the buried person was intimately associated with the creation of marble artefacts. Nonetheless, the burial emphasises marble as process as well as an icon of social value and cultural identity.

The evidence of the ECI shows that marble gradually began to form the core of a sign system that was democratically accessible and generated recursive indexical and iconic

relationships. To understand how these semiotic dynamics provided a matrix through which self-awareness, intersubjectivity and collective identity could develop, it is necessary to explore how schematic figurines substantiated distinct conceptions of value. The figurines of the early Grotta-Pelos phases are overwhelmingly schematic, but they are relatively uncommon and have significant asymmetries in their distribution. Of the possible 150-200 ECI graves excavated by Clon Stephanos at the beginning of the twentieth century, only seven contained schematic figurines (Rambach 2017, 78). When figurines do appear, they tend to cluster. Of the twelve ECI graves containing schematics that were excavated by Christos Tsountas on Greater Paros and Siphnos, eight contained more than one figurine (ibid, 81). However, even within the grave contexts containing schematics there is an extreme gradient in distribution. Christos Tsountas excavated 190 likely ECI graves on Greater Paros, of which only ten contained schematic figurines. Of the forty-six figurines found in these graves, 58% come from only two graves, Krassades grave 117 and Pyrgos grave 103 (ibid, 81). Thus, out of the total 59 schematics securely provenienced to the ECI, almost half come from the two rich graves on Greater Paros. It is from this highly asymmetrical distribution of early schematics that we can begin to interpret a great deal about their semiotic function within Grotta-Pelos society.

The presence of a single schematic in the minority of grave contexts does reveal the association of the form with individuals. Of important note is grave 147 at Akrotiraki on Siphnos which solely contained a relatively large, 10 cm schematic with an incised pubis that had been repaired at the neck. This evidence implies a clear sense of attachment and value during the object's use-life, and as the only artefact in the grave it denotes a significant association with the individual. Of further note is grave 77 at Panayia on Paros, considered to be a child's burial due to the small size of the tomb, it contained a violin schematic and single perforated red stone (Rambach 2017, 66). If the tomb was indeed that of a child, then two things can be inferred. First, the schematic was either created by the child or gifted by an adult.

Second, if the object was gifted, it is doubtful that this was due to the social prominence of the child. If the grave offering was the result of some form of "prestige" dynamic, then it is likely that this was due to the child's associations with certain adults rather than their own accomplishments. These factors help to support the argument that the figurines were implicated in kinship dynamics.

Well-furnished grave contexts reify the connection of figurines with the broader interactions and exchanges of the ECI. Yet, "wealth" in figurines does not appear in graves as synonymous with other forms of material acquisition. For example, grave 137 at Zoumbaria on Greater Paros contained four figurines and three pebbles and one ceramic vessel (Rambach 2017, 73-75). This assemblage reveals a connection between local interaction networks and marble but does not emphasise a particularly unique role in the storage, transport, exchange and consumption of Cycladic materials. In other words, marble potentially articulated related but conceptually distinct forms of value as well as heterogenous social relationships. The variety of grave associations between schematic pieces, ceramics, jewellery, seashells, and tools such as mortars and pestles reveal the diversity of individual relationships and activities in which marble functioned as a form of value.

It is important to recognise that the distribution of schematic figurines reveals no systematic relationship between "wealth" and figurines. Figurines can be present in otherwise "poor" graves as well as absent from materially abundant ones. This distribution pattern reinforces the point that the figurines articulated a conception of social value that was distinct from the ability to accumulate materials within interaction networks. That the majority of graves contained multiple figurines, most often between two and three, indicates more an ability to command attention within Cycladic interaction networks than the acquisition of wealth. The rather large size of some schematics reinforces this social attention-capturing dynamic; for example, an 18 cm piece was found in association with a 7 cm schematic in grave

127 at Livadh on Greater Paros. The presence of multiple and large schematics draws attention to social relationships as an association of bodies mediated through the buried individual. It is in these regards that the two figurine rich graves from Pyrgos and Krassades on Greater Paros provide particularly important evidence of the social dynamics and concepts of value that were mediated between marble figurines and people.

4.3.4 Fruits of the Marble Orchard

Two graves from Greater Paros are undeniably the most marble rich and well-furnished burials of the ECI which give the most insight into concepts of value and kinship expressed with the material during the Grotta-Pelos era. The "wealthy" tombs of Pyrgos 103, containing a clay collared jar, jewellery and fourteen schematic figurines, and Krasades 117, holding an engraved marble bowl along with fourteen schematics reveals overlapping yet distinctive semiotics (Doumas 1977, 60; Rambach 2017, 67-72). Leaving aside the figurines for the moment, the grave at Pyrgos suggests a greater emphasis upon individual identity, while the clay collared jar is a relatively common item that played a quotidian role in Grotta-Pelos acts of storage and exchange. In contrast to this average ceramic vessel, the rounded marble bowl, incised with radial lines, found at Krassades indicates a special object used for display and consumption. The sizes of the figurines at Pyrgos ranged between 3 and 10 cm, while those at Krassades varied from 2 to 15 cm. The mean average size of the figurines at both graves is between 5 and 6 cm. At Pyrgos the most common size ranges around 3 cm and at Krassades the average size ranged around 5 cm. In both graves the vast majority of the figurines fit easily into the palm of the hand, while a smaller number were quite literally a handful. The 15 cm piece from Krassades is over twice the height of the next largest, 7 cm piece. At Pyrgos, four of the pieces range between roughly 9 and 10 cm. While seemingly trivial at first, the embodied aspects of these figurines reveal much about their semiotic function as value forms. The majority (75%) of the figurines from both graves are 7 cm or less, that is to say, pieces that

were easily carried upon the person. The four larger pieces from Pyrgos would have been somewhat bulky to carry about, while the 15 cm piece from Krassades can be described as relatively oversized and is very unlikely to have been carried around on a regular basis.

The significance of these affordances becomes clear when one starts to consider the possible explanations for the overwhelming number of figurines in the two graves. From an individualistic interpretation, it could be argued that these two persons simply possessed a great number of the objects and were thus buried with their inordinate number of small marble belongings. If this argument is carried out, there are then only two readily available possibilities: a "producer" or "accumulator" hypothesis. Either these individuals were marble sculptors that had a great number of the objects lying around at their death, or during the course of their lifetime they expended an uncommon degree of energy upon collecting these marble artefacts. If the latter hypothesis is followed, this opens a number of questions about the system of value in which such accumulation took place. The ready availability of marble and the relative ease in constructing most schematic pieces argues against a form of value derived through scarcity. Thus, if the interred individuals did acquire these objects over the course of their lifetimes, it is very unlikely that they would have been willing to sacrifice much in the way of material wealth to gain these artefacts. The only plausible reason to expend energy to gather such large numbers of figurines would be for their relational value within social interactions.

Of the two abundant depositions at Pyrgos and Krassades, only the largest pieces (those measuring over 7 cm) were effective for capturing attention beyond interpersonal interaction. The 15 cm piece from Krassades displays this dynamic most clearly, and particularly in juxtaposition to the significantly smaller thirteen figurines with which it was interred. The large schematic is the only figurine from both assemblages that could be reasonably held with both hands, thus indicating a capacity to capture attention at a larger scale of social interaction. This

large piece suggests that schematics were beginning to be incorporated into communal acts of display, gesture and performance. The largest schematics of the ECI appear to have been created to capture attention at a group level. In contrast, the smaller pieces are all easily held in the palm and carried upon the person. Like their Neolithic predecessors, these schematics would have been most effective for capturing attention on an interpersonal scale. The small size of the vast majority of ECI schematics and the presence of similarly sized pebbles in many graves have important bearing upon the conceptions of value substantiated by the figurines. As objects that lacked use and exchange value in a traditional economic sense, their value can only be understood as having emerged through personal attachment and the mediation of social interaction.

Grotta-Pelos schematics were highly mobile objects during a time in which dependence upon small-scale local interactions networks were intensifying across the Cyclades. The mobility of the figurines is attested to not only by their easily hand-held size, but also because the schematics of the ECI lack any clear features for attachment as ornamentation, that is they bear no obvious notches, lugs or perforations (except in clear cases of repair) for the purpose of display. These objects were readily kept upon one's person, though not necessarily visibly, and easily transferred between individuals. The affordances of the schematics suggest that the most reasonable conclusion about the social value of these figurines was that they functioned as gifts. The only way in which objects of such a scale would have effectively mediated social value beyond ornamentation is through acts of gifting. Given the lack of competition over the resource as well as the relative simplicity of the schematic forms, the social value of the objects appears to have been generated through aesthetic appreciation, personal attachment and relational identities in the context of gifting dynamics. Whether one follows the producer or the accumulator hypothesis of the individualistic interpretation, one comes to the conclusion

that the only reason to create or acquire so many small marble forms would have been to offer them as gifts.

Recognizing that gifting dynamics are most likely to have generated the quantities of small schematics found in the graves at Pyrgos and Krassades leads us away from the individualistic interpretation to a more robust social interpretation. That is, the likelihood that the majority of the figurines found in the graves were other people's possessions that were gifted to the deceased. Such a gifting relationship has two plausible dynamics, that they were either gifted during the individual's life or during post-mortem rituals. However, the deposition of the figurines appears more likely to have emerged from burial gifting than lifetime acquisition. If schematic figurines were indeed circulating as gifts during the ECI, they functioned as indices of the specific social interactions that they mediated and generated. In other words, they were tokens of these social relationships. The availability and rapidity with which small schematics can be produced indicates that they are better conceptualised as enactive signs of social "bonds" rather than as "wealth." The appearance of a figurine in a likely child burial, the presence of figurines in grave contexts otherwise lacking in other grave goods, and the uniform use of marble from grave 127 at Krassades all attest to a semiotics of social value distinct from concepts of personal wealth.

The amassing of such a large number of figurines during the lifetimes of the two persons from Krassades and Pyrgos seems to be the less plausible scenario. The small figurines lack affordances for easy display and are in too large a quantity for all of them to have been conveniently carried. This indicates that if they were acquired during life, they were likely stored, but this seems doubtful for a number of reasons. If the schematics indeed functioned as tokens in a gift economy, then the accumulation of so many figurines represents a kind of stagnation in their circulation and value. Depending on the perspective taken, a more traditional economic interpretation would be that the individuals either had been over-gifted the objects,

or that they had difficulty re-gifting them. Like some kind of prehistoric asset bubble, the affordances and quantities of the small schematics imply that these individuals had more than they knew what to do with. They could not have been effectively displayed in collective gatherings, personal attachment and valuing of specific figurines would have been less pronounced, while their value as tokens of social relationships would be diminished by their lack of circulation.

The "wealthy" assemblages from Greater Paros support an argument for more nuanced and intersubjective concepts of value surrounding the schematics and their deposition. The existence of only one marble bowl along with the fourteen schematics at Krassades does not imply the kind of diverse "wealth" as was found in grave 56 at Panayia with its obsidian, copper, marble vessels, and jewellery. Likewise, despite the more individualising feature of jewellery in Pyrgos 103, none of the artefacts in the grave have any implicit connections to the circulation of valuable commodities such as obsidian and copper, nor does the single clay pyxis emphasise particularly unique local interactions. Grave 56 at Panayia, which contained marble palettes and a marble bowl but no figurines, shows that marble vessels, figurines and other forms of material wealth had interacting but different conceptions of value. That is to say, the dynamics of accumulation involving figurines were distinct from those involved in the acquisition of other special materials. The materials from Panayia 56 suggest a link between the accumulation of valued commodities through extended exchange networks as well as semiotics of display and commensality utilising marble vessels. Importantly, the grave shows that these activities were not fused with the circulation of figurines. Rather than conceiving of the figurines in terms of an exchange value, such as debt tokens or fetishized acquisition, it would appear that the schematics are better viewed as enactive signs of relational value that substantiated distinct dynamics and concepts of relatedness. A social interpretation of the value expressed through the schematics at Pyrgos and Krassades suggests that the objects were

tokens of respect, affiliation, and identification with two prominent individuals who commanded a great deal of attention in their local communities.

From a relational perspective on value, the figurines appear as icons of a shared cultural identity expressed through the interpersonal circulation of a collectively valued substance. The mobility of these objects enabled them to generate and function as indices of social interactions and factoral expressions of these relationships. The semiotic recursiveness generated by schematic figurines provided a tangible locus of value through which numerous modalities of social identity could be conceptualised. In these regards, the schematics can be viewed as a kind of distributed mnemonics that denoted past interactions, social bonds and obligations to catalyse future activity. From this perspective, if the figurines were accumulated in life by the two individuals buried at Pyrgos and Krassades, they signified respected roles of the individuals in terms of affiliative, affinal or consanguineal relationships and responsibilities rather than positions of economic privilege. However, the intimate size of most schematics, the fact that they lack obvious affordances for ornamentation or group display and given that circulation appears central to their ability to generate value, the evidence leads us to consider the strong possibility that these artefacts were accumulated at death.

The affordances of schematics as small, personal and mobile objects, during a period in which dispersed communities were highly dependent upon their local interaction networks for social reproduction and survival, suggests that the circulation of these figurines scaffolded a form of distributed intersubjectivity. The schematics were readily sourced, easily shaped, attractive, mobile and unlikely to inspire particularly competitive interactions. These affordances suggest that metaplastic feedback in social contexts enabled these marble objects to generate a locus of social value and reflexivity through crafting, imitation, gifting and circulation. A strong case can be made for interpreting the lion's share of figurines found in the "rich" graves at Pyrgos and Krassades as personal possessions of individuals attending the

funeral, likely gifted to the deceased as a collective performance that reified the social bonds of the ceremony's participants. A perspective that is consistent with the hypothesis that the sculptures were a form of kinshipping technology.

While it is clear that not all Grotta-Pelos peoples were buried with figurines, when schematics were placed in graves they tend to appear in multiples. The placement of numerous marble bodies within a grave is suggestive of a metaphor of sociality or congregation, implying an ability to produce and mobilise bodies. The grave at Krassades in particular emphasises the iconic similarities of marble, commensality (or sustenance) with the bowl, communality with the large number of figurines, as well as distinctive social identities/roles with the single large schematic and the burial itself. It should further be recognised that the ability to acquire either material "wealth" or respected status would have been a function of age. Importantly, the fourteen figurines found at both Pyrgos and Krassades represent close to half the upper population estimates of local Grotta-Pelos communities (Broodbank 2000, 178). Furthermore, both Krassades and Pyrgos are large ECI cemeteries with at least fifty, and fifty-eight graves respectively. If Broodbank's estimate of twenty burials per family a century is accepted, then the two sites suggest a range between three families in one century or a single-family lineage over three centuries. Regardless, the number of figurines is equal to roughly 70% of a single family's expected burial population during a century, that is, the amount of people that would be buried over a span of roughly seventy-five years or about three generations. It is interesting that the number of figurines in both graves have close parallels to the population dynamics of Grotta-Pelos communities. Observation of these numerical relationships is not meant to suggest specific social relationships, as there are many plausible associations such as gender, familial or other forms of kinship that were potentially being conceptualised. Rather, the intent is to emphasise that the numbers of figurines found in both graves are in keeping with the kinds of numbers one would expect to find in Grotta-Pelos families and their immediate interaction

networks both spatially and temporally. This fact further reinforces the view that the schematics were gifted by members of the local kinship group.

If the figurines did indeed embody a kinship logic of some fashion, it is likely that they expressed specific relational concepts, e.g., matrilineal descent, affinal ties or immediate family. Given the frequency and variability of deposition practices involving figurines during the ECI, it can be inferred that the artefacts identified distinctive connections to the deceased that were deemed appropriate for burial under specific circumstances. What is undeniable about the twenty-eight schematics from the two graves is that the individuals were the subjects of unique attentional focus and occupied important positions within their local communities, relationships that would have required time and experience to generate. It is in these regards that the most plausible explanation of the two individuals from Krassades and Pyrgos is that they were deeply respected parriarchs of their communities. It would seem that these individuals had generated, mobilised and organised numerous bodies over their lifespans, the significance and value of which was acknowledged and expressed through the deposition of figurines by their surviving kin. Whether the schematics demonstrated an intensive familial relationship or a more extensive kinship dynamic,[46] the evidence affirms the view that the creation and circulation of figurines formed a medium through which relationships could be conceptualised and substantiated amidst the transforming communities and interactions of the ECI.

4.4 Conclusion: Community, Death and Growing Value

The transition of Cycladic communities into the Early Bronze Age was a process in which social identities were brought into sharper contrast through the intense localisation of

[46] For example, one could imagine dynamics in which, say all the females in a maternal lineage deposited tokens of these relationships, or one in which all members of an immediate family group provide the offerings.

family life, the spatial distribution and periodic gatherings of the broader community and the necessity of maintaining these interactions. It is in this context that schematic figurines appear to have generated value from their accessibility, personal associations, attention-capturing properties and the semiotics of gifting. As the interactions of the Grotta-Pelos system were established, certain individuals became important foci of these networks and interactions. That is to say, they generated centrality within their interaction networks. The evidence from the well-furnished tombs suggests this centrality was expressed in two general ways; control over material flows in the environment and focus of community relationships. It is clear from the contrasting evidence that marble evinced a relational logic far more than it emphasised individual conceptions of "wealth."

Marble seems to have provided a scaffold through which social conceptions of value could be identified and acted upon. This idea fits well with the argument that status is best conceptualised as the degree to which one is a focus of social attention (see Ames 2010, 20-22). However, such arguments have traditionally been articulated from an individualistic perspective of status seeking, improving one's position, prestige and rank (e.g. Wiessner and Schiefenhövel 1998; Henrich and Gil-White 2001). These perspectives obscure the social dynamics of status as a relationship that is generated over time as a sense of interpersonal value that is accorded to the individual by the community. The affordances and semiotics of marble artefacts suggest that status in Grotta-Pelos society was a form of social attention that aggregated over the course of a person's life. That is, the material record evinces a concept of status in which particular individuals were valued as exemplars and mediators of a communal sense of identity. As the EBA began to intensify on the islands the forms of value embodied through marble synergised with the movement and exchange of materials and people on a regional scale to express radical transformations in Cycladic social organisation.

The maintenance and reproduction of Grotta-Pelos society required a continual circulation of bodies between communities and it is from such dynamics that we can appreciate how the valuing of kinship generates the fundamental dynamics of a gifting economy. Graeber notes, "exchange occurs when property of some sort passes from one person to another; circulation occurs when values or valued qualities are transferred" (2001, 81). From this perspective, value within kinshipping processes can be understood as qualities of relatedness that are transferred between consanguineal, affinal and social groups. As Vivieros de Castro discusses, if a "gift is to debt as a commodity is to profits… the gift equivalent of commodity prices would be 'classificatory kinship terms'" (2009, 248-49; following on Gregory 1982). The gifting and receiving of children between families is a transference of the value of kinship relations, whereby the loss of family for one group is a debt incurred by another. As Gregory argues, "while prices describe cardinal value relations between transacted objects, kinship terms describe ordinal rank relations between the transactors themselves" (ibid, 249). In other words, the "costs and benefits" of kinshipping are best conceptualised in terms of obligations and responsibilities in relation to opportunities for marriage and alliance. Broodbank has suggested that the emergence of the figurines was tied to the necessity of exogamy in Grotta-Pelos society (2000, 173). It is through the dynamics of intermarriage and gifting that we can best understand the semiotics of value surrounding the emergence of Cycladic sculpting traditions as a means of conceptualising the creation of bodies and organising social interactions as a specific cultural identity. The interweaving of familial and social solidarities is not only essential to survival, but also the fundamental grounds of social creativity through the literal reproduction of bodies.

This chapter has explored in detail how the early record of Cycladic sculpting evinces a relational concept of value. This evidence is consistent with the argument in chapter two that the broader ecological and social transformations of the Neolithic-Early Bronze Age transition

suggest that the figurines emerged as a form of kinshipping technology. It should be noted that the other major category of marble artefacts, namely vessels, display a similar relational logic. Anthropologists have long noted that the sharing of food and bodily substances are one of the keyways in which communities generate kinship identities (Sahlins 2013a, 4; Vivieros de Castro 2009, 238-45). The numerous marble forms involved in storage, consumption and commensality are suggestive of an extended semiotics of kinship through shared substance. That is, food and marble were conceptually blended to express sociality and relatedness of the body. It is in these regards that we can appreciate Cycladic marble "as a culturally relative hypostasis of common being" (Sahlins 2013a, 14). The material substantiated a shared metaphor of the body that enabled Cycladic islanders to conceptualise the value of their relationships and coordinate the activities of their communities. The next chapter will examine how the relationship between value, kinship, and gifting transformed Cycladic social interaction during the fluorescence of the Keros-Syros culture.

Chapter Five: The Semiotics of Gifting and Reproduction

5.1 Introduction: Value and Kinship

Contemporary scholarship tends to interpret Cycladic sculpture in terms of "prestige" dynamics, that is, the competition for social power and prominence in which the objects conveyed "status" to their possessors. Cyprian Broodbank provides perhaps the most robust explanation of a Cycladic prestige dynamic on a macro-scale, arguing that the removal of marble artefacts from circulation (such as Aplomata and the Special Deposits on Keros) were possibly strategies of value control that maintained the prestige value of the object by limiting access (2002, 268). He thereby explains the abundance and diversity of ECII marble forms as "the result of a top-down innovation spiral aiming at social distinction with added bottom-up emulation from aspiring people in other communities" (ibid, 269). However, prestige frameworks come with ontological and epistemological commitments that can obscure relational concepts of value. The difficulty with such interpretations of past behaviour is that prestige is presented as a kind of economic commodity which individuals compete and exchange for, reifying thoroughly modern conceptions of value.

Authors that argue for prehistoric prestige dynamics clearly do not conceptualise prestige goods as commodities within price-exchange systems. However, the ontological biases of commodity culture creep into fundamental assumptions about prehistoric prestige dynamics, particularly the emphasis on individual utility maximisation, which distorts interpretations. There are strong reasons to reject an interpretation of Cycladic conceptions of value from the assumptions of commodity culture. First, the conceptualisation of measurement and equivalency necessary for the emergence of commodity value appears to have depended upon the forms of material engagement afforded by the growth of production and exchange during the Bronze Age (Renfrew 2001; see also Graeber 2012). Second, the longboats used for

long distance interactions were not high-capacity cargo vessels capable of transporting materials in bulk, a reality which motivated Broodbank's argument that voyaging was involved in a prestige dynamic involving exotic knowledge (1993). Third, the general lack of clear bureaucratic technologies in the Cyclades (e.g., systematic use of seal stones, obvious measurement systems) as well as the lower degree of imports relative to exports further argues against a commoditised view of EBA exchange. Lastly, the Homeric word for honour (τιμή) only came to mean price around the same time that coinage began to emerge, which provides strong chronological grounds for disentangling EBA concepts of "prestige" from the assumptions inherent to commodity frameworks (see Seaford 2004). It is from a perspective of the transformation of value explored in the previous chapter that we can appreciate how the Cycladic islanders mediated older modalities of organising social relationships with the emerging "international spirit."

If concepts of value in terms of exchange equivalence are interdependent with the emergence of a commodity culture, then the relationship between the production and circulation of materials in non-market economies logically involves different conceptions of value. Developing from the previous chapter, there is significant evidence that the development of Cycladic marble sculpting involved gifting dynamics, indicating ideas of "economic" value distinct from those conceptualised by a prestige-commodity nexus. Gifting can generally be understood as the economic circulation of valued materials in a variety of exchange dynamics where value is not considered in terms of quantitative equivalency or immediate reciprocity, but through the creation of affiliation, responsibilities and debts. Vivieros de Castro has insightfully noted that Cristopher Gregory's definition of gifting as "an exchange of inalienable things between persons who are in a state of reciprocal dependence" is an equally strong definition of kinship (Gregory 1982 quoted in Vivieros de Castro 2009, 246). In a gift economy, value is inherently social and intersubjective; as Gregory notes, "what a gift transactor desires

is the personal relationship that the exchange of gifts creates" (Gregory [1982] 2015, 19). The value of the object is the relationship the artefact embodies – a value that it enactively signifies as both index and icon as discussed in chapter four.

The availability and the relative ease of learning to work marble (at least in its most basic form) militates against concepts of commodity and exchange value. Rather, the ubiquity of the material and particularly the smaller schematics which dominate the forms of the early Grotta-Pelos culture and their occasional large concentrations in ECI graves (Rambach 2017), are suggestive of gifting dynamics. Furthermore, the super abundance of figurines and evidence for feasting on Keros share a striking similarity to the kind of "potlatch" dynamics first examined by Mauss ([1925] 2002). The relationship between kinship and gift has been recognised since Claude Levi-Strauss argued that marriage was the paradigmatic example of gifting relationships ([1947] 1969). Chris Gregory in his seminal Gifts and Commodities, argues that, "the social organisation of reproduction of things-gifts is governed by the methods of reproduction of people. The latter is a personification process which gives things-gifts a soul and a gender classification; the reproduction of things-gifts must be organised as if they were people" (Gregory [1982] 2015, 98). The emergence of Cycladic figurines at a time when the cognitive burdens of social interaction had markedly intensified is strongly suggestive that the artefacts circulated as part of a gifting economy that worked to substantiate and maintain Cycladic social relationships.

Cycladic islanders undeniably valued marble increasingly over the course of the Neolithic-Bronze Age transition, and that the material was bound into thoroughly relational forms of meaning is indisputable. During the EBA, the organisation of social life and associations between figurines, female development, reproduction, families, high status and multiple burials, provides strong reason to interpret these semiotic relationships as expressive (at least in part) of kinship dynamics. As we have seen in the previous chapter, marble was

highly valued purely in terms of sustained attentional focus upon the material, its circulation in various forms and use within ritual contexts. However, what still requires clarification is how the physical value of marble and its exchange logics were co-constituted through kinshipping dynamics. In other words, how are value and kinship "systems" similar to each other and to what degree are they interdependent? Cycladic marble provided a dynamic structure through which "economic" activities of production and circulation substantiated a socio-political reality of life on the islands. Cycladic sculpture was a locus of activity and interaction through which a semiotics of Cycladic sociality could be manifested, conceptualised and manipulated. In this way, the relationship between value and kinship in Cycladic sculpting traditions can be explored as two modalities of the same fundamental process.

5.2 The Turning Tide: Naturalistic Pieces and the ECI-ECII Transition

Having previously examined the schematic figurines of the ECI, it is important to now focus on the naturalistic pieces of the period. The advent of the naturalistic Plastiras type figurines during the emergence of the ECI were a major development in Cycladic marble sculpting. The large 18 and 15 cm schematic pieces from Livadhi and Krassades respectively reveal a process of enlargement already occurring during the early Grotta-Pelos phase, a dynamic that can be reframed as a process of growing attentional focus. The torsos of Plastiras pieces show clear stylistic similarities with those of the violin schematic figurines. The existence of Grotta-Pelos schematics with rounded breasts (Doumas 2017, 56) and continued associations of marble and red pigment (Hendrix 2003; Rambach 2017) reveal a creative evolution of form intimately linking schematics and naturalistic pieces. The Plastiras pieces with secure ECI contexts originate from Paros and Naxos (Doumas 2017). The form reveals

both increasingly skilled craftwork, the growth of regional interactions and continuity of previous traditions.

It is through the early development of the naturalistic figurines and their connections with schematic styles that the conceptual changes facilitated through marble shaping begin to take on a new intensity of focus and activity. On Naxos, grave 5 at the cemetery of Akrotiri contained a single schematic and Plastiras figurine, two clay cylindrical pyxides, a marble collared jar and marble palette as well as a necklace of twenty-one stone beads (Doumas 2017, 56-57). Much like earlier "wealthy" Grotta-Pelos burials, this deposition reveals an emphasis on individual identity with jewellery, while the clay pyxides and marble collared jar can be understood to have emphasised the importance of local interaction networks. The association of a Plastiras piece and violin schematic in the same burial contexts supports the argument that the technical and conceptual developments of the figurines were concomitant processes. The violin schematic is quite large (19.5 cm), while the Plastiras piece (8.7 cm), despite missing its legs (Doumas 1977, 87) indicates a similar process of enlargement as seen in the earlier "wealthy burials." Significantly, given that the schematic was larger than the Plastiras piece even when it was still unbroken indicates the naturalistic figurine operated at a more interpersonal scale, while it is the schematic that implies a greater degree of collective attention. Many sourced Plastiras pieces are equivalent to mid-ranged schematic pieces. In other words, they were objects easily held in the hand. In these regards, they seem to reflect a similar capacity for exchange and circulation as schematic pieces. However, the early naturalistic figurines have affordances for standing display. The detail of the Plastiras pieces and their capacity for presentation all imply a dynamic in which individual identity was simultaneously defined and integrated into the concepts of social value articulated through marble. A novel and detailed naturalistic figurine provided a powerful icon of the indexical association between the artefact and the crafter, as well as any recipients.

The development of the sculpting traditions during the later Grotta-Pelos period show a growing entanglement of the social value expressed through marble in conjunction with increasingly well-defined identities at burial. For example, in grave 20 at Akrotiri, a schematic figurine (10.5 cm) and a Plastiras piece (10.8 cm) missing its legs below the knees were found along with a small bronze bead (Doumas 1977, 93). The assemblage provides a subtle link between marble figurines and the extended trade network that circulated valuable materials and individual display. Importantly, the Plastiras figurine from the grave bears traces of red pigment detailing eyes, maintaining continuity with earlier finds of pigmentation, as well as prefiguring the painting of FAF sculptures (Doumas 2017, 62). Thus, even this small collection of materials attests to the feedback between attention, identity and interaction which makes Cycladic marble sculpting so distinctive.

Grave 9 from the eponymous Plastiras cemetery on Paros reveals a great deal about the early conceptual changes that the naturalistic figurines were mediating. Plastiras grave 9 is one of the few unlooted graves from the cemetery, so it is difficult to say much about its broader mortuary context. Of the 12 ECI graves discovered at Plastiras, two marble collared jars are reported to have come from the plundered graves 6 and 7, while one piece of coarse pottery was discovered in the unrobbed, but damaged grave 8 (Doumas 1977, 99). Grave 9 is one of the richest discoveries of the Grotta-Pelos phase with four Plastiras figurines (ranging between 11 and 15 cm), two marble collared jars, a marble bowl, whetstone, bronze needle and fragments of obsidian blades. Significantly, no schematic forms were found in the grave, suggesting a degree of conceptual distinction or drift with naturalistic pieces. The marble bodies from Plastiras 9 are associated with a variety of artefacts that emphasise acts of circulation, storage, consumption and display of materials, as well as extended flows of obsidian and bronze. Furthermore, the needle, whetstone and obsidian emphasise crafting indicating a focus upon the relationship between identity and skilled behaviour in Cycladic

communities. The semiotics of this burial suggest a growing contrast and recursion between individual identity, transforming interactions, and the coordination of social relationships.

All secure Plastiras figurines range between 9 and 15 cm, despite half of the six being broken at the legs. Relative to the schematics of the ECI, these scales are equivalent to mid-sized and large examples of the older forms. The Plastiras pieces with clear contexts were easily held in the hand, affording mobility and circulation. The sizes of the pieces suggest they were effective for small group attention capture, a capacity strengthened by carved facial details, and in some cases painting. The flat feet of the Plastiras figurines afford standing display that could provide a locus of attention within gatherings or as part of the semiotic background in which interactions took place. It is worth noting that the size of the figurines fits well with the intimacy and mobility of Grotta-Pelos households. That is to say, the figurines of the period were effective for small group attention capture and easy to transport during settlement relocations and canoe journeys. However, the naturalism and detail of the figurines reveal an intensified emphasis upon human bodies. The developmental continuities between schematic and naturalistic figurines suggests a thoroughly relational conception of value that mediated the tension between the individuality and sociality of the body. However, the Plastiras pieces appear to introduce a unique degree of nuance into those dynamics. Returning to Plastiras 9, the presence of four, well defined naturalistic female bodies were plausibly icons of specific individuals. If this was the case, the marble forms were indexical signs of specific relationships to the buried person. It is thus reasonable to speculate that the figurines from grave 9 were associated with specific kinship categories. If the kinshipping logics explored previously are valid, this argues for the idea that the Plastiras figurines expressed specific concepts of relatedness which were instantiated through the buried individual.

The Plastiras figurines indicate an emergent dynamic in which social identities were being conceptually integrated with the value of marble amidst the transforming relationships

of the EBA. To reframe this perspective, the attentional focus given to individuals within these interaction networks indicates that social centrality was generated through a confluence of regional interactions, interpersonal bonds and skilled behaviour. In terms of conceptual changes, the provenienced Plastiras figurines reveal an emphasis on the female body. Cyprian Broodbank notes that it is "striking that the boom in production of female figurines coincides with the phase of maximum population dispersal in the Cyclades […] in other words with the period when exogamy and competition for women would have been at its most pronounced" (Broodbank 2000, 173). Again, there are individualistic and social interpretations that can be applied to the figurines. An individualistic approach emphasises the possession and exchange of bodies (a hypothetical example being the signification of wives or daughters as a source of social power), while a more social perspective highlights the relatedness of bodies (another conjectural example being matrilineal lines of descent that identify kinship-groups). Regardless of the specific conceptual relationships and dynamic that the figurines expressed, what is undeniably clear is that marble afforded an incredibly plastic and recursive semiotic scaffold with which to generate and share those concepts of identity and value.

The ECI graves reveal a semiotics of value that conceptually blended domains of performative relatedness. Graves and cemeteries are inherently indices of individual and community lifecycles, supporting the view that Cycladic cemeteries expressed metaphors of containment and social reproduction. It is perhaps significant that bodies in Cycladic graves are generally in foetal position, while the deposition of female figurines imply a metaphor about the generation of bodies. ECI grave assemblages display a variable yet distinct range of relationships and interactions. Vessels presented cultural icons of local interactions while figurines suggest the sociality of bodies. Likewise, special objects such as jewellery, obsidian blades, bronze beads, needles and awls as well as objects such as mortars and pestles emphasise the skilled behaviours which made Cycladic life possible. In these regards, the ECI tombs and

cemeteries appear to be a spatial metaphor for the generation, individuation, maintenance, and continuity of Cycladic bodies. The distinct yet overlapping value forms circulating in the EBA generated an emergent ideology though which the islanders' identities and relationships developed. As the Cycladic peoples transitioned from the ECI into the ECII these early patterns of value creation can be seen to synergise and complexify in a veritable explosion of material culture forms and interactions.

5.2.1 Acceleration

The emergence of the Kampos group during the transition from the ECI into the ECII attests to an acceleration in the diversity and quantity of materials deposited in graves. It is during this period that we see the first examples of Cycladic midrib daggers, a greater diversity of vessels used in acts of storage and consumption, as well as vessels of apparently ritual purpose such as the so-called "frying pans" (Broodbank 2000, 221). With the emergence of the Kampos group there is an observable increase in the intensity and extensivity of interactions across the Aegean. The most important Kampos cemetery, and one of the largest of all Cycladic cemeteries is the site of Agrilia on Ano Kouphonisi. With seventy-two intact tombs out of a total of ninety-two graves (Zapheiropoulou 2008, 183), the site has a number of unusual features compared to all other Early Cycladic periods, suggesting experimentation with a variety of unique practices.[47] Firstly, the tombs are unique in the Cylclades, consisting of chambers cut into the soft Kouphonisi limestone. Secondly, every furnished grave contained a pyxis lid. Thirdly, the graves were built with sunken forecourts outside the burial chamber and backfilled with offerings. Beneath the fills are variable assemblages of clay vessels, sea pebbles, obsidian fragments, seashells and metal objects. Above this, close to the top layers of the backfill was placed a crushed vessel, most usually a pyxis or collared jar (ibid, 184). The

[47] There are two other important grave sites on the island, Loutra and Alonistria Chassouri. Both appear to be of a slightly later date given the differences in assemblages.

development of the Kampos group is intimately linked with the expansion of long-range voyaging, a reality that is attested to by the strong evidence for a Cycladic colony at Agia Photia on Crete (Broodbank 2000, 302-04). The assemblage at Hagia Photia is a mix of Minoan and Kampos group materials, while the tombs share a distinct similarity to the limestone cut tombs of Agrilia (ibid 192; Betancourt 2008). The emphasis placed on storage vessels, as well as the presence of forms related to those found in the north Aegean all reveal a growing focus on long distance movement and interaction.

That the Minor Cyclades provides evidence for the earliest establishment of voyaging culture should be of little surprise. The small size of the islands and their spatial density means that successful occupation of the Minor Cyclades was uniquely dependent upon sustained and continual interactions and exchanges. The presence of well-furnished graves comprised almost entirely of ceramic vessels attests to this. For example, tomb 12 at Agrilia contained two collared jars, a drinking cup, a spherical pyxis, and pedestalled bowl along with sherds of many more jars, pyxes, drinking cups, bowls and fragments of obsidian blades (Zapheiropoulou 2008, 186-87). While the grave lacks evidence for "prestige goods" other than obsidian, there is a clearly pronounced emphasis on the circulation of materials and acts of commensality.

The presence of back-filled platforms outside graves containing numerous offerings, particularly fragmented vessels, indicates acts of communal performance which affirmed social relationships. The unique deposition of a seahorse in tomb 63 along with the finds of occasional seashells further substantiates a semiotics of maritime existence (Zapheiropoulou 2008, 184). Furthermore, the deposition of numerous sea pebbles in some backfills, such as Tomb 13, reveals a conceptual continuity with pebbles from earlier Cycladic contexts (ibid, 187-88). The substantial number of pebbles found at Agrilia suggest the possibility that the pebbles were offerings made by individuals, suggesting similar conceptual dynamics to those of the schematic rich graves on Greater Paros discussed in the last chapter. Along with the pebbles in

tomb 13, the deposition of cups, pyxes, and fragments of many other vessels suggests that acts of communality and commensality were mediated through individual life cycles to provide opportunities for shared attention and understanding.

Somewhat surprisingly, Agrilia is not a particularly marble rich cemetery. A marble kandila and palette were found in tombs 55 and 41 respectively (Zapheiropoulou 2008, 184). However, the presence of a Louros figurine's head in grave 9, and marble plaque bearing the relief of a figurine distinctly reminiscent of the Louros form, are of particular note (Gavalas 2017, 274). The Louros relief is a unique object without directs parallels in the Cyclades. The artefact has a perforation running through the neck, indicating that the object could possibly be attached to bodies or structures in acts of public display. There are a limited number of contexts with provenienced Louros figurines in the Cyclades: Grave 17 at Tsikniades on Naxos contained what appears to be the fragment of a Louros style torso (Philaniotou 2017b, 264-66). Placed atop this fragment was a schematic piece measuring just over 5 cm with a Louros style head and neck extending from a slender body with incisions on the abdomen and a deep groove at the base that produces two small triangular legs. The deliberate placement of the smaller schematised figurine atop the fragmented body inside the grave context suggests a parent-child relationship (ibid, 266). A spade styled schematic with a Louros style head found in grave 113 of the same cemetery, and a fractured Louros head found near graves 13 (looted) and 14 (unlooted) give tantalising but limited evidence for the distribution and use of the form. However, it is from the exceptionally "wealthy" and rather famous example of grave 26 from Louros Athalassou on Naxos from which we have the only provenienced examples of complete Louros figurines.

Grave 26 was excavated at the beginning of the twentieth century by the anthropologist Clon Stephanos, an individual renowned for a less than enthusiastic approach to detailed notes on the hundreds of graves which he opened (e.g Στέφανος 1912). Nonetheless, the grave at

Louros Athalassou is one of the most impressive Cycladic burials ever found. A niche built into the wall of the cist grave contained seven Louros figurines measuring between 13 and 22 cm. The figurines appear to have been arranged symmetrically with the tallest at the centre and descending in size on either side (Rambach 2017, 79; Papazoglou-Manioudaki 2017, 329). Given the pronounced and relatively symmetrical differences in sizes, this pattern is highly suggestive of a generational relationship between the figurines. The figurines are relatively absent of detail, however the 17.4 cm figurine placed second from the left bears a conical cap, while the parallel, 18 cm figurine second from the right bears wide hips and an incised vulva. The assemblage gives the distinct impression of a "family" of figurines at different stages of development, and to a limited degree, gendered distinctions. Grave 26 also contained fourteen obsidian blades and one core, four copper awls, six miniature incised spherical clay vessels containing blue colourant, a mended marble bowl, a spherical wide-mouthed marble vase, four spherical clay pyxides, one stone bead, four shell beads, a necklace of two-hundred silver discs and a Kampos style "frying pan" that bears a sun, spirals and four fish (Papathanasopoulos 1961-62, 131-137). Broodbank has argued that the finds from the Louros tomb reveal an emerging maritime identity (2000, 251). From the aggregation of bodies to displays of identity and the material flows of Cycladic maritime interaction, the grave at Louros shows clear continuity with the semiotics of value present in Pyrgos 103, Krassades 137 discussed in the previous chapter and Plastiras 9. However, the evidence of the Kampos group generally reveals a drastic intensification and extensification of these dynamics



Figure 22: Louros Athalassou Tomb 26.

The tomb at Louros Athalassou is perhaps the earliest example of a maturing Cycladic maritime ideology beginning to cohere across a variety of scales. The marble and clay vessels reify the social interactions through which Cycladic life was sustained. The miniaturised pigment containers not only indicate the production, circulation and use of unique substances, but their presence with obsidian blades also suggests bodily decoration and modification (Carter 2008, 225-236). The presence of four copper awls, fourteen obsidian blades and a core highlight skilled behaviour as well as extended trade networks. The jewellery implies identity and social display, and the shell beads produce a further important link with the sea. However, the necklace of two-hundred silver discs suggests an intensive scalar shift in the relationship between display, attention capture and the ability to marshal resources across extended networks. The necklace would have had a dramatic effect on collective attention, drawing and reinforcing focus upon the wearer. The perceptual relationships generated through the silver ornamentation suggest a semiotics of rarity and value that was conceptually blended with individual identities (see Iliopoulos 2016a). Here we might even speak of the transformation of social value into relationships of socio-economic power, or an ability for individuals to gain

status and influence through the accumulation and control of rare materials. Nonetheless, while there is a clearly developing emphasis upon individual identity, this is still expressed in relation to collective activities and shared understanding.

As with the "wealthy" graves at Krassades and Pyrgos, Louros Athalassou is also likely the grave of a community parriarch. The interred individual not only commanded attention at interpersonal and group scales, as suggested by the jewellery, but the person was a focal point of regional interactions. The individual clearly had the ability to aggregate valuable materials, capture attention, and mobilise bodies. The Louros "frying pan", with its sea spirals and fish, reinforces the argument that maritime activities and social identities were being mediated through collective rituals. The evidence from the Kampos phase suggests that individuals were being identified as sources of social value. However, the value generated through attention-capturing individuals was nonetheless socially distributed and thoroughly relational.

Louros figurines are essentially highly developed schematic figurines that emphasise the communality of bodies. The sculptures from Louros 26 in particular appears to highlight not only relationships between bodies, but also emphasises bodies as developmentally socialised processes. Despite the individualising, exotic and valuable materials found in the tomb, the burial still expresses a deep concern with kinship and relatedness. The largest, 22 cm figurine from Louros was a substantial marble object and easily perceived by a sizable group of people. It is tempting to imagine the considerable gathering of peoples that were motivated to attend the funeral at grave 26, close family, extended kin, and other bonds that emerged over years of social interactions through which the individual became particularly respected. What is beyond doubt is that by the ECI-II transition, the growing intensity of local and regional exchanges in conjunction with the structural interdependence of these maritime communities began to generate powerful feedback between individual development, seaborne interactions and collective social values. There is clear evidence for a shared and developing culture of

ritual meaning during the ECI. However, it is with the floruit of the ECII that we observe this cultural continuum transform into an organised system of ritualised value creation.

5.3 The Full Regatta: Floruit of the Keros-Syros Culture

The changes between the assemblages of the ECI-II transition graves and those of the Keros-Syros phase are not as radical as the transformations between the early Grotta-Pelos phase and the Kampos group. Overall, there is a general increase in the number of graves, and the number of wealthy depositions. The broad characteristics of wealthy graves of the Kampos group and the emerging Keros-Syros culture display many similar materials and combinatory possibilities. These continuities in tradition are observable with just a few examples from the ECII. On Naxos, grave 10 in the cemetery of Spedos contained two Folded-Arm Figurines, four marble vessels, two sauceboats, and five other ceramic vessels, one of which was covered in silver foil (Papathanasopoulos 1961-62, 46-50). One of the most significant changes in the ECII is the appearance of silver or silver leafed vessels indicating the manipulation of value through the display of materials. The Keros-Syros sauceboats are also a critical diagnostic of conceptual and material changes in the ECII with their emphasis on performance and commensality. The sauceboats also imply increasingly ritualized acts of hospitality and communality at a time of rapidly expanding community interactions.

Other than the floruit of marble sculpting during the ECII, the growing quantities and diversifying forms of metallic objects circulating in the Aegean provide the most striking evidence for transforming relationships of value. On Amorgos, grave 14 at Dokathismata, contained two Folded-Arm Figurines, two marble bowls and two clay vessels, as well as a bronze weapon with silver rivets and a fragmented silver bowl (Tsountas 1898, 154). Grave 14A at the same site contained a silver diadem with a sun motif, birds and animals engraved upon it, a sliver pin with an animal head, a silver bowl and two silver bracelets along with a

marble bowl, figurine, a pebble grinder with red pigment, and a ceramic vessel (ibid, 154-55). The types of artefacts and their combinations are relatively similar to earlier phases of the ECI-ECII transition. Vessels, jewellery, figurines and the common presence of red pigments all show clear continuity of tradition amidst intensifying material interactions.

Perhaps the most significant sociological change with ECII burials is the growing practice of multiple inhumations. Though still the minority of burials, there are numerous cases of multi-level cists and ossuaries occasionally containing as many as twelve bodies (Doumas 1977, 60). Of particular note is the care and attention given to skulls in multiple burials and ossuaries, with the skulls most often curated and carefully placed within the burial contexts. The emphasis placed upon the head echoes the attention paid to carving and painting faces of the Folded-Arm Figurines. Multiple inhumations are generally in poorly constructed, poorly furnished graves, suggestive of increasingly asymmetrical social relationships (Doumas 1977, 56). However, a three-storey grave on Naxos challenges an overly linear interpretation of this evidence as reflective purely of social inequality.

Tomb 21 at Aghioi Anargyroi produced an assemblage that runs counter to strongly individualising concepts of Cycladic wealth. Grave 21 contained twelve inhumations, one on the bottom level, nine in the middle and two at the top storey (Doumas 1977, 100-114). The initial burial lacked any offerings, the middle level held a frying pan, deep cup, three marble bowls (including a bowl wedged between levels) and eight obsidian blades. The penultimate burial involved a Spedos figurine, and the final was accompanied by a single obsidian blade (ibid, 112). The building of the tomb shows that it was built with an expectation of multiple inhumations. When the original, solitary and unfurnished burial is considered in the light of this planning, it suggests a more nuanced conception of value than just individual "wealth" and "prestige." Following the initial unfurnished burial, the subsequent depositions in the tomb can be interpreted as unique, if delayed, grave offerings to the original inhumation.

The total artefact assemblage of Aghioi Anargyroi 21 would qualify as a well-furnished burial for a single occupant. The organisation and depositions of the grave are indicative of a concept of value that was expressed through intergenerational relationships, in which material abundance appears to have been more of a consequence than a focus of these relationships. Furthermore, it suggests a conceptual blending between the placement of marble bodies and the placement of multiple humans as grave offerings. These tombs suggest that value was not fused with or subordinated to individual acquisition and aggrandisement. The contents of Aghioi Anargryoi 21 further supports the argument that the semiotics of Cycladic marble sculpting were intimately bound with dynamics of kinship and the development of intersubjectivity.

The relational sense of value expressed through the Folded-Arm Figurines are brought into sharper light by the case of a possible tomb from Phiondas on Naxos. Knowledge about the context of the finds is based upon the second-hand account from Giorgos Houzouis, whose father Ioannis discovered a cist containing a "royal family" of seven Spedos figurines that he subsequently donated to the local museum (Legaki 2017, 219-254). Accounting for reasonable gaps, changes in memory, and possible embellishments for narrative effect there is no significant reason to doubt the general veracity of the story. Given that the son is recollecting a piece of familial lore, the lack of any significant material and social benefit through distortion of the facts, and that the father did indeed donate the discovered materials to the Naxos museum, the details of the burial should be cautiously accepted as accurate.

Houzouis reported that the seven figurines were discovered along with a bronze dagger, ten marble vessels, a fragment of a marble vessel, marble pestle, a marble wedge, two clay pyxides, multiple sherds and no skeletal remains (Legaki 2017, 238). If the account of the assemblage is accurate, it is the second secure "burial" association between a bronze dagger and Folded-Arm Figurines after Dokhasthismata 14 on Amorgos (ibid, 249). The seven

figurines were supposedly found propped up against the wall of the tomb in ascending order from the smallest to the largest piece. Of the original seven figurines, the two smallest have been lost, but the remaining five ascend in size from 15 cm to 50 cm. Of these, the smallest remaining piece is asexual in its characteristics, lacking breast and pubic incisions. The subsequent 18 cm and 23 cm pieces both have sexual characteristics while the 30 and 50 cm both appear to display different stages of pregnancy. Legaki has posited that the assemblage displays the female lifecycle from childhood to maturity (ibid, 250) and the available evidence implies a strong emphasis on the developmental and intergenerational relationships of Cycladic bodies. The dagger, presumably as an indexical and iconic sign of male violence, seems to present a strongly gendered juxtaposition with the marble finds from Phiondas. If the available information from the site is accepted as reasonably accurate, we again see an emphasis on relational value that extends beyond individualist notions of profit maximising competitors.

5.3.1 Marble Plantations

The ECII cemetery with the most abundant marble finds is undoubtedly that of Aplomata on Naxos. Twenty-two figurines were found in five surviving graves of the cemetery, which has largely fallen into the sea. Of these five tombs, it is "grave" 13 that contained the largest assemblage, comprising a "pre-canonical" figurine, two Kapsala, five Spedos, three seated pieces, two shell schematics, five marble vessels, silver rings and a silver bracelet (Kontoleon 1971, 178; Doumas and Lambrinoudakis 2017, 184-218). However, it should be noted that the deposition was found in a pit located beneath a later Roman house (Legaki 2017, 249). Given that the finds appear to be secondary depositions and there are no features of a traditionally built grave nor finds of human remains, it seems that this is quite likely not part of an actual burial (Doumas and Lambrinoudakis 2017, 192). There are two distinct possibilities from the finding of "grave" 13, that of ritual pit deposition similar to ones found on Ano Kouphonisi (Zapheiropoulou 2008, 189-193; Philaniotou 2017a, 177; Gavalas

2017, 293-295), or possibly the disposal pit of a later community disconnected from the marble sculpting traditions. Putting aside these particular difficulties, Aplomata is an exceptionally marble-rich site. Only grave 19 contained ceramics, a single frying pan along with a Spedos piece, the lower legs of another figurine and three marble vessels (ibid, 189). Significantly, grave 27 contained two Spedos figurines and fragments of two others along with what appears to be the secondary depositions of a violin schematic and two marble vessels (Lambrinoudakis 1976, 298; Doumas and Lambrinoudakis 2017, 191). Minimally, the evidence from Aplomata suggests the possibility that certain graves and pit deposits were returned to repeatedly over the course of time. It is clear that the community at Aplomata intensively valued marble over a broad period of the folded-arm form's development.

Over the course of the ECII there is strong evidence for a growing association between individual identities, material abundance and marble. The two "wealthiest" unambiguous tombs from Aplomata are graves 15 and 23. Grave 15 contained a Spedos figurine, marble frying pan, four marble vessels, a steatite vessel, bronze fragments and a bone tube with blue pigment. Grave 23 contained a seated figurine, a Spedos figurine, the head of another Spedos piece, a marble frying pan, four marble vessels, a silver spoon and two bone tubes (Doumas and Lambrinoudakis 2017, 192). These graves demonstrate continuities in traditions and themes along with novel combinatorial possibilities. Perhaps the most significant developments revealed by examples from Aplomata are the marble "frying pan" skeuomorphs and the seated figurines. The frying pans clarify the deep conceptual links between their enigmatic, yet clearly maritime semiotics and the sculpting traditions. Experimental archaeology has shown that the frying pans make suitable mirrors utilising a variety of liquids available in the EBA (Papathanassoglou and Georgouli 2009). If the frying pans were indeed used as mirrors, such perceptual feedback potentially had significant implications upon self-awareness and identity formation. Simple mirrors are in keeping with the generally growing

evidence for bodily modification during the ECII (Carter 2008). The marble "frying pans" are possible evidence of a conceptual blending of self-perception with a semiotics of bodies and broader forms of Cycladic material culture.

The geography of the Cyclades, as Broodbank has effectively demonstrated, makes Aplomata a likely central site within the canoe-based interaction networks of the period (2002, 211-246). The centrality of western Naxos, coupled with the island's abundant arable lands and marble deposits, raises the strong possibility that the Folded-Arm Figurines first emerged amidst the communities surrounding Aplomata. The only fully secure context for a possible pre-Folded-Arm Figurine comes from the transitional cemetery at Tsikniades in the Louros area of the island near Afentika where Clon Stephanos found a damaged harpist (Philaniotou 2008, 195-207). The cemetery is quite substantial – the one-hundred and twenty-two excavated graves were marked with stone cairns, spirals and circles and contained forms ranging across the ECI-ECII transition. It would seem that terrestrial and maritime networks of Naxian communities played a pivotal role in the development and distribution of the folded-arm form. The custom clearly emerged from the earlier interactions of the Grotta-Pelos phase, and particularly the core feedback generated between Paros and Naxos. In these regards, the Aplomata cemetery presents itself as a kind of well in which flows of Cycladic marble steadily accumulated. The possible emergence of the FAF form emerging around western Naxos leaves open the question as to why so many of the objects were directed towards Keros, a question that will be returned to in the subsequent chapter.

5.3.2 The Value of Gender

The binding of identity and interaction through an emergent semiotics afforded by marble is perhaps nowhere clearer than with the seated figurines such as the renowned harpists and cup bearer (figs. 32 & 34). Almost all of the secure examples of such figurines derive from Naxos. Many, though not all, of the seated pieces are distinctive for their emphasis on

movement and action. The lack of breasts on the cup bearer and the carved penises on many harpists (and all examples of standing flautists), have been interpreted as a possible gendered distinction between masculine activity and a more passive feminine identity in the form of the FAF figurines (Sherratt 2000, 133-136). This observation on gender and activity is a reasonable interpretation of certain iconic and indexical properties directly presented by the seated figurines. However, the contrasting description of the female figurines lacks nuance, and is ultimately reductive to the forms of value identified in the primary iconic associations of the male figurines. This argument risks both overemphasising gendered signs and thereby obscuring other semiotics relationships at work, as well as assuming a hierarchy of values that distort the cultural logics at play in the early Cyclades. By taking a more gestalt view of the seated figurines wider semiotic relationships it is possible to tease out a more robust account of the shared knowledge generated through their forms.

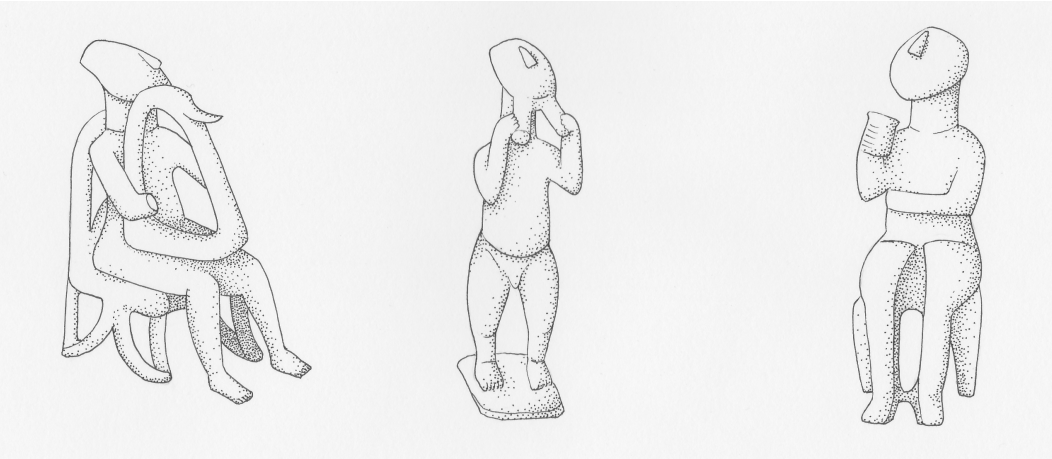


Figure 23: Seated Harpist, Flautist and Cup Bearer (Drawing adaptation by Dr Céline Murphy).

Emphasis on gendered differences in Cycladic sculpture runs the danger of reifying contemporary concerns which obscure other features that were possibly more salient to the Cycladic islanders than the sex of the objects. The four-seated figurines discovered at Aplomata show folded-armed women, distinguished by their breasts, sitting upon a chair. The seated figurine from grave 23 is broken at the legs and head but is clearly seated upon a four-legged stool similar to those seen with the cup bearer and some harpists. The other three-seated figures

were found in the pit burial of "grave" 13. Two are seated upon stools similar to the one from grave 23, while the third sits upon a beautifully carved and curved high back chair, similar to those of some harpists (Doumas and Lambrindoudakis 2017, 200-205). The most important feature to note about these four pieces is that they clearly depict the folded-arm form in a seated position. The other known examples of seated figures implicitly depict acts of sociality such as drinking, feasting, musicality, singing and storytelling. Beyond just their sex, these seated pieces exhibit a sense of proportionality consistent with the FAFs and, more critically, they were made with the classic lyre shaped heads of the form. Of all the seated figurines, the harpists deviate most, with their heads markedly tilting upwards, suggesting the projection of voice. Ultimately, there is no a priori reason to assume that the presence of a penis should be considered more significant than the presence of a Cycladic head.



Figure 24: Seated Female from Aplomata (Drawing adaptation by Dr Céline Murphy).

This argument is not meant to challenge whether musical performance was identified as a male activity, as examples of musicality in Cycladic sculpture are on the whole quite distinctly gendered. Rather, the intent is to challenge the gendered assumption that masculine value was "active" and feminine value was "passive." In contrast to the view that the primacy

of meaning for special classes of figurines such as harpists, cup bearers and flautists resides in gendered differences, an alternative perspective emphasises the importance in similarities of form. It is the folded-arm form that should be given primacy of meaning and it is the incorporation of male activity with these bodily icons that holds the most significance. The consistency, continuity and distribution of the Folded-Arm Figurines suggests they were signs of collective authority which held semiotic priority over their male counterparts.

Rather than evoking passivity, the cross-armed, forward gazing and attention-capturing stance of the Folded-Arm Figurines could just as reasonably have projected certainty and knowledge. Because the vast majority of FAF sculptures lack indications of pregnancy, feminine agency does not seem to have been conceptualised purely as an ability to reproduce. However, as suggested by the finds from Tsikniades, the development of the female body appears to have been a source of meaning and value embodied by the FAFs. Instead of a passive form, we observe an image inherently imbued with the potentials and certainties of the body. If, returning to Graeber, activity is understood as the source of value, the folded-arm form suggests that the female body was conceptualised as the fundamental source of all activity. That is, the ontological associations between marble and the Cycladic environment, the depiction of the female form, the evidence that the figurines were conceptualised both in terms of familial relationships and growth cycles all supports the view that the FAF figurines enactively signified the creation and continuation of Cycladic life. In other words, the FAF sculptures were icons that conceptually blended the value of marble, communities of practice and the female body into a shared metaphor of Cycladic existence.

The single known example of a complete cup bearer, despite its lack of secure provenance (Sotirakopoulou 2005, 61), does provide possible insight to gendered concepts of value expressed through the figurines. Seated upon a stool, the figure's general characteristics are in keeping with the folded-arm form, the right hand is folded against the body while the

left hand raises a cup, possibly to drink or toast. Importantly, the piece has no breasts, nor any other indications of sex. The lack of breasts and a depiction of an activity are insufficient evidence to assert a male identity. Rather, it is this androgyny that makes the piece particularly interesting. The lyre-shaped head and the single folded arm immediately bring forth the folded-arm form. The raised cup parallels the sense of activity and movement observed in the harpists, but it also reifies the emphasis placed upon vessels and commensality observed in Cycladic burial assemblages. In these regards, the cup bearer suggests a semiotic synthesis of the folded-arm form's authority with the fundamental activities of Cycladic sociality. The ambiguous characteristics of the piece can be considered as purposefully indistinct by presenting a shared "social" body that subsumed gender and age distinctions into one form.

Some final consideration should be given to the semiotics of the highbacked chairs of some harpists and the enthroned woman from Aplomata. The intricate lines and curves draw attention and increase the attraction of such pieces, and it is not difficult to see the chairs as implying a particular sense of authority. However, the tops of the harpists' chairs curve upwards, becoming slightly obscured behind the head. In contrast, the chair of the seated women from Aplomata "grave" 13 runs parallel on either side of her body to the height of the neckline, connecting with a downward curve that perfectly frames the head. If anything, the sense of authority seems far more emphasised by the chair of the seated woman than that of the harpist. The depiction of a folded-arm figure seated in an ornate and high-backed chair suggests a better interpretation for the gendered semiotics at play than simple delineation between passivity and activity. As Broodbank has noted, the harpists are suggestive of the storytelling traditions of a voyaging culture (2002, 253) in which exotic knowledge is likely to have been a key form of value through which status was acquired (Broodbank 1993). Rather than a simple value schema equating males and activity, it is possible to interpret the harpists as male activity becoming imbued with authority of the folded-arm forms. From this

perspective, the primary meaning expressed by the harpists is not a relationship between men and activity but an incorporation of male activity into the social value conceptualised through the folded-arm forms. That is to say, what is significant about the sculptures is not that men were harpists, but that male musicians could be depicted in marble with FAF features and placed upon similar seats as those of female figures. This suggests that male activity was being conceptually blended with the social value and semiotic authority substantiated by the FAF form.

There are reasonable grounds to infer a strong balance of matriarchal power in Cycladic society. Beyond the abundant icons of women, there are a number of structural reasons that indicate women had substantial influence in their communities. It is logical to suspect that there was a strong matrilineal dynamic within Cycladic social organisation, not only because of the kinshipping logics that appear to be expressed through female figurines, but also due to the antecedent structure of Early Cycladic society. During the Grotta-Pelos era the exchange of bodies and maintenance of kin relationships were critical for sustaining their fluid and dispersed communities. The social realities of the ECI would have been a disorienting gyre of canoes, flocks, farmsteads and hamlets shifting across the landscape. The entanglement of kin groups generated by the decentralised, mobile lifestyles of Grotta-Pelos communities and their structural dependence upon exogamy would have been highly complex in terms of its spatial and temporal distribution. Under these conditions, direct intersubjective knowledge and consistent interaction with all of an individual's kin relations would have been limited and periodic, necessitating a means of collectively mapping relationships so that individuals and groups could readily establish their relatedness with potentially unfamiliar people.

It is from these general structural patterns that we can appreciate how certain dynamics of matriarchal power and matrilineal descent were emphasised. Outsiders that married into a family would have lacked the knowledge and intimacy of the group's dynamics, thereby

supporting matriarchal authority relative to newcomers. Furthermore, out-married persons substantiated a relationship to a broader community of families as an indexical link to these groups and as a local icon of these kin identities. An out-married person assuredly had a strong influence in mediating connections with other families. In such a circumstance, an out-married parent would become the essential, daily link of Cycladic children to their extended kin groups, as well as the primary source of interpersonal knowledge between groups.

The reorganisation of social life in the ECI potentially created a variety of opportunities for women to express significant social power, and in this context, there are strong reasons to believe that matrilineal descent played an important role in structuring Cycladic kinshipping logics. The dynamics of canoe voyaging presents an important source of potential matriarchal power. Groups that became heavily focused and dependent upon canoe-born interactions imply increasing and extended male absences that undoubtedly impacted gender dynamics within settlements. These shifts in social interactions and demographic balances suggest an emphasis on the household authority of women, one that is even more pronounced with the advent of long-distance voyaging regimes. Launching longboats of between 25 to 40 people, presumably mostly able-bodied males due to the extreme risks involved, substantially altered the demography of a Keros-Syros village for extended periods. Cycladic women would have had power in numbers and significant influence over the organisation of daily village life and the production of materials in the community, particularly during voyaging season. Thus, it is reasonable to speculate that Cycladic kinship not only had an important matrilineal component but that women were a source of communal authority in settlements and quite likely more than a few marble artefacts.

5.3.3 Chalandriani and the Peripheries of Marble Circulation

Thus far, the evidence considered in this section comes from the core marble islands of the sculpting traditions. It is therefore necessary to explore the role that ECII marble artefacts

played in communities that were peripheral to the central marble sculpting islands in order to fully appreciate the influence and importance of these traditions in the wider region.[48] With 722 graves, Chalandriani is far and away the largest burial site in the entire Cyclades (Marthari 2017b, 297-309). However, of the excavations that have occurred there since the middle of the nineteenth century, only twenty-two figurines have been discovered (twelve naturalistic pieces and ten schematics). Grave 468 is one of the richest tombs uncovered by Tsountas. The burial contained nine metal tools, two decorative silver pins, as well as bone, ceramic and stone artefacts and a single Apeiranthos style schematic figurine. While showing a connection to the marble sculpting traditions, the grave again reveals that material wealth was not intrinsically associated with the FAFs. More recently, Marissa Mathari excavated twenty-eight graves of which two held figurines (ibid, 302-308). An Apeiranthos figurine was found outside grave II which contained just one obsidian blade. This discovery further demonstrates a distinction between the value of the figurines and concepts of wealth. Grave IX contained a Spedos figurine and marble bowl placed near the head of a skeleton with a bone tube and copper scraper in close proximity. Two clay vessels were placed in front of the individual and a frying pan was set vertically against the wall displaying imagery of a vulva, sea spirals and a longboat with a footed jar and obsidian blade placed nearby. Thus, at Chalandriani, as with other Keros-Syros cemeteries, there are similar semiotic relationships between quotidian artefacts, valuable substances, seafaring, the female body, and marble. However, it is also clear that the folded-arm form was a rarer object than in the core marble islands.

The relatively small number of figurines found at Chalandriani does not necessarily indicate an insignificant role for the objects and can instead be understood to reflect structural transformations in their value due to Syros' position within ECII society. To illustrate this,

[48] This is not to suggest such communities were peripheral in terms of broader Aegean relationships, only to denote that they were on the periphery of the communities intensively shaping marble in the central Cyclades.

grave VII of Mathari's excavation is one of the most unique finds of the entire ECII. In a niche above the head was placed, from southwest to northwest, a marble bowl, a scraper ending in a knot of wire loops and a frying pan depicting a longboat that was placed as a tray containing a marble spouted bowl, animal bone and a pectin shell. A footed jar was placed in front of the face and beneath the skull were two bronze needles, a bronze awl and three bone pins. One of the pins was missing its head, the other depicted a bird and the head of the last was carved in the shape of a naturalistic figurine. This unique find shows a conceptual blending between the figurines, personal possession and display that adds a new dimension to the ways in which figurines articulated relationships between individuals and communities. The figurine-shaped pin provided an immediate, but discreet, association between the identity of the wearer and the sculpting tradition while subtly drawing attention to the individual's head. Thus, we see that figurines could be intimately and relatively inconspicuously associated with individual identities. The relationship to the figurine could be expressed through display on an interpersonal scale, producing an interesting parallel with the painting of jewellery and other patterned markings on the folded-arm forms.

The bone pin blends the iconic and indexical properties of the figurines with the semiotics of personal ornamentation to form a direct relationship between the individual and the folded-arm form. In juxtaposition, depictions of jewellery on FAFs produced icons of body ornaments with potential associations between individuals and signs of identity (e.g. people that wear particular types of ornamentation). The semiotic recursion between bodies and ornamentation supports the argument that the figurines mediated the tension between individual and collective identity. This tension between personal ornamentation and collective icon lends a great deal of credence to Hendrix's conjecture, discussed in chapter three, that abstract patterns painted on figurines expressed group affiliations (2003). Patterns such as zigzags and lozenges are clear secondary icons whose associations and meanings derived from

convention. Interestingly, these images have been observed on painted pottery of the period and reveal differences in subregional patterning (Broodbank 2000, 202-207) Whether these designs resulted from icons of jewellery, tattooing practices, scarification, or specifically through application of paint to figurines, the one clear fact is that the meanings of these images were thoroughly relational. The relational properties of painted designs suggest that the FAFs could flexibly mediate specific identities and interpersonal knowledge through shared secondary icons which perceptually anchored these relationships.

It is with these relationships in mind that it is possible to infer a great deal about the mediation of value and interaction through the core-periphery dynamics of the marble sculpting traditions. The low quantity of marble figurines is in keeping with Chalandriani's location on the edge of the marble sculpting core, as is clear from the geography and geology of the islands. The communities at Chalandriani were intimately linked to the core marble regions with a shared understanding of identity and value. Given the distance from Syros by canoe journey and limitations on cargo, the circulation of marble was undoubtedly less intense than in the marble sourcing regions of Naxos and Paros. Increasing distance from the core marble centres emphasised the indexical properties of the sculptures, signifying both the voyaging process and distant communities while reinforcing associations with individuals and groups that transported the materials. The effort in obtaining these objects and their rarity can be considered within the traditional terms of a supply and demand curve increasing the value of such objects. Yet, such an interpretation risks conceptualising these interactions as a form of quantitative exchange value, e.g. an object as a unit of prestige. Instead, we can consider value along a gradient of perceptual impact and attentional capture. The relative rarity of figurines in peripheral Cycladic communities would have increased their "visibility," drawing more collective focus upon a more limited range of objects. This dynamic indicates an agency of

imported figurines to generate distinctive though contiguous local interactions and associations in the framework of shared knowledge mediated by the figurines.

Awareness of the presence of specific artefacts and performative acts with them would have been heightened within more distant communities. The core-periphery dynamics of marble-shaping communities suggests that decreases in overall quantities of marble would have been compensated for by the semiotic impact gained through increasing transport and rarity. However, bottlenecks in regional flows of marble potentially limited the circulation of the artefacts within certain communities. Constraint upon access to marble implies increased opportunities for distinct individuals and groups to become more intensely associated with the artefacts, suggesting a close relationship between discrete identities and control over the value of the figurines. In these regards, aggregations of marble in peripheral communities plausibly reinforced attention upon smaller, more defined groups. This attentional feedback generated by access to rarer forms increased opportunities for discrete identities to command influence over social interactions.

The identities indicated by the ECII burial record were not rigid but expressed through fluid combinatorial possibilities which cohered around a number of central themes such as maritime interactions, sociality, kinship and skill. The various permutations of Cycladic burial assemblages imply a semiotic entanglement of tool use, domestic goods, special materials, personal display, social activity and bodies. The figurines, though often related to the accumulation of other special materials and large depositions, were not conceptually fused with individualising forms of value. That is to say, figurines were not systematically associated with concepts of personal wealth. Rather, the figurines evince concepts of value and identity that both mediated and catalysed the organisation of social relationship.

Flows of marble structured Cycladic interactions to produce emergent forms of organisation. The Folded-Arm Figurines provided a consistent, yet plastic, locus of attention

through which semiotic relationships could develop and extend their connections through circulation and use. Bottlenecks and confluences in the circulation of marble magnified the attentional focus and semiotic relationships generated by communities. In this way, the figurines provided a scaffold through which growing asymmetries in material flows and social attention could be flexibly incorporated into the organisation of communities. By providing a means through which individuals and groups could capture attention, the FAFs supported the creation and manipulation of value at new scales of interaction through a shared icon of Cycladic intersubjectivity. This nexus of collective attention, entangled as it was with the dynamics of seafaring and village life, facilitated the abilities of individuals and groups to develop social centrality during a time of profound change in regional interactions. In these regards, the FAFs potentially aided in smoothing over and legitimising growing asymmetries and distinctions between groups and individuals.

5.4 Dwelling in the Past

A growing body of evidence has begun to clarify the extent to which marble artefacts participated in everyday life making it possible to interpret their semiotic function within settlements. The repairing and repeated painting of figurines have long attested to the use and circulation of marble within Cycladic communities beyond burial contexts, but recent finds from settlements have started providing greater clarity on these dynamics. Though there are very few Folded-Arm Figurines found in settlements to date, the limited examples of naturalistic pieces in conjunction with the abundant finds of schematic figurines and marble vessels reveals that marble bound together the activities of communities beyond burial ceremonies.

The aggregation of Keros-Syros peoples into large villages at the onset of the ECII was a profound transformation in the organisation and phenomenology of Cycladic social

interaction. ECII villages appear to have ranged around forty families, representing a cluster equivalent to roughly sixty Grotta-Pelos households or twelve of their hamlets covering an area of approximately one hectare (Broodbank 2000, 212-221). Within the villages, peoples of varying degrees and forms of relatedness continually and consistently navigated social interactions on a daily basis. In addition to these relationships, there probably existed dynamic hinterlands of settlements similar to those of the Grotta-Pelos culture. Such antecedent networks would have provided the basis of the pastoral economy as well as feeder populations for villages and webs of kinship upon which communities could draw for support. Likewise, the newly emergent villages provided new foci around which these rural communities could organise. In other words, the swirling gyre of Grotta-Pelos communities began to cohere into more spatially and temporally stable interactions with the villages acting as gravitational centres.

Keros-Syros villages structured Cycladic social geography by anchoring social interactions in ways that enabled communities to orient, conceptualise and navigate their relationships. The lights of distant villages, directions of travel, specific material and artefact associations with various regional groups would have contributed to stabilising the perception and understanding of the spatial and social organisation of the Cyclades. The stability generated by Keros-Syros settlements provided a foundation upon which novel categories of social identity could be conceptualised, e.g., the village unit, associated households, hamlets and kinship groups as well as the relationships and interactions between these various scales of organisation. The numbers, densities, distributions and possible connections of Keros-Syros communities were a different order of complexity from the preceding Grotta-Pelos phase and generated new possibilities and potentials for emergent interaction. What is clear from the evidence of Keros-Syros settlements is that marble shaping mediated these dynamics by

extending Cycladic relationships and conceptually anchoring them to shared traditions of meaning-making and value creation.

Fragments of naturalistic figurines found in settlements have revealed that the sculptures could potentially circulate within communities for generations, play important roles in village ceremonies and were potentially linked to the activities on Keros. The most unique finds of naturalistic figurines in settlements come from Ayia Irini on Kea where a number of pieces were ritualistically deposited within structures. To date, such behaviour has only been observed at Ayia Irini (Wilson 2017). Nonetheless, they suggest a number of important features that are consistent with the general semiotics of the figurines.

One of the more difficult finds from the site to interpret is that of a leg fragment, seemingly of an ECI Plastiras piece. The leg was deposited at the base of the lower western road of the settlement when it was reoccupied in Phase II (ibid, 96). It is difficult to tell whether the piece was placed intentionally or simply used as fill during the start of the road construction. However, a number of factors argue in favour of an intentional placement. First, the discovery of other figurine fragments with clear ritualistic deposition inside houses is indicative of an accepted settlement practice. Second, the use of a leg fragment in conjunction with the road can be interpreted as an indexical icon of movement. However, even if the figurine was simply used as fill without any other consideration, the presence of an ECI figurine fragment in an ECII context minimally reveals that the object existed above ground for centuries before its deposition, implying that marble figurines could persist as heirlooms of significant antiquity (ibid, 101). What is beyond doubt is that the impact of the sculpting traditions was extensive and had a powerful effect upon far flung communities.

All five of the Early Cycladic figurines found in secure contexts at Ayia Irini have wear and breaks that indicate substantial use and circulation prior to deposition (Wilson 2017, 94-102). The four remaining figurines discovered in the settlement are all folded arm pieces, all

deliberately placed within buildings. A figurine discovered in building E of the settlement is one of three known examples of the Kea subvariety; the two other examples originate from the Special Deposit South on Keros (ibid, 96-98). The figurine from Agia Irini is missing its head and neck and was embedded into the clay layer of the building's floor, equidistant from the entrance and interior doorway leading to a room containing a large, stamped hearth. Outside of Keros, Ayia contains the highest number of fragmented figurines deposited in ritualistic contexts. Minimally, this piece suggests a contiguity of ritualised fragmentation that extended between two communities roughly 160 km apart, or four days travelling time at the estimated top cruising speeds of a Cycladic longboat.[49]

The other three FAF fragments were found in house D which connects to house E. The lower torso and upper legs of one Folded-Arm Figurine was found at the entrance corridor to the structure, while a similar fragment was found at the bottom fill of the building's largest room and the lower legs of another figurine were placed on top of this same fill. A circular paving stone which stood out from the surrounding irregular pavers was placed above this final fragment, which provided a sign of the figurine's placement beneath (ibid, 99). The two fragments of room 2 in house D were placed along the same axis at opposite ends of the room with the lower piece near the threshold of the building's third room and the upper fragment near the entrance from the first room. The placement of two leg fragments on a line running through the centre of the building's three rooms as well as the hips and upper legs of a third piece at the entrance corridor that runs along the side of the building indicates a semiotics of movement. Thus, it would appear that at Ayia Irini, the conceptual blending of figurine fragments and settlement structures functioned as a spatial metaphor that supported residents conceptualising the movement and dwelling of bodies in the community.

[49] The semiotics of fragmentation will be investigated in more detail in the following chapter.

The evidence from Ayia Irini provides significant clues as to the domestic use of the figurines. While these rituals might have been unique to the settlement, they are clearly an extension of the traditions found in the core marble producing islands. The fact that only fragmented pieces were discovered implies a link to practices of breakage found on Keros. Furthermore, the figurines imply a semiotics of bodies and the built environment. The use of lower torso fragments with clear vulvas perhaps argues for a metaphor of bodily containment, passage, and shared space. The emphasis on mobility with the iconic properties of several similar body fragments, their indexical relationships to thresholds, entranceways, and corridors suggests the conceptualisation of collective movement through the built environment. The circular paving marker above the one lower leg and feet fragment reveals an effort to draw attention and maintain awareness of these relationships in the collective space of the room. Furthermore, the paver, and even more crucially, the stamped hearth in the room adjacent to the figurine in building E, imply a space of communal ceremony. These features, and the overlapping structure of buildings E, E-D, and D near the centre of the site are reminiscent of a social centrality not radically dissimilar to the collective spaces observed in many of the Neolithic villages of the Cyclades. Regardless, the deposition of the figurines at Ayia Irini reveals both the extensivity of marble's value far from the core islands as well as their capacity to shape the semiotics of lived spaces.

Ayia Irini's location at the periphery of the marble sculpting traditions potentially encouraged local kin groups to emphasise their links to the Cycladic core. It is reasonable to speculate that the use of leg fragments provided an icon of movement and distance relative to the central sculpting communities. The preservation of antique sculptures, their association with the foundations of roads and buildings, household scales of organisation and communal space all affirm concepts of social value in keeping with the argument that the figurines were a kinshipping technology for identifying one's heritage and relatedness to others.

The closer we get to the centre of the marble kyklos, the more evidence we find for the active circulation of the material in settlements. At Akrotiraki on Siphnos several marble artefacts were discovered in the disturbed layers of the settlement, including marble bowl fragments, a pebble with two black painted bands, a head of Louros type, the head and neck of an Apeiranthos piece and an uncategorised marble piece with red dots in a vertical line, two horizontal bands, dotted polygons (Papadopoulou 2017, 113-14). Closer to the marble hub of the islands, the evidence from Siphnos suggests more small-scale, but active flows of marble, their modification with paint and association with commensality. However, upon investigating the core sculpting region we observe evidence for substantial flows of marble within daily life.

The site of Potamia on Ano Kouphonisi, though heavily eroded by the sea, appears to have been a settlement with substantial traffic based on the diversity and number of artefacts discovered there. Amidst numerous ceramics such as sauceboats, stone tools, spools, obsidian, and a brazier, there were also found two schematics as well as a leg and a thigh fragment, and a seated female figurine (Philaniotou 2017a, 171-182). The seated piece, though missing its head and legs, is of the same general variety as those from Aplomata, albeit about half the size of the examples discussed. Nonetheless, the presence of the seated figurine at Potamia is evidence that seated pieces were potentially displayed in settlement contexts. Such pieces would have structured social environments by providing a focal point of attention and props for interactions as well as subtly reinforcing the semiotics of background contexts. Furthermore, the seated figurine from Potamia is easily held in the hand and circulated between people. The evidence from Ano Kouphonisi attests to the fluid roles and relationships of many figurine types that existed above ground and as a part of daily interactions. However, it is at the settlement of Skarkos on Ios that the most important evidence about the role of figurines in daily life is derived.

5.4.1 Skarkos

Skarkos is the most extensively excavated ECII settlement and provides substantial evidence that figurines played an active role in village life. To date, fifty-five buildings have been excavated at Skarkos (Marthari 2008; Marthari 2017a). The site appears to have been occupied during the earlier period of the ECII, given a lack of any evidence of Kastri group ceramics. Lying along both the northwest-southeast and east-west axis of the trade routes connecting the Aegean, the site attests to extensive links across the region with numerous ceramics indicative of mainland contacts and the broader Cyclades. Skarkos was part of the dense local interactions between the central Cycladic islands (Marthari 2008, 73-79). Special use vessels such as burnished stamped frying pans and pedestalled jars are present yet very uncommon in the settlement (ibid, 80). Many marble skeuomorphs of course and fine ware, lids, and implements, were found scattered across the site (Mathari 2017a, 134). Skarkos formed a key node in the core flows of Cycladic marble and as regards settlement contexts with figurines, it is rivalled only by Dhaskalio.

The distribution of figurines at Skarkos suggests that the objects were consistently circulating in the daily life of the village. A total of fifty-two figurines have been uncovered at the site, almost all found in buildings or public spaces (ibid, 123). Of these figurines, thirty-three were complete, thirty-six were Apeiranthos style schematics (including three fragmented pieces), there were thirteen irregular schematics including one made from triton shell as well as two head and neck fragments of Chalandriani folded-arm forms (ibid, 123-125). One of the Apeiranthos style figurines was made from a pot sherd, indicating that rapidity and quantity were factors in the creation of schematics and their value (ibid, 124). Figurines were dispersed across the settlement, which suggests that they played a ubiquitous role in daily life. All were found in the destruction and ash layers as well as one folded arm fragment in the surface layer above the buildings. Eight figurines (15%) were found outside buildings, two public squares

had one figurine each, four figurines were found in another square, two were found outside but near the site, one in a recess equidistant between two buildings, and another in a space created by three buildings (ibid, 129-133). This evidence reveals that the figurines circulated widely in a variety of open spaces around the settlement. Their near-universal presence in the destruction and ash layers indicates not only a presence in daily life, but possibly their desertion or loss in public settings during the process of abandonment, suggesting they were actively carried on persons. The remaining forty-two figurines (81%) were found inside buildings. Fourteen buildings contained one figurine each, two buildings held two, one building had three, another building contained five and one building produced sixteen figurines including the other folded arm fragment (ibid, 129). Groups of two to five figurines were found in the same room and layer in numerous contexts, suggesting they were placed together (ibid, 129). Roughly 28% of the excavated buildings, most of which seem to be houses (ibid, 133), contained figurines, indicating that the objects were ubiquitous in village life.

The so-called "building" of the figurines, a structure containing sixteen pieces, is one of the most important finds in recent history as it offers the first and only substantial evidence for figurine production within villages. The building of the figurines is, to date, the only probable marble workshop known in the Early Cycladic record. Two of the building's rooms contained five and six figurines along with emery, tools, pumice, and abundant obsidian. Room 398, with five figurines, held large concentrations of obsidian, an unfinished figurine and bowl as well as marble flakes, strongly suggesting a locus of production. Of the six figurines with pigment found at Skarkos, three were found among the six discovered in room 399. The room also contained red pigment and a bone tube, suggesting that the initial application of paint was directly linked with the primary sculpting process (ibid, 133-34). A further twenty-nine unfinished marble bowls and an unfinished Apeiranthos figurine were found elsewhere at the site (ibid, 134). All of this implies not only that villages were locations of intensive marble

production, but also that there was a strong degree of craft localisation in settlements, implying a degree of specialisation. Thus, a picture emerges of organised marble crafting in Cycladic villages which generated flows of the material within settlements and between communities.

The schematic pieces at Skarkos are indicative of similar interpersonal dynamics and patterns of circulation to those first evidenced in Grotta-Pelos burials, particularly in regard to the clusters of the objects at the site and their sizes. Furthermore, many of the schematics at Skarkos have strong associations with the folded-arm form. Eight of the Apeiranthos figurines found at Skarkos were shaped to indicate noses, and of these, five have distinctly back sloping lyre shaped heads (ibid, 141-42). These features imply a direct iconic equivalence with FAF sculptures. Other than Skarkos, the next most abundant finds of schematic figurines in a "settlement" context come from twelve finds at Dhaskalio (Renfrew 2017, 165-170) Of these pieces, seven have similarly shaped noses and lyre-shaped curvature (only one piece with an intact head lacks these features). The shaped heads from Skarkos and Dhaskalio show clear linkages between the circulation of schematics within communities, the folded-arm form and interactions between regional groups. What is clear from the evidence is that schematic figurines circulated within household and public spaces as part of daily life. This circulation of schematics was unequivocally bound up with the semiotics of more complex sculptural forms found in the Cyclades. The distribution of schematics in ECII settlement contexts suggests a continuity of traditions that extends into the depths of Cycladic existence. From the circulation of pebbles and schematics in Neolithic villages to congregations of marble bodies in Grotta-Pelos graves, the shaping, display, and exchange of marble bodies formed a locus of sustained attention and interaction for generations. In many regards, these small and mobile icons of the body were the "workhorses" of the semiotic relationships expressed through marble. The schematics provided a dynamic and plastic resource through which relationships could be actively preformed and maintained through interpersonal connectivity and movement. It was

this scaffolding of collective value and shared understanding that first emerged through pebbles and schematics, which in turn supported more elaborate dynamics and complex semiotic relationships. In other words, from the earliest horizons to the floruit of the ECI, schematics bound together interpersonal relationships and communal identities through fluid exchanges and interactions that sustained the value of marble shaping activities.

The finds from Skarkos indicate that the production of figurines and other marble artefacts took place within the villages. To this evidence should be added an unfinished figurine clearly intended to be of naturalistic form that was found in the Mycenaean layers at Koukounaries on Paros (Katsarou-Tzeveleki and Schilardi 2008, 63), along with an Apeiranthos piece and the head of a FAF (ibid, 67). The discovery of a small number of Apeiranthos figurines in other settlement contexts, including three at Akrotiraki on Siphnos, one at Phylokopi on Melos, and three at Akrotiri on Santorini (Marthari 2017a, 126) further supports a view of a wide ranging and deep-rooted practice of displaying and circulating schematics with communal interactions. It can be stated with some conviction that the value of marble was not oriented purely towards funerary practices but participated in and mediated daily lived experiences. As vessels, schematics, and naturalistic figurines, marble moved within and between communities of the ECII at numerous scales of interaction, from the interpersonal to the regional. The question remains open as to why the Apeiranthos schematics are commonly found in settlements and less so in cemeteries, while the inverse holds true for the FAFs. One possible answer is that the schematics played a quotidian role within a Cycladic gift economy (as argued for in chapter four), whilst the FAFs were largely reserved for more heightened, collective rituals. Nonetheless, the shaping and circulating of marble provided dynamic and transforming entanglements of material signs through which Cycladic islanders were able to perceive and conceptualise the value of their collective activities and relationships.

5.5 Conclusion: Regimes of Value, Oceans of Meaning

Under the rubric of "prestige", the human pursuit of value is reduced to dynamics of accumulation, exchange, and equivalency. The problem with such concepts is that they tend to sit within a thoroughly modern conception of individuals as profit-maximisers or self-aggrandisers driven to accumulate status, wealth or reproductive success (Ames 2010). That is to say, human agents are conceived of as ego-centric benefit seekers that must negotiate social relationships as a collection of individuals in search of competitive advantage.[50] Social relationships are presented as inherently teleological interactions *between* and not ontological affiliations *with* people; sociality is conceived of as a means to meet the material ends of individuals, and not as the necessary condition through which humans are able to create and recreate collectively their material realities.

Within a prestige-commodity framework value is *measured* (calculated as opposed to qualitatively experienced) in terms of material wealth that is believed to signify "status" and is conceptualised as a kind of symbolic commodity that can be acquired and manipulated to generate profit, understood as social power. Prestige goods therefore confer status that can then be expressed as social power to acquire more prestige goods, which then enables further manipulation of their value as a symbolic commodity. The circularity of this argument is clear: it sets up an endless refraction in which prestige goods are valuable because they confer status, which affords the power to make prestige goods valuable.

This conceptual fusion of prestige and status with commodity and profit results from a set of modernist assumptions about the nature of individuals, symbolic thought and economic value. Traditionally, artefacts without clear economic uses are explained away as "symbolic objects," or, cultural forms that transmit content to the representational mind. If it is assumed

[50] The relationship between this vision of society, the Machiavellian intelligence hypothesis and Theory of Mind, is clear; it is a view of social cognition that is fundamentally locked into a Game Theory logic of strategic interactions.

that humans are essentially Machiavellian egos with profit-maximising brains, it follows that the value of a "symbolic object" rests in its ability to confer economic gain to the individual. The value of a "prestige good" is traditionally understood in terms of abstractions such as status or honour, which provide both motivation and profit. Symbolic content comes to be seen as a commodity that is possessed by the individual mind and quantifiable in physical wealth as prestige goods.

Marble, and particularly Cycladic figurines, provided a medium through which the creative tension between the individuality and sociality of the body could be expressed. For just as kinship is about delineating shared bodies, "bodily differences are necessary for the creation of kinship, because the creation of kinship is the creation of bodily difference" (Vivieros de Castro 2009, 242). It is the interdependence of self and other, insider and outsider, that should be seen as the principal source of value generated and transferred through the circulation of bodies within societies. Cycladic figurines developed during an intensive shift to extensive exogamy and matured with the re-emergence of village society. Not only did the figurines function as a technology for collective attention capture through a shared icon of the body that could be differentiated through paint but acts of circulation allowed them to operate as indices of these social interactions. The semiotics of Cycladic sculpting do not suggest concepts of individual prestige, but of relatedness and kinship as a "cultural order of intersubjectivity" (Sahlins 2013a, 239). Marble's value was fundamentally intersubjective and emerged as an enactive sign of these relational dynamics, in which the reproduction of people and gifts operated according to the same principles (cf. Gregory 2015, 73-106). In order to understand how a nexus of value, kinship and gifting generated the innovation spirals of Cycladic sculpting we must now look to Keros.

Chapter Six: Keros and the Marble Kyklos

6.1 Introduction: The Keros Complex

As interactions began to intensify across the Aegean world during the third millennia BC, the circulation of bodies, materials and canoes in the Keros-Syros period began to gravitate around a small and relatively inhospitable island. The activities uncovered at the site demonstrate a social and political creativity afforded by the conceptions of value and relatedness generated through marble. It is now clear that the figurines were not merely personal possessions or burial goods, but that they mediated highly organised behaviour on a regional scale. Over the course of generations, Cycladic islanders congregated at the site of Dhaskalio-Kavos to deposit fragmented figurines among other materials involved in significant acts of performance and festivity.

The island of Keros is perhaps the most striking example of emergent complexity in the Aegean during the EBA. The site is emergent in the sense that self-organizing dynamics generated novel relationships and interactions that are not reducible to the linear effects of component processes, such as agricultural innovations, settlement expansion or increased trade. Dhaskalio-Kavos is complex in terms of the quantities and heterogeneity of interacting elements, the energy density and intensity of these interactions, as well as the scales at which these relationships were developing coherence. In light of the ritual and economic organization revealed by the site, Colin Renfrew has labelled this prehistoric polity the "Confederacy of Keros" (2013). It is clear that the Cycladic Folded-Arm Figurines played a key role in the activities at Dhaskalio-Kavos. However, the exact nature of this relationship remains deeply mysterious. A variety of interpretations of the social complexity evidenced by Keros have been put forward. The site has been described as a "symbolic attractor" and is claimed to be the oldest known maritime sanctuary in the world (Renfrew et al. 2012). Prior to the most recent

excavations, Cyprian Broodbank pointed out that Dhaskalio has many features of a trading settlement (2000, 258–62), an observation in keeping with the site's maritime centrality during the period.

Undoubtedly, a key feature of Keros' story resides in the relationship between marble sculpting and maritime movement. Interpretations of Dhaskalio and Kavos either focus on social cooperation through ritual or emphasize economic dominance by a specific group. This chapter argues that Cycladic marble, as a locus of value through which kinship dynamics were conceptualized and manipulated, provided the semiotic resources through which trust horizons could be raised and cooperative endeavours organised. The superabundance of marble artefacts, building materials and sea stones that have been uncovered at Dhaskalio-Kavos reveal that the material played a crucial role in the site's conceptualisation. In this context, it is argued that marble shaping facilitated and stabilised long-range voyaging regimes by coordinating social interactions in the central Cyclades.



Figure 25: Keros as seen from the southern shore of Ano Kouphonisis with Dhaskalio on the far right.

6.2 Interpretations of Keros

Cycladic islanders destroyed thousands of marble artefacts and travelled significant distances to deposit them on Keros. The ritual complex on Keros is primarily comprised of the settlement on Dhaskalio and the Special Deposits of the Kavos area (see Figure 37). The site concentrated large quantities of marble into an area of roughly five hectares (Dixon 2013; Gavalas 2013; Gavalas and Brodie 2018; Renfrew 2018). Innumerable figurines and vessels, mostly fragmentary, were deposited in two large open-air sites of congregation known as the Special Deposits. Adjacent to these ritual deposits, the promontory of Dhaskalio consisted of a warren of buildings, halls, courtyards, promenades, stairways and drainage systems located on top of an inhospitable outcrop of rock (cf. Renfrew et al. 2013). Dhaskalio was built, in part, with thousands of metric tonnes of marble imported from Naxos to the site (Dixon 2013) and was a location of intensive metal crafting (Bennet 2018). For centuries, flows of materials from across the Cyclades and broader Aegean gravitated towards Keros (Hilditch 2015; Hilditch et al. 2018, 464–5; Sotirakopoulou 2008; 2016). The site undeniably influenced social interactions amongst seafarers and communities on a regional scale.

Interpretation of Keros' function and significance has been open to notable debate. Broodbank has argued that Dhaskalio was a prominent trading settlement with the Special Deposit North (SDN) functioning as a unique cemetery (2000, 223–46). Broodbank's argument was formulated before the excavation of the Special Deposit South (SDS), and the excavations of the past two decades have brought this interpretation into question. However, the view that Dhaskalio was a trading centre is still a valid position given the quantity and diversity of materials from across the Aegean found in the settlement. In juxtaposition, Colin Renfrew's description of the site as a maritime sanctuary for collective rituals has had the most influence upon interpretations of Keros (Renfrew 2013; Renfrew et al. 2012). Dhaskalio-Kavos has features indicative of both a ritual and trading centre, and it is in these contrasting features that

it is possible to understand how the value of marble, the demands of long-distance voyaging and the dynamics of kinship generated novel social complexity at the site.

The patterns of behaviour evidenced on Keros do not easily slot into modern conceptual distinctions between social, cultural and economic activity. There are important insights as well as significant shortcomings concerning the ways in which the major interpretations of Keros have been framed. Broodbank's network analysis of the Cyclades shows how a matrix of canoeing technologies, settlement distributions, geographic formations and environmental dynamics made Keros a natural "centre of gravity" for EBA maritime movement (Broodbank 2000, 237–46; see also Knappett 2014; Rivers et al. 2013). However, Dhaskalio does not conform to the expectations of a settlement. Despite the connectivity of the site on a global scale, it is locally remote and inhospitable with poor access to fresh water and arable land. Undoubtedly, the site was only sustainable through maritime connectivity. Significantly clear domestic spaces are conspicuously absent (cf. Renfrew et al. 2013), indicative of either unique function or intentional abandonment. Critically, the argument that the Special Deposit North was a highly unique cemetery is not well borne out by the evidence.

It is undeniable that some mortuary activities occurred on the island, but the material record strongly suggests that they were not a primary focus. Evidence for burial is comprised of a single intact cist and two other possible destroyed cists found in the vicinity of the SDN (Zapheiropoulou 2007). Anonymous accounts from individuals believed to be involved in the looting of Keros also suggest that there were a small number of graves near the SDN (cf. Papamichelakis and Renfrew 2010). Furthermore, though bone fragments have been found near the Special Deposits, the fact that none were discovered in the intact SDS supports a non-funerary interpretation (Moutafi 2015). In addition to this evidence, there are three partially constructed rock-shelters, found immediately to the south of the SDS, that contained the bodies of 13 persons (roughly half of which were non-adults) and were clearly intended as primary

internments before secondary burials (Moutafi 2015, 503–4). Finally, Broodbank's hypothesis is most significantly undermined by evidence that the Special Deposits appear to have developed prior to the floruit of Dhaskalio (Renfrew et al. 2015b; Renfrew 2018). In other words, ritual activities on Keros seem to have preceded the emergence of the most intensive activity on Dhaskalio and it is unlikely that a cemetery predates and declined during the settlement's floruit.

If the site was indeed a trading centre of some nature, the activities on Dhaskalio appear to have developed as an outgrowth of the rituals at Kavos. The chronology of the site is complicated and will hopefully be further clarified by radiocarbon dating from the most recent excavations. As stands, radiocarbon dates from well stratified contexts on Dhaskalio currently supports a chronological framework of three phases associated with distinct ceramic assemblages. Phase A is identified with the Keros-Syros Culture and is defined by the absence of materials from Phases B and C which are associated with the early and late Kastri culture respectively (Sotirakopoulou 2016, 1-3). The consensus dates are 2750-2300 BC with the transitions between phases A and B occurring c. 2550 BC, and phases B and C c. 2400 BC (Ramsey et al. 2013, 702). There are three radiocarbon dates from Kavos which are relatively early with a weighted average calibration of 2558±79 BC (Renfrew 2007, 113). Unfortunately, this evidence is not particularly secure due to the stratigraphic complexities of the disturbed SDN. Furthermore, no radiocarbon samples were procured from the SDS (Ramsey et al. 2013) However, the pottery from the SDS provides fairly robust evidence for the chronology of the site. Kastri pottery forms, diagnostic of Phase B, are rare in the SDS. Likewise, the white-slipped volcanic pottery that is indicative of Phase C is extremely sparse at the location. It is estimated that 80% of the activity in the SDS took place in Phase A, about 19% in Phase B, and about 1% in Phase C (Renfrew et al. 2015b, 223). Thus, at present, the best evidence suggests the floruit of the Special Deposits significantly precede the floruit of Dhaskalio.

The complex social interactions that took place on Keros suggest an entanglement of regional communities, ritual activity and maritime interactions with the wider Aegean world. The possible causal primacy of the Special Deposits militates against Broodbank's argument that Dhaskalio-Kavos was a central settlement similar to nearby contemporaries such as Skarkos. The evidence that ritual activities on Keros preceded most activity on Dhaskalio suggests a high degree of sustained attention and collective intention to focus social interactions upon the site. Though this information favours Renfrew's argument of a ritual sanctuary, it also complicates the narrative. Ritual activities at the Special Deposits involving the fragmentation of marble artefacts subsided as Dhaskalio became a location of intensive metallurgical production and the extensive importation of pan-Aegean material forms (Georgakopoulou 2013; 2018) If Keros was primarily a site of collective rituals involving Cycladic figurines, why do these practices seem to have largely vanished as Dhaskalio emerged, displaying characteristics more in keeping with a trading site? Evidence surrounding the development of Cycladic figurines in conjunction with the chronology of Keros provides a means of synthesizing Broodbank's and Renfrew's arguments. Specifically, ritual activity involving marble forms appears to have enabled Cycladic islanders to establish a stable, region-wide cultural regime of long-distance voyaging that transformed the dynamics of interaction in the central Cyclades.

6.3 The Organisation of the Keros Complex

The activities at Dhaskalio-Kavos span a period of roughly 500 years, during which time the cultural dynamics at the site underwent profound transformations. During the early Keros-Syros Phase A, activity seems to have been predominantly focused upon the Special Deposits but includes limited evidence around the centre of Dhaskalio's eastern slope. The Keros-Syros period is followed by an Early Kastri Phase B, in which activity seems to have

orientated away from the Special Deposits to focus upon Dhaskalio, culminating in a Late Kastri Phase C, during which time activity at the Special Deposits appears to have ceased almost entirely. These transforming patterns of activity and the cultural assemblages associated with the various phases are the first most significant clues for interpreting the organizational dynamics through which Dhaskalio-Kavos emerged.

Dhaskalio is a rugged, nearly 1.2-hectare formation of high-pressurised limestone (brachiated marble) jutting out of Keros' western shelf. The promontory's southern, western and northern faces are dominated by sheer cliffs that rapidly ascend toward the site's summit. The eastern face of the formation provides the easiest entrance, albeit with a very steep ascent. Dhaskalio is both island and mountain in miniature, covered in architectural materials that have been cascading down its slopes for thousands of years, blurring the boundaries between geological formation and rubble heap.[51] The density and extent of construction at the site is nothing short of monumental. During Dhaskalio's floruit, the site was a veritable hive of architecture and activity that distinctively shaped the island's visual profile. A large hall sat atop the crest of the island together with various structures that ran along the ridge of the summit. The eastern slope of the promontory provided the largest building area and hub of activity on the island. Excavations have revealed a dense clustering of structures that formed a warren of footpaths, causeways, stairways and drains. The eastern slope curves into a heavily terraced northern face paved with marble courtyards and walkways that lay just beneath the apex of the site. During the ECII, Dhaskalio was a small peninsula that would have provided direct access between the major areas of the Keros complex (Dixon and Kinnaird 2013). The land bridge that enabled islanders to move between Dhaskalio and the Special Deposits would have bisected the inlet into two shallow bays that doubtlessly harboured numerous Cycladic vessels during periods of congregation.

[51] Since the loss of the land bridge, the island has transformed into a unique ecosystem (Hurston et al. 2009).

The two Special Deposits lay roughly parallel to each other relative to the east-west line of division created by the land bridge. The two deposits appear roughly equivalent in size, covering less than a quarter hectare each. However, the looting of the SDN makes it impossible to determine the original spatial organisation of the area. The SDS reveals a minimalistic, open-air formation defined with low walls, cairns and areas of deposition. The fragmented materials show a clear locus of density, but a generalised distribution of materials (Gavalas and Brodie 2018, 350-351). It seems likely that the SDN's spatial organisation was originally more defined than the SDS, given the evidence of generally higher quality materials, the instance of a complete Spedos figurine, the nearby presence of at least one cist grave, fragments of very large figurines, and unprovenanced special artefacts such as the famous dove bowl in the Goulandris Museum that most likely originated from Keros (Sotirakopoulou 2005; Marthari et al. 2017; Renfrew et al. 2018a). Unfortunately, due to the catastrophic destruction, one can do little more than speculate as to the organisational relationship between the North Deposit and the rest of the site. However, the SDN does appear to have had a distinctive ritual role involving more high value materials than the SDS and was quite likely more spatially defined.

The two deposits along with an apex at the summit of Dhaskalio essentially creates an imaginary isosceles triangle. The sloping plateaus of the deposits occupy the centre mass of vision from the promontory's eastern face where the majority of the settlement was constructed. The Kavos area forms a natural amphitheatre around Dhaskalio, and sound travels readily between the key areas of the site (Renfrew 2018). The dense accumulations of materials in the Special Deposits, and particularly the luminescent and glittering fragments of marble, would have drawn visual focus from Dhaskalio. In other words, the spatial environment of Dhaskalio-Kavos affords a perceptual hub that reinforces attention upon the area encompassing the Keros complex. That the only substantial evidence of Phase A occupation at Dhaskalio occurs on the centre mass of the eastern slope facing towards the Special Deposits further

evinces a sense of interiority that bounded the activities of the complex from the earliest phases. Though the evidence from this initial period is limited on Dhaskalio, it is nonetheless present, revealing that the location was intimately associated with the Special Deposits from the outset. Whatever the full extent of this early occupation was in reality, it appears that construction rapidly intensified as activities on Kavos subsided.



Figure 26: Dhaskalio

The pottery assemblages from Keros both sophisticates and complicates our understanding of the activities there. Perhaps the most enigmatic ceramic pattern is the fact that the Phase C assemblage on Dhaskalio is restricted to the summit (Sotirakopoulou 2016, 4). It is possible that the evidence from the most recent excavations will change this picture and therefore our understanding of the chronology. However, as stands, there are two primary interpretations of this pattern. The first possibility is that this pattern reflects an intentional spatial organisation of the site with Phase C materials purposefully constrained to the summit, potentially for ritual reason or as a result of status distinctions. The other possibility is that this pattern reflects a temporal relationship as supported by the stratigraphy of the SDS. In this

latter case, the structures on the summit were either constructed during Phase C or were the only part of the settlement that remained in use during the period and kept clean of the preceding phases. Significantly, the Phase C pottery assemblage reveals a decline in total percentages of fabrics sourced from the Keros Triangle and a substantial increase in pottery sourced from Thera, Melos or Aegina (Sotirakopoulou 2016, 390-391). Minimally, the pottery diagnostic of Phase C indicates an expansion of maritime networks relative to the regional sources of the preceding phases.

The most significant insights about the organisation of Keros derived from the ceramic assemblages emerge from the stylistic and regional patterning of the materials. Analysis has clearly shown that, "different shapes, arrived in different proportions from different places and the balanced composition of the assemblage was achieved by combining numerous sources" (Broodbank 2007, 183). This evidence provides some of the most robust support for Broodbank's trading centre hypothesis in that it demonstrates the intentional selection of goods by the local community, either as a result of on-site choices, acquisition from voyages, or some combination thereof (ibid, 184). The lack of a standardised suite of forms, or specific styles solely associated with specific regions negates the idea of well-defined dedications brought in by outside participants. Nonetheless, the ceramic assemblage is not the result of a haphazard acquisition of any available materials, but an expression of well-defined relationships and purposeful selections.

The evidence for local selection of materials adds nuance to the analysis of Keros, but it does not negate the idea that the island was a centre of congregation. First, the ceramics on Keros are overwhelmingly, and probably entirely, imported (Sotirakopoulou 2016, 388). The proportion of imports from beyond the Keros Triangle increases significantly through the three phases (ibid, 390). Undeniably, Keros exhibited a high degree of centrality within an extending network of maritime relationships. Acquisition of materials from more distant regions through

voyaging practices seems likely given the consistent forms with diverse provenance that appear. Particularly, mainland sauceboats were highly valued and highly unlikely to have filtered in such large quantities through happenstance. Nonetheless, within the Keros Triangle, it is plausible that the selection of (some) ceramics happened on site during acts of congregation. Though exploring the dynamics of pottery selection on Keros in detail are beyond the scope of this thesis, there are two key lines of evidence that militate against the idea that Dhaskalio was a standard ECII settlement. First, the preponderance of figurines does suggest a well-defined form for ritualistic dedication and any explanation of the ceramics must also grapple with the enormous quantities of the marble artefacts that appear at the site. Second, the importation of marble for construction minimally indicates regional cooperation encompassing the Kouphonisia and southern Naxos. This evidence reveals that the organisation and development of the Keros Complex undoubtedly relied upon the coordination of multiple communities in the central Cyclades.

6.4 The Centre of the Attention

If the Folded-Arm Figurines formed a locus of attention within groups, then the island of Keros formed the nexus of attention between these communities. The Cycladic islanders deposited thousands of Folded-Arm Figurine fragments upon the western slopes of Keros. The clear majority (94%) of statues most likely originated from Naxos, roughly 4% are believed to come from Ios, two figurines from Paros and the remaining 2% are unknown, potentially coming from Syros or Ios (Tambakopoulos and Maniatis 2017, 478). Other than the figurines, the deposits contain enormous quantities of marble and other stone vessel fragments as well as ceramic sherds. There are also substantial fragments of sauceboats, of which some appear to have originated from as far afield as Attica and the Argolid (Renfrew 2018, 553;

Sotirakopoulou 2016, 383). It would seem that the islanders chose to bring bodies and materials by canoe to Keros in order for their communities to interact at that specific location.

The Keros-Complex lies at both a geographic and perceptual hub of the central Cyclades, allowing for a clear line of sight of some of the most important islands within the ECII world. On a clear day, the summit of Dhaskalio affords a view of all the minor Cyclades as well as Naxos, Ios, Santorini, Anafi and the southwestern portion of Greater Paros. On an exceptionally clear day it is possible to see both Siphnos and Ikaria. A short paddle south from the site brings the cliffs of Amorgos in to view. From Dhaskalio, an individual can observe eleven Cycladic islands (if Greater Paros is taken as a contiguous whole) and one in the eastern Aegean. The spatial environment visually encompasses four of the major voyaging routes that connected the Cyclades, Mainland Greece, Crete and Anatolia. Broodbank's proximal point analysis, based on settlement distribution and the estimated voyaging ranges of Cycladic longboats, has convincingly articulated why the Minor Cyclades is likely to have developed a central site within the demographic and technological parameters of the ECII (2000, 175-210). Dhaskalio provided a prominent but accessible location from which communities and directions of travel were easily perceived and oriented.

In the modern world, the promontory is difficult to distinguish from Keros outside of the Kouphounisia, but this would not necessarily have been the situation in the EBA. Numerous features of Dhaskalio would have drawn attentional focus and orientated Cycladic communities to its locations. In close proximities, the naturally pyramidal shape of the island bristled with stone and marble structures that augmented the promontory's profile. Indeed, the use of marble potentially increased the general luminosity of the site with non-negligible effects on attention capture. However, it is metallurgy that likely had the most significance for the island's visual profile in the ECII. Metallurgical activity is found extensively across Dhaskalio, with particularly significant densities found on the summit and north face of the site

(Georgakopoulou 2013). These are the locations with the best access to the high winds necessary to operate Cycladic furnaces, perforated ceramic funnels used to process copper, lead and silver (Philaniotou et al. 2013). Based on contemporary experimental evidence, such furnaces produced large multi-coloured jets of flames (Marks and Doonan 2018). An evening of high winds and intense productivity would have potentially illuminated Dhaskalio for dozens of kilometres, orienting surrounding communities to the activities taking place. That is to say, the site potentially had a significant ability to draw attention in the surrounding area through performative displays of metallurgical activity (ibid). The environmental affordances and intensive activities at Dhaskalio-Kavos support the view that the site was a perceptual anchor through which local communities mapped their social realities, and it is clear that marble was deeply entangled with these dynamics.

The folded-arm form undoubtedly provided a central icon of the people interacting on Keros and the fragmentation of these figurines was essential to the conceptual relationships mediated by these congregations. Cycladic islanders clearly formed a powerful association between Keros and their marble artefacts and went to great lengths to transport these materials to the island. The creation, fragmentation, transport and deposition of marble artefacts in the Special Deposits reveals an entanglement of ECII communities, iconic forms and congregations on Keros. Though a Folded-Arm Figurine has never been discovered on Dhaskalio and while activities around the Special Deposits seem to have dwindled during the Early Kastri Phase B (Renfrew 2018), the intensive importation of marble to Dhaskalio reveals both a continuity and transformation of the material's value. The structural entwinement of marble into the architecture of Dhaskalio suggests a conceptual blending of the sculpting traditions and the activities on Keros with the building process. The polarities of depositing fragmented marble objects in the Special Deposits and the creation of Dhaskalio implies a refraction of value in which fragmentation preceded the major episodes of construction. It is in

consideration of this transformation of value that it is possible to make sense of the development of Dhaskalio-Kavos and its broader socio-political significance as a centre of regional cooperation.



Figure 27: The Keros Complex. After Renfrew 2013: Fig. 9.

Geography, currents, voyaging ranges and settlement distribution all provide important insight into why the Minor Cyclades were a locus of social interaction and logical site for the emergence of social complexity. However, they tell us very little as to why the Dhaskalio-Kavos area was chosen, given the site's many peculiarities in terms of access, habitability and material assemblages. The defensibility and visual field provided by Dhaskalio offers some indication as to the site's strategic value, but the plausible chronological primacy of the Special Deposits suggests that these features were not a principal concern when ritual activities were

first established. The possible priority of the Special Deposits relative to Dhaskalio complicates Broodbank's trading-centre thesis. If Dhaskalio was a settlement that flourished through trade, it appears that it did not begin its life as such but resulted from prior acts of ritual congregation on Keros. Furthermore, Dhaskalio is a very odd location upon which to build a settlement. Beyond the difficulties of importing building materials and constructing upon its steep slopes, the site is relatively isolated on a local level (albeit central form a regional network perspective). Dhaskalio-Kavos reveals a sustained, intergenerational effort on a regional scale to maintain and utilize the site, which only deepens the mystery as to why Cycladic communities chose such an inhospitable and difficult location to focus collective behaviour. In this regard, the deposition of sea stones on both Dhaskalio and Kavos sheds light onto some of the dynamics of congregation occurring at the site.



Figure 28: The Minor Cyclades. ©Google

6.5 Mind the Pebbles

Analyses of the symbolic dimensions of Keros have largely fixated on the preponderance of Folded-Arm Figurines. One class of material evidence found at the site, that of limestone sea pebbles, has tended not to garner nearly as much enthusiasm. Nonetheless, the ritual deposition of these simple artefacts reveals a great deal about the conceptual relationships surrounding the physical movement and numbers of people involved in congregations on Keros. As discussed in previous chapters, sea pebbles have been a relatively common feature of the Cycladic archaeological record dating back to the Neolithic. Marble pebbles provide an ideal template for shaping schematic figurines, and due to this relationship suggest a basic icon of the body. Likewise, marble pebbles are frequently found in the ECI cemeteries, revealing the long-held significance of sea stones in the Cyclades (Rambach 2017). The detection of a painted eye on a pebble from a Grotta-Pelos grave on Despotiko discussed in chapter three (Hendrix 2003, 430) further reinforces the point that these simple forms were identified with the body. The conceptual relationship between pebbles, schematics and bodies formed early during Cycladic engagements with marble and indicates a continuity of meaning.

The ritual deposition of pebbles at Dhaskalio and Kavos not only implies continuity with earlier practices involving sea stones such as their placement in burials, but also reveals enactive signs that are distinctive to the site in terms of spatial ranges of movement, acts of congregation and the materials specified to signify these relationships.[52] Over the course of Dhaskalio's development it became a common practice to retrieve fist-sized Kouphonisi limestone pebbles from the adjacent islands (Ano and Kato Kouphonisi) and transport them to the site. The sea stones are scattered, individually and in small clusters, across the entire site.

[52] The most plausible alternative explanation to a ritual function for the pebbles is that they were used as building materials. However, this is unlikely for a number of reasons; first, the intentional accumulation of pebbles in prominent areas; second, the presence of a large number in the SDS where no structures existed; third, the size and roundedness of the stones is neither ideal for aggregate in roofing nor the construction of walls.

Excavators realized their significance when they discovered a collection of hundreds of pebbles in the summit enclosure (Nymo et al. 2013). A number of important semiotic relationships are revealed by this evidence. First, Kouphonisi limestone pebbles were a specified material form that required travel to distinct locations to acquire, thereby producing indexical signs of this movement. Second, limestone is the geological precursor of marble and these sea stones share an iconic similarity with the marble pebbles observed throughout the Early Cycladic record. The evidence suggests that these objects functioned as an iconic minimum of the body, indicating that the limestone forms found at Dhaskalio and Kavos indexed a microcosm of physical movement within the Kouphonisia. The form, quantities and accumulation of pebbles over time appear to have reified a semiotics of congregation and its attendant normative relationships.

The most significant find of pebbles on Dhaskalio, which reveals their clear role within a semiotics of congregation, comes from the promontory's summit enclosure. A total of 489 imported sea stones were discovered in the enclosure and over 1500 were documented across Dhaskalio during the 2006–2008 excavations (Nymo et al. 2013, 518). The exact dynamics of how they were brought to the promontory, whether by groups or specified persons, individually or en masse, is simply unknowable. Nonetheless, it is clear that the pebbles were ritualistically deposited, and the quantities and consistency of the act suggest the conceptualization of a defined community of congregants.[53] Further emphasizing the argument that sea stones provided an enactive semiotics of congregation are 728 catalogued pebbles which appear to have been largely clustered at the northern end of the SDS (Boyd 2015, 377–8; Renfrew and

[53] It is salient to note that the dynamics of such congregation are qualitatively distinct from those of the Special Deposits. The pebbles from the summit enclosure reveal repeated gatherings of smaller groups in confined areas as opposed to the open-air setting of the deposits which afforded the possibility for much larger gatherings. It is possible that the more circumscribed congregations at the summit enclosure could have functioned as part of a social stratifying process by creating a bottleneck in community access. Regardless, distinctly different patterns of social interaction are apparent.

Nymo 2015).[54] These pebbles are almost entirely of Keros limestone, most likely gathered from the Kavos beach area beneath the Special Deposits. Thus, two similar behaviours are observed which function as indices of two significantly different spatial ranges of movement. Like the tracks of any animal, the movement of pebbles tell us that persons gathered these sea stones from distinct areas and carried them with the intent to place them in specific locations. Over generations, people gathered sea pebbles and carried them to the top of Dhaskalio and apparently to the north-western side of the SDS. However, it is not entirely clear whether these activities were contemporaneous or if the pebbles at the SDS preceded the depositions on Dhaskalio (Boyd 2015, 378). Nonetheless, it is possible to appreciate how dense accumulations of sea pebbles provided a perceptual target with which Cycladic islanders were able to conceptualize their relationships.

The pebbles from Dhaskalio and Kavos appear to have generated a quantitative and temporal relationship through a basic semiotic schema that blended a bodily icon with indices of bodily movement. Humans have an innate number sense capable of perceiving exact numerosity in groups of three and four (Malafouris 2013, 108–9), beyond which humans begin to rely upon counting technologies such as tally marks, tokens and number systems to stabilize exact numerical thinking (Overmann 2016). Moreover, though precise calculations of large quantities require material scaffolds, human perception is extremely sensitive to changes in magnitude through addition and subtraction (Malafouris 2013, 106-107; Overmann 2017, 363). The ability to estimate and appreciate general quantity through direct perception provides a key insight into the semiotic function of the limestone pebbles as part of a metaplastic relationship. Regardless of whether Cycladic islanders were taking exact counts of sea stones, their deposition provided a general sense of the quantities of humans that had performed acts

[54] This apparent clustering in the Special Deposit South cannot be stated unequivocally since there was no systematic cataloguing of the pebbles at the start of the excavation. However, the distribution is pronounced and strongly suggests the possibility that these depositions occurred after the deposit began to fall into disuse.

of deposition. Magnitudinal shifts would have been observable over time through enlarging collections of pebbles. The accumulation of these simple signs suggests a rough-and-ready means of assessing the general quantities of (pebble-carrying/associated) persons that congregated at Dhaskalio and Kavos. In short, the pebbles can potentially be understood as a kind of proto-bureaucratic census taking.

Thousands of people potentially carried Kouphonisi limestones to Dhaskalio over the course of multiple generations as a means of indexing their acts of congregation.[55] The steady accumulation of pebbles through acts of congregation indicates Cycladic islanders were able to perceive this flow of human beings over time through the addition and magnitudinal changes in the sea stones over time. The evidence for pebbles on Dhaskalio comes almost entirely from the Phase B and C periods (Renfrew and Nymo 2015). Significantly, the placement of pebbles at the SDS appears to develop after the original practices of depositing fragmented ceramics, stone vessels and figurines began to subside in Phase B, implying both a transformation and continuity of tradition (Boyd 2015, 377–8). This chronology strongly suggests that the deposition of pebbles on Dhaskalio and the SDS were relatively contemporary developments. Though the two practices show clear conceptual linkage, the difference between Kouphonisi and Keros limestone indicates a semiotic distinction between Dhaskalio and Keros. The placings of pebbles at the SDS, if they indeed occurred after major activities subsided, are likely best interpreted as acts of remembrance enabling later congregants to identify with the past rituals through a pilgrimage to and performance at the deposit (Boyd and Renfrew 2018, 539). Ultimately, the Kouphonisi pebbles reveal a greater emphasis on movement within the Minor Cyclades, while the Keros pebbles show a much more immediate and direct association between the island itself and acts of congregation.

[55] Principally between 2400 and 2240 BC.



Figure 29: The Kouphonisia. ©Google

The depositing of sea stones as well as fragmented artefacts indicates modification of the landscape in ways that enabled histories of congregation to be physically perceived. The open air and dense accumulation of materials in both Special Deposits implies a similar magnitudinal relationship to the accrual of pebbles. The sheer quantity of broken materials attested to the scale of attendance at past rituals. These material accumulations indicate that the landscape of Dhaskalio-Kavos was modified in such a way that it enabled participants to perceive transformations in social interaction over time through an enactive semiotics of movement and congregation. The quantities, densities, spatial organization and temporalities of materials at Dhaskalio and Kavos enabled multiple scales of interaction to be conceptualized. This relationship between numerical cognition and the semiotics of congregation reveals an emphasis on tracking gatherings on Keros and maritime movement in the local area. However, these dynamics only evidence patterns of behaviour, not the causal processes that resulted in the particular significance of Keros, nor why activity was oriented away from the Special Deposits to focus upon Dhaskalio. To understand the fragmentation and

deposition of enormous quantities of materials on Keros, as well as the intensive effort of constructing Dhaskalio and its functions, it is necessary to examine the relationships between social cognition, kinship and seafaring that contextualizes the emergence of Dhaskalio-Kavos.

6.6 Canoes, Communities and the Voyaging Cycle

Seafaring and Cycladic society were inextricably fused from the outset. The material agency of maritime technologies was critical for the creation of kinship networks and the reproduction of communities. The reorientation towards small-scale, local interaction networks during the EC I indicate an intensified emphasis upon maritime mobility in familial and social identity. In short, canoes were an essential locus of social organization that was deeply embedded into the constitution and reproduction of Cycladic society. The social interactions and material exchanges generated by Cycladic seafarers during the EBA clearly transformed regimes of value throughout the Aegean basin (Broodbank 1989; Renfrew 2011). The movements of Cycladic longboats made available exotic materials and techniques while intensifying interactions between a great multitude of peoples and cultural practices, a dynamic in which distance and knowledge were likely key sources of value (Broodbank 1993; 2000, 276–319). Long-range voyaging undoubtedly made Cycladic islanders conscious of the scale and diversity of Aegean societies and reshaped their concepts about community and social identity as well the possibilities of social organization.

The people of the Cyclades were becoming increasingly aware of a vast, rewarding and dangerous Aegean world as they began to aggregate into the first post-Neolithic villages. ECII communities likely experienced threats from external competition as well as growing local pressures and complexities produced by village-level organization. Multiple communities with populations in the hundreds, bolstered by extended hinterlands of smaller, related groups, were occupying and negotiating a shared environment. The complexity of such a social geography

should not be underestimated. Cycladic communities existed within entanglements of kinship and local affiliations amidst a wider world filled with dangers and opportunities. The most readily available means of organizing cooperative responses to competitive pressures were assuredly the social ties and normative obligations made possible through affinal and consanguineal kinshipping practices. In this context, the circulation, distribution and use of the figurines may well have exerted a stabilizing effect upon these relationships by providing coherence and continuity of meaning for the society as part of an extended cognitive system.

Cycladic long-range voyaging has been framed as a prestige dynamic expressed primarily through the acquisition of exotic knowledge and materials from successful journeys. While there must have been status associated with skilled voyaging, to conceptualize long-range voyaging in terms of individual motivation in a prestige economy glosses over the enormous social complexities of organizing these feats. The establishment of an organised voyaging culture was a high-risk endeavour for the communities involved. Voyagers faced serious threats to their lives on the far horizons, while families faced those possibilities at home. The loss of a longboat would have been a disaster for a Cycladic community. A vessel containing a 25- to 40-person crew equates to roughly 10% of a major ECII settlement, and therefore roughly a quarter of the able-bodied adults of a single Cycladic village (Broodbank 2000, 256–8). Even without the social catastrophe of a vanished longboat, the extended absences of so many individuals invariably left communities more exposed to predation by other groups. Furthermore, if multiple Cycladic communities simultaneously deployed longboats for lengthy periods, this could potentially have exposed the whole region to incursions by hostile groups. Thus, it is important to appreciate the extent to which long-distance voyaging was not simply a matter of launching a canoe into the far reaches, but a fraught and dangerous proposition for an entire community.

Long-distance voyaging was undoubtedly motivated by shared conceptions of value, but this sense of value was only made possible through high degrees of trust. Voyagers needed a great deal of confidence in each other, and communities needed to feel assured as to their own safety as well as the competence of the crews on whom the lives of their loved ones depended. Similarly, voyagers needed to feel confident that they were not leaving their homes and families at extreme risk. If, for example, a community such as Aplomata fielded a vessel, they needed to feel secure that they were not opening themselves up to raiding from a nearby community such as Koukounaries or Skarkos. Likewise, multiple contemporary communities engaging in voyages around the same time periods required mutual confidence that they were not exposing their shared territories to significant threat. Cooperative endeavour of the kind entailed by long-range voyaging thus demanded a high degree of shared knowledge and trust. Furthermore, raising the trust horizons of an extended Cycladic community demanded an understanding of the organization and timing of activities across the region. By mediating interactions through a shared semiotic of material engagement, the figurines were effective tools for increasing trust amongst the distal relationships of Cycladic society. In this way, we can begin to appreciate how the agency of marble and the semiotics of the figurines were metaplastically enfolded into the maritime environments of the Cycladic EBA.

Regimes of long-distance voyaging required islanders and their communities to navigate relationships at a global scale of Aegean communities, a regional scale of Cycladic settlements and a local scale of immediate families and specific communities. The growing period between planting and harvesting, roughly May through September, is also the period of the most moderate weather on the islands. It is also worth noting that the dispatching of voyagers during this timeframe would have reduced local resource pressure prior to the autumn harvest. It is this window of voyaging times that gives us the most insight into the broader social structuring of voyaging culture (cf. Agouridis 1997; Broodbank 2000, 92–6). Entwined

into the ecology and agricultural practices of the Cyclades was a seasonal cycle that afforded cyclical voyaging. That is to say, the punctuated and repeating periods of travelling times provide a naturally calendrical, and therefore ritualistic, quality to voyaging activities. Thus, it is possible to appreciate how the risks and rewards of longboat journeys involved social pressures and demands that were distributed across multiple scales of interaction and mediated through a shared chronological framework and semiotics of value between communities. Likewise, juxtaposition to other Aegean communities undoubtedly brought Cycladic identities, relationships and solidarities into stronger relief. It is from this nexus of voyaging, social interaction, temporality and shared knowledge that we can now explore the emergence of Keros.

6.7 Fragmentation and Creation

As we have seen in previous chapters, the emergent complexity of Keros makes a great deal of sense from a geographical and technical standpoint but also in terms of social cognition. With the limited speeds and dangers of canoe-based travel, the islands of the minor Cyclades formed a dense hub connecting Naxos, Amorgos, Ios and Paros all within a day or two's journey. At the peripheries of the Minor Cyclades are the major approaches to the Dodecanese via Ikaria and Astypalaia as well as Crete via Santorini. Likewise, safe inter-island hops led to Melos and the northern Cyclades. In other words, the geography of the Minor Cyclades created a locus around which maritime communities could intensify local interactions while tapping into the broader material and energetic flows of the Aegean world moving through the Cyclades.

Amidst the intensifying seafaring dynamics of the ECII, marble-shaping traditions had already persisted on the islands for millennia. During the Grotta-Pelos era, the creation and circulation of marble figurines, particularly schematic forms, had already developed into foci

of social attention that supported the conceptualisation and organisation of Cycladic relationships as seen in chapters three and four. The naturalist forms began to emerge as the Cyclades began to transition into the ECII and consistent long-range voyaging activities were being established. The rapid development and distribution of the Folded-Arm form in the ECII produced a shared icon that indexically associated the persons and relationships that generated and circulated the figurines, respectively. Every location and performance involving Folded-Arm Figurines created a perceptual target through which the broader social contexts of the form could be integrated. In other words, the figurines provided a stable and distributed scaffold through which islanders could conceptualise the communities and peoples that shared the image, their historical relationships and their contemporaneous existence.

As discussed in the previous chapters, the figurines provided a distributed semiotic scaffold through which islanders could conceptualize their communities and historical relationships as well as shape collective meaning through performative actions involving the figurines. FAFs created a perceptual target that reified the broader social contexts in which they were embedded, and it is in these regards that the semiotics of fragmentation are clarified. Due to Cycladic marble's accessibility and ease of production, as well as the distribution and relational concepts embodied by sculpted forms, the fragmentation and deposition of marble artefacts on Keros should not be considered in terms of the destruction of value so much as its transformation. Hadji eloquently details the perceptual dynamics at play in the fragmentation of the object:

> *Intentional, communal, performative breaking, breaking as an agreed upon corporeal expression of a common yet unspoken cultural code is a multisensory experience par excellence … For the breaker, it is the peri-personal space where the act takes place … Moreover, the sound of breaking(s) as a marked interruption of either silence or, possibly, rhythmic chanting, would be heard and absorbed by all participants. The image of the object coming apart was also a shared sensory experience.* (Hadji 2016, 37)

The destructions of figurines were undoubtedly profound attention-capturing acts with the ability to shape meaning amongst a large number of participants. From the perspective of an enactive semiotics, figurine fragments suggest factoral associations of part and whole, as well as indexical links to their breakage and transportation to Keros and the site's continuity and contiguity with the iconic forms. Their deposition on Keros implies an anchoring of these relationships to a specific geography and the patterns of movement involved in transporting them to the island. It is feasible that some of the FAF fragments found in burials and settlements around the Cyclades are related to activities at Kavos, but an exhaustive analysis has yet to occur.[56] If this is the case, then such fragments provided extended indexical associations between settlements, cemeteries and the activities on Keros. The factorality and mobility of FAF fragments potentially functioned as tokens of the relationships, obligations and histories of the people that participated in the rituals on Keros. Nonetheless, the semiotic and attention-capturing properties of the figurines enabled practitioners to manipulate concepts of value and relatedness at new scales through acts such as fragmentation.

The value of marble was not that of an exotic precious substance, but of a shared relationship expressed through the agency of the material and individual skill. Due to Cycladic marble's accessibility and ease of production, as well as the distribution and relational concepts embodied by sculpted forms, the fragmentation and deposition of marble on Keros should not be considered in terms of the destruction of value so much as its transformation. The sculptures were clearly implicated with death, given their abundant mortuary finds, and perhaps the intentional destruction of the figurines embodies a similar logic to the end of life. However, the mobility and handheld size of most FAF fragments and the examples of figurine pieces in settlements suggest a potentially more complex role in social life than purely that of mortuary practices. The FAF fragments potentially functioned as acts of "enchainment" that identified

[56] For an initial discussion, see Marthari et al. 2019.

and bound together specific relationships, agreements, decisions and activities mediated through the breakage of figurines (Chapman and Gaydarska 2007; Chapman 2012). If this were the case, the location of each fragment would have created a recursive index of the relationships between Keros, and the individuals or groups in possession of such pieces.

The FAFs were distributed icons and indices of shared identities, values and activities provided a metaplastic resource for expanding the trust horizons of Cycladic communities. The Folded-Arm Figurines would have demarcated people and groups inside and outside the community of practice and the normative dynamics associated with such activities, that is to say they would have offered a distinction between figurine practitioners and social outsiders. If Cycladic figurines were indeed a form of kinshipping technology, such a dynamic suggests that the artefacts played a role in mediating the tension between consanguinity, affinity and relatedness as a fundamental locus of social creativity and means of generating social solidarity. Thus, the manipulation of value via marble forms would have provided a key substance with which to shape, transform and reconceptualise social relationships. In other words, the FAF form provided distributed affordances of shared attention, beliefs and intentions through which Cycladic islanders could understand and trust the activities of their broader community. Thus, congregation on Keros can be understood as a way of mediating the dynamics of the EBA through the transformation of value capable of generating self-organising relationships at new scales.

6.8 The Emergence and Transformation of the Keros Confederacy

Cycladic islanders undoubtedly formed a powerful association between Keros and the folded-arm form, an association that both motivated and mediated relationships in the central Cyclades and beyond. The abundant materials in the Special Deposits attest to the sizable and repeated congregations that took place there. These gatherings not only initiated intensive

activity upon Dhaskalio but drew in participants from across the region. It is beyond doubt that the ceremonies of breakage were related to the dynamics of feasting; however, it remains unclear where these events took place and whether the activities in the Special Deposits were linked to feasting on Dhaskalio. The aggregation of bodies, the deposition of figurine fragments and the potential consumption of food from marble vessels prior to their destruction suggest an intermingling and absorption of bodily substances, possibly indicating a kinshipping metaphor in which sacred materials and a sacred environment were entwined with fundamental dynamics of sociality and social reproduction (cf. Sahlins 2013b; Viveiros de Castro 2009). The materials present in the Special Deposits show that the most intensively involved communities were from the local island cluster of Amorgos, Ios and Naxos (Hilditch 2015). Nonetheless, strong participation from the broader archipelago as well as communities from mainland Greece are evident (Sotirakopoulou 2016). These archaeological data contextualize well with the development of voyaging culture during the ECII and provide important insight into the transformation of activities at Dhaskalio and Kavos as an emergent property of local interaction, kinshipping, the value of marble and long-range voyages.

As long-range voyaging culture expanded, patterns of movement and connectivity shifted and transformed across the Aegean, undergoing enormous scalar shifts during the course of the Early Bronze Age. The regional circulation of materials during the early phases of the ECII was primarily between the Cyclades and mainland Greece. The geological formation of the Cyclades provides multiple easily navigable routes through the islands, with particularly dense connections to Euboea, Attica and the Argolid. It makes intuitive sense that the closer and safer passages between the Greek mainland and the Cyclades were the focal point for the early expansion of intra-regional exchange, and Phase A at Keros appears to attest to the dominance of these interaction networks at the time. Maritime voyages during the ECI–II transition appear to have largely occurred within a circuit that included the eastern portion

of Attica and Euboea, northeastern Crete and southwestern Anatolia. This range of interaction shifted to cover almost the entire Aegean basin during the early ECII and then shifted northwards, away from Crete in the latter half of the period (Broodbank 2000, 299–304; see also Kouka 2008). Thus, we observe an initial phase of voyaging in which connections were first explored and established, leading to a floruit of pan-Aegean movement at the height of Dhaskalio-Kavos. This period of expansion was followed by a decline at the site as well as a reduction and reorientation of voyaging ranges, primarily away from Crete towards northwestern Anatolia. The Minor Cyclades formed the nexus of EBA maritime networks connecting mainland Greece, Crete and Anatolia. Evidence from the final phases of the Cycladic EBA suggests an increasing disruption of canoe-based networks attested to by increasing fortification and circumstantial evidence for the introduction of sailing technology (Broodbank 2000, 341–9; Renfrew 2018, 556). It was having the geographic good fortune of being located at a natural and technical bottleneck in the energetic and material flows of the Aegean that enabled Cycladic islanders to generate novel forms of social complexity.

Keros formed the hub of an extended cognitive system which emerged through the metaplastic synergy of marble, seafaring, kinship and gifting, transforming social relationships across the Aegean. The connectivity of the Minor Cyclades suggests an impetus for collective organizational responses to the benefits and dangers of occupying such a strategic location. This interpretation squares well with the stratigraphy from Dhaskalio-Kavos. The establishment of ritual activities during Phase A occurred as long-range voyaging was rapidly expanding. Activity began to orientate around Dhaskalio during Phase B and the early development of the Kastri group, an assemblage that is primarily identified through the introduction of Antolianizing materials (Angelopoulou 2008; Broodbank 2000, 309–18) Importantly, the shift in material assemblage from Phase A to Phase B does not involve the subtraction or loss of any particular Keros-Syros forms. Rather, Phase B emerges through the

addition of Anatolian techniques and styles, commensurate with the picture of increased connectivity at the zenith of the voyaging cultures. During Phase C of the late Kastri period, Anatolian styles were increasingly integrated with local Cycladic forms while ritual activities at the Special Deposits largely ceased before Dhaskalio eventually fell into disuse. The decline in rituals and activities at Dhaskalio-Kavos is consistent with the broader reorientation of voyaging towards the northern Aegean and growing disruptions of the maritime networks formed by longboats. It is from the association between the phasing of Dhaskalio, Kavos and the broad chronology of ECII voyaging that we can fit the final piece of the puzzle together in order to understand the likely function and transformation of activities at the site.

6.9 Conclusion: Keros and the Metaplastic Niche

The families, clans, communities and tribes surrounding the Minor Cyclades during the EBA emerged from complex entanglements of lineage, affinity and affiliation that formed the contexts of Cycladic society. From the Neolithic onwards, the shaping of marble was metaplastically entwined with Cycladic identity and conceptions of value. By the ECII, the creation and circulation of figurines formed part of an extended sign system through which Cycladic islanders could perceive, conceptualize and mediate their relationships through engagement with shared value forms. The use of Folded-Arm Figurines to concretize social identity developed in conjunction with the expansion of long-range voyaging, suggesting a material metaphor that conceptually blended the physical environment with bodies, community and maritime movement.

The floruit of marble sculpting occurred at a time when the scale and diversity of Aegean communities was becoming increasingly apparent. If it is accepted that the agency of marble generated an enactive semiotics of kinshipping values, then the history and function of Dhaskalio-Kavos becomes increasingly clear. The growing demands and possibilities of an

emergent voyaging culture required a means of organizing these activities in ways that ensured the continued security and functionality of Cycladic communities during the extended absences of longboat crews. It is in these contexts that the folded-arm form provided the most consistent, widely distributed and powerful attention-capturing technology available to ECII communities. Faced with the opportunities and dangers of the wider Aegean world as well as the complexities of organizing substantial, heterarchical social relationships within the islands, the folded-arm form presents as an exceptionally potent tool for generating new scales of interaction. In this regard, one must consider the possibility that Dhaskalio-Kavos functioned to establish and organise maritime voyaging regimes as a ritual practice, a process that played a major role in generating the cultural transformations of the subsequent periods.

Keros formed a nexus in the circulation of bodies and materials throughout the Aegean. The fragmentation and placement of figurines in the centre of this gyre reveals a clear integration of the relationships substantiated through marble artefacts with broader regional movements in the archipelago. Evidence suggests that people potentially congregated on Keros in the hundreds, indicating that the island periodically hosted populations comparable to a large village, if not more (Renfrew 2018, 555). The size of these gatherings means that knowledge of when to congregate on Keros was widely shared. Voyaging season had an inherently calendrical structure and the regional centrality of Keros made the site ideally situated to harness the spatial and temporal patterns of Cycladic seafaring. Thus, it is fair to assume that congregation on Keros was closely linked to the voyaging cycle. A calendrical association between Keros and voyaging is the most plausible framework for shared knowledge about the appropriate times to journey to the island for acts of congregation. It is in this context of seasonal aggregation and ritual activity that one can appreciate the true importance of Keros in establishing a cultural regime of long-range voyaging.

Fragmentation and deposition conceptually integrated the location and environment of Keros with marble artefacts as well as acts of congregation and possibly communal feasting. These activities appear to have been reified through the later depositions of sea pebbles on both Dhaskalio and Kavos. Nonetheless, Keros' central but comparatively isolated position between three major islands suggests that the area was relatively "neutral" territory. Furthermore, the high degree of interaction in the Minor Cyclades made the area a natural focal point of attention as well as contested space by the various groups traversing the area. These dynamics made the location a natural hub around which communities were forced to navigate and organise regional interactions. Given the dangers and rewards of the ECII, choosing such a location for congregation and then saturating it with the material signs of Cycladic social relationships was an exceptionally effective means of modifying the environment to facilitate collective identification. The creation of such a regional "sanctuary" suggests a capacity for novel social and political creativity by affording social experiences and interactions that were distinct from the relationships and power dynamics of daily life in Cycladic communities (cf. Wengrow and Graeber 2015). Thus, Dhaskalio-Kavos not only presents itself as an emergent space for novel social interaction and intersubjective identities, but the behaviours attested to at Kavos begin to take on the appearance of an agreement or compact. In this way, these ritual acts generated a new form of community that mediated the burdens and necessities of coordinating social life on the islands.

Dhaskalio-Kavos was established through inter-island ceremonies that ritualistically enmeshed shared concepts of value and kinship with a fixed geographical location, marking it as a site of communal identity. From this perspective, the fracturing of figurines is suggestive of a covenant or pact enactively signified through the collective transformation of a shared

icon, indexing a commitment to participate in a new form of social relationship. If the figurines were indeed a kinshipping technology, then they provided an ideal cognitive tool for reconceptualizing social solidarities. This is particularly the case of stateless societies such as those of the EBA in which kinship would have been the primary means of organizing social relationships. If some form of accord between Cycladic communities was reached on Keros, it would have been achieved through negotiations between those delegated to represent their respective groups in order to activate kinship networks in support of cooperative endeavour. Such an agreement only makes sense in the context of long-range voyaging, and the necessity of organizing this activity in ways that reduced risk to the participating communities. Congregation, feasting and the breakage of materials appears to have enabled Cycladic communities to negotiate the establishment of canoeing regimes on a regional scale in order to ensure the maximum security and rewards of launching expeditions. In such a scenario the benefits would be multiple, providing a place of congregation for organizing journeys as well as a locus through which news, knowledge, techniques and materials could be concentrated, shared and disseminated. Such a dynamic of seasonal aggregation and dispersal clarifies a number of issues with the archaeology of Dhaskalio-Kavos in terms of the site's ritualistic and economic characteristics as well as its transformation over time.

The centuries-long physical transformations of Kavos and Dhaskalio reveal changing conceptual relationships and social interactions that are consistent with an emerging complexity catalysed through long-range voyaging. Not only was the value of marble expressed at the Special Deposits reconceptualized through the construction of Dhaskalio, but the evidence for the settlement's expansion is contiguous with the introduction of Kastri materials. It is a distinct possibility that activities organised on Keros were a key driver of the emergence and dissemination of the Kastri assemblage, suggesting that the shift in behaviours on the island and in the region (cf. Angelopoulou 2008; Kouka 2008) were heavily entangled

with Dhaskalio-Kavos. As Cycladic voyaging culture gathered momentum, it began radically altering the dynamics of the communities involved in the practices on Keros. In a sense, the value of the Folded-Arm form seems to have been subsumed by the island to enable more complex and sustained voyaging activities. During Phase B, the initial large-scale introduction of Anatolianizing forms began to produce a shift in activities and conceptions of value that refocused activities away from the Special Deposits. As the Keros complex continued to develop the reorientation of maritime networks away from Crete, an emphasis on exotic Anatolian forms, as well as possible ecological change and the introduction of sailing technology, potentially played a key role in the weakening and eventual breakdown of cultural coherence surrounding Dhaskalio-Kavos. The identity and function of the Keros complex assuredly transformed during the course of its existence, but the relationship between ritual and seafaring undoubtedly played a crucial role in that process.

If a regional voyaging culture was indeed organised through Keros, the island was likely, at least for the communities surrounding the Minor Cyclades, to be the "official" starting or ending point of a cyclical journey and potentially both. Keros, as a "centre of gravity", would have functioned to concentrate, organise and disseminate the benefits of voyaging in a single location. The launching of an expedition or the return of a longboat implies a natural focus of attention for initiating acts of congregation. The ample evidence of metallurgy is potentially indicative of provisioning for journeys or the end result of voyages in which materials and new forms were brought to Dhaskalio for reproduction and distribution. In this regard, the Special Deposits might be best understood as the remnants of prehistoric "treaties" that enabled a confederated polity to emerge through the expansion of voyaging practices. The idea that the activities at the Special Deposits established communal agreements and the trust necessary for sustained, intensive long-range voyaging is substantiated by the expansion of Dhaskalio, the introduction of the Kastri culture, and the general patterns of maritime connectivity during the

EBA. It is entirely plausible that the site emerged from ritual congregations in a decentralised political economy, but gradually transformed into a site resembling a trading centre with a local community exhibiting greater control and authority as indicated by the ceramic assemblage. Ultimately, it would seem that Dhaskalio-Kavos was both a ritual centre and a site of immense social, economic and political creativity expressed through a metaplastic relationship between marble shaping, kinshipping and seafaring.

Conclusion

Explaining the diversity, complexity and scalar plasticity of human social organisation requires analytical frameworks which can accommodate the enormous variety of interactions and synergies possible between human bodies and the material environment. Material Engagement Theory's framing of brains, bodies and material culture as dynamic cognitive systems provides a means of examining the material dimensions of social cognition that is both more parsimonious and robust in its accommodation of the available cultural evidence than traditional approaches. In this thesis, I have expanded the application of MET beyond a focus on individual cognitive development and demonstrate how MET provides a robust approach for engaging in an archaeology of social cognition. To this end, I have demonstrated how Cycladic marble sculpting offers robust evidence of an intergenerational relationship between skilled practice, cognitive development and emergent social organisation. The dynamics centred on Keros are an invaluable record that aids our understanding of material culture's role in generating and coordinating social relationships at multiple scales.

The material engagement approach draws from a broad array of scientific studies on perception, cognitive development and archaeological evidence, making use of often-overlooked materials (such as pebbles) to offer a unique explanatory framework for interpreting archaeological phenomena. The application of MET to the subject of Cycladic sculpting, intersubjectivity and the emergence of Dhaskalio-Kavos helps to clarify relationships between ecology, perception, semiotics and social interaction over archaeological timescales. Cycladic sculpture generated affordances for shared attention, beliefs and intentions through which Cycladic islanders could understand and coordinate the activities of their broader community. The emergence of Cycladic figurines at a time when the cognitive burdens of tracking and maintaining social relationships had markedly intensified strongly suggests that these artefacts circulated as part of a gifting economy that functioned to

substantiate and maintain the reproduction of Cycladic bodies. Creating and interacting with a widely distributed icon of the body provided a shared semiotics of value through which collective attention and intentions could be sustained and coordinated. In this way, the activities mediated by the figurines facilitated social organization at emergent scales, developing from homesteads to villages to regional confederacy during the course of EBA.

Chapter one provided a theoretical critique and framework for examining the material dimensions of social cognition. Rather than viewing society as an epiphenomenon of individual brains and social complexity as a result of isolable cognitive functions (e.g. Theory of Mind), I explored how a material culture perspective on social cognition allows for a robust explanation of social complexity that is non-linear and context-specific. Material culture provides a plastic scaffolding which enables human capacities for social organization to be manipulated on a developmental scale whilst preserving such changes intergenerationally. The evolutionary relationship between hands, eyes, materials and the bodies of others reveals that it is not necessary to hypothesise about pre-evolved, hardwired cognitive modules when explaining human social complexity. Instead, I argued that the diversity and scalar potentials of human social organization are enfolded within the developmental plasticity of the brain and the material environment.

In chapter two I explored how the environments of the Aegean shaped the emergence of unique maritime dynamics and distinctive forms of social organisation. I have argued that transformation in settlement patterns from the Final Neolithic into the EC represents a key transition in the development of Cycladic social cognition that played a central role in the emergence of Cycladic sculpting. At a local scale, the shift from villages to homesteads and hamlets appeared as a drastic reduction in complexity. Day-to-day interactions were simplified from consistent intimate relationships with multiple family groups and neighbours to a daily life dominated by the immediate family. However, this local simplification masked a global

increase in the complexity of social relationships. The shift from village communities to highly distributed and mobile groups necessitated a continual flow of bodies and materials as well as the ability to maintain collective identity over periods of prolonged absence. In the decentralized environments of the ECI, the burdens of tracking and maintaining social relationships sharply increased. The mobility of homesteads, flocks and canoes generated a dynamic, fluid and interdependent social structure in which the difficulties and necessities of orienting, identifying and sustaining relationships drastically increased. Based on this contextual evidence, I proffered the hypothesis that Cycladic figurines developed as a "kinshipping" technology that functioned to conceptualise relatedness and coordinate social interactions.

Chapter three examined how the creation of these figurines was situated within the dynamics of body perception and intersubjective development and clarified the way in which Cycladic sculpture potentially supported kinshipping dynamics. Evidence from the cognitive sciences thoroughly substantiates that the Cycladic figurines must be understood as attention-capturing technologies in both individual and group contexts. The development of human social cognition in early childhood through attention to bodies, faces and eyes reveals that the Cycladic figurines were ideally suited for generating collective attention and shared understanding through pragmatic engagements with the artefacts. Intimate interactions with marble figurines were entangled with the capacity to perceive, identify and differentiate self and other, providing a source of attentional focus through which object recognition, self-awareness, body perception and social knowledge could cohere. The shaping of marble bodies was an extremely robust means of generating collective attention and conceptualisation through pragmatic engagements and lifetime learning. In this sense, the neuro-cognitive evidence in conjunction with the archaeological record demonstrates a process of concept

formation emerging through enskilment and intensifying social interactions across an intergenerational time scale.

To demonstrate how attention-capturing properties of the artefacts generated collective conceptualisation through social interaction, chapter four analysed Cycladic marble artefacts as material signs within a broader semiotic system. The intersubjective properties of Cycladic figurines provide a strong basis for understanding how the artefacts supported processes of meaning-making through material engagement. The availability and ease of working the material, the perceptual properties of the figurines and their impact during childhood development as well as their plasticity and mobility made them ideal semiotic forms to circulate amongst dynamic maritime communities. Chapter four argued the figurines were material signs of identity and relatedness with which Cycladic society was conceptualized and enacted through joint attentional activities. Specifically, chapter four explored how the properties of the marble artefacts and particularly the smaller schematics of the EC I, as well as their occasionally large concentrations in graves from the period are strongly suggestive of gifting dynamics. The plausibility of the figurines circulating as part of a gifting economy further supports the argument that the artefacts functioned to substantiate and maintain Cycladic kinship structures. Thus, skilled interactions with the figurines over the course of generations produced a shared semiotics that mediated collective identity, knowledge and activity.

Chapter five further elaborated upon the semiotics of Cycladic sculpting by critiquing the prestige economy frameworks with which archaeologists typically conceptualise the artefacts. Here, chapter five argued against the implicit individualism of prestige dynamics and the ways in which it reifies certain contemporary economic concepts. The availability and the relative ease of learning to work marble (at least in its most basic forms) negates traditional concepts of utility and exchange value, suggesting that the creation of value was dependent upon skill and shared meaning generated through material engagement. Value can be

understood as a form of sustained, collective attention in which meaningful actions are constituted through their material signs. Since the raw material would have been impossible to control by any single group, the only available means of generating value with marble would have been through acts of skill, display and gifting. The creation, exchange and performative use of the figurines can be understood to have materially extended concepts of relatedness by demarcating communities of practice and denoting normative behaviours. Ultimately, the distribution of the figurines and contexts in which they are found suggests that kinshipping, gifting practices and ritualised performances involving the marble artefacts extended the spatial and temporal boundaries of Cycladic social cognition. In this way, Cycladic sculpture provided a distributed sign system that enabled the coordination of social interactions across multiple scales.

Finally, to consider how the perceptual and semiotic dimension of Cycladic sculpting shaped the emergence of novel social complexity, I applied the considerations of chapters two through five to an analysis of the activities on Keros in chapter six. The relationship between marble, social interaction and longboat voyaging provides a strong explanation for the development and transformation of the Keros as well as for broader chronological developments in the region. The circulation of marble was a means of anchoring collective attention upon a shared value form with which collective meaning could be shaped, shared, manipulated and transformed. These properties of the figurines made them ideal tools for raising the trust horizons and coordinating activities between communities engaged in rapidly intensifying maritime endeavours. The idea that the activities at the Special Deposits established communal agreements and the trust necessary for sustained, intensive long-range voyaging is substantiated by the expansion of Dhaskalio and general patterns of maritime connectivity during the EBA. Ultimately, a strong case was made that the figurines formed part

of a distributed cognitive system which enabled the regional organisation of long-range voyaging regimes centred on Dhaskalio-Kavos.

There are a number of avenues for future research into the Cycladic EBA that would not only further clarify the arguments made in this thesis but provide valuable knowledge for Aegean archaeology. This thesis has focused on marble largely to the exclusion of other materials that were central to Cycladic culture, in particular ceramics and metallurgy. This analytical framework was adopted in order to keep the scope of the project grounded. However, this raises further questions on the exploration of marbles semiotic relationships with other key features of Cycladic material culture. Indeed, future Material Engagement analysis of the developmental and semiotic properties of wider Cycladic and Aegean material culture will make for a more robust understanding of the semiotics of the Aegean EBA, their cognitive roles and systemic relationships. Particularly, studying the expansion of metallurgy from the standpoint of material agency and enactive signification will help to test and sophisticate the arguments presented in this thesis.

One key area for additional study of Cycladic sculpting would be a network analysis of the distribution and stylistic variations of schematic figurines. Particularly, the identification of stylistic similarities in local and regional networks could help to establish the degree to which schematics were circulating. Mapping these schematics and contextualising them with additional mortuary evidence could be used to identify potential kinship networks in the Cyclades. Another highly valuable area for further research would be to engage in an extensive program of 3D imaging of all known and possible Cycladic figurine fragments. Such a database could be processed using techniques from the computer vision and artificial intelligence community to identify fragment matches without the need to physically join pieces in from far-flung locations. Such an initiative would have the potential benefit being able to identify joins between provenanced and unprovenanced fragments associated with the looting of Keros. Such

research could possibly help to identify spatial distributions in the circulation of figurine fragments and linkages between communities. The first and most logical step would be to assess the potential matches of the figurine fragments from Ayia Irini with all known and suspected fragments from Keros. Ultimately, an application of the principles of material signification to network and spatial analysis has the potential to provide a great deal of insight into the social relationships and scales of interaction between Cycladic islanders.

The human ability to generate complex forms of social organization is one of the most difficult problems in both archaeology and the cognitive sciences due to the heterogeneity and rapidity of complex social emergence. Traditional approaches to social cognition examine the mechanisms through which individuals infer the mental contents of others. Such frameworks emphasise how humans think *about* one another but fail to address how human beings think *together*. In contrast, this thesis has analysed the development of Cycladic Social Cognition and demonstrated how the creation, circulation and manipulation of material culture mediates intersubjectivity and coordinates social interactions through shared attention, concept formation, and collective participation in semiotic relationships. In applying Material Engagement Theory to the analysis of emergent social complexity, this thesis has taken a multiscalar, multifactorial approach to accommodating the interdependent and bi-directional causal processes in which bodies, artefacts, communities and environments are enmeshed. Emergent complexity is not isolable or reducible to component processes or an initial set of conditions. Therefore, questions about human social complexity cannot be addressed through linear approaches to structure and function, whether in terms of cognitive mechanisms, social needs, or otherwise.

This thesis has demonstrated two key insights into the material dimension of social cognition which support analysis at an intermediate scale between evolution and individual development. First, skilled interactions with material culture can lead to shared semiotic

systems which mediate further enskilment and encounters with the world. Second, material culture enables people to perceive, enact, manipulate, and sustain concepts over different timescales or varied complexity. To this end, the specific case study of this work has generated two critical interpretations that pertain to general archaeological understanding. Firstly, all anthropomorphic depictions can be understood as attention-capturing technologies. Secondly, all political economies can be analysed as economies of attention. Through the anchoring of attention upon skilled relationships with material culture, human communities begin to formulate shared sign systems and narratives which coordinate and flexibly incorporate human social interactions across multiple scales. In this way, it is possible to understand how individual social and emotional intelligence coheres within the wide-ranging, self-organising dynamics of complex societies. Ultimately, if individual cognition is best understood as a dynamic system which extends across brain, body, and world, then social cognition is best conceptualised in terms of complex adaptive systems which coordinate individual development.

The relationship between marble and Cycladic intersubjectivity reveals the deeply entangled relationship between cognition, the material environment and the diversity of human cultures. Cycladic marble sculpting emerged during a time in which the cognitive burdens of social interaction had markedly intensified. Marble shaping generated an attention-capturing semiotic medium through which concepts of relatedness could be conceptualised and enacted at emergent scales. The evidence suggests that the marble figurines are best understood as kinshipping technologies that functioned as part of a gifting economy. Through marble, the islanders learned to conceptualize and manipulate notions of relatedness at novel scales. The emergent relationship between bodily perception, attention capture, enskilment, social interaction, kinship and gifting all provide insight into how Cycladic figurines helped to generate scalar shifts in collective organization. Dhaskalio-Kavos was both a ritual centre and

a site of immense social, economic and political creativity. In this way, material engagement with marble reshaped cognitive development and social interaction, and thereby enabled novel scales of social organization to emerge in the prehistoric Cyclades. For roughly 500 years, Keros formed the centre of a *kyklos* in which the value of marble, kinship and seafaring extended the boundaries of social cognition and played a key role in the emergence of the Aegean Bronze Age.

Bibliography

Agouridis, C. (1997) Sea routes and navigation in the third millennium Aegean, *Oxford Journal of Archaeology* 16(1): 1–24.

Ames, K. M. (2010) On the evolution of the human capacity for inequality and/or egalitarianism. In Hayden, B., & Villeneuve, S. (eds) *Pathways to Power. New Perspectives on the Emergence of Social Inequality*: 15–44. New York: Springer.

Anderson, P. W. (1972) 'More is different', *Science* 177(4047): 393–396.

Anderson, B. R. O. (2016) *Imagined communities: reflections on the origin and spread of nationalism*. London: Verso.

Angelopoulou, A. (2008) The "Kastri Group": Evidence from Korfi ton Amygdalion (Parnormos) Naxos, Dhaskalio Keros and Akrotiri Thera. In Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon: a colloquium on the prehistory of the Cyclades*: 149–164. Oxford: Oxbow Books.

Armelagos, G. J., Goodman, A. H. and Jacobs, K. H. (1991) The origins of agriculture: Population growth during a period of declining health. *Population and Environment* 13(10): 9–22.

Astafiev, S. V., Stanley, C. M., Shulman, G. L., and Corbetta, M. (2004) Extrastriate body area in human occipital cortex responds to the performance of motor actions. *Nature Neuroscience* 7(5): 542–548.

Aston, A. (2017) Cognition and the City: Cognitive Ecology and the Paris Commune of 1871. In Cowley, S. J. and Vallée-Tourangeau, F. (eds) *Cognition Beyond the Brain* vol. 2: 215–231. London: Springer International Publishing.

Atkins, P. W. (2010) *The laws of thermodynamics: a very short introduction*. Oxford: Oxford University Press.

Bailey, D. (2014) Touch and the cheirotic apprehension of prehistoric figurines. *Sculpture and Touch*:17–43. London: Routledge.

Bamford, S. C. and Leach, J. (eds) (2012) *Kinship and beyond: the genealogical model reconsidered*. New York: Berghahn Books.

Barrett, J. C. and Halstead, P. (2004) *The emergence of civilisation revisited*. Oxford: Oxbow Books.

Barrett, L., Henzi, P. and Rendall, D. (2007) Social brains, simple minds: does social complexity really require cognitive complexity? *Philosophical Transactions of the Royal Society B: Biological Sciences*, 362(1480): 561–575.

Bednarik, R. G. (1999a) Maritime navigation in the Lower and Middle Palaeolithic. *Comptes Rendus de l'Académie Des Sciences-Series IIA-Earth and Planetary Science*, *328*(8): 559–563.

Bednarik, R. G. (1999b) Pleistocene seafaring in the Mediterranean. *Anthropologie (1962-)*: 275–282.

Belmont, J. S., & Renfrew, C. (1964) Two prehistoric sites on Mykonos. *American Journal of Archaeology*, *68*(4): 395–400.

Bennet, J. (2018) The work of the British School at Athens, 2017–2018. *Archaeological Reports* 64: 9–27.

Bertamini, M. and Makin, A. (2014) Brain Activity in Response to Visual Symmetry. *Symmetry* 6(4): 975–996.

Betancourt, P. P. (2008) The cemetery at Hagia Photia, Crete. In Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon: a colloquium on the prehistory of the Cyclades*: 237–40. Oxford: Oxbow Books.

Birtacha, K. (2017) Examining the Paint on Cycladic Figurines. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 491–502. Oxford: Oxbow Books.

Bleed, P. and Matsui, A. (2010) Why Didn't Agriculture Develop in Japan? A Consideration of Jomon Ecological Style, Niche Construction, and the Origins of Domestication. *Journal of Archaeological Method and Theory* 17(4): 356–370.
Boehm, C. (1993) Egalitarian Behaviour and Reverse Dominance Hierarchy. *Current Anthropology* 34(3): 227–254.
Boehm, C. (2001) *Hierarchy in the forest: the evolution of egalitarian behavior*. Cambridge: Harvard University Press.
Bonini, L. and Ferrari, P. F. (2011) Evolution of mirror systems: a simple mechanism for complex cognitive functions. *Annals of the New York Academy of Sciences* 1225(1): 166–175.
Boyd, M. J. (2013) The structure and architecture of the settlement. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., Boyd, M. J. (eds) *The settlement at Dhaskalio: The Sanctuary on Keros and the Origins of Aegean Ritual Practice: the excavations of 2006-2008* vol. I: 341–385. Oxford: Oxbow Books.
Boyd, M. J. (2015) Assemblage Studies. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., Boyd, M. J. (eds) *Kavos and the Special Deposits: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008* vol. II: 353–380. Oxford: Oxbow Books.
Boyd, M. J. and Renfrew, C. (2018) The Material Worlds of Dhaskalio and Kavos. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., Boyd, M. J. (eds) *The marble finds from Kavos and the archaeology of ritual: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008* vol. III: 533–545. Oxford: Oxbow Books.
Boyd, R. and Richerson, P. J. (1988) The evolution of reciprocity in sizable groups. *Journal of Theoretical Biology* 132(3): 337–356.
Brodie, N., Doole, J., Giorgos, G., and Renfrew, C. (2008) *Horizon: a colloquium on the prehistory of the Cyclades*. Oxford: Oxbow Books.
Brodie, N. J. and Gavalas, G. (2018) The Stone Vessels. In Renfrew, C., Philaniotou, O., and Boyd, M. J. (eds) *The marble finds from Kavos and the archaeology of ritual*: *The sanctuary of Keros and the origins of Aegean ritual practice* Vol. III: 259–353. Oxford: Oxbow Books.
Broodbank, C. (1989) The Longboat and Society in the Cyclades in the Keros-Syros Culture. *American Journal of Archaeology* 93(3): 319-337.
Broodbank, C. (1993) Ulysses without sails: Trade, distance, knowledge and power in the early Cyclades. *World Archaeology* 24(3): 315–331.
Broodbank, C. (2000) *An island archaeology of the early Cyclades*. Cambridge: Cambridge University Press.
Broodbank, Cyprian. (2006) The origins and early development of Mediterranean maritime activity. *Journal of Mediterranean Archaeology*, *19*(2).
Broodbank, C. (2007) The pottery. In Renfrew, C., Doumas, C., Marangou, L., and Gavalas, G. (eds.) *Keros, Dhaskalio Kavos: The investigations of 1987-88.* Cambridge: McDonald Institute for Archaeological Research.
Broodbank, C. (2013a) *The making of the Middle Sea: a history of the Mediterranean from the beginning to the emergence of the classical world*. London: Thames & Hudson.
Broodbank, C. (2013b) "Minding the gap": Thinking about change in Early Cycladic island societies from a comparative perspective. *American Journal of Archaeology*, *117*(4), 535–543.
Broodbank, C., & Strasser, T. F. (1991) Migrant farmers and the Neolithic colonization of Crete. *Antiquity*, *65*(247), 233–245.
Byrne, R. W. (1997) The technical intelligence hypothesis: an additional evolutionary stimulus to intelligence. In Whiten, A. and Byrne, R. (eds) *Machiavellian intelligence II*: *Extensions and evaluations* Vol. 2: 289–311. Cambridge: Cambridge University Press.

Byrne, R. W. and Whiten, A. (eds) (1988) *Machiavellian intelligence: social expertise and the evolution of intellect in monkeys, apes, and humans*. Oxford: Oxford University Press
Carsten, J. (2004) *After kinship*. Cambridge: Cambridge University Press.
Carter, T. (2016) Obsidian consumption in the Late Plesitocene – Early Holocene Aegean: contextualising new data from Mesolithic Crete. *The Annual of the British School at Athens* 111: 13–34.
Carter, T. B. (1998) *'Through a glass darkly': Obsidian and society in the southern Aegean Early Bronze Age*. University of London.
Carter, T. (2008) 'The consumption of obsidian in the Early Bronze Age Cyclades', in Brodie, N., Doole, J., Giorgos, G., and Renfrew, C. (eds) *Horizon: a colloquium on the prehistory of the Cyclades*: 225–35. Oxford: Oxbow Books.
Carter, T., Strasser, T. F., Panagopoulou, E., Campeau, K., & Mihailović, D. D. (2018) Obsidian circulation in the early Holocene Aegean: A case study from Mesolithic Damnoni (SW Crete). *Journal of Archaeological Science: Reports*, *17*, 173–183.
Chakrabarty, D. (2009a) The Climate of History: Four Theses. *Critical Inquiry* 35(2): 197–222.
Chakrabarty, M. (2018) How Stone Tools Shaped Us: Post-Phenomenology and Material Engagement Theory. *Philosophy & Technology 32(2), 243-264*.
Chapman, H., & Gearey, B. (2004) The social context of seafaring in the Bronze Age revisited. *World Archaeology*, *36*(4), 452–458.
Chapman, J. and Gaydarska*, B. I.* (2007) *Parts and wholes: fragmentation in prehistoric context*. Oxford: Oxbow Books.
Chapman, J. (2012) *Fragmentation in archaeology: people, places and broken objects in the prehistory of South Eastern Europe*. London: Routledge.
Cherry, J. F. (1979) Four problems in Cycladic prehistory. *Papers in Cycladic Prehistory*, 22–47.
Cherry, J. F. (1981) Pattern and process in the earliest colonization of the Mediterranean islands. *Proceedings of the Prehistoric Society*, *47*, 41–68.
Cherry, J. F., & Torrence, R. (1982) The earliest prehistory of Melos. In *An Island Polity: The Archaeology of Exploitation in Melos* (pp. 22–34). Cambridge: Cambridge University Press.
Christian, D. (2011) *Maps of time: an introduction to big history*. Berkeley: University of California Press.
Clark, A. (2008a) *Supersizing the mind embodiment, action, and cognitive extension*. Oxford: Oxford University Press.
Clark, A. (2008b) Where Brain, Body and World Collide. In Knappett, C. and Malafouris, L. (eds) *Material Agency: Towards a Non-Anthropocentric Approach*: 1–18. Boston: Springer.
Clark, A. and Chalmers, D. (1998) The Extended Mind. *Analysis*, 58(1): 7–19.
Coleman, J. E. (1977) *Kephala: a late Neolithic settlement and cemetery*. Princeton: American School of Classical Studies.
Costantini, M., Urgesi, C., Galati, G., Romani, G. L., & Aglioti, S. M. (2011) Haptic perception and body representation in lateral and medial occipito-temporal cortices. *Neuropsychologia* 49(5): 821–829.
Coward, F. (2016) Scaling up: Material culture as scaffold for the social brain. *Quaternary International* 405: 78–90.
Coward, F. and Gamble, C. (2008) Big brains, small worlds: material culture and the evolution of the mind. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1499): 1969–1979.
Coy, J. (1977) Animal remains. In Coleman (ed.), *Kephala: a late Neolithic settlement and cemetery*: 129–132. Princeton: American School of Classical Studies.
Dawkins, R. (1982) *The extended phenotype: the long reach of the gene*. Oxford: Oxford University Press.

Dawson, H. (2016) *Mediterranean Voyages: The Archaeology of Island Colonisation and Abandonment*. New York: Routledge.
De Jaegher, H. and Di Paolo, E. (2007) Participatory sense-making: An enactive approach to social cognition. *Phenomenology and the Cognitive Sciences* 6(4): 485–507.
De Jaegher, H., Di Paolo, E. and Gallagher, S. (2010) Can social interaction constitute social cognition? *Trends in Cognitive Sciences*, 14(10): 441–447.
De Landa, M. (1997) *A thousand years of nonlinear history*. New York: Zone Books.
Demoule, J.-P., & Perlès, C. (1993) The Greek Neolithic: A new review. *Journal of World Prehistory*, *7*(4), 355–416.
Descola, P. (2012) *The ecology of others: anthropology and the question of nature*. Chicago: Prickly Paradigm Press.
Dewey, J. (1939). Theory of valuation. *International Encyclopedia of Unified Science.*
Dixon, J. (2013) The Petrology of the Walls. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., Boyd, M. J. (eds) *The settlement at Dhaskalio: The Sanctuary on Keros and the Origins of Aegean Ritual Practice* vol. I: 309–323. Oxford: Oxbow Books
Dixon, J., and Kinnaird, T. (2013) 'The geology of Kavos and Dhaskalio' in Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., and Boyd, M. J. (eds) *The settlement at Dhaskalio: The sanctuary on Keros and the origins of Aegean ritual practice* vol. I: 25-44. Oxford: Oxbow Books.
Doumas, C. (1977) *Early Bronze Age burial habits in the Cyclades*. Gothenburg: Paul Astroms Forlag.
Doumas, C. (2017) Figurines from Akrotiri, Naxos and Plastiras, Paros. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 53–64. Oxford: Oxbow Books.
Doumas, C. and Lambrinoudakis, V. (2017) The Cemetary at Aplomata on Naxos. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 183–218. Oxford: Oxbow Books.
Downing, P. E., Bray, D., Rogers, J. and Childs, C. (2004) Bodies capture attention when nothing is expected. *Cognition* 93(1): B27–B38.
Draganski, B., Gaser, C., Busch, V., Schuierer, G., Bogdahn, U., & May, A. (2004) Neuroplasticity: Changes in grey matter induced by training. *Nature* 427(6972): 311–312.
Dunbar, R. I. M. (1992) Neocortex size as a constraint on group size in primates. *Journal of Human Evolution* 22(6): 469–493.
Dunbar, R. I. M. (1993) Coevolution of neocortical size, group size and language in humans. *Behavioral and Brain Sciences* 16(04): 681.
Dunbar, R. I. M. (1998) The social brain hypothesis. *Evolutionary Anthropology: Issues, News, and Reviews* 6(5): 178–190.
Dunbar, R. I. M. (2003) The Social Brain: Mind, Language, and Society in Evolutionary Perspective. *Annual Review of Anthropology* 32(1): 163–181.
Dunbar, R. I. M. (2009) The social brain hypothesis and its implications for social evolution. *Annals of Human Biology*, 36(5). 562–572.
Dunbar, R. I. M., Gamble, C. and Gowlett, J. (2010a) *Social brain, distributed mind*. Oxford: Oxford University Press.
Dunbar, R. I. M., Gamble, C., & Gowlett, J. (2010b). The Social Brain and the Distributed Mind. In Dunbar, R. I. M., Gamble, C. and Gowlett, J. (Eds.), *Social brain, distributed mind*. Oxford: Oxford University Press.
Dupuy, J. P. (2009) *On the origins of cognitive science: the mechanization of the mind*. Cambridge: MIT Press (A Bradford book).
Elliot, A. J. and Maier, M. A. (2014) Color Psychology: Effects of Perceiving Color on Psychological Functioning in Humans. *Annual Review of Psychology* 65(1): 95–120.

Emery, N. J., Clayton, N. S. and Frith, C. D. (2007) Social intelligence: from brain to culture. *Philosophical Transactions of the Royal Society B: Biological Sciences* 362(1480): 485–488.
Erdal, D., Whiten, A., Boehm, C., and Knauft, B. (1994) On Human Egalitarianism: An Evolutionary Product of Machiavellian Status Escalation? *Current Anthropology* 35(2): 175–183.
d'Errico, F., Henshilwood, C., Vanhaeren, M., & Van Niekerk, K. (2005) Nassarius kraussianus shell beads from Blombos Cave: evidence for symbolic behaviour in the Middle Stone Age. *Journal of Human Evolution*, 48(1): 3–24.
Evans, J. D. (1994) The early millennia: Continuity and change in a farming settlement. *Knossos: A Labyrinth of History. Papers Presented in Honour of Sinclair Hood*, 1–22.
Evans, J. D. and Renfrew, C. (1968) *Excavations at Saliagos near Antiparos*. British School of Archaeology at Athens.
Facorellis, G. and Maniatis, I. (2002) Radiocarbon dating of the neolithic settlement of Ftelia on Mykonos: calculation of the marine reservoir effect in the Cyclades. *The neolithic settlement at Ftelia, Mykonos*: 309–315 Rhodes: University of the Aegean.
Farr, H. (2006) Seafaring as social action. *Journal of Maritime Archaeology*, *1*(1), 85–99.
Fenici, M. and Garofoli, D. (2017) The biocultural emergence of mindreading: integrating cognitive archaeology and human development. *Journal of Cultural Cognitive Science* 1(2): 89–117
Ferentinos, G., Gkioni, M., Geraga, M., & Papatheodorou, G. (2012) Early seafaring activity in the southern Ionian Islands, Mediterranean Sea. *Journal of Archaeological Science*, *39*(7), 2167–2176.
Firth, R. (1961) *History and traditions of Tikopia.* Wellington: Polynesian Society
Fiske, S. T. and Taylor, S. E. (2013) *Social cognition: from brains to culture*. London: Sage.
French, C. A. I. and Whitelaw, T. M. (1999) Soil erosion, agricultural terracing and site formation processes at Markiani, Amorgos, Greece: The micromorphological perspective. *Geoarchaeology* 14(2): 151–189.
Froese, T. and Fuchs, T. (2012) The extended body: a case study in the neurophenomenology of social interaction. *Phenomenology and the Cognitive Sciences* 11(2): 205–235.
Froese, T. and Leavens, D. A. (2014) The direct perception hypothesis: perceiving the intention of another's action hinders its precise imitation. *Frontiers in Psychology* 5: 1-15.
Gage, T. B. and DeWitte, S. (2009) What Do We Know about the Agricultural Demographic Transition? *Current Anthropology*, 50(5): 649–655.
Gallagher, S. (2011) *How the body shapes the mind*. Oxford: Clarendon Press.
Gallagher, S. (2017) *Enactivist interventions: rethinking the mind*. Oxford: Oxford University Press.
Gallagher, S. and Hutto, D. (2008) Understanding others through primary interaction and narrative practice. *The shared mind: Perspectives on intersubjectivity* 12: 17–38.
Gallagher, S. and Ransom, T. G. (2016) Artifacting minds: Material engagement theory and joint action. *Embodiment in evolution and culture*: 337–351.
Gallese, V. (2007) Before and below "theory of mind": embodied simulation and the neural correlates of social cognition. *Philosophical Transactions of the Royal Society B: Biological Sciences* 362(1480): 659–669.
Gamble, C. (1998) Palaeolithic society and the release from proximity: A network approach to intimate relations. *World Archaeology* 29(3): 426–449.
Gamble, C. (2010) Technologies of separation and the evolution of social extension. In Dunbar, R., Gamble, C., and Gowlett, J. (eds.) *Social Brain, Distributed Mind*: 17-42. Oxford: Oxford University Press.

Gamble, C., Gowlett, J. and Dunbar, R. (2011) The Social Brain and the Shape of the Palaeolithic. *Cambridge Archaeological Journal* 21(01): 115–136.
Gardner, H. (1998) *The mind's new science: a history of the cognitive revolution*. New York: Basic Books.
Garofoli, D. (2017) RECkoning with representational apriorism in evolutionary cognitive archaeology. *Phenomenology and the Cognitive Sciences 17*(5): 973-995.
Garofoli, D. and Iliopoulos, A. (2017) Replacing Epiphenomenalism: a Pluralistic Enactive Take on the Metaplasticity of Early Body Ornamentation. *Philosophy & Technology 32*(2): 215-242.
Gavalas, G. (2013) The Marble Vessels from Dhaskalio. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas G., and Boyd, M.J. (eds) *The Settlement at Dhaskalio: The sanctuary of Keros and the origins of Aegean ritual practice the excavations of 2006-2008,* vol. I: 505–516. Oxford: Oxbow Books.
Gavalas, G. (2017) The stone vessels found at Dhaskalio Kavos in 1987. In Marthari, M., Renfrew, C., and Boyd, M. (eds) *Early Cycladic Sculpture in Context*: 373-378. Oxford: Oxbow Books.
Georgakopoulou, M. (2013) Metal Artefacts and Metalurgy. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas G., and Boyd, M.J. (eds) *The Settlement at Dhaskalio: The sanctuary of Keros and the origins of Aegean ritual practice the excavations of 2006-2008,* vol. I: 667–692. Oxford: Oxbow Books.
Georgakopoulou, M. (2018) Metal Production, working and consumption across the sites of Dhaskalio and Kavos. In Renfrew, C., Philaniotou, O., and Boyd, M. J. (eds) *The marble finds from Kavos and the archaeology of ritual*: *The sanctuary of Keros and the origins of Aegean ritual practice* vol. III: 501–532. Oxford: Oxbow Books.
Gerbault, P., Liebert, A., Itan, Y., Powell, A., Currat, M., Burger, J., Swallow D. M., and Thomas, M. G. (2011) Evolution of lactase persistence: an example of human niche construction. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366(1566): 863–877.
Getz-Gentle, P. (1994) *Early Cycladic sculpture: an introduction*. Malibu: J. Paul Getty Museum.
Getz-Gentle, P. (2013) *Personal styles in early Cycladic sculpture*. Madison: University Of Wisconsin Press.
Getz-Preziosi, P. (1987) *Sculptors of the Cyclades: individual and tradition in the third millennium B.C*. Ann Arbor: University of Michigan Press.
Gill, D. W., & Chippindale, C. (1993). Material and intellectual consequences of esteem for Cycladic figures. *American Journal of Archaeology*, 601–659.
Gislén, A., Warrant, E. J., Dacke, M., & Kröger, R. H. (2006) Visual training improves underwater vision in children. *Vision Research* 46(20): 3443–3450.
Golitko, M. and Keeley, L. H. (2007) Beating ploughshares back into swords: warfare in the Linearbandkeramik. *Antiquity* 81(312): 332–342.
Gosden, C. (2005) What Do Objects Want? *Journal of Archaeological Method and Theory* 12(3): 193–211.
Gosden, C. and Malafouris, L. (2015) Process archaeology (P-Arch). *World Archaeology* 47(5): 701–717.
Gottlieb, G. (2007) Probabilistic epigenesis. *Developmental Science* 10(1): 1–11.
Gowlett, J., Gamble, C. and Dunbar, R. (2012) Human Evolution and the Archaeology of the Social Brain. *Current Anthropology* 53(6): 693–722.
Graeber, D. (2001) *Toward an anthropological theory of value: the false coin of our own dreams*. New York: Palgrave.
Graeber, D. (2012) *Debt: The first 5000 years*. London: Penguin.

Graeber, D. (2013) It is value that brings universes into being. *HAU: Journal of Ethnographic Theory* 3(2): 219–243.
Green, D. M. (1991) Chaos, fractals and nonlinear dynamics in evolution and phylogeny. *Trends in Ecology & Evolution* 6(10): 333–337.
Gregory, C. A. (1982) *Gifts and commodities*. London: Academic Press
Gregory, C. A. (2015) *Gifts and commodities*. Chicago: HAU Books
Gremillion, K. J. and Piperno, D. R. (2009) Human Behavioral Ecology, Phenotypic (Developmental) Plasticity, and Agricultural Origins: Insights from the Emerging Evolutionary Synthesis. *Current Anthropology* 50(5): 615–619.
Grove, M. and Coward, F. (2008) From Individual Neurons to Social Brains. *Cambridge Archaeological Journal* 18(03): 387-400.
Gunderson, L. H. and Holling, C. S. (2002) *Panarchy: understanding transformations in human and natural systems*. Washington: Island Press.
Hadji, A. (2016) (Dis)entangled bodies or the (be)holder vs. the spectator: Detached views of Early Cycladic figures and figurines. *Quaternary International* 405: 31–41.
Hadjianastasiou, O. (1988) A late Neolithic settlement at Grotta, Naxos. *Problems in Greek Prehistory*, 11–20.
Halstead, P. (1981) From determinism to uncertainty: social storage and the rise of the Minoan palace. *Economic archaeology: towards an integration of ecological and social approaches*: 187–213. Oxford: BAR.
Halstead, P. (1996) Pastoralism or household herding? Problems of scale and specialization in early Greek animal husbandry. *World Archaeology* 28(1): 20–42.
Halstead, P. (2004) Life after Mediterranean polyculture: The subsistence subsystem and the Emergence of Civilisation revisited. *The Emergence of Civilisation Revisited*: 189-206. Oxford: Oxbow Books.
Haltead, P. and O'Shea, J. (1982) A friend in need is a friend indeed: social storage and the origins of social ranking. In Renfrew, C., Shennan, S., Audouze, F., Schlanger, N., Sherratt, A., Taylor, T., & Ashmore, W. (Eds.) *Ranking, resource and exchange: aspect of the archaeology of early European society*: 92–99. Cambridge: Cambridge University Press.
Harmand, S., Lewis, J.E., Feibel, C.S., Lepre, C.J., Prat, S., Lenoble, A., Boës, X., Quinn, R.L., Brenet, M., Arroyo, A. and Taylor, N. (2015) 3.3-million-year-old stone tools from Lomekwi 3, West Turkana, Kenya. *Nature* 521(7552): 310–315.
Hastings, A., Byers, J.E., Crooks, J.A., Cuddington, K., Jones, C.G., Lambrinos, J.G., Talley, T.S. and Wilson, W.G. (2007) Ecosystem engineering in space and time. *Ecology Letters* 10(2): 153–164.
Haxby, J.V., Hoffman, E.A., and Gobbini, M.I. (2000) The distributed human neural system for face perception. *Trends in Cognitive Sciences* 4(6): 223–233.
Hayles, N.K. (1999) *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics.* Chicago: University of Chicago Press.
Hendrix, E. A. (2003) Painted Early Cycladic Figures: An Exploration of Context and Meaning. *Hesperia*, 72(4): 405-446.
Henrich, J. and Gil-White, F. J. (2001) The evolution of prestige: freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior* 22(3): 165–196.
Herrmann, E., Call, J., Hernández-Lloreda, M. V., Hare, B., and Tomasello, M. (2007) Humans Have Evolved Specialized Skills of Social Cognition: The Cultural Intelligence Hypothesis. *Science* 317(5843): 1360–1366.
Hicks, D. (2010) The Material-Cultural Turn: Event and Effect. In Beaudry, M. C. and Hicks, D. (eds) *The Oxford handbook of material culture studies*: 25–98. Oxford: Oxford University Press.

Hiditch, J. (2015) The Ceramic Fragments of the Special Deposit South. In Renfrew, C., Philaniotou, O., Brodie, N. Gavalas, G., and Boyd, M. J. (eds) *Kavos and the special deposits: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008,* vol II: 229–247. Oxford: Oxbow Books.
Hilditch, J., Hein, A. and Kilikoglou, V. (2018) The Fabric Study of the Pottery of Dhaskalio and Kavos & Appendix: Neutron Activation Analysis of Early Cycladic Ceramics from Kavos and Dhaskalio. In Renfrew, C., Philaniotou, Brodie, N., Gavalas, G., and Boyd, M. J. (eds) The *Marble Finds from Kavos and the Archaeology of Ritual: The sanctuary on Keros and the origins of Aegean ritual practice* vol. III: 445-500. Oxford: Oxbow Books.
Hodder, I. (2011a) Human-thing entanglement: towards an integrated archaeological perspective: Human-thing entanglement. *Journal of the Royal Anthropological Institute* 17(1): 154–177.
Hodder, I. (2011b) Wheels of Time: Some Aspects of Entanglement Theory and the Secondary Products Revolution. *Journal of World Prehistory* 24(2–3): 175–187.
Hodder, I. (2012) *Entangled: an archaeology of the relationships between humans and things*. Malden: Wiley-Blackwell.
Hodder, I. (2014) The Entanglements of Humans and Things: A Long-Term View. *New Literary History* 45(1): 19–36.
Hoffman, G. L. (2002) Painted ladies: Early Cycladic II mourning figures? *American Journal of Archaeology* 106(4): 525–550.
Hofmanová, Z., Kreutzer, S., Hellenthal, G., Sell, C., Diekmann, Y., Díez-del-Molino, D., van Dorp, L., López, S., Kousathanas, A., & Link, V. (2016) Early farmers from across Europe directly descended from Neolithic Aegeans. *Proceedings of the National Academy of Sciences*, *113*(25), 6886–6891.
Holekamp, K. E. (2007) Questioning the social intelligence hypothesis. *Trends in Cognitive Sciences* 11(2): 65–69.
Honea, K. (1975) Prehistoric remains on the island of Kythnos. *American Journal of Archaeology*, *79*(3), 277–279.
Horejs, B., Milić, B., Ostmann, F., Thanheiser, U., Weninger, B., & Galik, A. (2015) The Aegean in the early 7th millennium BC: maritime networks and colonization. *Journal of World Prehistory*, *28*(4), 289–330.
Hsiao, J. H. and Cottrell, G. (2008) Two Fixations Suffice in Face Recognition. *Psychological Science* 19(10): 998–1006.
Humphrey, N. K. (1976) The social function of intellect. In Hinde, R. A., and Bateson, P. P. G. (eds) *Growing points in ethology*: 303–317. Cambridge: Cambridge University Press.
Hurston, H., Voith, L., Bonanno, J., Foufopoulos, J., Pafilis, P., Valakos, E., and Anthony, N. (2009) Effects of fragmentation on genetic diversity in island populations of the Aegean wall lizard Podarcis erhardii (Lacertidae, Reptilia). *Molecular Phylogenetics and Evolution* 52(2): 395–405.
Hutchins, E. (1995) *Cognition in the wild*. Cambridge: MIT Press.
Hutchins, E. (2010) Cognitive Ecology. *Topics in Cognitive Science* 2(4): 705–715.
Hutto, D. D. (2008) *Folk psychological narratives: the sociocultural basis of understanding reasons*. Cambridge: MIT Press.
Hutto, D. D. (2017) Basic social cognition without mindreading: minding minds without attributing contents. *Synthese* 194(3): 827–846.
Hutto, D. D. and Myin, E. (2013) *Radicalizing enactivism: basic minds without content*. Cambridge: MIT Press.
Iliopoulos, A. (2016a) The Evolution of Material Signification: Tracing the Origins of Symbolic Body Ornamentation through a Pragmatic and Enactive Theory of Cognitive Semiotics. *Signs and Society* 4(2): 244–277.

Iliopoulos, A. (2016b) The material dimensions of signification: Rethinking the nature and emergence of semiosis in the debate on human origins. *Quaternary International* 405: 111–124.
Iliopoulos, A. and Garofoli, D. (2016) The material dimensions of cognition: Re-examining the nature and emergence of the human mind. *Quaternary International* 405: 1–7.
Ingold, T. (2007a) Beyond biology and culture. The meaning of evolution in a relational world. *Social Anthropology* 12(2): 209–221.
Ingold, T. (2007b) Materials against materiality. *Archaeological Dialogues* 14(01): 1-16.
Ingold, T. (2007c) The trouble with evolutionary biology. *Anthropology Today* 23(2): 13–17.
Ingold, T. (2009) Stories against classification: transport, wayfaring and the integration of knowledge. In Bamford, S. C., Bamford, S., & Leach, J. (Eds.) *Kinship and beyond: the genealogical model reconsidered*: 193–213. Oxford: Berghahn Books.
Ingold, T. (2010) "The Social Brain", Great Expectations International Conference February 5th 2010 DPU and GNOSSIS Research Centre Denmark.
Ingold, T. (2011) *Being alive: essays on movement, knowledge and description*. London: Routledge.
Ingold, T. (2012a) Towards an Ecology of Materials. *Annual Review of Anthropology.* 41: 427-442
Ingold, T. (2012b) Stories against Classification: Transport, Wayfaring and the Integration of Knowledge. In S. C. Bamford & J. Leach (Eds.), *Kinship and beyond: The genealogical model reconsidered* (1st paperback ed, pp. 193–213). New York: Berghahn Books.
Ingold, T. (2013) *Making: anthropology, archaeology, art and architecture*. London: Routledge.
Irwin, G. (1989) Against, across and down the wind: A case for the systematic exploration of the remote Pacific Islands. *The Journal of the Polynesian Society*, *98*(2), 167–206.
Irwin, G. (1992) *The prehistoric exploration and colonisation of the Pacific*. Cambridge: Cambridge University Press.
Itier, R. J. and Batty, M. (2009) Neural bases of eye and gaze processing: The core of social cognition. *Neuroscience & Biobehavioral Reviews* 33(6): 843–863.
Iwaniuk, A. N. and Arnold, K. E. (2004) Is Cooperative Breeding Associated With Bigger Brains? A Comparative Test in the Corvida (Passeriformes). *Ethology* 110(3): 203–220.
Johnson, N. F. (2009) *Simply complexity: a clear guide to complexity theory*. Oxford: Oneworld.
Kaczanowska, M., & Kozłowski, J. (2011) Lithic industry from the Aceramic levels at Knossos (Crete, Greece): An alternative approach. *Eurasian Prehistory*, *8*(1–2).
Katsarou, S. and Schilardi, D. U. (2004) Emerging Neolithic and Early Cycladic settlements in Paros: Koukounaries and Sklavouna. *The Annual of the British School at Athens* 99: 23–48.
Katsarou, S. and Schilardi, D. U. (2017) Recontextualised Neolithic and Early Cycladic figurines at the acropolis of Koukounaries, Paros. In Marthari, M., Renfrew, C., and Boyd, M. (eds) *Early Cycladic Sculpture in Context*: 410-420. Oxford: Oxbow Books.
Katsarou-Tzeveleki, S. and Schilardi, D. U. (2008) Some Reflections on EC domestic space arising from observations at Koukounaries, Paros. In Brodie, N., Doole, J., Gavalas, G., Renfrew, C. (eds) *Horizon A Colloquium on the prehistory of the Cyclades*: 61–71. Oxford: Oxbow Books.
Keegan, W. F. and Diamond, J. M. (1987) Colonization of islands by humans: A biogeographical perspective. *Advances in archaeological method and theory* 10: 49–92.
Kirsh, D. (1995) 'The intelligent use of space', *Artificial Intelligence*, 73(1–2). 31–68.
Klein, R. G. (2000) Archeology and the evolution of human behaviour. *Evolutionary Anthropology: Issues, News, and Reviews* 9(1): 17–36.
Knappett, C. (2005) *Thinking through material culture: an interdisciplinary perspective*. Philadelphia: University of Pennsylvania Press.

Knappett, C. (2013) *Network analysis in archaeology: New approaches to regional interaction*. Oxford: Oxford University Press.
Knappett, C. (2014) *An archaeology of interaction: network perspectives on material culture and society*. Oxford: Oxford University Press.
Knappett, C., Evans, T. and Rivers, R. (2008) Modelling maritime interaction in the Aegean Bronze Age. *Antiquity* 82(318): 1009–1024.
Knappett, C. and Malafouris, Lambros (2008) *Material agency: towards a non-anthropocentric approach*. New York: Springer.
Kouka, O. (2008) Diaspora, Presence or Interaction? The Cyclades and the Greek Mainland from the Final Neotlithic to Early Bronze II. In Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon: a colloquium on the prehistory of the Cyclades*: 271–279. Oxford: Oxbow Books.
Koutsoukou, A. (1992) *An archaeological survey in north-west Andros, Cyclades*. Edinburgh: University of Edinburgh.
Krause, J., Lalueza-Fox, C., Orlando, L., Enard, W., Green, R.E., Burbano, H.A., Hublin, J.J., Hänni, C., Fortea, J., De La Rasilla, M. and Bertranpetit, J. (2007) The Derived FOXP2 Variant of Modern Humans Was Shared with Neandertals. *Current Biology* 17(21): 1908–1912.
Kuniecki, M., Pilarczyk, J. and Wichary, S. (2015) The color red attracts attention in an emotional context. An ERP study. *Frontiers in Human Neuroscience* 9: 1-14.
Laland, K., Matthews, B. and Feldman, M. W. (2016) An introduction to niche construction theory. *Evolutionary Ecology* 30(2): 191–202.
Laland, K. N. and O'Brien, M. J. (2010) Niche Construction Theory and Archaeology. *Journal of Archaeological Method and Theory* 17(4): 303–322.
Laland, K. N. and O'Brien, M. J. (2011) Cultural Niche Construction: An Introduction. *Biological Theory* 6(3): 191–202.
Laland, K. N., Odling-Smee, J. and Myles, S. (2010) How culture shaped the human genome: bringing genetics and the human sciences together. *Nature Reviews Genetics* 11(2): 137–148.
Lambrinoudakis, V. K., & Zapheiropoulou, P. (1976). *Ἀνασκαφὴ Νάξου*. PAE.
Latour, B. (1993) *We have never been modern*. Cambridge: Harvard University Press.
Latour, B. (2007) Can We Get Our Materialism Back, Please? *Isis* 98(1): 138–142.
Leavens, D. and Racine, T. P. (2009) Joint attention in apes and humans: are humans unique? *Journal of Consciousness Studies* 16(6–7): 240–267.
Legaki, I. (2017) Sculptures from Phiondas, Naxos. In Marthari, M., Renfrew, C., and Boyd, M. (eds) *Early Cycladic sculpture in context*: 219–254. Oxford: Oxbow Books.
Lévi-Strauss, C. (1969) *The elementary structures of kinship*. Boston: Beacon Press.
Lewis, P. A., Rezaie, R., Brown, R., Roberts, N., & Dunbar, R. I. (2011) Ventromedial prefrontal volume predicts understanding of others and social network size. *NeuroImage* 57(4): 1624–1629.
Maguire, E. A. Gadian, D.G., Johnsrude, I.S., Good, C.D., Ashburner, J., Frackowiak, R.S. and Frith, C.D. (2000) Navigation-related structural change in the hippocampi of taxi drivers. *Proceedings of the National Academy of Sciences* 97(8): 4398–4403.
Maier, M. A. Barchfeld, P., Elliot, A.J. and Pekrun, R. (2009) Context specificity of implicit preferences: The case of human preference for red. *Emotion* 9(5): 734–738.
Malafouris, L. (2008a) Between brains, bodies and things: *tectonoetic* awareness and the extended self. *Philosophical Transactions of the Royal Society B: Biological Sciences* 363(1499): 1993–2002.
Malafouris, L. (2008b) Is it 'me' or is it 'mine'? The Mycenaean sword as a body-part. In *Boric, D., and Robb, J. (eds) Past Bodies: Body-Centered Research in Archaeology.* Oxford: Oxbow Books.

Malafouris, L. (2008c) Beads for a Plastic Mind: the "Blind Man's Stick" (BMS) Hypothesis and the Active Nature of Material Culture. *Cambridge Archaeological Journal* 18(03): 401-414.
Malafouris, L. (2009) "Neuroarchaeology": exploring the links between neural and cultural plasticity. *Progress in Brain Research 1*78: 253–261.
Malafouris, L. (2010a) Metaplasticity and the human becoming: principles of neuroarchaeology. *Journal of Anthropological Sciences* 88(4): 49-72.
Malafouris, L. (2010b) The brain–artefact interface (BAI): a challenge for archaeology and cultural neuroscience. *Social Cognitive and Affective Neuroscience* 5(2–3): 264–273.
Malafouris, L. (2012) Prosthetic gestures: How the tool shapes the mind. *Behavioral and Brain Sciences* 35(04): 230–231.
Malafouris, L. (2013) *How things shape the mind: a theory of material engagement*. Cambridge: MIT Press.
Malafouris, L. (2015a) Creative thinging: The feeling of and for clay. *Pragmatics & Cognition*, 22(1): 140–158.
Malafouris, L. (2015b) Metaplasticity and the Primacy of Material Engagement. *Time and Mind*, 8(4): 351–371.
Malafouris, L. (2016a) Material Engagement and the Embodied Mind. In Wynn, T. and Coolidge, F. L. (eds) *Cognitive Models in Palaeolithic Archaeology*: 69–88. Oxford: Oxford University Press.
Malafouris, L. (2016b) On human becoming and incompleteness: a material engagement approach to the study of embodiment in evolution and culture. In Etzelmüller, G., & Tewes, C. (eds) *Embodiment in evolution and culture*: 289–305. Tübingen: Mohr Siebeck.
Malafouris, L., and Renfrew, C. (2010) *The cognitive life of things: recasting the boundaries of the mind*. Cambridge: McDonald Institute for Archaeological Research.
Marangou, L. (2002) ΑμοργόςΙ. Η Μινώα. Η πόλις, ο λιμήν και η μείζων περιφέρεια. Η *εν Αθήναις Αρχαιολογική Εταιρεία*
Marangou, L., Renfrew, C., Doumas, C. and Gavalas, G. (2008) Markiani on Amorgos: an Early Bronze Age fortified settlement–overview of the 1985–91 Investigations. In Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon. A Colloquium on the Prehistory of the Cyclades*: 97–105. Oxford: Oxbow Books.
Marks Y.A., and Doonan R. (2018) Copper Smelting in the Early Bronze Age Aegean. Presented at the Experimental Archaeology General Session at the SAA's Annual Meeting in DC.
Marthari, M. (2008) Aspects of Pottery Circulation in the Cyclades During the Early EB II Period: Fine and Semi-Fine Imported Ceramic Wares at Skarkos, Ios. In Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon. A Colloquium on the Prehistory of the Cyclades*: 71–84. Oxford: Oxbow Books.
Marthari, M. (2017a) Cycladic figurines in settlements: the case of the major ECII settlement at Skarkos. In Marthari, M., Renfrew, C. and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 119-164. Oxford: Oxbow Books.
Marthari, Marisa. (2017b) Figurines in Context at the Chalandriani Cemetery on Syros. In Marthari, M., Renfrew, C. and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 297–309. Oxford: Oxbow Books.
Marthari, M., Renfrew, C. and Boyd, M. J. (2017) *Early Cycladic sculpture in context*. Oxford: Oxbow Books.
Marthari, M., Renfrew, C., & Boyd, M. J. (Eds). (2019) *Beyond the Cyclades: Early Cycladic sculpture in context from mainland Greece, the north and east Aegean*. Oxford: Oxbow Books.
Mathieson, I., Alpaslan-Roodenberg, S., Posth, C., Szécsényi-Nagy, A., Rohland, N., Mallick, S., Olalde, I., Broomandkhoshbacht, N., Candilio, F., & Cheronet, O. (2018) The genomic history of southeastern Europe. *Nature*, *555*(7695), 197–203.

Mauss, M. (2002) *The gift: the form and reason for exchange in archaic societies*. London: Routledge.
Mavridis, F. (2019) Of Neolithic Figurines from Mainland Greece and Early Cycladic Anthropomorphic Imagery. In Marthari, M., Renfrew, C., & Boyd, M. J. (eds.) *Early Cycladic Sculpture in Context from beyond the Cyclades: From Mainland Greece, the North and East Aegean*. Oxford: Oxbow Books.
Mcbrearty, S. and Brooks, A. S. (2000) The revolution that wasn't: a new interpretation of the origin of modern human behaviour. *Journal of Human Evolution* 39(5): 453–563.
McCulloch, W. S. and Pitts, W. (1943) A logical calculus of the ideas immanent in nervous activity. *The bulletin of mathematical biophysics* 5(4): 115–133.
Meltzoff, A. N. and Moore, M. K. (1983) Newborn Infants Imitate Adult Facial Gestures. *Child Development* 54(3): 702-709.
Moll, H. and Tomasello, M. (2007) Cooperation and human cognition: the Vygotskian intelligence hypothesis. *Philosophical Transactions of the Royal Society B: Biological Sciences* 362(1480): 639–648.
Moore, M. W. and Perston, Y. (2016) Experimental Insights into the Cognitive Significance of Early Stone Tools. *PLOS ONE* 11(7).
Morais-Arnaud, J. (1982) Le Néolithique ancien et le processus de néolithisation au Portugal in Le Néolithique ancien méditerranéen. Actes du Colloque international de Préhistoire, Montpellier 1981. *Archéologie En Languedoc. Revue de La Fédération Archéologique de l'Hérault Sète*, 29–48.
Moutafi, I. (2015) 'The Human Remains from Area A', in Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., and Boyd, M. J. (eds) *Kavos and the special deposits: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008,* vol. II: 483–505. Oxford: Oxbow Books.
Münte, T. F., Altenmüller, E. and Jäncke, L. (2002) The musician's brain as a model of neuroplasticity. *Nature Reviews. Neuroscience* 3(6): 473–478.
Newen, A., Bruin, L. de and Gallagher, S. (2018) *The Oxford handbook of 4E cognition*. Oxford: Oxford University Press.
Nowell, A. (2010) Defining Behavioral Modernity in the Context of Neandertal and Anatomically Modern Human Populations. *Annual Review of Anthropology* 39(1): 437–452.
Nymo, G., Renfrew, C. and Dixon, J. (2013) The Pebbles from Dhaskalio. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., and Boyd, M. J. (eds) *The settlement at Dhaskalio*: *The sanctuary of Keros and the origins of Aegean ritual practice, the excavations of 2006-2008, vol I:* 517–530. Oxford: Oxbow Books.
O'Brien, M. J. and Laland, K. N. (2012) Genes, Culture, and Agriculture: An Example of Human Niche Construction. *Current Anthropology* 53(4): 434–470.
O'Shea, J. (1981) Coping with scarcity: exchange and social storage. *Economic archaeology: towards an integration of ecological and social approaches* 96: 167–83.
Otto, T. and Willerslev, R. (2013) Prologue: Value *as* theory: Value, action, and critique. *HAU: Journal of Ethnographic Theory* 3(2). 1–10.
Oustinoff, E. (1984) The manufacture of Cycladic figurines: a practical approach. *Cycladica: studies in memory of NP Goulandris*, 38: 47.
Oustinoff, E. (1987) The Early Cycladic Sculptor: Materials and Methods. *Early Cycladic Art in North American Collections, Richmond, Virginia Museum of Fine Arts*. 90–102.
Overmann, K. A. (2016) The role of materiality in numerical cognition. *Quaternary International* 405: 42–51.
Overmann, K. A. (2017) Thinking materially: cognition as extended and enacted. *Journal of Cognition and Culture*, 17(3–4): 354–373.

Overmann, K. A. and Wynn, T. (2018) Materiality and Human Cognition. *Journal of Archaeological Method and Theory 26*(2): 457-478.
Papamichelakis, G., & Renfrew, C. (2010). Hearsay about the" Keros Hoard". *American Journal of Archaeology 114*(1): 181-185.
Papadatos, Y. and Tomkins, P. (2013) Trading, the Longboat, and Cultural Interaction in the Aegean During the Late Fourth Millennium B.C.E: The View from Kephala Petras, East Crete. *American Journal of Archaeology* 117(3): 353.
Papadatos, Y. and Venieris, E. (2017) An experimental approach to the manufacture of Cycladic-type figurines with folded arms: preliminary observations. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 483–490. Oxford: Oxbow Books.
Papadopoulou, Z. D. (2017) Sculptures from Akrotiraki, Siphnos and its cemetery. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 107-118. Oxford: Oxbow Books.
Papageorgiou, D. (2008) The marine environment and its influence on seafaring and maritime routes in the prehistoric Aegean. *European Journal of Archaeology* 11(2–3): 199–222.
Papamichelakis, G., & Renfrew, C. (2010) Hearsay about the" Keros Hoard". *American Journal of Archaeology*, *114*(1), 181–185.
Papangelopoulou, T. (2017) A schematic figurine of shell from Mersinia on Kythnos. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 88–92. Oxford: Oxbow Books.
Papathanasopoulos, G. A. (1961) Kykladika Naxou. *Archaiologikon Deltion, Meletai (1961-62)*, 104–151.
Papathanassoglou, D. A. and Georgouli, Ch. A. (2009) The “frying pans” of the Early Bronze Age Aegean: an experimental approach to their possible use as liquid mirrors. *Archaeometry*, 51(4): 658–671.
Papazoglou-Manioudaki, L. (2017) The Early Cycladic figurines from the excavations of Clon Stephanos on Syros and a note on his work on Naxos: towards context. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 310–334. Oxford: Oxbow Books.
Parkinson, W. A. and Duffy, P. R. (2007) Fortifications and Enclosures in European Prehistory: A Cross-Cultural Perspective. *Journal of Archaeological Research* 15(2): 97–141.
Paynter, R. (1989) The Archaeology of Equality and Inequality. *Annual Review of Anthropology* 18(1): 369–399.
Peelen, M. V. and Downing, P. E. (2007a) The neural basis of visual body perception. *Nature Reviews Neuroscience* 8(8): 636–648.
Peirce, C. S. (1902) Logic as semiotic: The theory of signs. *Philosophical writings of Peirce*.
Perlès, C. (1987) *Les industries lithiques taillées de Franchthi (Argolide Grèce) 3: Du néolithique ancien au néolithique final*. Excavation at Franchthi Cave, facicule.
Perlès, C. (1990) *Excavations at Franchthi cave, Greece. Les Industries lithiques taillées de Franchti (Argolide, Grèce): Tome II Les industries du Mésolithique et du Néolithique initial. Fascicle 5*. Bloomington: Indiana University Press.
Perlès, Catherine. (1999) Long-term perspectives on the occupation of the Franchthi Cave: Continuity and discontinuity. *British School at Athens Studies*, 311–318.
Perlès, C. (2001) *The early Neolithic in Greece: the first farming communities in Europe*. Cambridge: Cambridge University Press.
Perlès, C., Takaoğlu, T. and Gratuze, B. (2011) Melian obsidian in NW Turkey: Evidence for early Neolithic trade. *Journal of Field Archaeology* 36(1): 42–49.
Pettay, J. E., Helle, S., Jokela, J., and Lummaa, V. (2007) Natural Selection on Female Life-History Traits in Relation to Socio-Economic Class in Pre-Industrial Human Populations. *PLoS ONE*. 2(7).

Philaniotou, O. (2008) Naxos, Tsikniades: an early Cycladic cemetery. In Brodie, N., Doole, J., Gavalas, G., and Renfrew C. (eds) *Horizon: A colloquium on the prehistory of the Cyclades*: 195–207. Oxford: Oxbow Books.
Philaniotou, O. (2017a) Figurines from Potamia on Epano Kouphonisi (Pandelistsavaris property). In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 171-182. Oxford: Oxbow Books.
Philaniotou, O. (2017b) Figurines from the cemetery of Tsikniades, Naxos. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 263-271. Oxford: Oxbow Books.
Philaniotou, O., Bassiakos, Y. and Georgakopoulou, M. (2011) Early Bronze Age copper smelting on Seriphos (Cyclades, Greece). In Betancourt, P. P., and Ferrence, S. C. (eds) *Metallurgy: Understanding How, Learning Why, Studies in Honor of James D. Muhly*: 157-64. Philadelphia: INSTAP Academic Press.
Phoca-Cosmetatou, N. (2008) Economy and occupation in the Cyclades during the Late Neolithic: the example of Ftelia, Mykonos. In Brodie, N., Doole, J., Gavalas, G., and Renfrew C. (eds) *Horizon: A colloquium on the prehistory of the Cyclades*: 37–41. Oxford: Oxbow Books.
Phoa-Cosmetatou, N. (2011a) *Initial occupation of the Cycladic islands in the Neolithic: strategies for survival*. In Phoca-Cosmetatou, N. (ed.) *The first Mediterranean islanders: initial occupation and survival strategies*. University of Oxford School of Archaeology.
Phoca-Cosmetatou, N. (2011b) *The first Mediterranean islanders: initial occupation and survival strategies*. University of Oxford School of Archaeology.
Piaget, J. and Frye, N. (1971) *Structuralism*. New York: Harper & Row.
Piccinini, G. (2009) Computationalism in the Philosophy of Mind. *Philosophy Compass* 4(3): 515–532.
Piccinini, G. and Scarantino, A. (2010) Computation vs. information processing: why their difference matters to cognitive science. *Studies in History and Philosophy of Science Part A* 41(3): 237–246.
Piccinini, G. and Scarantino, A. (2011) Information processing, computation, and cognition. *Journal of Biological Physics* 37(1): 1–38.
Pitt, D. (2018) "Mental Representation", *The Stanford Encyclopedia of Philosophy* (Winter 2018 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/win2018/entries/mental-representation/>.
Premack, D. and Woodruff, G. (1978) Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences* 1(04): 515.
Price, T. D., and Feinman, G. M. (2010) *Pathways to power: new perspectives on the emergence of social inequality*. New York: Springer.
Ramachandran, V. S. and Hirstein, W. (1999) The science of art: A neurological theory of aesthetic experience. *Journal of Consciousness Studies* 6(6–7): 15–41.
Rambach, J. (2017) Schematic Marble figurines from secure Early Cycladic I grave contexts on the islands of Ano Kouphonisi, Antiparos, Dhespotiko, Naxos, Paros and Siphnos. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 65–87. Oxford: Oxbow Books.
Ramsey, C. B., Renfrew, C., and Boyd, M. J. (2013) The Radiocarbon Determinations. In Renfrew, C., Philaniotou, O., Brodie, N. J., Gavalas, G. and Boyd, M. J. (eds.) *The settlement at Dhaskalio: The sanctuary of Keros and the origins of Aegean ritual practice, the excavations of 2006-2008* vol. I. Oxford: Oxbow Books.
Reader, S. M. and Laland, K. N. (2002) Social intelligence, innovation, and enhanced brain size in primates. *Proceedings of the National Academy of Sciences* 99(7): 4436–4441.

Reid, V. M., Dunn, K., Young, R. J., Amu, J., Donovan, T., and Reissland, N. (2017) The Human Fetus Preferentially Engages with Face-like Visual Stimuli. *Current Biology* 27(12): 1825-1828.
Reingruber, A. (2011) Early Neolithic settlement patterns and exchange networks in the Aegean. *Documenta Praehistorica*, *38*, 291–306.
Reingruber, A., & Thissen, L. (2005) 14C database for the Aegean catchment (eastern Greece, southern Balkans and western Turkey) 10,000–5500 cal BC. *How Did Farming Reach Europe*, 295–327.
Renfrew, C. (1969) The Development and Chronology of the Early Cycladic Figurines. *American Journal of Archaeology*, 73(1): 1–32.
Renfrew, C. (1987) Dhaskalio Kavos as symbolic attractor. In Renfrew, C., Doumas, C., Marangou, L., and Gavalas, G. (eds) *Keros, Dhaskalio Kavos the investigations of* 1987-1988: 429–42. Oxford: Oxbow Books.
Renfrew, C. (1991) *The Cycladic spirit: masterpieces from the Nicholas P. Goulandris Collection*. London: Thames and Hudson.
Renfrew, C. (1996) The sapient behaviour paradox: how to test for potential. In Mellars, P., and Gibson, K. R. (eds) *Modelling the early human mind*: 11–14. Cambridge: McDonald Institute for Archaeological Research.
Renrew, C. (2001) Symbol before concept: material engagement and the early development of society' In Ian Hodder (ed) *Archaeological Theory Today*: 122-140. Oxford: Blackwell.
Renfrew, C. (2004) Towards a theory of material engagement. In DeMarrais, E., Gosden C., and Renfrew, C. (eds) *Rethinking materiality: The engagement of mind with the material world*: 23–31. Oxford: Oxbow Books.
Renfrew, C. (2007) Radiocarbon dates and absolute chronology. In Renfrew, C., Doumas, C., Marangou, L., and Gavalas, G. (eds) *Keros, Dhaskalio Kavos: The investigations of 1987-88.* Cambridge: McDonald Institute for Archaeological Research.
Renfrew, C. (2008) Neuroscience, evolution and the sapient paradox: the factuality of value and of the sacred. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 363(1499): 2041–2047.
Renfrew, C. (2011) *The emergence of civilisation: the Cyclades and the Aegean in the third millennium BC*. Oxford: Oxbow Books.
Renfrew, C. (2013) The sanctuary at Keros: Questions of materiality and monumentality. *Journal of the British Academy* 1: 187–212.
Renfrew, C. (2017a) Early Cycladic sculpture: Issues of provenance, terminology and classification. In Marthari, M., Renfrew, C., and Boyd, M. (eds) *Early Cycladic Sculpture in Context*: 1-12. Oxford: Oxbow Books.
Renfrew, C. (2017b) 'The Sculptures of Neolithic Saliagos' In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 23–29. Oxford: Oxbow Books.
Renfrew, C. (2018) The Conclusions of the 2006-2008 Project. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., and Boyd, M. J. (eds) *The marble finds from Kavos and the archaeology of ritual*: *The sanctuary of Keros and the origins of Aegean ritual practice: The Excavations of 2006-2008* vol. III: 547–558. Oxford: Oxbow Books.
Renfrew, C., & Aspinall, A. (1990) Aegean obsidian and Franchthi cave. *Les Industries Lithiques Taillées de Franchthi (Argolide, Grèce). Les Industries Du Mésolithique et Du Néolithique Initial, Excavations at Franchthi Cave, Fasc*, *5*, 257–270.
Renfrew, C., Doumas, C., Marangou, L., and Gavalas, G. (2007) *Keros, Dhaskalio Kavos: The investigations of 1987-88.* Cambridge: McDonald Institute for Archaeological Research.
Renfrew, C. Philaniotou, O., Brodie, N., Gavalas, G., Margaritis, E., French, C. and Sotirakopoulou, P. (2007) Keros: Dhaskalio and Kavos, early Cycladic Stronghold and Ritual

Centre. Preliminary Report of 2006 and 2007 seasons. *The Annual of the British School at Athens* 102: 103–136.
Renfrew, C. Philaniotou, O., Brodie, N. and Gavalas, G. (2009) The Early Cycladic settlement at Dhaskalio, Keros: preliminary report of the 2008 excavation season. *The Annual of the British School at Athens* 104: 27–47.
Renfrew, C., Boyd, M. and Ramsey, C. B. (2012) The oldest maritime sanctuary? Dating the sanctuary at Keros and the Cycladic Early Bronze Age. *Antiquity* 86(331): 144–160.
Renfrew, C., Philaniotou, O., Brodie, N. J., Gavalas, G. and Boyd, M. J. (2013) *The settlement at Dhaskalio: The sanctuary of Keros and the origins of Aegean ritual practice, the excavations of 2006-2008* vol. I. Oxford: Oxbow Books.
Renfrew, C. and Nymo, G. (2015) The Other Finds from the Special Deposit South: The Pebbles. in Renfrew, C., Philaniotou, O., Brodie, N. J., Gavalas, G. and Boyd, M. J. (eds) *Kavos and the special deposits: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008.* Vol. II: 326–329. Oxford: Oxbow Books.
Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G. and Boyd, M. J. (2015a) *Kavos and the special deposits: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008. Vol. II*. Oxford: Oxbow Books.
Renfrew, C., Molloy, B., Kersel, M., Boyd, M. J., and Sotirakopoulou, P. (2015b) Formation and Use of the Special Deposit South. in Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G. and Boyd, M. J. (eds) *Kavos and the special deposits: The sanctuary on Keros and the origins of Aegean ritual practice: the excavations of 2006-2008. Vol. II*. Oxford: Oxbow Books
Renfrew, C., Philaniotou, O., Brodie, N. J., Gavalas, G. and Boyd, M. J. (2018a) *The marble finds from Kavos and the archaeology of ritual*: *The sanctuary of Keros and the origins of Aegean ritual practice: The Excavations of 2006-2008,* vol. III. Oxford: Oxbow Books.
Renfrew, C., Boyd, M. and Margaritis, E. (2018b) Interdisciplinary approaches to the prehistory of Keros. *Archaeological Reports* 64: 67–84.
Richter, D. K. (2003) *Facing east from Indian country: a Native history of early America*. Cambridge: Harvard University Press.
Riede, F. (2011) Adaptation and niche construction in human prehistory: a case study from the southern Scandinavian Late Glacial. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366(1566): 793–808.
Rietveld, E. and Kiverstein, J. (2014) A Rich Landscape of Affordances. *Ecological Psychology*, 26(4): 325–352.
Robb, J. (2008) Tradition and agency: human body representations in later prehistoric Europe. *World Archaeology* 40(3): 332–353.
Robb, J. (2013) Material Culture, Landscapes of Action, and Emergent Causation: A New Model for the Origins of the European Neolithic. *Current Anthropology* 54(6): 657–683.
Robb, J. and Harris, O. J. T. (2013) *The body in history: Europe from the Palaeolithic to the future*. Cambridge: Cambridge University Press.
Roberts, P. (2016) "We have never been behaviourally modern": The implications of Material Engagement Theory and Metaplasticity for understanding the Late Pleistocene record of human behaviour. *Quaternary International* 405: 8–20.
Rowley-Conwy, P. (2011). Westward Ho! The spread of agriculture from Central Europe to the Atlantic. *Current Anthropology 52*(S4): S431-S451.
Rutter, J. B. (1984) The Early Cycladic III gap: What it is and how to go about filling it without making it go away. *The Prehistoric Cyclades: Contributions to a Workshop on Cycladic Chronology*, 95–107.
Sahlins, M. D. (2013a) *What kinship is - and is not*. Chicago: The University of Chicago Press.

Sahlins, M. (2013b) On the culture of material value and the cosmography of riches. *HAU: Journal of Ethnographic Theory* 3(2): 161–195.
Sampson, A. (2002) *The neolithic settlement at Ftelia, Mykonos*. Rhodes: University of the Aegean.
Sampson, A. (2008a) The Mesolithic settlement and cemetery of Maroulas on Kythnos. In Brodie, N., Doole, J., Gavalas, G. and Renfrew, C. (eds) *Horizon: A Colloquium on the Prehistory of the Cyclades*: 13–7. Oxford: Oxbow Books.
Sampson, A. (2008b) The architectural phases of the Neolithic settlement of Ftelia on Mykonos. *Horizon A Colloquium on the Prehistory of the Cyclades. Cambridge*, 29–35.
Sampson, A. (2010) Mesolithic Greece. *Ion, Athens*.
Sampson, A. (2016) An extended Mesolithic settlement in Naxos. *Mediterranean Archaeology and Archaeometry* 16(1): 269–271.
Sampson, A. (2019) *Palaeolithic and Mesolithic sailors in the Aegean and the Near East*. Cambridge: Cambridge Scholars Publishing.
Sampson, Adamantios, Kaczanowska, M., & Kozłowski, J. (2012) Mesolithic occupations and environments on the island of Ikaria, Aegean, Greece. *Folia Quaternaria*, *80*.
Sampson, A., Kaczanowska, M., & Kozlowski, J. K. (2017) Kara Pounta on Sikinos: A Settlement of the Mesolithic in the Southern Cyclades. *Proceedings of the 3rd Cycladic International Conference Athens*.
Sampson, A. and Mastrogiannopoulou, V. (2017) Figurines from the Late Neolithic settlement of Ftelia, Mykonos. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 30-38. Oxford: Oxbow.
Sasaki, Y. Vanduffel, W., Knutsen, T., Tyler, C. and Tootell, R. (2005) Symmetry activates extrastriate visual cortex in human and nonhuman primates. *Proceedings of the National Academy of Sciences* 102(8): 3159–3163.
Schilardi, D. U. (1975) Paros, Report II: The 1973 Campaign. *Journal of Field Archaeology* 2(1–2): 83–96.
Schlinger, H. D. (2009) Theory of Mind: An Overview and Behavioral Perspective. *The Psychological Record* 59(3): 435–448.
Schep, I., & Knappett, C. (2004). Dual emergence: evolving heterarchy, exploding hierarchy. In Barrett, J. C., & Halstead, P. (eds) *The emergence of civilisation revisited.* Oxford: Oxbow Books.
Seaford, R. (2004) *Money and the early Greek mind: Homer, philosophy, tragedy*. Cambridge: Cambridge University Press.
Shanks, M. (2007) Symmetrical archaeology. *World Archaeology*, 39(4): 589–596.
Shannon, C. E. (1948) A Mathematical Theory of Communication. *Bell System Technical Journal*, 27(3): 379–423.
Shea, J. J. (2011) *Homo sapiens* Is as *Homo sapiens* Was: Behavioral Variability versus "Behavioral Modernity" in Paleolithic Archaeology. *Current Anthropology* 52(1): 1–35.
Shennan, S. (2011) Property and wealth inequality as cultural niche construction. *Philosophical Transactions of the Royal Society B: Biological Sciences* 366(1566): 918–926.
Shennan, S., Downey, S.S., Timpson, A., Edinborough, K., Colledge, S., Kerig, T., Manning, K. and Thomas, M.G. (2013) Regional population collapse followed initial agriculture booms in mid-Holocene Europe. *Nature Communications*, 4: 2486.
Shennan, S. (2018) *The First Farmers of Europe: An Evolutionary Perspective* (1st ed.). Cambridge: Cambridge University Press.
Sherratt, S. (2000) *Catalogue of Cycladic antiquities in the Ashmolean Museum: the captive spirit*. Oxford: Oxford University Press.
Shorey, P. (1910) The Meaning of ΚΥΚΛΟΣ in Plato, Rep. 424 A. *Classical Philology* 5(4): 505–507.

Shryock, A., Smail, D. L. and Earle, T. K. (2012) *Deep history: the architecture of past and present*. Berkeley: University of California Press.
Silver, M. and Di Paolo, E. (2006) Spatial effects favour the evolution of niche construction. *Theoretical Population Biology* 70(4). 387–400.
Smail, D. L. (2008) *On deep history and the brain*. Berkeley: University of California Press.
Smith, B. D. (2011) A Cultural Niche Construction Theory of Initial Domestication. *Biological Theory*, 6(3): 260–271.
Smith, B. D. and Zeder, M. A. (2013) The onset of the Anthropocene. *Anthropocene* 4: 8–13.
Sotirakopoulou, P. (1990) The earliest history of Akrotiri: The late Neolithic and Early Bronze Age phases. *Thera and the Aegean World III*, *3*, 41–47.
Sotirakopoulou, P. (2005) *The 'Keros Hoard' , myth or reality? Searching for the lost pieces of a puzzle*. Los Angeles: The J. Paul Getty Museum.
Sotirakopoulou, P. (2008) Dhaskalio Kavos, Keros: The Pottery from the Investigations of the 1960s in Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon, A Colloquium on the Prehistory of the Cyclades*: 115–120. Oxford: Oxbow Books.
Sotirakopoulou, P. I. (2016) *The pottery from Dhaskalio: The sanctuary of Keros and the origins of Aegean ritual practice, the excavations of 2006-2008,* vol. IV. Oxford: Oxbow Books
Sotirakopoulou, P., Renfrew, C. and Boyd, M. J. (2017) Selected sculptural fragments from the Special Deposit North at Kavos on Keros. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 345-368. Oxford: Oxbow Books.
Spiridon, M., Fischl, B. and Kanwisher, N. (2006) Location and spatial profile of category-specific regions in human extrastriate cortex. *Human Brain Mapping* 27(1): 77–89.
Sterelny, K. (2007) Social intelligence, human intelligence and niche construction. *Philosophical Transactions of the Royal Society B: Biological Sciences* 362(1480): 719–730.
Sterelny, K. (2010) Minds: extended or scaffolded? *Phenomenology and the Cognitive Sciences*, 9(4): 465–481.
Sterelny, K. and Watkins, T. (2015) Neolithization in Southwest Asia in a Context of Niche Construction Theory. *Cambridge Archaeological Journal* 25(03): 673–691.
Stiner, M. C., & Munro, N. D. (2011). On the evolution of diet and landscape during the Upper Paleolithic through Mesolithic at Franchthi Cave (Peloponnese, Greece). *Journal of Human Evolution*, *60*(5), 618–636.
Stirner, M. C., Earle, T., Smail, D. L., & Shryock, A. (2012) Scale. In Shryock, A. and Smail, D. L. (eds) *Deep history: the architecture of past and present.* Berkeley: University of California Press.
Stone, V. E. (2006) Theory of mind and the evolution of social intelligence. In Cacioppo, J. T., Visser, P. S., Pickett, C. L., & Berntson, G. G. (eds) *Social neuroscience: People thinking about thinking people*: 103–129. Cambridge: MIT Press.
Stotz, K. (2010) Human nature and cognitive–developmental niche construction. *Phenomenology and the Cognitive Sciences* 9(4): 483–501.
Strasser, T. F., Panagopoulou, E., Runnels, C. N., Murray, P. M., Thompson, N., Karkanas, P., McCoy, F. W., & Wegmann, K. W. (2010) Stone Age seafaring in the Mediterranean: Evidence from the Plakias region for Lower Palaeolithic and Mesolithic habitation of Crete. *Hesperia*, 145–190.
Tainter, J. A. (2011) *The collapse of complex societies*. Cambridge: Cambridge University Press.
Takaoğlu, T. (2004) Interactions in the fifth millennium BC eastern Aegean: New evidence. *Anatolia Antiqua. Eski Anadolu*, *12*(1), 1–6.
Takaoğlu, T. (2005) *A Chalcolithic marble workshop at Kulaksızlar in western Anatolia: An analysis of production and craft specialization*. Archaeopress.
Takaoğlu, T. (2016) Chalcolithic marble working at Kulaksızlar in western Anatolia. *TUBA-AR*, *5*(1).

Talalay, L. E. (1991) Body imagery of the ancient Aegean. *Archaeology* 44(4): 46–49.
Talalay, L. E. (2018) *Deities, Dolls, and Devices: Neolithic Figurines From Franchthi Cave, Greece, Fascicle 9, Excavations at Franchthi Cave, Greece*. Bloomington: Indiana University Press.
Tambakopoulos, D. and Maniatis, Y. (2017) The marble of the Cyclades and its use in the early Bronze Age. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 467–482. Oxford: Oxbow Books.
Tambakopoulos, D. and Maniatis, Y. (2018) The Provenance of the Marble Artefacts. In Renfrew, C., Philaniotou, O., Brodie, N., Gavalas, G., and Boyd, M. J. (eds) *The Marble Finds from Kabos and the Archaeology of Ritual: The sanctuary on Keros and the origins of Aegean ritual practice* vol. III: 355-431. Oxford: Oxbow Books.
Taylor, J. C., Wiggett, A. J. and Downing, P. E. (2007) Functional MRI Analysis of Body and Body Part Representations in the Extrastriate and Fusiform Body Areas. *Journal of Neurophysiology* 98(3): 1626–1633.
Televantou, C. A. (2008) Strofilas: a Neolithic settlement on Andros. In Brodie, N., Doole, J., Gavalas, G., and Renfrew, C. (eds) *Horizon: A Colloquium on the Prehistory of the Cyclades*: 43–53. Oxford: Oxbow Books.
Televantou, C. A. (2017) Figurines from Strophilas, Andros. In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 39–51. Oxford: Oxbow Books.
Tichy, R. (2000) Expedice Monoxylon II: diabany clun v neolitu západního Stredmorí. *Rekonstrukce a Experiment v Archeologii*, *1*, 37–70.
Tomasello, M. Carpenter, M., Call, J., Behne, T. and Moll, H. (2005) Understanding and sharing intentions: The origins of cultural cognition. *Behavioral and Brain Sciences* 28(05): 675-691.
Tomasello, M. (2014) *A natural history of human thinking*. Cambridge: Harvard University Press.
Tomasello, M. and Carpenter, M. (2007) Shared intentionality. *Developmental Science* 10(1): 121–125.
Tomasello, M. and Rakoczy, H. (2003) What Makes Human Cognition Unique? From Individual to Shared to Collective Intentionality. *Mind and Language* 18(2): 121–147.
Toth, N. and Schick, K. (2018) An overview of the cognitive implications of the Oldowan Industrial Complex. *Azania: Archaeological Research in Africa* 53(1): 3–39.
Trautmann, T., Feeley-Harnik, G. and Mitani, J. C. (2011) Deep kinship. In Shryock, A. and Smail, D. L. (eds) *Deep history: the architecture of past and present*: 160–188. Berkeley: University of California Press.
Trevarthen, C. (1979) Communication and cooperation in early infancy: A description of primary intersubjectivity. *Before speech: The beginning of interpersonal communication* 1: 530–571.
Trevarthen, C. H. and Hubley, P. (1978) Secondary intersubjectivity: confidence, confiding and acts of meaning in the first year. In *Lock, A. (Ed.) Action, Gesture and Symbol: the emergence of language*. London: Academic Press.
Tsountas, C. (1898) Kykladika. *Archaiologiki Ephemeris,* 1898: 137-212.
Tsountas, C. (1899) Kykladika II. *Archaiologiki Ephemeris*, 1899: 73-134.
Tuan, Y.F. (2011) *Space and place: the perspective of experience*. Minneapolis: University of Minnesota Press.
Tzalas, C. H. (1989) O dromos tou opsidianou me ena papyrenio skaphos stis Kyklades. *Archaeologia*, *32*, 11–20.
van Andel, T. H., & Runnels, C. N. (1995) The earliest farmers in Europe. *Antiquity*, *69*(264), 481–500.
van Andel, T. H., Zangger, E. and Demitrack, A. (1990) Land Use and Soil Erosion in Prehistoric and Historical Greece. *Journal of Field Archaeology* 17(4): 379–396.
Van de Noort, R. (2004) An ancient seascape: The social context of seafaring in the early Bronze Age. *World Archaeology*, *35*(3), 404–415.

Varela, F. J., Thompson, E. and Rosch, E. (2000) *The embodied mind: cognitive science and human experience*. Cambridge: MIT Press.
Viveiros De Castro, E. (2012) The Gift and the Given: Three Nano-essays on Kinship and Magic. In Bamford, S. C. and Leach, J. (eds) *Kinship and beyond: the genealogical model reconsidered*: 237–268. New York: Berghahn Books.
Voland, E. (1995) Reproductive Decisions Viewed from an Evolutionary Informed Historical Demography. In Dunbar, R. I. M. (ed) *Human Reproductive Decisions*: 137–159. London: Macmillan Education UK.
Voutiropoulos, N. (2002) The Polychrome Ware from Ftelia. In Sampson, A. (ed) *The Neolithic Settlement at Ftelia, Mykonos.* Rhodes: University of the Aegean.
Wagstaff, M. and Cherry, J. F. (1982) Settlement and population change. In Renfrew, C., and Wagstaff, J. M. (eds) *An Island Polity. The archaeology of exploitation in Melos*: 136–155. Cambridge: Cambridge University Press.
Wagstaff, J. M., & Renfrew, C. (1982) *An island polity: The archaeology of exploitation in Melos*. Cambridge: Cambridge University Press.
Walls, M. (2018) The Bow and Arrow and Early Human Sociality: an Enactive Perspective on Communities and Technical Practice in the Middle Stone Age. *Philosophy & Technology* 32(2): 265-281.
Warren, P. and Hankey, V. (1989) *Aegean Bronze Age chronology*. Bristol: Bristol Classical Press.
Watts, C. (2008) On Mediation and Material Agency in the Peircean Semeiotic. In Knappett, C. and Malafouris, Lambros (eds) *Material agency: towards a non-anthropocentric approach*: 187–207. New York: Springer.
Wengrow, D. and Graeber, D. (2015) Farewell to the "childhood of man": ritual, seasonality, and the origins of inequality. *Journal of the Royal Anthropological Institute* 21(3): 597–619.
Whitelaw, T. M. (1983) The settlement at Fournou Korifi Myrtos and aspects of Early Minoan social organization. *Minoan Society*, *323*, 345.
Whitelaw, T. M. (1991) Investigations at the Neolithic sites of Kephala and Paoura. *Landscape Archaeology as Long-Term History: Northern Keos in the Cycladic Islands from Earliest Settlement until Modern Times*, 199–216.
Whitelaw, T. (2004) Alternative pathways to complexity in the southern Aegean. In Barrett, J. C., and Halstead, P. (eds) *The emergence of civilisation revisited*: 232–56. Oxford: Oxbow Books.
Whiten, A. and Byrne, R. W. (1997) *Machiavellian intelligence II: extensions and evaluations*. Cambridge: Cambridge University Press.
Wiessner, P. W. and Schiefenhövel, W. (1998) *Food and the status quest: an interdisciplinary perspective*. Providence: Berghahn Books.
Wilson, D. E. (2017) *The Cycladic Marble Figurines from EBII Ayia Irini, Kea.* In Marthari, M., Renfrew, C., and Boyd, M. J. (eds) *Early Cycladic sculpture in context*: 94-102. Oxford: Oxbow Books.
Withagen, R. and van Wermeskerken, M. (2010) The Role of Affordances in the Evolutionary Process Reconsidered: A Niche Construction Perspective. *Theory & Psychology* 20(4): 489–510.
Witmore, C. (2014) Archaeology and the New Materialisms. *Journal of Contemporary Archaeology*, 1(2): 203–246.
Wijnen, M. H. J. M. N. (2014) *The early neolithic I settlement at sesklo: An early farming community in Thessaly, Greece*. Modderman Stichting 15-05-2014.
Wilson, D. E. (1999) *Ayia Irini: Periods I-III: the Neolithic and Early Bronze Age Settlements*. Mainz on Rhine: P. von Zabern.

Woodward, A. L. (1998) Infants selectively encode the goal object of an actor's reach. *Cognition* 69(1): 1–34.
Wright, J., Jones, C. and Flecker, A. (2002) An ecosystem engineer, the beaver, increases species richness at the landscape scale. *Oecologia* 132(1): 96–101.
Wynn, T. *et al.* (2011) "An ape's view of the Oldowan" revisited. *Evolutionary Anthropology: Issues, News, and Reviews* 20(5): 181–197.
Wynn, T. and Coolidge, F. L. (2011) The Implications of the Working Memory Model for the Evolution of Modern Cognition. *International Journal of Evolutionary Biology*: 1–12.
Wynn, T. and Coolidge, F. L. (2014) Technical cognition, working memory and creativity. *Pragmatics & Cognition* 22(1): 45–63.
Zachos, K. (1990) The Neolithic period in Naxos. *Cycladic Culture: Naxos in the 3rd Millennium BC*, 29–38.
Zapheiropoulou, P., Renfrew, C., Doumas, C., Marangou, L., & Gavalas, G. (2007) The 1967 rescue project. *Keros, Dhaskalio, Kavos: The Invesigations of 1987*, *88*, 30–32.
Zapheiropoulou, P. (2008) Early Bronze Age cemeteries of the Kampos Group on Ano Kouphonisi. In Brodie, N., Doole, J., Gavalas, G. and Renfrew, C. (eds) *Horizons: A Colloquium on the Prehistory of the Cyclades*: 183–194. Oxford: Oxbow Books.
Zapheiropoulou, P. (2017) The Complete FAF Sculpture of Spedos Variety from Dhaskalio Kavos on Keros. In Marthari, M., Renfrew, C. and Boyd, M. J. (eds) *Early Cycladic Sculpture in Context*: 335–344. Oxford: Oxbow Books.
Zilhão, J. (1993) The spread of agro-pastoral economies across Mediterranean Europe: A view from the far west. *Journal of Mediterranean Archaeology*, *6*(1), 5–63.
Κοντολέων, N. M. (1971) *Ανασκαφή Νάξου υπό Νικολάου Μ. Κοντολέοντος (πίν. 149-162)*.
Στέφανος, Κ. (1912). Εργασίαι εν Νάξω. Η εν Αθήναις Αρχαιολογική Εταιρεία.

“You mathematicians and Glass Bead Game players,” he would say, “have distilled a kind of world history to suit your own tastes. It consists of nothing but the history of ideas and of art. Your history is bloodless and lacking reality. You know all about the decay of Latin syntax in the second or third centuries but don’t know a thing about Alexander, or Caesar or Jesus Christ. You treat world history as a mathematician does mathematics, in which nothing but laws and formulas exist, no reality, no good and evil, no time, no yesterday, no tomorrow, nothing but an eternal, shallow mathematical present… Of course one should bring order into history,” Jacobus thundered. “Every science is, among other things, a method of ordering, simplifying, making the indigestible digestible for the mind. We think we have recognised a few laws in history and try to apply them to our investigations of historical truth. Suppose an anatomist is dissecting a body. He does not confront wholly surprising discoveries. Rather, he finds beneath the epidermis a congeries of organs, muscles, tendons, and bones which generally conform to a pattern he has brought to his work. But if the anatomist sees nothing but his pattern, and ignores the unique, individual reality of his object, then he is a Castalian, a Glass Bead Game player; he is using mathematics on the least appropriate object. I have no quarrel with the student of history who brings to his work a touchingly childish, innocent faith in the power of our minds and our methods to order reality; but first and foremost he must respect the incomprehensible truth, reality and uniqueness of events. Studying history, my friend, is no joke and no irresponsible game. To study history one must know in advance that one is attempting something fundamentally impossible, yet necessary and highly important. To study history means submitting to chaos and nevertheless retaining faith in order and meaning. It is a very serious task, young man, and possibly a tragic one.”

-Herman Hesse (The Glass Bead Game)