An Archaeological Typology of 10,000 Aegean and Anatolian Fibulae c. 1200 - 400 BC

Volume 1: Text

Maximilian S. L. Buston

DPhil in Archaeology

25th April 2019

Kellogg College

University of Oxford

An Archaeological Typology of 10,000 Aegean and Anatolian Fibulae c. 1200 - 400 BC

Abstract Maximilian S. L. Buston DPhil in Archaeology

Kellogg College Hilary 2019

Archaeology involves the comparison of one thing with another, using intuition or measurements to distinguish variation at different levels of detail. This thesis makes the case for the centrality of typology, the relations between things, to archaeological theory, advancing a multi-layered typology designed to analyse different kinds of question. I define three levels: the ‘variant’, useful to study production, the ‘group’, meaningful for consumption, and the ‘super-group’, relevant to identity. By contrast, traditional typologies, fixed and mono-level, tend to mask information they render impossible to analyse. My typology replaces the seminal work of Blinkenberg (1926) *Fibules Grecques et Orientales* as well as combining several regional *Prähistorische Bronzefunde* typologies (Caner 1983; Kilian 1975; Sapouna-Sakellarakis 1978) into one scheme. The work incorporates 10,000 fibulae from the Aegean and Anatolia into 1,202 variants, 259 groups, and 53 super-groups from the 12th to the 5th century BC.

The first half of the thesis presents the historiography of fibula study, the new typology, and the nominal data. Notable is the dramatic increase in fibula count and diversity in the 8th and 7th century, as well as shift from cemetery to sanctuary dedications, followed by their all but total disappearance by the 6th century. The second half is concerned with style, degrees of similarity, and what stylistic variation is for. A network analysis of shared-presence is shown to be subject to serious flaws; whilst an export network based on a manufacture test is much more promising. A diversity analysis of site assemblages and profile-group variation is employed to reveal divergences of use, practice, and dress style. Why the variety in the 8th and 7th century? An argument is advanced that variety is produced to achieve humankind’s ends as loci of distributed personhood and cognition. I end with positing the part fibulae played in the various subsystems of extended minds.

Preface

When Professor Cyprian Broodbank brought the question of Greek fibulae to my attention in his then office at Gordon Square, University College London, in 2011, little did I know what I was getting into. The next time I saw him we concluded that one cannot only look at pins. Well, I am not looking at pins, the straight-pins that Jacobsthal (1956) and Kilian-Dirlmeier (1984) carefully documented, and I am not simply looking at fibulae either. The main drive of this thesis is typology, the sorting and measurement of archaeological units, and how almost all archaeological work is built on the comparison of one thing from another based on complex but often overlooked levels of stylistic similarity. If the archaeologist loses sight of the theoretical issues of typology, the advances elsewhere are undermined.

Volume 1 presents the main text of the thesis. Volume 2 contains the typological descriptions, large charts, and Appendices A-F. Volume 3 is the fibula catalogue, Appendix G.

Acknowledgements

Special thanks go to my two supervisors, Professors James Whitley and Irene Lemos, who have supported me continuously since my project began seven years ago. They have been a dream team. A similar statement can be made about my distinguished examiners: Professors Chris Gosden and Marie-Louis Sørensen; and assessors: Dr Lisa Bendall, Dr Dan Hicks, Dr Linda Hulin, and Dr Peter Stewart.

I am also indebted to the A. G. Leventis Foundation for without whose support this work would never have begun. Kellogg College for its invaluable scholarship and travel grants, as well as the Vronwy Hankey Memorial Fund for Aegean Studies. Numerous scholars assisted me at various museums: Dr Anja Ulbrich and Dr Marianne Bergeron at the Ashmolean, Ms Alexandra Chatzipanagiotou at the National Archaeological Museum of Athens, and Dr Matthew Haysom at the Knossos Stratigraphic Museum. Thanks also go to the School Administrator at the British School at Athens, Mrs Tania Gerousi, for obtaining the necessary permits to study material from the Argive Heraion and Knossos North Cemetery.

I happily thank Stephen Buston and Melena Meese for proof-reading the text. I also need to thank Polly Buston for lending me her copy of *Hart's Rules* and proofing the abstract. Many deserve thanks at Oxford: the DPhil programme director, Dr David Griffiths; the typologist of fibulae at Veii, Dr Judith Toms, whom I had many good conversations and comparative sessions discussing our typologies; Dr ZhiMin Xiao for introducing me to LyX and Mr Iain Campbell to FileMaker Pro and Tableau; the Dean of Kellogg College, Dr Alistair Ross, and the Academic Administrator, Ms Sarah O'Brien, for their guidance whilst I was Junior Dean.

Though it was Professor Cyprian Broodbank who was the first to suggest the topic, it was Dr Corinna Riva and Professor Todd Whitelaw who provided the critique of my MA thesis necessary to formulate this DPhil research.

Contents

List of Figures

List of Tables

Abbreviations

#	Unique fibula number given in Appendix G (Volume 3)
B	Blinkenberg's code
BF	Bronzo Finale
Blinkenberg	Blinkenberg 1926
BM	Bronzo Medio
Bz	Bronzezeit
C	Caner's code
Caner	Caner 1983
CG	Cypriot-Geometric
CP	Catch-plate
EG	Early-Geometric
EO	Early-Orientalising
EPG	Early-Protogeometric
G	Geometric
Ha	Hallstatt
K	Kilian's code
Kilian	Kilian 1975
Kilian-Dirlmeier	Kilian-Dirlmeier 2002
LC	Late-Cypriot
LG	Late-Geometric

LH	Late-Helladic
LM	Late-Minoan
LPG	Late-Protogeometric
MG	Middle-Geometric
MPG	Middle-Protogeometric
PF	Profile
P-F	Primo Ferro
PGB	Protogeometric-B
ProtoC	Protocorinthian
S-S	Sapouna-Sakellarakis's code
Sapouna-Sakellarakis	Sapouna-Sakellarakis 1978
SM	Submycenaean / Subminoan
SPG	Subprotogeometric
SubG	Subgeometric
XS	Cross-section

Whilst abbreviations are generally avoided, the American Journal of Archaeology's abbreviations of titles of standard reference works, journals, and book series are occasionally employed.

All dates are in BC unless otherwise noted.

Chapter 1

Introduction & Historiography

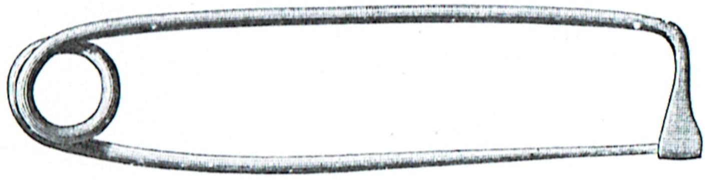
1.1 Introduction

In 1926 Christian Blinkenberg, then director of the National Museum of Denmark, published *Fibules Grecques et Orientales* (Blinkenberg 1926). This landmark work documented some 2,434 fibulae in 206 types, providing scholars a comprehensive typology that showed a dizzying amount of fibula variation from the Eastern Mediterranean. The primary function of a fibula (Figure: 1.1) is to fasten, and they have obvious parallels with the modern safety pin (Figure: 1.2). Blinkenberg's work appeared to settle the question of fibulae in terms important at the time, namely a chronological and ethnic ordering; '*épirotes*', '*thessaliens*', '*helladiques*', and so on (Blinkenberg, 16). A century on these foundations appear rather shaky, and yet superseding Blinkenberg's work appeared for some an insurmountable task (Catling and Catling 1980, 234). Although more recent work, notably by the *Prähistorische Bronzefunde* series, has filled in some gaps, there has not been any real effort toward explanation (Caner 1983; Kilian 1975; Sapouna-Sakellarakis 1978; Snodgrass 1976). There is no explanation as to why there are gaps geographically, no answer as to why there is so much variety, and no analysis of their meaning or value. Yet, it is now becoming clear that the variation in fibulae rested not

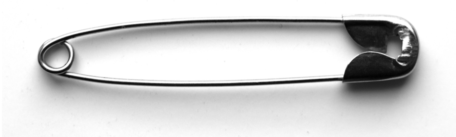
Figure 1.1: The parts of a fibula (adapted from Kilian-Dirlmeier 2002, 37, Pl. 36, No. 521).

only in their style, but in their use, function, and meaning. The use of fibulae was culturally and regionally specific.

It is not only that a new synthesis of Aegean and Anatolian fibulae is overdue that warrants their re-examination, but rather that fibulae are an immeasurably undervalued source of information. For fibulae are identity-laden artefacts possessing multiple layers of meaning that can provide a glimpse at the systems and agency of daily life (cf. Gleba 2017; Martin 2015). Uncovering this information requires a new kind of typology, one that extends beyond the traditional typology that is fixed and mono-level. By traditional, I mean a typology where each object fits into only one category that can be used to answer only one kind of question, usually chronology (Adams and Adams 1991, 8-11; Clarke 1978, 35-7; Klejn 1982, 5-10; Sørensen 2014, 251; 2015a, 88). A new typology must look at how different levels of typological detail can provide information of different orders (cf. Binford 1962, 219). Specifically, I aim to create a typology fit to classify objects in multiple ways from the perspective of the craftsman, the consumer, and their cultural groups; it is flexible and multi-level. This new typology is the first of three major aims of the thesis; ultimately, 10,282 fibulae were recorded and each assigned three out of 1,202 variants as defined in Plates: 1-129. The second is to bring up-to-date the distribution



(a) A1.Ia.2b, #3, late-13th century violin bow fibula from Mycenae T.8, scale 1:1 (Montelius 1912, 158, Fig. 355).



(b) A modern safety pin, not to scale (Source: Author).

Figure 1.2: Early violin bow fibula and modern safety pin.

of fibulae and their regional interconnections. The third is to explain, after their gradual introduction from the late-13th century, their value and rise to popularity in the 8th and 7th century before their unexplained decline in use after the 6th.

Fibulae were a new technology that came about with the invention of the spring. Several scholars place this in the Alpine foothills in the 13th century (Alexander and Hopkin 1982, 406-9). The previous technology they would come to co-exist with was the pin, made of bronze, bone, and (scholars suspect for it rarely survives) wood (Lorimer 1950, 351). Pins could be fastened using string, although their long length meant this was not essential (Figure: 1.3). Like the Victorian hat-pin, the pin could used as a lethal murder weapon, as a hapless Athenian found upon his return from a failed attempt to reclaim some stolen statues in Aegina (Waterfield 1998, *Herodotus* V. 83-7; see further on page 12). The fibula had obvious advantages, namely of being quicker to fasten and having a catch-plate for protection against the needle (Alexander 1973, 185; Muscarella 1964, 36). Yet, in the Iron Age, fibulae never replaced pins (Jacobsthal 1956; Kilian-Dirlmeier 1984). In some find-spots, fibulae had a greater propensity for use than pins and vice versa, while in others they were used together. The greatest explanation seems to be cultural, and with different ways of dress across regions, the answer may lie with the elusive concept of fashion.

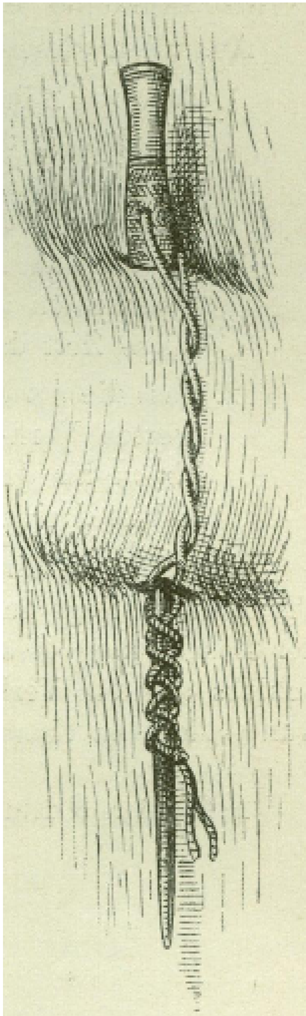


Figure 1.3: Fastening a pin with string (Lissauer 1907, 805, Fig. 58).

Figure 1.4: A brooch fibula; a bronze fibula supports an ivory plaque. FA2.Va.8c, #8807, not to scale (Coldstream and Catling 1996, Fig. 169).

Fibulae were not only for fastening clothes (Alexander 1973, 191-2). However, their use in the Aegean and Anatolia points to this. Fibulae were not only functional but also decorative, with incision along the bow or catch-plate, or formed like modern brooches, where a fibula would support a brooch or plaque (Figure: 1.4). Nevertheless, added decoration does not mean the form was not in itself decorative, indeed beautiful and beguiling, and the variation in style was astonishing. It is, however, added decoration that has drawn the attention of scholars and museums (e.g. Hampe 1971; Reisinger 1916), and the scholarship of Greek fibulae has largely paralleled scholarly paradigms. By shedding light on a few key points in the historiography, I will show how I study fibulae differently, and why a new study is needed.

At the turn of the 20th century AD almost all prominent scholars had an interest in fibulae, including Montelius (1882; 1895; 1903; 1912), Dörpfeld (1902), Furtwängler (1906; 1913), Myres (1910a; 1910b; 1913; 1914), Orsi (1913), Ridgeway (1901), and Undset (1889). Fibulae were seen as a residue of ethnic identities and a means to explore archae-

Figure 1.5: The decorative form of a fibula from Lefkandi T.13, #1520, scale 1:1 (Popham et al. 1980, 175, Pl. 173).

ology in an evolutionary framework that Montelius and others were adopting from natural history (Almgren 1995, 23; Daniel 1943, 16). The American School's excavations of the Argive Heraion between 1891-1895 captures the developing aims of Classical Archaeology well. Whilst Waldstein (1902, 20-3) was interested in the marbles for their beauty, de Cou (1905, 191) was interested in typological development. Some 5,738 bronzes were excavated of which 3,938 cleaned:

> The patinated pieces were left untouched, together with others in which the oxides had already destroyed the bronze in whole or in part, and a considerable number of pieces which did not seem of sufficient interest to repay the trouble (de Cou 1905, 192).

Some 2,841 (49.5%) made the final publication, and the unusual inclusion of fragmentary objects is noteworthy:

> The selection and arrangement of catalogue numbers has been made with a view toward securing a continuous development from one subdivision of a type to another, and where it seemed practicable, from type to type. It is for this purpose that many objects have been entered and described which would not of themselves be of any especial value or interest (de Cou 1905, 192).

Fibulae have more often been considered a minor-art (*Kleinkunst*) or functional safety-pin, and have received little attention or been ignored altogether (e.g. Osborne 2009; Robertson

1975; Whitley 2001). This dichotomy is clear in scholarship of the 20th century AD, and Hampe's (1936) discovery of artistic hands, such as the '*Schwanmeister*', contributed to the distinction between decorated 'Boeotian fibulae' as art (Figure: 1.6), as opposed to undecorated fibulae often neglected, unrecorded, and undrawn (Hampe and Simon 1981, 111).

Hampe (1936) followed the tradition of looking to capture the spirit and individuality of ancient Greece within the paradigm that had long sought the origins of European civilisation (Bernal 1991, 281-336; Morris 1992; cf. Desborough 1972, 353). A fibula might demonstrate the *Kunstwollen*, and thus oeuvre of the 'culture' that created it (Zerner 1976, 180), or what I might now call the 'distributed mind' (cf. Gell 1998, 163, 221-3), but in the early 20th century AD was used to reaffirm the divergence between the work of the spirited West as opposed to the stasis of a shackled East (Riegl [1900] 2000, 124-7; Sherratt 1997, 44).

An extract from the *Conference on the Future of Archaeology* at the University of London in 1943 shows the dichotomy in Greek archaeology well:

> It is absurd that students should be trained to distinguish between the several masters of Attic vase-painting and the different schools of sculpture, but given no inkling of even the typological significance of unpainted wares, safety-pins and swords (Childe 1943, 25).
> At Oxford, in the four years classical course, there is little place for archaeology (Beazley 1943, 42).

Childe assailed an archaeology that immortalised a particular part of ancient Greece and its 'art', that had a special affinity in our society, to the neglect of others. An example is the series *Griechische Vasenmalerei: Auswahl Hervorragender Vasenbilder* (Furtwängler and Reichhold 1904): the plate volumes are some 715mm tall, and continue the tradition of early-18th century AD antiquarians (e.g. Millingen 1813). This tradition presented our vision, as well as the needs of our society, as much if not more than any 'society' in the ancient world. This is a lingering paradigm that, ironically, Childe (1958, 9, 81, 161)

(a) Fibula with large 'sail' catch-plate, BE3.VIb.11d, #4331 from Thebes, scale 1:2 (Hampe 1936, Pl. 15, No. 29).

(b) Fibula by the *Schwanmeister*, BE3.VIa.11d, #4315 from Thebes, scale 1:1 (Hampe 1936, Pl. 13, No. 17).

Figure 1.6: Decorated fibulae with large Sail catch-plates.

belongs, and that Beazley worked like Hampe, to 'add the significant details, the positive facts, that lent this narrative scientific authority' (Whitley 1997, 44).

The New Archaeology of the 1960s and 1970s did not bring the benefits it promised to Classical Archaeology (Binford 1965; Clarke 1973). Fibulae were never subject to a quantitative study, and, if anything, scholars became shy to offer them any kind of explanation that was not merely functional (Snodgrass 1985, 34). Museum galleries of Greek archaeology tend to show an unrepresentative sample of Sail-Boat fibulae, or rare examples made of gold or silver (an exception is the National Museum of Denmark). European prehistory galleries in the Neues Museum, British Museum, or Musée du Louvre are much more representative. This serves to highlight both the historical importance that fibula types have played in European chronologies (e.g. Bietti-Sestieri 1973; Müller-Karpe 1959; Pare 2008), and that everyday *non-Greek fibulae* do not need to 'prove themselves' as much as their 'Greek' counterparts. Only a miniscule fraction of the types presented in this thesis are found outside the museum storeroom, which is quite misleading for today's typologists.

Fibula publications of the second half of the 20th century AD document fibulae at the expense of explanation. The goal of *Prähistorische Bronzefunde* has been to document; to create a repository for scholars to explain (Jockenhövel 2016, 4). Yet, it was the typologists themselves best placed to do so, and this led to a missed opportunity. Now, in the 21st century AD, fibulae are almost forgotten: most standard books, if they mention them at all, include only a passing mention (Lemos 2002; Osborne 2009; Plantzos 2016; Wallace 2010; Whitley 2001). I am unable to explain this. Are fibulae too arcane, obscure, or perhaps not worthy of explanation? In the remainder of the chapter, allow me to introduce the evidence for fibulae before turning to the fundamental concepts of this thesis: typology, style, and variation. It is here I introduce my research questions. Thereafter, I present a more detailed historiography of fibula study and a brief overview of the period. The main methodologies of the thesis are reserved to the beginning of each subsequent chapter.

The evidence from our period is primarily from sanctuary and cemetery deposits (223 sites are recorded in Plate: 130; 10,282 fibulae are catalogued in Appendix G); however, there is also a visual and literary record. Rather than dismissing literary evidence (e.g. Brøns 2014, 62), it is actually the best available. Foremost, as with vase representations none are earlier than the 6th century, and so it is only because of the literary evidence that the placement and association of fibulae with particular parts of clothing in 8th century tombs is interpreted. Moreover, the attention given by Homer is insightful to the value fibulae possessed at the height of their popularity, archaeologically speaking, and at the time the Iliad and Odyssey were being sung, from the late-8th century (Hall 2014, 24-5; Whitley 1991, 341-3; 2001, 89):

1. 'Each man sent his herald off to bring back the presents. Antinoös' herald brought in a great robe, beautiful and elaborate, and in it were twelve double pins, golden all through, and fitted with bars that opened and closed easily' (Lattimore 1975, *Odyssey* 18. 291-4).
2. 'Still, I will tell you, in the way my heart imagines him. Great Odysseus was wearing a woollen mantle of purple, with two folds, but the pin to it was golden and fashioned with double sheathes [alternatively 'double-bowed'], and the front part of it was artfully done: a hound held in his forepaws a dappled fawn, preying on it as it struggled; and all admired it, how, though they were golden, it preyed on the fawn and strangled it and the fawn struggled with his feet as he tried to escape him. I noticed also the shining tunic that he was wearing on his body. It was like the dried-out skin of an onion, so sheer it was and soft, and shining bright as the sun shines' (Lattimore 1975, *Odyssey* 19. 224-34).
3. 'For I myself gave him his clothing, as you describe it. I folded it in my chamber, and I too attached the shining pin, to be his adornment; but I shall never welcome him home, come back again to the beloved land of his fathers. It was on a bad day for him that Odysseus boarded his hollow ship for that evil, not-to-be-mentioned Ilion' (Lattimore 1975, *Odyssey* 19. 255-9).
4. 'Aphrodite likes to beguile the women of Achaea to elope with Trojans, whom she so adores: now, fondling some Achaean girl, I fear, she scratched her slim white hand on a golden pin' (Fitzgerald 1998, *Iliad* V. 424-8).
5. 'Earl Nestor of Gerenia replied: "No Argive then can take it ill; no one will disregard him when he calls to action." With this he pulled his tunic to his waist, tied his smooth feet into good rawhide sandals, and gathered round him with a brooch his great red double mantle, lined with fleece. He picked a tough spear capped with whetted bronze and made his way along the Achaean ships' (Fitzgerald 1998, *Iliad* X. 125-33).

6. ‘Hera, having anointed all her graceful body, and having combed her hair, plaited it shining in braids from her immortal head. That done, she chose a wondrous gown, worked by Athena in downy linen with embroideries. She caught this at her breast with golden pins and girt it with a waistband, sewn all around with a hundred tassels. Then she hung mulberry-coloured pendants in her ear-lobes, and loveliness shone round her. A new head-dress white as the sun she took to veil her glory, and on her smooth feet tied her beautiful sandals’ (Fitzgerald 1998, *Iliad* XIV. 180-92).

7. ‘Nine years I stayed, and fashioned works of art, brooches and spiral bracelets, necklaces, in their smooth cave, round which the stream of Ocean flows with a foaming roar’ (Fitzgerald 1998, *Iliad* XVIII. 400-3).

There is much to learn from this evidence. First, fibulae were a well known device easily understood, and remarked upon in these passages for their special qualities, namely their golden character. The word for pin is the same as for fibulae: *περόνη*, and it is also used interchangeably with ‘brooch’ and ‘clasp’ by the translators (Lorimer 1950, 337-8; Ridgeway 1901, 567-9). Only the last, however, uses the word *πόρπαι* (brooch) instead of *περόνη* (Lemos, pers. com.). Why there was not a separate word for fibula and straight-pin is an interesting question. Perhaps fibulae were generally out of use by the time the texts were written down, or later copyists of Homer’s works did not fully understand the difference. In any case, I suggest 1, 2, 3, 5, and 7 are fibulae whilst 4 and 6 are pins. The second point is that men wear a single fibula to hold together their mantle (2, 3, and 5), and the women wear a pin, presumably straight-pins (4 and 6). Indeed, the Thessalians had a word for a chlamys fastened with a fibula (Ridgeway 1901, 557). Third, the value of a fibula is very important, coming toward the beginning of each description. Weapons come after dress; other jewellery is rarely remarked. It may be fibulae are mentioned early because they are noticeable but this is not unimportant. Fourth, Odysseus’ fibula is described in detail. The translation of ‘double sheathes’ above is by Lattimore (1975, 288) whilst another translates ‘double-bowed’ (Lawrence 1992, 192), which makes much more sense, very likely a BEδ2, which was common at the time (Plate: 38). The description of the catch-plate is a good example of *ekphrasis*, the use of an object to make a narrative (Whitley 2013a, 399). Such decoration in real examples is small and very hard to perceive; only those given permission by the wearer, or upon viewing it at a sanctuary, would be able to see the 'narrative art'. This all plays into its power of captivation that is never quite reached, hence it is telling that its efficacy is narrated by the poet. Note too, their emphasis as objects *for adornment*; appreciated as beautiful objects suited for a hero or goddess. Finally, it is not without meaning that there are more references to fibulae in Homer than later authors, consistent with the chronology of fibula and pin use attested archaeologically. I shall further remark on the date of Homer on page 285.

Visual representations of dress are almost invisible in the time between Mycenaean frescoes, and Archaic and Classical vase paintings and sculpture, and so, besides Homer (e.g. *Iliad* 14, 178-80; *Odyssey* 19, 225, 292-4), archaeologists are left with the adjunct of fibulae and pins. Naturally, fibulae have an intimate association with dress, and certain types of dress, which must be connected with their introduction, c.1250-1150 BC, and their fall from popularity, c.600-500 BC (Alexander and Hopkin 1982, 405; Blinkenberg 1926, 14; Desborough 1964, 54). The fundamental chapter remains Lorimer (1950, 336-405) and it is worth pausing on two key issues. The first is how and who wore fibulae. DeVries states fibulae 'seem to have been used, above all, for pinning the women's garment known to modern archaeologists as the "peplos"' (1972, 111). The well-known section is in Herodotus:

> [The wives] surrounded him, grabbed hold of him, and stabbed him to death with the [*περόναι*] which fastened their clothes... the only punishment they could come up with for the women was to make them change over to the Ionian style of clothing. Previously, women in Athens had dressed in the Dorian fashion... so they made them change over to a linen tunic, which did not need fastening with a [*περόναι*] (Waterfield 1998; *Herodotus* V. 87).

In fact, fibula and pin use has a sporadic regional and chronological distribution, and it is not at all clear that fibulae (as opposed to pins) were used with the peplos. Neither is it clear that fibulae were used more by women than men (e.g. Figure: 1.7a; Lemos 2002, 114). Indeed, Lorimer (1950, 337-8) makes a good case for it not being fibulae but straight-pins that were used for fastening the peplos at the shoulders, attested archaeologically and in later vase paintings (Figure: 1.7b). An extensive list of representations is now provided by Brøns (2014, 63-8; see also Abrahams 1908; Lady Evans 1893; Neils 2009). If fibulae were not the primary fastener of the peplos, were they instead used for shawls and cloaks (*chlaina* and *chlamys*)?

The second of Lorimer's (1950, 354) conclusions, is that the demise of fibulae coincides with the introduction of the popular Ionic chiton as a critical aspect of what scholars call Orientalisation, the process of Orientalising. For Pallottino (1965, 783), Orientalising was the adoption of Oriental decorative features as a side-effect of (westward) commercial expansion across a backward Mediterranean, whilst Whitley (2013b, 410-11) would emphasise acculturation, the adaptation by Greeks of selected ideas for their own purposes, but not of one but several Orientalising phenomena: 'Phoenician', 'North Syrian', and 'Egyptian' being the most obvious (Boardman 1999, 55-6; Feldman 2014, 17; Gunter 2009, 80-91; 2016, 216). Using the famous example from Zincirli (Figure: 1.8a), Lorimer argued 'the queen's dress is that which was adopted by a large part of the Greek world and came to be known as the Ionic chiton; that in the Near East from which the Greeks ultimately, perhaps in some cases directly, derived it, it had sometimes a slit in front closed by the Greek fibula' (Lorimer 1950, 354). Lorimer's questions have remained unresolved. Instead, taking fibulae with a change in dress for granted, other scholars focused on their introduction in Late-Helladic IIIB/C as key evidence for migration, speculated from the North (Alexander and Hopkin 1982, 409; Desborough 1964, 54; Lamb 1929, 31). For one scholar they were inherently 'a non-Mycenaean feature' (Desborough 1964, 56). These explanations are thus culture-historical, that is, they are based on the assumption that such material, especially personal ornaments, are inherent to particular people or ethnicities (Childe 1950, xiii-xix; Muscarella 1964, 35; Ridgeway 1901, 560).

I know of no early literary evidence for Anatolian fibulae, instead the evidence is in sculpture. An interesting example is the Khorsabad frieze, showing a group of tribute bearers (Figure: 1.8b). Muscarella (1967a, 82) argues they are of one national group for their distinct dress. The identification of this group, he argues, is deliberately shown by the 'Phrygian' fibula, whom the sculptor called attention by raising the arms of the man. Thus,

(a) A spiral fibula, possibly an FA, see #8779-9007 (Brøns 2014, 67, Fig. 4.6).

(b) Straight-pins securing a peplos at the shoulders (Furtwängler and Reichhold 1904).

Figure 1.7: (a) A possible fibula depicted on the left hand shoulder of a warrior on an Attic black-figure *dinos* signed by Lydos dated c.560-540 BC, a rarity in vase painting, and (b) a pair of straight-pins holding a peplos, much more common.

the argument follows: 'the procession represents gift bearers from King Midas in the year 710/709 B.B., the year Phrygia was attacked from Cilicia by Sargon's agents' (ibid. 82).

The question of dress, and dress styles, is very important and more complex and nuanced than these generalisations show. This is being attended to (e.g. Gleba 2017; Harlow and Nosch 2014) and is beyond the scope of my work. Style, however, remains a critical part of this thesis: to understand the complexity of fibula use, the analyst must explain why there was so much stylistic variation. To do so I need typology.

The first half of this thesis tackles the issues of typology head on (Clarke 1973; 1978; Klejn 1982; Read 2007; Sørensen 2015a; Taylor 2015; VanPool and Leonard 2011). The primary questioning concerns how a typology can answer different kinds of question: those of production, consumption, and identity. The answer is straightforward. A multi-layered hierarchically-unfixed typology is required. The origins of this treatment of types is found in Clarke (1978, 206) and Klejn (1982, 251-7). Yet, if this is so, I put into question almost all prior typologies employed in Aegean and Anatolian archaeology: those that are fixed and mono-level. In other words, traditional typologies tend to force data into simplistic groups that may over-subdivide certain aspects and under-subdivide others to the extent that they are superficial and inflexible (Klejn 1982, 58-63).

My first research question is: *'To what extent is typology useful for understanding different kinds of question, concerning production, consumption, and identity?'* This is addressed in Chapter 2 with the creation of a new typology long overdue. The benefits extend beyond this question. It allows quantitative study of fibulae across the Aegean and Anatolia for the first time where the regional *Prähistorische Bronzefunde* volumes did not synchronise one with the other.

My second research question is: *'To what extent can phylogenetic trees assist the analyst in understanding stylistic evolution? What has stylistic evolution got to do with chronology?'* It brings to light the important difference between how typologies are constructed either as

(a) Relief from Zincirli (Muscarella 1967a, Fig. 7).

(b) Frieze from Khorsabad (Muscarella 1967a, Fig. 1).

Figure 1.8: Fibulae represented in sculpture.

logical structures to answer specific questions or as phylogenies which are evolutionary in nature (Klejn 1982, 5). It also raises the important question of what style is for in archaeology (Feldman 2014, 6; Neer 2010, 7; Sackett 1990). Style, of course, is used to tell one object apart from another; a principal act in defining a chronology, for example Late-Protogeometric from Subprotogeometric. The evolution of fibulae may not, however, run in any particular straightforward manner from simple to complex (see below Figure: 2.4 on page 52). Indeed, style is a much more complex and also insightful data than simply as a means for ordering objects for chronologies sake (Klejn 1982, 6-10).

My third research question is simply: *'What was the regional and chronological distribution of Aegean and Anatolian fibulae?'* Importantly, it is not an end in itself, rather an early step to outline the data. I have already made the point that, well into the 20th century AD, typology revolved around chronology and culture as a means to write a history of cultures (see also Ford and Steward 1954, 43; Willey and Phillips 1958, 31). Ever since the Three Age System, archaeology could be written as a history of technology or material culture, which many thought was synonymous with ethnicity (Daniel 1943, 32-9; Sherratt 1997, 57-60). Christian J. Thomsen, another head of the National Museum of Denmark (like Blinkenberg), did not develop the Three Age System for this purpose, of course (Daniel 1943, 14-6). The second key was the popularity of Darwin's theory of evolution. This led weight to the ordering of artefacts in an evolutionary manner, in that one type could evolve from another. Hildebrand (1880) had already formulated a typology of European fibulae in an evolutionary framework at the time Montelius was gaining fame (cf. Beltz 1913; Montelius 1882; 1912). Montelius was explicit in describing his method as akin to natural history:

> [We] have for a long time tried to find the inner relationships that connect one form, a certain species in nature, with another form… A species for the natural scientist is comparable to a type for the prehistorian (Montelius 1900, cited by Almgren 1995, 23).

The advent of New Archaeology in the 1960s and 70s critiqued both the method of forming types on what they saw as intuition and the reasons for doing so in the first place. Notable figures such as Binford (1962, 217), Clarke (1973; 1978; 1979), and Klejn (1982) wanted to understand types in a systematic and abstract way (Shennan 1989, 833; 2004, 5-7). Ultimately, they were after the processes of the system and not the description of its parts, and for that they needed to define the fundamental entities not in a traditional manner but as a series of repeated similarities (Clarke 1978, 20). The drive to data quantification was welcome (Snodgrass 1985, 34), but that did not mean the knowledge base from other evidence should be ignored. It is precisely this information that aids scientific archaeology meaning. As Klejn (1982, 262) put it, typologists must know something of the culture in the first place; typology must work from the top down, from culture to type to variant. The important point is to be analysing the right kind of information.

Yet, although the present typology borrows a lot from Clarke (1978), I do not wholly part company with the method of subdivision of traditional typologies. This is based on gestalts: 'a sensory image so sharp and distinct that we invest it with immediate, intuitive significance' (Adams and Adams 1991, 42). But, I can be a little more explicit. Gestalts are akin to attributes: 'a logically irreducible character of two or more states, acting as an independent variable within a specific frame of reference' (Clarke 1978, 156). As I will show, variants are attribute-clusters in the same way a gestalt is emergent as a sum of its parts (Castelfranchi and Miceli 2009, 228). Whilst I do not borrow subdivisions already made in traditional fibula typologies, nevertheless it is profitable to have groundwork already done (cf. Adams and Adams 1991, 10).

It is important to state that the attributes (or variant categories) I go on to subdivide are determined by the typologist. There are countless variables in the subdivision of fibulae, yet many are less important than others. Clarke (1978, 155) differentiated their different levels: the inessential, essential, and key attributes. Essential attributes include length and width; inessential attributes include weight and material. Indeed, Alexander (1973, 189, Fig. 3) lists 105 possible attributes for a fibula. Few of these play an important role in my subdivision (cf. Read 2007, 214). For fibulae, the profile, cross-section, and catch-plate

Figure 1.9: Constraints and variables involved on the production and reception of an artefact (Clarke 1978, 153).

Figure 1.10: Constraints on artefact production through space and time (Clarke 1978, 229).

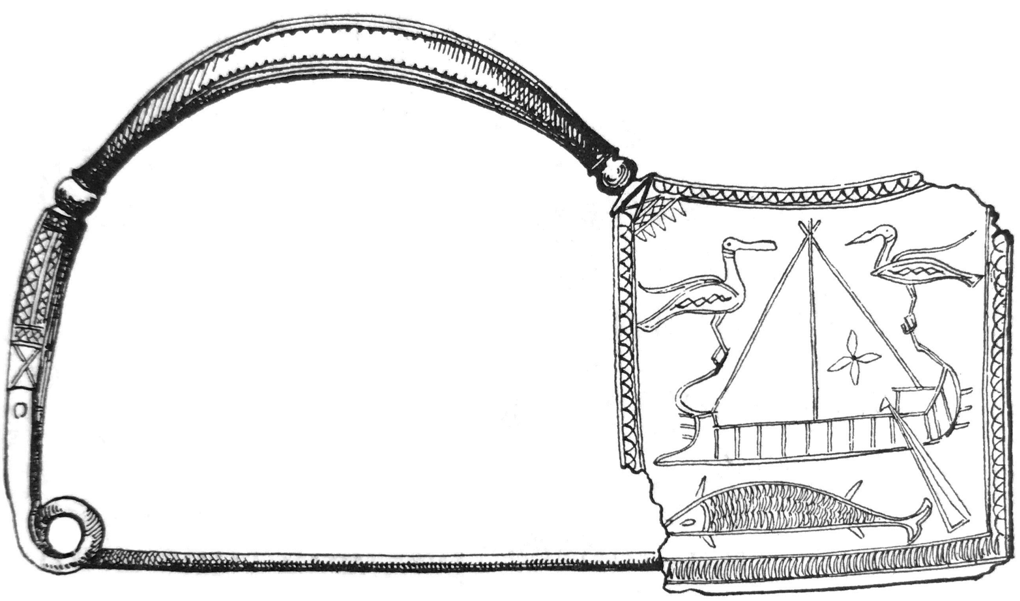
(see definitions on page 2.1) are the key elements both a consumer and craftsman would see and feel in differentiating a fibula (Figure: 1.9), and the range of features available would be constrained through time and space (Figure: 1.10). Thus a computational correspondence analysis, matrix analysis, or recursive-subdivision procedure and their theses of finding subdivisions that are not inherently obvious (e.g. Clarke 1979, 495, Fig. 3; Martin 2015, 17; Read 2007, 217) is not relevant at this stage of the analysis. Science ought not be used for science's sake, but rather on well thought out observations. Unlike most advances in theoretical archaeology, typological theory has not advanced beyond these issues. Hence, modern work is often predicated on typologies whose principles have been formed quite some time ago.

An important goal of this thesis is to contribute to reinstating typology as archaeology's most pressing problem, which is something that post-processual archaeologists have tended to avoid in the pursuit of increasingly nuanced theoretical interpretations (Bintliff 2015). Yet, failing to criticise the classification of the artefacts under study, leads to results that are misleading or even unrelated to the research questions at hand. This is because interpretation is necessarily based on similarity. The principal analyses of this thesis, classification, networks, and diversity, are especially so. To misinterpret similarity is not only to misunderstand the meaning of variation, but in some cases to interpret difference that may never have been meaningful (e.g. Östborn and Gerding 2014; 2015). In the case of fibulae, an uncritical use of cultural types (such as Blinkenberg's '*épirotes*', '*thessaliens*', and '*chypriotes*') has led to error in recent scientific work; a stylistic analysis can be more valid than a compositional analysis, and at the least the latter cannot be attempted without the former (cf. Orfanou 2015). My fourth research question is then: *'How useful are network analyses for understanding interaction? How similar do assemblages need to be to evidence meaningful interaction?'* It requires a critical approach to style and the differentiation of types in my typology.

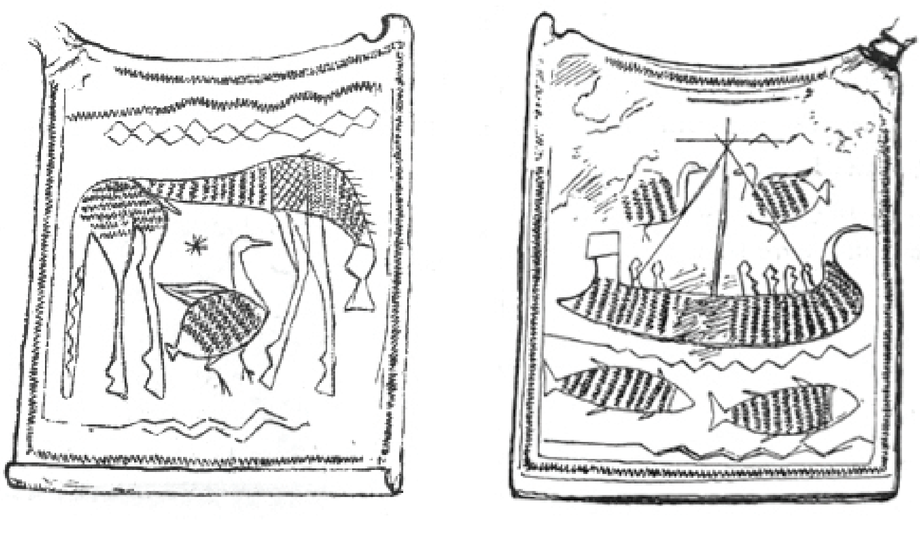
Style is often understood as the *oeuvre* of an artist or style of a society, as a collective cultural patterning (cf. Clarke 1978, 250; Gell 1998, 167; Taylor 2015, 99-104). Scholars tend to use 'style' for their own means; the archaeologist may use style to assign an object to a type rather than as being intrinsically meaningful (Schapiro 1953, 287). First of all, style is multi-scalar in that a society or artist can possess multiple styles, and objects may be broken down into different levels of style. For Schapiro (1953, 289), style could largely be read in three parts: 'form elements' (motifs), 'form relationships' (composition), and 'qualities' (expression). A certain fibula may look like it may be the output of a Boeotian workshop whilst the catch-plate may be in the style of an individual artist (cf. e.g. #4314 and #4585, Figure: 1.11). Style, like artefacts, is polythetic, meaning that its internal cohesion is greater than external differences (Clarke 1978, 35-7). Style is also a tool to investigate culture by way of assessing form and form structure (Ackerman 1978, 155), just as artefact patterning provides data for systems archaeology. Style is thus the substance of typology, and any archaeological research that compares one object from another is necessarily an archaeology of style (Arrington 2017, 24; Neer 2010, 7). Archaeology cannot escape style, and the aesthetic judgment that is required.

The typological levels I am seeking: production, consumption, and identity can be understood as different kinds of style. The craftsman will see the style of an artefact differently to a consumer; an artefact will be seen differently by different beholders (*sensu* Neer 2010, 12; Whitley 2018, 179). What follows, then, are multiple definitions of style for each beholder and type of object. The level of style I am referring to at production is akin to the hand of the craftsman who made it, not dissimilar to the attribution of vase painters (cf. Arrington 2017, 25-8), which I call 'variants' in my typology (for definitions see page 39). Distinguishing one variant from another betrays the mistakes and innovations during the production of copies within artefact 'groups'. The distinction between two variants of the same group may be overlooked by a consumer (Figure: 1.12a and b). Group-level style betrays information that shows how one fibula is different from another as a form of combined parts; a consumer would be able to tell one from another (a or b, versus c). The highest level, that of super-groups, where looking at identity beholds style at a more general level, is made up of groups and variants. Certain peoples could be identified for a super-group-level of style, clearly different (a, b, and c, versus d). Super-group style can also encompass a technological style (Gunter 2009, 102); a, b, and c are single piece fibulae, whilst d is two piece where a replaceable pin is slotted into the stem (Pedde 2001, 485). An observer of identity, like a witness on the other side of the street, may not be able to distinguish the difference between group-level styles as a consumer may not be likely to distinguish between variant style (cf. Gunter 2009, 86). In this way, style is hierarchical and can be measured at different levels; but the different levels should not be measured together at the same time (see below on page 147). This is because they are of different orders of style, and comparing variant-, group-, or super-group-level style is not comparing like-for-like. This is the primary argument of parting company with mono-level typologies that force only one kind of analysis to take place.

In Chapter 2, I design a typology that addresses multiple levels of similarity, and thus



(a) #4314, scale 1:1 (Blinkenberg, 174, Fig. 206).



(b) #4585, not to scale (Perrot and Chipiez 1898, 252, Figs. 128-9).

Figure 1.11: Decorative style of two catch-plates from Thebes.

The image originally presented here cannot be made freely available via ORA because of copyright.

The image originally presented here cannot be made freely available via ORA because of copyright.

(a) V1 variant style, #2116 (Kilian, Pl. 9, No. 283)

(b) V2 variant style, #2185 (Kilian, Pl. 11, No. 308)

The image originally presented here cannot be made freely available via ORA because of copyright.

The image originally presented here cannot be made freely available via ORA because of copyright.

(c) U2 group-level style, #2017 (Kilian, Pl. 27, No. 702)

(d) DH3 super-group-level style, #7254 (Caner, Pl. 19, No. 231B)

Figure 1.12: Levels of style in fibula profiles; a and b: variants of the same group; c: variant of different group; d: variant of different super-group. Scale 1:1 (Source: Author).

allows the analysis of the multiple layers of styles, their meaning, and purpose. Taking on board the extraordinary variation of the fibula corpus my fifth research question is: '*What is stylistic variation for? What can an investigation of diversity tell us in terms of production, consumption, and identity?*' It questions the value of style and the potential agency that things exert as a result of their style (Gosden 2005, 196). Is style analogous to power (Feldman 2014, 2; Gell 1988, 7; 1998, 69; Whitley 2012, 582; Winter 1998)? I employ diversity analysis popular in the 1980s (e.g. Kintigh 1984) to assess this and include contextual examples. I also circle back to my first question: if typology is useful to understand production, consumption, and identity, it is because of the subtle concept of style.

1.2 Historiography of Aegean and Anatolian fibula typologies

The first systematic typology of Aegean and Anatolian fibulae was Blinkenberg's; it remains the only typology of fibulae from the Aegean as a whole and so it is referred to time and again. Its formulation began with the unearthing of 1,581 fibulae at Lindos and a desire to determine both their chronology and origin (Blinkenberg, 7). The typology is concerned with indigenous development in Greece; fibulae manufactured in the Near East are all put together with Cypriot examples (B.XIII), whilst he adopts Montelius's (1895, Pl. XVII, No. 240) typology for Italian fibulae found in the Aegean (B.XI). Anatolian fibulae are rather misrepresented as *Types d'Asia Mineure* (B.XII) since most of these appear to originate from Gordion, and Asia Minor types appear much more akin to those of the Greek Islands (B.IV). Blinkenberg's method is clear: first, the find-spot for the greatest number of examples indicated origin; second, subdivision was based on strong and clear particularities (Blinkenberg, 17-18). Whilst the typology has been fundamental to the study of fibulae in Greece: 'many studies have been made since Blinkenberg wrote in 1926, but none has attempted to be so catholic - perhaps, indeed, it is no longer possible to attempt such a survey' (Catling and Catling 1980, 234), it is important to note that Blinkenberg (13) omitted rare examples of imprecise form.

Three further typologies are regional and belong to the *Prähistorische Bronzefunde* series. They are *Fibeln in Thessalian von der Mykenischen bis zur Archaischen Zeit* (Kilian 1975), *Die Fibeln der Griechischen Inseln* (Sapouna-Sakellarakis 1978), and *Fibeln in Anatolien I* (Caner 1983). These works share the aim of Blinkenberg in as much as the goal is to classify fibulae, though they are more cautious about assigning an origin to individual types (Snodgrass 1976, 76). Thus they go about recording individual examples and sorting them into groups to create a handbook, or perhaps repository, of fibula types from the regions they chronicle. They hope to include all examples and peculiarities, illustrating the majority singly; they include thousands of important technical drawings. This is of course useful data, however, there is a risk of meeting a polemic of New Archaeology: the accumulation of data for no greater reason (Clarke 1973; 1978, 21). The data in *Prähistorische Bronzefunde* is expertly presented but it is never fully assessed. That criticism is not my most important though, as I shall show. *Prähistorische Bronzefunde*'s goal is to find final 'fixed-types' in that the type designation comprises the bow shape, cross-section, catch-plate, adjuncts and decoration altogether, albeit to varying levels of subdivision. These volumes require individual comment because each employs their own unique typology and level of detail, and it is almost impossible to assess types, and their subdivisions, between them.

Kilian created a valuable typology of fibulae from Thessaly, based on detailed intricacies of production, in order to pinpoint their development, and therein some production centres too. Kilian employs a subjective subdivision for his 'primary key': for arch forms, A (round), B (slightly swollen), C (swollen), and D (very swollen); then E (*Bogenfibel mit Bügel aus Ziergliedern*); F (sheet); G (vertical sheet), and so on. This is where the issues of 'fixed-types' begin. The undue weight placed upon the shape and thickness of the wire as primary key leads to trouble distinguishing between, for example, swollen and very swollen, such as Kilian's CIIIb and DIb (Figure: 1.13: a and b). Note also the convoluted numeration: the subdivisions after the primary keys IIIb and Ib refer to the same feature of the different arch form (*Bogenfibel*) primary keys 'C' and 'D'; whilst, moreover, the primary keys 'C' and 'D' for plate forms (*Plattenfibel*) are also wholly different (Snodgrass 1976, 76).

It is not so much that the typology seems a little too subjective here, for all typologies are necessarily subjective (Adams and Adams 1991, 4; Martin 2015, 16-17), but that the consistency fought for prioritising the primary key renders the rest of the classification inconsistent. So, Kilian's arch forms AVb, BVb, and CVb are all separate types because of the primary keys A, B, and C, and they share the same features of central boss with two ellipses, and so the second part of the designation is the same, Vb (Figure: 1.13: d-f). On this basis why is Kilian's No. 259 designated AIIIe when surely more akin to AVb (Figure: 1.13: c and d)? First of all, I might contend the key feature, or idea, for the consumer, and perhaps also the craftsman, would not have been the exact thickness of the wire but the presence of the central boss. Indeed, the craftsman may not have been able to perfectly reproduce the wire thickness of each fibula since they are, after all, made individually (see below Section 3.1.8 on page 123; cf. Read 2007, 200). Would the consumer have seen or felt the difference between Kilian's degree of swelling? The whole emphasis is obviously incorrect: Kilian's Nos. 391 and 393 are assigned to the same type, CIVc, yet they have both a different number of ellipses on the bow, a different length of rhomboidal stem, and totally different catch-plates; No. 393's catch-plate is not only of different shape but adorned with a knobbed collared globe (Figure: 1.13: g and h). Kilian's CIVc is an artificial type and neither meaningful to consumer nor craftsman. As we shall see in Chapter 2, Kilian's CIVc is analogous to my profile-group U (U2 & U5), the cross-section XXId, and catch-plate-groups 12-13. Indeed, the catch-plate is often missing, and perhaps as a result this important feature is disregarded in most of Kilian's classification. The catch-plates of Kilian's Nos. 422 and 439 are similarly different, whilst No. 430's

(a) CIIIb **(b)** DIb **(c)** AIIIe

(d) AVb **(e)** BVb **(f)** CVb

(g) CIVc **(h)** CIVc

Figure 1.13: Some types according to Kilian (Kilian 1975, Pls. 6, 7, 14 and 15). Not to scale.

catch-plate is missing (Figure: 1.13: d - f), it has 'No Comparison' (Clarke 1978, 157), and so, if the 'fixed typology' had included all features, No. 430 would not be able to be assigned.

Despite this, if scholars were to accept Kilian's primary key has value in determining production, this is largely undone by types such as DIb, an imprecise group of examples, Nos. 221-254 (Kilian 1975, Pls. 6-7). The catch-plate is not the only feature disregarded. Here the arch bow is D (very swollen) in all cases, but it is flanked on each side by either single or double ellipses. Some of the bows have collars atop the swell (of which there are at least 5 obvious varieties) whilst others have none. These inconsistencies do not invalidate the work, and Kilian's conclusions are based on the divisions he believes to be most important (cross-sections of wire) at the expense of others (catch-plates and bow features). Would it be feasible to subdivide to more than 250 types? The trouble with Kilian's typology is that it is fixed to the cross-section and its numeration (or characters) is not mutually exclusive. How could I analyse this data quantitatively given this issue? It would be very difficult, the analyst would need to translate the variant matrices (Kilian 1975, 14-17) and continue despite the lack of subdivision of bow features and catch-plates. Indeed, such an analysis has not been attempted, and nor any distribution maps offered.

The corpus of Sapouna-Sakellarakis is valuable to any Aegean scholar, yet it suffers from a much more obvious lack of subdivision. A clear example is Sapouna-Sakellarakis' VIIa (fibulae with decorative elements on the bow) where 55 examples of the type are designated by a few types of knobs, collars, and points. Within the single type VIIa there are at least 5 or 6 different catch-plates (out of only 24 sufficiently preserved), and at least 16 cross-sections (Figure: 1.14). Sapouna-Sakellarakis' type VIIb is more consistent in that the attachment must be a bird. VIIb is not a bad group if the author would like to show what a consumer might see, whilst VIIa is entirely arbitrary. The lack of further subdivision of Sapouna-Sakellarakis' types proves a great challenge when the figures are not included for all examples. I estimate 3,038 fibulae are noted in Sapouna-Sakellarakis whilst 1,733 are enumerated and approximately 1,079 have images. Thus, like Kilian's work, quantitative work is not possible, as there is no consistency between type division. A similar critique would be easy to make for Caner's prized work (e.g. with Caner's Type III).

What then, is this information for? Here the blame lies with the paradigm of *Prähistorische Bronzefunde*. The trouble of final fixed-types, whatever degree of precision or consistency achieved, is that they are inherently static (cf. Sørensen 2015a, 88). The analyst is left with a typology that is difficult to use for research into questions of networks, diversity, or even

(a) No. 1232 **(b)** No. 1274 **(c)** No. 1327A

Figure 1.14: Examples from type S-S.VIIa (Sapouna-Sakellarakis 1978, Pls. 37-38). Not to scale.

simple quantification. The types are neither fully divided by production or consumption, even if the typologist may be satisfied that they have achieved their goal. Furthermore, each typology is regional and so cannot be compared equivalently across the region. It is therefore of no surprise that recent scholars have created their own smaller typologies when their work requires it (e.g. Catling 1996, 550-4; Felsch 2007, 120-42; Lemos 2002, 109-14).

Let's reiterate two goals of this thesis that are covered in Chapters 4 and 5. Based on fibula distributions, one is to assess the connectedness within Aegean and Anatolian regions in the 13th to the 7th centuries, another to assess the diachronic diversity between them. First, it is only possible to answer these questions with the construction of a typology consistent for fibulae found in the Aegean and Anatolia as a whole, hence a new typology needed to be made. Second, I take on board the warning already mentioned that, because the variability of the assemblage is so vast, it may be impossible for one author to construct (Catling and Catling 1980, 234). I overcome this issue by considering the polythetic, hierarchical, and malleable nature of archaeological entities determined by Clarke (1978, 149-244). It is tricky to blend this view of typological construction with that of the traditional one, and so I contend it worth abandoning the goal of *Prähistorische Bronzefunde's* static fixed-types altogether. But here lies the most important advantage of my typology. By separating the fibula into three key component 'variant lists' (see Section 2.2 and Volume: 2), the profile, cross-section, and catch-plate, the typologist gives flexibility to the analyst. First, the separation greatly simplifies the typology, in that a long list of final types is unimportant (for curiosity, the number in my data is 3,473). If the question is to analyse material between two sites, in theory (cf. Chapter 4) only the final types from those two sites would need to be taken from the tables. At the same time all combinations should be available so that any fibula could be entered into the data (the possible number of types is almost 22 million, but of course not all combinations were produced in antiquity). Second, it allows the analyst to analyse single features individually, such as catch-plates, then pooling the results for a more powerful look at production spheres and chronology (cf. Martin 2015, 93). Third, it allows the inclusion of fragmentary data whilst simultaneously removing *Prähistorische Bronzefunde*'s need to assign fragmentary pieces into a final type by hunch. Instead, components that are not known are listed in my database with a '—': they have 'No Comparison' (Clarke 1978, 157).

1.2.1 Central & Eastern Mediterranean typologies

The history of fibulae shows their development as regionally specific; sometimes evolving independently, and sometimes with repeated contact. Further, certain types have far greater distribution patterns than others, such as the Eurasian Spectacle fibulae (Alexander 1965; Pabst 2011). Thus, it is important to alert the reader to the historiography of fibulae where the Aegean and Anatolia sees most contact, namely the Near East and Central Mediterranean. The *Prähistorische Bronzefunde* series, notwithstanding its shortcomings, along with earlier works are an excellent starting point.

In the Near East, Stronach's (1959) was the first typology after Blinkenberg's, and Myres's (1914); fibulae showed potential in tackling issues of chronology (Birmingham 1963). In an overlooked paper, Ghirshman (1964) arranged evidence from Iran. Fibulae found in Cyprus have been classified by Catling (1964) and Giesen (2001), and detailed work on a type that travelled across the Mediterranean, known variably as the 'Cassibile', 'Monachil', 'Megiddo', and 'Cypriot' type has led scholars to create phylogenetic trees (Buchholz 1986, Fig. 9; cf. Carrasco *et al.* 2014, Fig. 1; Pare 2008, Fig. 5.12). The Near Eastern distribution was systematically improved by Pedde (2000; 2001). Pedde's typology is divided first into four main groups based not on shape but manufacture process; ‘A’ is single-piece, whilst ‘B’, ‘C’, and ‘D’ variants are all two-piece, almost universal in the Near East but rare in the Aegean. Pedde’s B designates bow fibulae; C are those cast straight and bent over a rod; and D are those cast straight and bent by pliers so that the fibula took the shape of a triangle (Pedde 2001, 486).

The most important work in the Central Mediterranean is Lo Schiavo’s (2010) *Le Fibule dell’Italia Meridionale e della Sicilia*; indeed it is a masterly corpus of over 8,000 fibulae in c.471 types, and a particular help is a cross-section drawing for the great majority of examples. Yet, despite this, it is disappointing for it draws few conclusions (De Marinis 2012, 930). Central Italy is recorded by Savella (2015), building on earlier work (Close-Brooks 1969; Guzzo 1972; Sundwall 1943; Toms 2006), whilst von Eles Masi (1986) collects the examples from Northern Italy. The Croatian coast has been documented by Glogović (2003) but the interior has not. Serbia, Macedonia, and Kosovo are included in Vasić (1999), whilst the entrance to the Danube is covered by Gergova’s (1987) typology of Bulgarian fibulae and Bader’s (1983) on Romanian respectively. Sulava’s (2011) recent corpus from Georgia show astonishing parallels at the far side of the Black Sea. Thus, there is an untapped catalogue to compare the Aegean and Anatolian distribution with, though the areas that have not been analysed remain the greater part.

1.3 Historical overview

Whilst Blinkenberg (38-40) argued both ‘violin’ and ‘arch-bow’ fibulae had a Greek origin, more recent consensus places the invention of the spring and violin form in the Alpine foothills in the mid-13th century (Alexander and Hopkin 1982, 406; cf. Furumark 1941a, 91-3; Lemos 2002, 109; Muscarella 1964, 35). Arch forms could also have had a 12th century Central or Northern European origin if they were not in fact independent evolutions of the violin form. In the Aegean then, fibulae are introduced in the late-13th century, whilst it is not until the late-9th century that any are found in Central Anatolia (Sams 2011). Indeed, Anatolian fibulae are 'two-piece', where a replaceable pin slots into the stem, and may have been introduced not from the Aegean but Cyprus or the Near East (Pedde 2000; 2001).

In the Aegean, their introduction is associated with a traditional hiatus, the end of the Bronze Age and the 'Mycenaean Civilisation' with it, c.1200 BC. The destruction of so-called palaces including Mycenae, Tiryns, Pylos, and Thebes, as well as the Hittite Empire, the Egyptian New Kingdom, and numerous smaller states in the Levant and Mesopotamia, marked a new Era (Bachhuber and Roberts 2009; Drews 1993, 1-30; Lemos 2007b, 723; Morris 2006, 73-81; Nowicki 2000). The following age has been called by some the Iron Age and by others the Dark Age (Kotsonas 2016, 246, Fig. 2; Murray 2018, 26, Fig. 1). The negative connotation of the latter has some truth archaeologically, as key indicators of civilisation were lost including state level organisation, literacy, and high art, and there was a general abandonment of sites (Desborough 1972; Snodgrass 1971, 2). Nevertheless, it is clear that people kept living, and continuity is shown in many spheres, including language, religion, and cult (D'Agata 2006; Lemos 2014, 186; Mazarakis Ainian 2016; Wallace 2010). Continuity is also shown in the Levant and Central Anatolia (Bell 2009, 34-8; Rose 2012, 2) and in some ways the distinction between the Bronze and Iron Age is more a result of a separation in terminology and scholarly fields than anything perceived by past peoples (Kotsonas 2016, 257; Murray 2018, 21, 43).

The scale of communities and types of exchange in the Aegean itself must have changed nevertheless (Murray 2018, 45-6). Semerari (2016, 22) has argued for 'disentanglement', where the Mediterranean became less connected and more regionally diverse. The fibula data does not share this analysis; in the transitional period they are widely distributed and relatively uniform. Their distribution in the 12th and 11th century is perhaps broader than when they were most popular by the 8th century. Indeed, uniformity or stylistic diversity need not coincide with connectivity; heightened connectivity can coincide with regional diversity. Nevertheless, the important East-West connections from the Near East broke down in scale, and evidence for Levantine contact with the Central Mediterranean is sparse until the 9th century (Aubet 2001, 194-211; Bell 2016, 98-100; Bikai 2000; Frankenstein 1979, 263). The narrative from the Levant is similar and often exemplified with the story of the Egyptian courtier Wenamun. Upon travelling to Lebanon to collect timber for the construction of a sacred barge, Wenamun found Egyptian royal influence had all but evaporated, having been replaced by a buoyant trade of local princes and merchant fleets (Aubet 2001, 114-19; Bell 2009, 34-8; 2016, 95; Broodbank 2013, 460-72; Markoe 2000, 26-9). During the course of his journey, Wenamun was robbed, chased by vengeful ships, and almost lynched after being blown off-course to Cyprus, where the story cuts off.

For most scholars, the 8th century witnessed a manifest transformation, with a Greek renaissance on one hand, and Orientalising, Connectivity, and Mediterraneanisation on the other (Hägg 1983; Morris 2003; Riva and Vella 2006). If this interaction was supposed to provide uniformity, regional diversity of fibulae (and also ceramics) only increases (Coldstream 1983). In the case of fibulae, a massive increase in regional and stylistic diversity is witnessed in the 8th and 7th century. It is at this time that connections through to Central Anatolia appear, with types being imitated along the Asia Minor Coast and others being dedicated directly at Panhellenic sanctuaries such as Olympia and the Argive Heraion (Strøm 1995). Orientalisation and Mediterraneanisation have been shown to be far too simplistic to explain the complex regional processes masked beneath them (Riva 2010; Niemeier 2016, 234). Yet, more recent investigation into reception, entanglement, and agency has not overcome the methodological challenges of analysing big data. In fact, this thesis returns to age-old theoretical issues debated by processual archaeologists such as Binford (1962; 1965) and Clarke (1978; 1979; cf. Shennan 2004, 7) some 50 years ago. Rather than address and integrate New Archaeology into their work, present scholars have tended to sidestep the issues.

1.3.1 The status quo

Fibulae found in the Aegean and Anatolia have hardly been examined with any theoretical approaches advanced by processual or post-processual archaeology (Figure: 1.15), rather they have been analysed in some isolation. Even a simple quantification of fibula assemblages, or an investigation of system regularities as Clarke (1978, 460) might have done, has not been attempted. Instead, fibulae have been recorded in excavation reports (e.g. Bräuning and Kilian-Dirlmeier 2013; Catling 1996; Felsch 2007), scholarly syntheses (e.g. Lemos 2002), and chronological dissertations (e.g. Pare 2008). Recent work has also investigated compositional analysis (Orfanou 2015). So, unlike the advances of fibula study for the rest of Europe in recent times, especially looking at their social significance (e.g. Brøns 2012; Martin 2015), or that of pins (Hallager 2012), the explanation of fibulae in the Aegean remains near non-existent. Perversely, as the theoretical arena has become richer, the archaeologist interested in fibulae has become even more circumspect to explanation. That fibula dedication was so diverse shows that the deposition context needs to be investigated to understand their meaning. Scholars have yet to understand, or even properly record, the irregular dedication of fibulae, and have yet to explore how a fibula deposited in a grave was different to that displayed in a sanctuary. Recent developments in Classical Archaeology, such as Mediterraneanisation, connectivity, and networks on one hand (e.g. Collar, Coward, Brughmans, and Mills 2015; Leidwanger 2013; Morris 2003; Tartaron 2013), and the reception of objects in terms of ideology, status, and agency on the other (e.g. Castelfranchi 2014; Knappett 2005; Treherne 1995; Whitley 2012), will be considered in the following chapters with a view to how fibulae may aid our understanding.

1.3.2 Summary of chapters

Chapter 1 charted the introduction of fibulae into the Aegean and Anatolia, and the historiography of their study. The key concepts, typology and style, were scrutinized, and my five research questions introduced. Chapter 2 begins with a set of definitions and the formulation of the new typology. The typology is multi-layered, comprising the profile, cross-section, and catch-plate of a fibula; and multi-level, from variant, group, to super-group. Each profile-group is assigned a chronology, and the series should be read in conjunction with the type descriptions in Volume: 2 (Plates: 1-129) and fibula catalogue in Volume: 3 (Supplementary Information). Chapter 3 provides an overview of the data over time, including distribution by site-type and regions, as well as method of manufacture, material type, and size. The analysis finds a huge rise in quantity and diversity of fibulae in the 8th and 7th century, especially in sanctuary contexts, followed by their near total disappearance in the 6th and 5th century. Chapter 4 concerns network analyses, questioning the validity of such an approach; artefacts that look the same may have had no direct relation, being subject to convergent adaptation or even being a second or third generation copy of earlier horizontal transmission. A manufacture test is devised to create a network of fibulae with identifiable manufacture provenance, indicative of exports. The penultimate Chapter, 5, concerns stylistic diversity, value, and agency. Diversity analysis is employed to compare the nature of fibula assemblages as well as the structure of groups and variants. An assessment of fibula value is given in relation to their role in agency relations, and thus the archaeological subsystems they belonged. By looking at agency I also cover emotion and identity, and distributed cognition and personhood. Chapter 6 provides a summary of each chapter's results and a conclusion to the research questions posed.

Figure 1.15: A simplified diagram showing various strands of archaeology today: (a) Classical Archaeology (Source: Author) and (b) archaeological thought according to Hodder (2012, 7; see also Binford 1962; Ingold 2000; Shennan 2011). The study of fibulae found in the Aegean has remained under the paradigm of Classical Archaeology, and has remained several decades behind the archaeological models scholars employ today.

1.3.3 Summary of research questions

1. To what extent is typology useful for understanding different kinds of question, concerning production, consumption, and identity?

2. To what extent can phylogenetic trees assist the analyst in understanding stylistic evolution? What has stylistic evolution got to do with chronology?

3. What was the regional and chronological distribution of Aegean and Anatolian fibulae?

4. How useful are network analyses for understanding interaction? How similar do assemblages need to be to evidence meaningful interaction?

5. What is stylistic variation for? What can an investigation of diversity tell us in terms of production, consumption, and identity?

Chapter 2

Typology of Aegean & Anatolian fibulae

I have discussed the historiography of fibula typologies and how Clarke's (1978) hierarchisation of archaeological entities remains cogent despite more recent treatises (see section 1.2). If the reason for creating an Aegean-wide typology is to quantitatively analyse fibula assemblages for the first time, it must provide categories able to include all fibulae found in the Aegean and Anatolia in the 13th to the 5th century. To begin I must set out definitions, then state the principles and processes of subdivision. Problems encountered will be discussed thereafter as this helps to elucidate the typology's construction.

2.1 Definitions

The following type definitions borrow largely, but not exclusively, from Clarke (1978, 149-244); others are made with the aid of an Oxford English Dictionary. Clarke's (1978, 217) terms of 'type group', 'specific type', and 'subtype' are not used here as they retain the hazardous word 'type', and they refer to levels of affinity inconsistent with ours; instead, I use 'super-group', 'group', and 'variant'.

Typology definitions

Classification: A defined set of categories which together include all of the entities the classification investigates.

Classify: The recursive process of sorting data (e.g. variants) into mutually exclusive groups (e.g. artefact-types); to classify also refers to the process of creating types. Thus, to avoid doubt, when I place an entity into a type, I use the term ‘designate’; when I refer to the creation of types, I use ‘subdivision’.

Type: A mutually exclusive group (or class) defined by a typologist. Archaeological entities are polythetic; they are grouped by similarity of some attributes but not others (Clarke 1978, 36, 217).

Typology: A system of defined artefact-types made for an analytical purpose. Traditionally, in fibula typologies, the prefix ‘B.’ is Blinkenberg’s, ‘C.’ is Caner’s, ‘K.’ is Kilian’s, and ‘S-S.’ is Sapouna-Sakellarakis’.

Coding: The assignation of characters to artefact-types e.g. B.VII.6d; K.*Plattenfibel*.EIVa; S-S.XIa. The ‘primary key’ is the code letter that comes first.

Artefact: ‘Any object modified by a set of humanly imposed *attributes*’ (Clarke 1978, 206, original emphasis).

Artefact-class: A class of artefacts distinguished by their functional adaptation to the environment such as fibulae, swords, or pottery. This is Clarke’s ‘type-group’.

Artefact-type: Distinguishes an individual fibula artefact as a collection of ‘variant-categories’, e.g. B1.Vd.2a, in words: profile B1; cross-section Vd; catch-plate 2a. The ‘specific artefact-type [is] an homogeneous population of artefacts which share a consistently recurrent range of attribute states within a given polythetic set’ (Clarke 1978, 217). The ‘attribute states’ that I have selected for my typology are here grouped into ‘variant-categories’. My artefact-type lies between

Clarke's specific 'artefact-type' and 'subtype' of perhaps 60% affinity between the fibulae designated therein.

Variant-category: Here the three categories: profile, cross-section, and catch-plate that are deemed to make up an artefact-type and are displayed in 'variant lists' (Plates: 1-129). Each category has a hierarchical structure made up of super-groups, groups, and variants.

Super-group: A number of groups. Somewhat equivalent to a regional style.

Group: A number of variants. Somewhat equivalent to a fibula prototype.

Variant: One or more 'humanly imposed' key attributes that make up a variant. Variants are therefore what I deem 'relevant attributes' in my typology; variants do not include 'essential' or 'inessential' attributes. The variant lies between Clarke's subtype and attribute, and has an equivalence to his 'attribute complex' (Clarke 1978, 158-60), of perhaps 90% affinity.

Attribute: According to Clarke (1978, 156), the attribute is 'a logically irreducible character of two or more states, acting as an independent variable within a specific frame of reference'. Two or more refers to present, absent, or 'multistate', where the last indicates the answer lies within a range. Clarke differentiates between different levels of attribute: the inessential, essential, and key attributes (ibid. 155). I designate key attributes as variants, the profile, cross-section, and catch-plate. They are defined by shape, whilst Clarke would have determined variants as attribute complexes. Essential attributes include length, width, and thickness. The inessential attributes include weight, material, repairs, and number of turns in the spring. The essential and inessential attributes are recorded in my database where the information is readily available, but they do not affect the subdivision of artefact-types presented in this thesis (see 2.2 on page 44).

The fibula number assigned in the database (see Appendix G).

Fibula definitions

The diagram shows the terms used to describe different locations of fibulae to allow consistency in the type definitions (Figure: 1.1 on page 2).

Profile: The profile is the 2D shape of the bow from spring (at the base of the stem) to catch-plate (at the base of the forearm), including any protuberant features along it. The profile category does not consider the shape of the catch-plate.

Cross-section: The cross-section of the bow from the centre, taking into account its shape throughout the bow. If there is a protuberant feature towards the centre, such as a boss, the cross-section is of the feature and not the wire supporting it.

Catch-plate: The catch-plate is the catch in the form of a hook or plate that holds and guards the pin. It is located at the base of the forearm or at the prow, in place of the forearm.

Protuberant features: Features that are inherent to the profile, cross-section, and catch-plate and stick out: they protrude or bulge. Types of feature include beads, bosses, cubes, discs, discoids, discoid-prisms, ellipses, knobs, loops, petals, rivets, swelling, and turns.

Decoration: The addition of decoration that is not inherent to the profile, cross-section, or catch-plate (i.e. protuberant features). Types of decoration include incision, stippling, embossing, figurative and geometric designs, hatches, bands, etc.

Common protuberant features

Beads: A swelling bead; often flanked. They may be amygdaloid, oval, oblong, elliptical, or round.

Bosses: A round bead abrupt to the bow; its diameter is usually more than twice that of the bow.

Discs: Flat disc section. They may be round or elliptical.

Discoids: Disc that protrudes on each face.

Discoid-prisms: Discoid with 4 to 6 acute triangles on each face.

Ellipses: A bead with a thin regular oval section.

Rilling: A shallow series of indentations created by casting or imitation (post-casting incision).

Segmented: A series of contiguous blocks, similar to beads, but distinct due to indentation rather than moulding.

Swollen: A portion of bow that swells as a bounded feature.

Loop: Like a spring but has a decorative function; loops are located along the bow in addition to the spring.

Turn: Where the wire has been turned or twisted over itself; it does not form a circle as a loop does.

Other features

Symmetric: An arch bow that is largely symmetric; the designation refers to interior of the bow as the catch-plate often renders an otherwise symmetric fibula asymmetric (Figure: 2.1a).

Asymmetric: An arch bow that is bent at one end, usually at the forearm; the designation refers to interior of the bow (Figure: 2.1b).

The image originally presented here cannot be made freely available via ORA because of copyright.

The image originally presented here cannot be made freely available via ORA because of copyright.

(a) A symmetric bow, E1.IIIa.7c, #220 from Thera (Sapouna-Sakellarakis, Pl. 7, No. 210).

(b) An asymmetric bow, E3.IIIa.2a, #340 from Lefkandi (after Popham et al. 1980, Pl. 104).

Figure 2.1: A typical symmetric (a) and asymmetric (b) plain bow from profile-group E.

2.2 Methodology part 1: typology

2.2.1 Process

I part company with typologies that assign broad initial coding divisions such as 'violin-bow', 'arch-bow', '*plattenfibeln'*, or 'two-piece' (e.g. Kilian 1975; Pedde 2001, 485). These categories do not compare equivalent features: the first two are divided by shape in profile, the third by catch-plate, and the fourth technology, and neither are they necessarily contiguous in time or space. Indeed, all the fibulae from one site may be arch-bows; scarcely any manufactured in the Aegean are two-piece. The distinction may have been irrelevant in the Iron Age itself, and so as a typologist's primary key it is not very meaningful. Instead, by reading off the profile-variant the broad super-group may be revealed (e.g. profile-super-group A-D are 'Violin'; E-N are 'Arch-bows', to varying degrees).

2.2.1.1 Subdivision procedure

My typology comprises three variant-categories that make up each artefact-type: the profile, cross-section, and catch-plate. The variants are made up of one or more attributes recorded in the variant lists with a code, sketch, and description (see Volume: 2, Pls. 1-129). The variants are those attributes I deem to be key attributes at the exclusion of essential and inessential attributes. My assumption is that the chosen key attributes capture a sufficient designation of fibulae for the producer, consumer, and modern-day archaeologist (above 1.2), and are subdivided to a 'roughly' equivalent level of behavioural complexity (Clarke 1978, 154). This is based on differences of shape by sight (or touch), even if they were difficult to describe. Clarke (1978, 155, 160) might have rebutted such an expectation arguing that the typologist must demonstrate the validity of key attributes by analysis: by treating all attributes with an equal arbitrary value; one might use Read's (2007, 217) recursive-subdivision procedure to do so. I disagree, at least for the study of fibulae. As discussed, my subdivisions are based on gestalts that recognise independent attribute clusters (see above on page 18). What I am recognising are not random shapes, however, but polythetic 'prototypes'. Gell defines the 'prototype' as 'entities held, by abduction, to be represented in the index, often by virtue of visual resemblance, but not necessarily' (Gell 1998, 27). For the moment, I can suggest that the prototype of a fibula lies in the mind of a craftsman as much as in the finished artefact group itself. The prototype (equivalent to a group), may *dictate* the new artefact (variant) the craftsman *had* to produce (Gell 1998, 35, 39). Fibula variants are not abstract designs that would need an arbitrary analysis of all attributes, rather they are definable entities employed by the craftsman to materialize the prototype. Analysing the connectivity of fibula assemblages (Chapter 4) is to analyse the prototype (and human mind) as much as the variants themselves. Archaeological entities are, of course, both physical and ideational (Chapter 5).

2.2.1.2 Coding

It is fundamental to stress that my coding is mutually exclusive. This prevents the confusion seen, for instance, in Kilian's numeration (above Section 1.2). In my typology each variant has a unique code. Each variant-category has its own coding style shown by the first character: profiles are capital letters (e.g. A1); cross-sections are Roman numerals (e.g. Ia); catch-plates are natural numbers (e.g. 1a). The coding between each category has no meaning; the ‘3’ in B3 (profile) and 3 (catch-plate) has no relationship. Likewise coding within each group has no meaning; the ‘a’ in IVa and XIIIa has no relationship. The coding of each variant is arbitrary; XIIIa and XIIIb are individual variants, seventy-six and seventy-seven in my list. *It is true that XIIIa and XIIIb have been grouped as rhombus (XIII), but designating a variant ‘XIIIa’ is not allowed if the typologist is unsure whether it should be XIIIa or XIIIb, rather in this case it is ‘No Comparison’ and the typologist should question whether the distinction between XIIIa and XIIIb is worthy of its subdivision.* This prevents errors where a ‘XIII’ designation could be the same as or different to e.g. XIIIb. I have aimed for each variant, not just its code, to be mutually exclusive. Where this is not the case, error lies in the subdivision or designation. To reiterate the coding: N2 is clearly a profile; Vc is a cross-section because V is followed by ‘c’ and not a natural number; V1 would be a profile. Each variant category is separated by a full stop for clarity.

2.2.1.3 Rank order

I have assigned a rank order to the artefact-type categories, e.g. BH19.XXVe.11d (#5312). The profile acts as a primary key, in that it comes first, although as we have just seen it need not necessarily. An investigation of consumption may look carefully at profiles whilst one of production the cross-section, and it is perfectly possible to reorder the coding thus: XXVe.BH19.11d. Moreover subdivision to the lowest denominator in each variant-category is possible, being coded independently, and variant-categories may be investigated on their own; such as cross-sections or catch-plates, thereby simplifying the complex variety of fibulae and unearthing important production information that may have been missed previously. Traditional typologies of the ‘fixed-type’, as noted above (Section 1.2 on page 24), mean that peculiar features (e.g. bead shape) are often insufficiently subdivided or excluded from the typology altogether, whilst here they may be included in the database (e.g. cross-section XXVc; cf. Sørensen 2015a, 91).

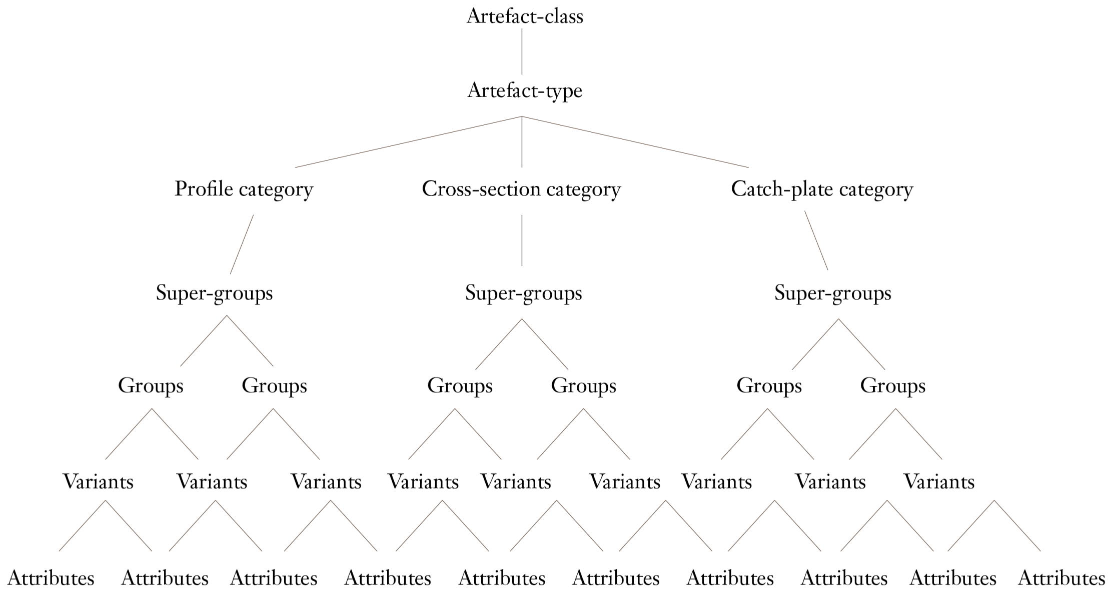


Figure 2.2: The type hierarchy of my typology (Source: Author).

2.2.1.4 Hierarchisation

It should be noted that I have adapted Clarke's (1978, 206, Fig. 49) hierarchy between attribute and artefact-type: the super-group, group, and variant (Figure: 2.2). The typology's hierarchisation gives flexibility to the analyst. There lies the best of both worlds: lowest denominator subdivision crucial for quantitative analysis (so entities are counted only once) and hierarchical groupings to test whether the typologist's subdivisions are meaningful. Suggested groups for cross-sections and profiles are definitively designated (I = Round; II = Knobbed Swell; A = Violin; E = Plain Arch, etc.) whilst a suggestion is given for catch-plates (2 = Flattened; 9-10 = Vertical Plates, etc.). An analyst may choose to group the categories differently; the coding for all variants are unique: my types are not fixed. Grouping variants at different levels of similarity highlights their polythetic nature and elucidates transmission between types, particularly when given a diachronic dimension.

Thus, using the typology in its present form allows the analyst to compare the data at different conceptual levels. I hypothesise the variant level to be synonymous with production, useful for the study of similarity networks. If the consumer were unable to differentiate between the variants, or not given the time to do so, the group-level may be more meaningful. This will be discussed in Chapter 5. The group-level represents the prototype, the idea for a particular fibula. For instance, when dedicating a type to a god, the group may be important but not the variant. Finally, super-groups may equate to a regional 'style zone' (Binford 1965, 208), and may reflect a regional dress. At the same time, Taylor (2015, 104) reminds us that meaning may not be available in the specific type (variant) but only when considering the whole production, like an artist's *oeuvre* (Gell 1998, 242). A hierarchical typology allows for this.

2.2.2 Phylogenetic trees

An apt method of displaying category subdivision is to use phylogenetic trees, already advocated in the 1960s by Clarke (1978, 165, 216, 226-8; Figure: 2.3). This method was also pioneered by Whallon (1972, 16) who argued that all typology was essentially tree-like. Evolutionary archaeologists have argued the division lies with relations of similarity (Phenetic trees) and hypotheses of common descent (Phylogenetic trees) (Holden and Shennan 2005, 20). There are many methods to create such trees, and they come with prerequisite definitions (see O'Brien, Buchanan, and Eren 2016, 69-75; Heggarty, Maguire, and McMahon 2010), and yet, it must be remembered that their transference to archaeological assemblages is not so straightforward. A method of creating phylogenies in biology such as cladistics requires a common ancestor, whereas a craftsman manufacturing a fibula could have easily drawn upon multiple 'ancestors' in its creation.

Phylogenetic definitions

Common descent: Hereditary adaptation where variants share a common ancestor (also called 'homology'). For example, a fibula developed from the same workshop

Figure 2.3: Clarke's (1978, 227, Fig. 61) illustration is of cultural assemblages but the word 'culture' could be replaced by 'fibula'; 'phase assemblage' could be replaced by 'polythetic artefact-type'. x^{II}'s show 'transform types' (which I call 'hereditary types') over time.

as its ancestor, or the copying and adapting of a fibula in circulation by the same craftsman.

Analogues: Similarities that are not of common descent (in cladistics these are called 'homoplasies'). Analogues may include convergence (or parallelism), horizontal transmission, and character-state reversal.

Convergent adaptation: Superficial similarity as a result of environmental adaptation (often called parallelism), where two variants may emerge independently. For example, a convergent pressure to innovate in parallel (e.g. strengthened arch-bows in the Aegean and Italy to hold heavier cloth: profile-variant E5) from a hereditary root (e.g. thin arch-bows: E1s) with similar results. The trajectory for development is limited by material (e.g. bronze) and perhaps inevitable (cf. Catling and Catling 1980, 239-40).

Horizontal transmission: Similarity based on borrowing between variants or assemblages as a result of interaction and connectivity. A novel feature, taken from a different production region, may appear on a catch-plate, for example.

Character-state reversal: The reversion to a previous variant. An outmoded variant may be re-selected and become prevalent once more. This could be common in fibula assemblages where selection was, in part, based on fashion.

Shared derived: 'A character or character state shared only by sister taxa and their immediate common ancestor' (O'Brien et al. 2016, 71).

Shared ancestral: 'Sister taxa that have been inherited from an ancestor more distant than the common ancestor' (ibid., 72).

The two most common processes in archaeological assemblages are hereditary and horizontal; sometimes called branching and blending (Crema, Kerig, and Shennan 2014, 289). For cladistics, the 'cladogram' provides a neat way to show these relations, and may be assessed by a Retention Index (RI) (O'Brien et al. 2016, 71). In practice, trees of variant subdivision are significantly messier and only hypothesise the relations between variants, be they homologues or homoplasies (cf. Heggarty et al. 2010, 3831). In my diagram, straight lines indicate shared derived variants; dotted lines suggest shared ancestral, or horizontal transmission (Plate: 131). Convergent adaptation is even more difficult to hypothesise as scholars are unsure of the level of interaction within the Aegean in the Early Iron Age. The use of phylogenetic trees in archaeology remain as hypotheses designed to visualise evolutionary relationships between variants, presenting a set of questions to be considered (see Chapter 4).

The result of my attempt demonstrated that, whilst I could demonstrate the existence of homologues and homoplasies how could I begin to tell them apart? The goal of creating the typology was to create types of equivalent value; not determine the evolutionary relations of every variant. Yet, the process brought about a typology that looked like an ineluctable evolution of stylistic complexity. This is the kind of progress that Montelius might have espoused (Almgren 1995). However, the order of variants in this way may not be chronologically correct, as Clarke noted with his grandfather clocks, where more complex variants did not always come after those more simple (Figure: 2.4). Nevertheless, ordering variants by complexity is still valuable for another reason. Variants and groups closer together are more akin, so I would expect, on the whole, a closer proximity of production for types stylistically similar. Moreover, I would not fall into the trap of placing grandfather clocks VI-VII-VIII between I-IV because I would not include them in one group. Rather, they are like having two groups side-by-side, not one group being a derivative of the next, as I indicate for variant categories. That still does not negate the issue of chronology, hence I look to context in that respect; but my typology does not need to be constructed in chronological order. Equivalent types may be compared by networks (Chapter 4) and diversity (Chapter 5) irrespective of chronological ordering, as I will argue later.

The creation of a phylogeny revealed a more pressing problem for typology as a whole. Tree-like typologies, where one type is an evolution of the other, are used by archaeolo-

Figure 2.4: Clarke's grandfather clocks (Clarke 1978, 185, Fig. 38).

gists to create chronologies based on 'dead-reckoning'. Types are spread over a chronological period to form a phase, such as a ceramic phase. The trouble is that new types are created by innovation, and yet innovation is not determined by time. The variants within profile-groups, e.g. AC or DH, could have been produced over several hundred years or, alternatively, several weeks (cf. Coldstream 2003, 248; Furumark 1941b, 5). Ultimately, using a phylogeny and its hypotheses for common descent and homoplasies for a fibula typology is too speculative to have a real value, and is not employed further in this thesis.

2.2.3 Variant definitions

2.2.3.1 Profile-variants:

> 'The profile is the 2D shape of the bow including any protuberant features along it, from spring to catch-plate. The profile-variant does not consider the shape of the catch-plate'.

Profiles are first divided by shape and then subdivided by features of (or added to) the bow. The shapes are thus capital letters (groups) and subdivisions natural numbers (variants): numeration is arbitrary. The shapes are grouped hierarchically into super-groups, there are thus four shape groups of violin-bow (A. Violin Bow; B. Violin Leaf; C. Violin Back-

Bent; D. Violin Open-Ring) and four groups of basic arch-bow (E. Plain Arch; Eδ. Single Feature Arch; F. Swelling Bow Mid-Catch; Fδ. Swelling Bow High-Catch).

My aim is to subdivide variants of equal weight based on shape but not size. It is true that two profiles designated variant K2 may still appear different, but the variant of an asymmetric arch with two flanked beads at prow and shoulder remains the same: the difference may be in size, date, or copy quality. Prioritising the subdivision of the prototype rather than the 'hand' of a particular workshop, where the relations of measurement and quality may be informative, is a shortcoming of this typology (see Section 2.2.1.1 on page 44). Yet, I will argue there is another route to achieve this (see Chapter 4). In one respect we miss some production information, on the other we gain a greater analysis of it: by looking too closely at particular artisan's hands risks missing horizontal transmission of cross-section and catch-plate-variants over a wider area. My view is that the processes behind this transmission are more important than the elucidation of a particular craftsman (cf. Beazley 1956; Hampe 1936,7; Whitley 1997).

See Profile-Variant List: Volume 2, Plates: 1-99

2.2.3.2 Cross-section-variants:

> 'The cross-section of the bow from the centre taking into account its shape throughout the bow. If there is a protuberant feature towards the centre, such as a boss, the cross-section is of the feature and not the wire supporting it'.

The necessity of including the cross-section category is the assumption that the craftsman would need to decide on the type of cross-section as the central component in manufacturing the design (or prototype) they wished to realise. The cross-section would determine the feel of the bow as well as constrain (or suggest) the form a profile could take. Firstly, the cross-section is taken from the centre to attempt consistency, for in fact, some fibulae have multiple cross-section types along the bow. However, the shape throughout the bow is considered because a 2D section would not distinguish swelling, for example, so here I subdivide the cross-sections in perspective. Finally, if a protuberant feature is found towards the centre, the cross-section is of the feature and not the wire. My contention is that the feature would be more prominent to the consumer as well as the craftsman; the wire being merely an adjunct or secondary consideration. As seen above, Kilian (1975) attempts to define the wire rather than protuberant features as his primary key, and so there are confusing distinctions based on a trivial relative size of the swell (e.g. between Kilian's nos. 664 and 675), or a fibula such as Kilian's no. 324 which, being made up of bosses and fillets, has almost no wire to distinguish it, and yet is placed under 'D' (very swollen).

Now that the cross-section is defined, the variants are divided by shape and given a code. The Roman numeral, together with letter, denotes an individual variant; by itself, a shape group, e.g. round; flattened; rhombus. Each variant is individual and mutually exclusive. There are 166 variants in total. The category therefore has a secondary hierarchical element. The nesting of the variants by shape is in addition to the individual designation, it assists in not only simplifying the system but allowing careful analysis of the 31 cross-section-groups.

See Cross-Section-Variant List: Volume 2, Plates: 100-12.

2.2.3.3 Catch-plate-variants:

> 'The catch-plate is the catch in the form of a hook or plate that holds and guards the pin. It is located at the base of the forearm or the prow, in place of the forearm'.

The great variety of variants we have now seen is shared by the catch-plates, and here a lot more information may be found than previously investigated. The catch-plates are subdivided by shape. The groups are given an individual number, 1-27, and variants add a letter, e.g. 1a; 1b. It is possible to group the shapes into super-groups, especially catch-plates 9-10 (vertical plates), 12-15 (horizontal plates), and 20-28 (hilts).

Some catch-plates have added decoration, particularly incised, and an additional thesis on decoration would be useful. However, like the profiles, this would highlight the particular craftsman more than the homologues or homoplasies of the corpus in general.

See Catch-Plate-Variant List: Volume 2, Plates: 113-29.

2.3 Typological issues

2.3.1 Cross-section-variants in perspective

Whilst a simple 2D drawing works for most cross-section-variants, it fails to distinguish those cross-sections that change shape throughout the bow. A dotted line in perspective is sufficient to show the subdivision here (Figure: 2.5). As defined above, the cross-section takes into account its shape throughout the bow rather than being a 2D section of the central point. In taking this position, it seems there is a risk that the cross-section is capturing an attribute state of the profile category: an oval swell in cross-section (Ib) could be shown with a swelling arch profile (Fδ1); but this is not actually the case as the swelling profile could have, for example, a IIb, VIIIc, or XIIIb section. The oval swell section determines what it is not: it does not have any knobs or other protuberant features along the bow, for example.

2.3.2 Mutual exclusivity, weight, and distance

As I have shown, some variant categories appear to overlap (as variants inherently do, being polythetic), however, crucially they remain mutually exclusive, and so they are not

(a) XIIIa Rhombus

(b) XIIIb Swelling Rhombus

(c) Vd Flattened Horizontal straight-sided leaf

(d) Ve Flattened Horizontal round leaf

Figure 2.5: Cross-sections in perspective (Source: Author).

being counted ‘twice’. The synergy of variant categories, where a fibula is easily recognised as a sum of its parts, as opposed to any individual variant, is important to note. This notion of synergy raises the issue of ‘weight’ between category subdivision. Weight takes into account the difference between subtle and obvious subdivisions. It is fairly likely that some consumers may not have noticed a variant subdivision clear to a craftsman. This is particularly true when it comes to including protuberant features with the cross-section and profile subdivisions, but is also clear between shapes, for instance, catch-plate-variant 9c (Vertical Plate Ascending Curve) and 9i (Vertical Plate Ascending). They are quite similar whilst catch-plate-variant 9o (Vertical Plate Plateau) is clearly distinct; 10a (Vertical Plate Apex) even more so. It is also reasonable to assume that the craftsman was not always able to properly reproduce two of the same artefact, and production error may account for difficulties in both subdividing and sorting for the typologist. I could call weight ‘distance of similarity’, proposing a measure for distance to see how close one assemblage is to another, in terms of stylistic similarity (typological similarity, not necessarily regional, chronological, or shared-presence). This issue is encountered in biological studies, and will be discussed in Chapter 4. Note, the weight issue is compounded if a network analysis combines profile and cross-sections in the same analysis; that is, if links are formed upon exceeding a threshold. Counting dependent variables is erroneous, hence I analyse variant categories separately.

2.3.3 Decorative features

Originally, four variant categories had been proposed. The fourth was decoration. This category was discarded for three main reasons. First, it made the typology overly complex as multiple types of decorations exist on some fibulae, and in varying places. Moreover, all four categories would be needed to ensure sufficient subdivision. For example, an M4.IIc.12–14 with certain beads and incision would not only be convoluted (M4.IIC.12-14+2ii+8iv+11x), but also very different to an M4.XIVb.– with knobbed rhombus, even though the first part of the coding indicated similarity. Second, these 'decorative' features could be incorporated in the other variant lists. Moreover, could a protuberant feature be disassociated from the cross-section or profile definitions? To analyse a cross-section without its feature would surely fail to fully subdivide: protuberant features must be inherent to their subdivision if the division is based on shape gestalts. The trouble with this solution is that whilst mutual exclusivity is maintained, attribute weight is compromised, as discussed above. A Swelling Convex cross-section with or without ridges is a good example (cross-section-variant VIIIa versus VIIIb). It is obvious that all typologies possess this problem when attempting to subdivide independent attribute clusters to the same value. So, I avoid grouping categories of different hierarchical levels during analysis. Third, Aegean fibulae were seldom decorated, and those that are belong late in the series, so for most fibulae 'no decoration' would have to be checked. Yet, all fibulae are decorative in their own way, in that their style is in their shape; not in added decoration. My database includes the field 'decoration present' where decoration is defined in Section 2.1 above. A further typology on fibula decoration would be useful but is beyond our scope (cf. Jennings 2016).

2.3.4 Scope of analyses and Mediterranean comparisons

The network analyses have to be restricted to the Aegean and Anatolia as my typology does not extend beyond these areas. It would be erroneous to quantitatively compare fibulae from my typology to those of another that is based on different subdivisions. I cannot assess diversity between non-included regions. Yet, if an analyst would like to assess the connectedness of fibula variants with fibulae found across the Mediterranean, this would require the tally of Aegean-like variants across Mediterranean *Prähistorische Bronzefunde* catalogues. It may be possible to quantify a degree of connectedness to non-Aegean fibula assemblages but not the other way around (without first quantifying the fibulae in the other regions).

Of course, non-Aegean fibulae found in the Aegean will be included in my typology, but they, being extracted from their home seriation, will be relative outliers. The presence of outliers in all variant categories is good reason to consider an alien nature. Even a fibula with a unique protuberant or shape is likely to possess features from of one or two other variant categories, thus indicating a local origin. In this way, even very exceptional fibulae may be shown to be produced in the Aegean and fit well into the classification.

2.4 Chronological reckoning

2.4.1 The problems of absolute and relative chronology

Aegean absolute chronologies in the Early Iron Age are framed by two historical dates from the Levant. The start is marked by Philistine Monochrome pottery (Mycenaean IIIC:1b) found in Philistia during 20th Dynasty Egypt, that is, the beginning of the 12th century. The end is marked by the Levantine destructions by the Assyrians, recorded in their annals of 722 and 712 BC (Coldstream and Mazar 2003, 41). In between there is dead-reckoning, the assignation of phase length on diagnostic pot numbers, and a few handfuls of sherds at Levantine sites with disputed stratigraphy. At the time of Coldstream's (1968) seminal *Greek Geometric Pottery*, Aegean sherds had been found at Samaria, Megiddo, and Tell Abu Hawam. As for dead-reckoning, the excavated pottery corpus tends to determine the historical record: 'long and stable phases are documented by a much greater abundance of grave groups that are also homogeneous in character, displaying a settled and harmonious style: phases for which we assume a comparatively slow development' (Coldstream 2003, 248). My principal query with dead-reckoning is that it does not satisfactorily take into account the prevailing economy, population levels, changing burial customs, or the use-life of the artefacts deposited. Indeed, caution is needed for innovation can increase rapidly in short time, as it appears to do with fibulae.

On the basis of dead-reckoning, Coldstream (2003, 251-55) linked Aegean sherds in Levantine contexts to the 'low-chronology'. It is not so much that those contexts are questionable (Brandherm 2008, 150-53), rather that the debate between the low- or high-chronology in the Levant remains inconclusive. The low-chronology was reinforced by Finkelstein (1996, 179), who argued that the foundations for a United Monarchy in the 10th century, the time of King David and King Solomon, were on unstable ground. It was a description in Kings (I, 9:15) about the architecture of Megiddo in the 10th century that Finkelstein argued was wrongly identified with Megiddo Stratum IV. Finkelstein (1996, 181) would instead date Stratum IV to the 9th century; Arad's Stratum XII is the only level, in his view, that can be dated to the 10th century. To accommodate this, Finkelstein had to lower the dates of Philistine Monochrome pottery (the upper anchor) by almost a century using negative evidence: no data showing contemporaneity with Pharaonic 20th Dynasty levels. Proponents of the high-chronology immediately refuted this key issue; some argued for cultural segregation, with Philistine Monochrome pottery acting as an ethnic marker (Bunimovitz and Faust 2001, 7). Yet, there is evidence for the upper anchor: three Late-Helladic IIIC-middle pictorial *kraters* are found in the destruction at Ugarit, providing an absolute date as early as 1195/1185 BC, whilst Late-Helladic IIIC stirrup jar fragments from Beit Shean are dated to the reign of Ramses III (Yasur-Landau 2003, 236-38). Furthermore, it has been shown that Philistine Monochrome ware is contemporary with Late-Cypriot IIIA (and thus Late-Helladic IIIC) (Sherratt 2006, 368-70). Coldstream's (2003) support of the low-chronology was refuted by Mazar (2004, 27-31) as a misreading of the evidence, however, Mazar does not dispute the conventional chronology of the Aegean. Mazar (ibid. 34) also pins blame for low radiocarbon dates from Tel Dor on the Weizmann Institute consistently but erroneously providing dates 100 years too low.

But it is not favouring the high-chronology in the Levant that is most important to raising the Aegean absolute chronology, rather Radiocarbon and dendrochronology dates from Iberia, North Africa, Italy, and Central Europe (Brandherm 2008; Doctor et al. 2008; Newton et al. 2014; Nijboer and van der Plicht 2006; van der Plicht et al. 2009). These readings consistently call to raise the Aegean chronology by 70-80 years, and it is for this reason that I largely follow Brandherm's (2008) review, agreeing that the conventional absolute chronology is untenable. Whilst the Levantine strata harbouring Aegean sherds continue to share a dazzling array of bitterly disputed inconsistencies (Bruins et al. 2011; Fantalkin et al. 2011), accepting the high-chronology causes less 'havoc' than the low alternative. The latter would particularly affect the West and Central Mediterranean. This view favours scientific data over conventional dead-reckoning, biblical descriptions such as Solomon's city, or Thucydides' colonial foundation dates. The main effect of adopting the high-chronology is the raising of Protogeometric to early-mid-11th century. This does not, however, cause as much congestion as once thought, because the Submycenaean phase has been argued to be coterminous with another phase: Late-Helladic IIIC-late/Submycenaean (cf. Hallager 2010; Vaessen 2014, 134); the absolute dates of Late-Helladic IIIC are 12th century (Weninger and Jung 2009; Yasur-Landau 2003, 239). From a historical point of view, the beginning of the 'Dark Age', the decline in Late-Helladic IIIC/Submycenaean before a new 'Greek spirit' is found in Protogeometric (Desborough 1972, 133), loses half a century of time. This reminds archaeologists that absolute chronology, and relative chronologies for that matter, are elusive abstractions of historical reality (Trachsel 2004, 335). These chronologies are ultimately ceramic sequences and a focus closer than 25-50 years is largely meaningless.

The wide geographic extent of this thesis means that discussion by centuries will take precedence for Mediterranean-wide analyses whilst relative sequences will be used for specific contextual examples (Figure: 2.6). When conducting comparative analyses, both (centuries and pot phases) encounter the difficulty that the phases (of pots and of the contexts where fibulae are found) are of dissimilar length. Finally, it should be noted that chronological sequences of Italy and Central Europe are often synchronised with the Aegean by fibulae and other metalwork (Nijboer 2008; Pare 2008; Trachsel 2004). Can fibulae, given their complexity, play a constructive role in Aegean-Mediterranean synchronisations?

2.4.2 Key chronological markers

Before beginning, I must stress the warning that a deposition date may not have reference to manufacture or the initial date of use; especially if the object were an heirloom or gift. Furthermore, I argued in Section 2.2.2. that stylistic sequencing is problematic. Firstly, fashions may go in and out of use, and it is not obvious that one style is an improvement over another in evolutionary terms. Secondly, style is created by innovation. Variation can be created in weeks and months let alone the generations that archaeologists often prefer to assign their phases. This was found with the failed application, or rather, guesswork, of phylogenetic trees.

Aegean World Chronologies

Century B.C.	Attic/ Euboean[1]	Crete[2]	Thessaly[3]	Corinth[4]	Italy[5]	Cyprus[6]	Levant[7]	Gordion[8]	C. Europe[9]
1300	LH IIIB1	LM IIIB1			BM 3				
1250	LH IIIB2	LM IIIB2							
									Bz D-late
1200	LH IIIC (early)	LM IIIC (early)		LH IIIC (early)	JBZ 2	LC IIIA	Iron IA		
1150	LH IIIC (mid/late/SM)			(mid/late)	BF I		Iron IB		Ha A1/2
		LM IIIC		SM		LC IIIB1			
1100	EPG	(late/SM)			BF II				Ha B1a
	MPG				BF IIIa				Ha B1b
1050	LPG	EPG		PG		LC IIIB2			
		MPG			BF IIIb		Iron I/II		
1000	EG I / SPG I				P-F IA	CG IA	Iron IIA		Ha B2-ear
	EG II / SPG II	LPG			P-F IB				
950						CG IB-II			Ha B2-late
	MG I / SPGIII	PGB		EG	P-F IC				
900		EG	EG / SPG						Ha B3a
				MG I	P-F II	CG III			
850	MG II	MG					Iron IIb		Ha B3-late
	LG I	LG		MG II				Tumulus W	
800			MG	LG				Destruction	Ha C1-ear
									Ha C1-m
750	LG II		LG	ProtoC				Tumulus MM	Ha C1-late
		EO					Iron IIIa		Ha C2-ear
700	SubG								Ha C2-m
650									
600							Iron IIIc		

Figure 2.6: Aegean world relative and absolute chronology (1. Brandherm 2008; cf. Weninger and Jung 2009, 416; 2. Coldstream and Catling 1996; Hallager 2007, 196; 3. Kilian; 4. Trachsel 2004, 196, Fig. 109; 5. and 6. Pare 2008; 7. van der Plicht et al. 2009, 214; 8. Sams 2011; 9. Trachsel 2004, 319, Fig. 195).

2.4.2.1 Late-Helladic IIIB

The very first fibulae found in Aegean contexts (profile-variant A1) are found in T.1, T.8, T.29, and T.61 at Mycenae; at least a further seven were found on the Acropolis. These provide a context of Late-Helladic IIIB, in the latter half of the 13th century (Blinkenberg, 46-7; Gates 1985, 263; cf. Furumark 1941a, 92-3; Karantzali 2001, 70). For this reason Blinkenberg (38-40) believed that fibulae were invented in Greece.

2.4.2.2 Lefkandi

Amongst many closed tomb contexts, Lefkandi is the most prolific of the early period. Moreover, the prevailing burial practice at Lefkandi, as for Athens, was for single burial (Kübler 1943; 1954; Popham et al. 1980). The first tombs at Lefkandi provide a date of Late-Helladic IIIC/Submycenaean (12th century) for simple arch forms, and their ensuing development to Subprotogeometric III. Tombs of multiple burial over many generations, such as at the Knossos North Cemetery, are inherently more problematic; not only are the ceramic dates wider, but it is often difficult to assign fibulae to specific burials within the tombs (Coldstream and Catling 1996, 543-4, 554).

2.4.2.3 Phrygian Gordion

Gordion is well established as the originator for 'Phrygian' fibulae, profile-groups BM-DT, give or take a few groups representing imitations. Phrygian fibulae are easily identified by their distinctive horned catch-plate-groups 21-24, which come in many variants. If Gordion is the progenitor, then the great tumuli mounds, and the destruction of the old city, are key chronological markers for these fibulae. Although the dates are often debated, the consensus (Rose 2017, 138, 171; Sams 2011, 60, 63; cf. Kohler 1995, 192, Table 4) is as follows:

Tumulus W

Destruction Level c.800 BC

Tumulus K-III

Tumulus P

Tumulus MM c.740 BC

This indicates that very few fibulae pre-date the destruction at the turn of the 8th century. They are profile-groups CP, DD, DG, and DH from Tumulus W; moreover, they have exclusively the same catch-plate-variant: 21d. Indeed, most types proliferate in the mid-8th century, coinciding with a renaissance of fibula popularity in the Aegean, as we shall see.

2.4.2.4 Sanctuary contexts

It is very unusual for a sanctuary context to provide coterminous dating to the periods in which fibulae were manufactured. Most provide a *terminus ante quem* in the Archaic and Classical periods, where the votive offerings, perhaps dedicated centuries before, have been collected together and buried. An example is with the construction of the Western Retaining Wall and Second Temple at the Argive Heraion in the later 5th century (Strøm 1988, 185; 1995, 38).

There are two important sanctuaries that break this trend. The first is Ephesus, where a significant number of fibulae were found in the Artemision dated to 700-650 BC; moreover, in later layers dating to 650-550 BC, fibulae are surprisingly scarce (Figure: 2.7; Klebinder-Gauß 2007, 21). The second is Kalapodi, where there are layers dated to the mid-8th century when it was ‘ritually buried’, and here the fibulae are found (Felsch 1983, 124-6; Klebinder-Gauß 2015, 193-4; Niemeier 2016, 234). These two sanctuaries provide chronological evidence that is much more consistent with the dating of fibulae found in closed burials.

2.4.3 Summary

Ultimately, only relatively few fibulae may be assigned such close dates as described above. Even when a fibula group or variant is found in a good closed context that does not necessarily mean others from the same group shared a similar date. There is much uncertainty over the length of which a certain group was manufactured or its use-life before deposition. To overcome this difficulty in the analyses it was decided to create four periods where each group could be more or less confidently placed (Table: 2.1).

Period	Absolute Date	Ceramic phase (Attic sequence)
Period 1	1200-1000 BC	Late-Helladic III - Protogeometric
Period 2	1000-800 BC	Early-Geometric - Middle-Geometric II
Period 3	800-600 BC	Late-Geometric - Subgeometric
Period 4	600-400 BC	Black-figure - Red-figure

Table 2.1: The four periods used in this thesis and their absolute and ceramic dates (Source: Author).

2.5 Variant lists, overview, and chronology

2.5.1 General overview

The typology is generally ordered by number of protuberant features along the bow, starting with plain bows and followed by swelling, one feature, two, three, four, five features, and so on. It is important to state that this sequence was created independent to prior knowledge of chronology or sequence at a cemetery, which in any case is rare in the study zone, unlike say, at Veii, in Italy (Toms 2006). I thus part company with fibula typolo-

Figure 2.7: The distribution of metal finds in the Peripteros at Ephesus; fibulae are shown in red (Klebinder-Gauß 2007, 23, Fig. 1).

gies that are created to fit into a pre-existing ceramic chronology, not because they are disagreed with, but I wished to prioritise the evolution of stylistic complexity, regardless whether this was true or not (Figure: 5.4 on page 229; cf. Clarke 1978, 185, Fig. 38). The methodology was dissection by equivalent value, so each variant may be compared like-for-like. This is particularly important when assessing diversity ratios in Chapter 5. I contend the difference between a J4 and J5 is roughly the same as that between a BW1 and BW2, even though they are radically different. Group-level dissection at equivalent value is harder to approach: whilst the difference between J and K is similar to BW and BX, the dissimilarity between J and BW is markedly greater than J1 and J7. Within-group cohesion is thus greater than between-group cohesion, depending on the number of steps taken. As I shall show in Chapter 5, the number of variants per group and groups per super-group is important when questioning diversity, hence the critical issue of equivalent value.

The key super-group break is between A-BL and BM-EF, where the latter are termed 'anchor' for having a protuberant feature contiguous to the spring and catch-plate. There is a coterminous technological difference between them where A-BL have a spring made with the bow whilst BM-EF have a replaceable pin slotted into the stem, known as two-piece fibulae (Birmingham 1963; Pedde 2000; 2001; Stronach 1959). Replaceable pins are common to the Near East and Anatolia and are not earlier than 900 BC. Within the latter are eight groups, CK-CKδ and CM-COδ, late versions local to the Aegean and Central Balkans, which use a pivot to hold a replaceable pin (cf. Bader 1983, 118, Pl. 38; Vasić 1999, 102, Pls. 51-56). None are earlier than 650 BC. Pivoted pins are common to Roman (e.g. EP) and Medieval brooches (Baxter and Cool 2016; Martin 2015).

One of the most important features are the catch-plates, dealt with separately. But the location on the profile is not to be overlooked; especially the difference with a high, mid, or low catch-plate. Some super-groups have both: a telling sign of different regional manufacture of the groups. Compare, for instance, profile-group F with Fδ (Plates: 3 and 4). Also notable, is a distinct low (or high) rhomboidal stem, different to the cross-section of the bow (e.g. U and AH); others are round, and sometimes very thin (AJ). The addition of finials or birds, as well as decoration, are also distinguishing features (e.g. G and H).

After the BM-DP groups, there are the Triangular DU-EF series, common to the Near East, but the groups are more complicated than that, with quite a high regional distribution in our area. When arriving at the more obviously distinct and advanced fibulae, profile-groups EK-GF, there are fewer general patterns. The groups are quite clearly internally defined, however, and I can note in particular the bone/ivory plaques fixed onto a simple violin fibula (often missing), profile-groups FA-FC and GB-GC, and metal facings likewise attached, FE, and the round and figurative brooches, FJ-FM. These are often later, and have a richer use of precious metals; perhaps they have a more decorative than functional purpose (Pülz 2009).

The following overview should be read in conjunction with the variant descriptions given in Plates 1-129 (Volume 2) and the fibula catalogue Appendix G (Volume 3). It is aimed to be as brief as possible to allow space for analysis; further information may be found in the references provided for each catalogue entry in Appendix G. Groups marked with the Greek 'δ' have an equal value as the main groups: they are not sub-groups; though sometimes they appear such. They arose during the recursive addition of new types.

The aim was to include all fibulae published in the Aegean and Anatolia, starting with Blinkenberg and the *Prähistorische Bronzefunde* catalogues. Other site reports are included as known to the author through references and general browsing. Naturally, unpublished fibulae are not included; they include those due to be published from Miletus (Donder 2002) and Prinias (Rizza 2008). Examples seen on eBay and other auction houses are likewise absent. A few museums do not have their whole collection included where the objects have no provenance; notable examples include the Harvard Art Museum (Ebbinghaus 2014), the Metropolitan Museum of Art (Muscarella 1988, 425-7), and the Tübingen University Museum (Herrmann 1982). Now follows a discussion of the series.

Figure 2.8: B3.Ve.2a, #72, from Kerameikos T.2, Athens, scale 1:1 (Kraiker and Kübler 1939, 48, Pl. 28).

2.5.2 Profile-variant series

A-D

See Figure 2.8; Volume: 2, Plates: 1-2; Volume: 3, 1-6, #1-83.

These are Violin bows with some variation in cross-section: round, swelling, or horizontal leaves, and almost exclusively a large spring. A strikingly wide distribution across Central Europe and the Eastern Mediterranean is exhibited for A1 and B1, yet with only few examples at each site (e.g. Glogović 2003, Pl. 1; Lo Schiavo 2010, Pls. 1-2; Vasić 1999, Pl. 1). The incised or *pointillé* decoration on about half the sample is not continued in the Aegean's plain and swelling 'arch-bow' series E-Fδ; in clear contrast to surrounding regions, including Italy and the Balkans (Bader 1983; Gergova 1987; Glogović 2003; Lo Schiavo 2010). Georgian examples, on the other hand, are usually undecorated (Sulava 2011). The date of A-B begin in the late 13th century, probably slightly earlier than the first E1-E4 variants, and are considered a development of the Alpine foothills due to the history of bronze coil use there (Alexander and Hopkin 1982, 405-6). Their typological development in the Aegean (A1-A4; B1-B4) does not necessarily correspond to chronology, however, as simpler A-B types are also found in later Protogeometric contexts.

Furumark (1941a, 92) believes the Italian sequence may confirm a linear chronological development, from profile-groups A-F, but it is not known where the simple Plain Arch E first developed, or the nature of its transmission between the two regions. In terms of quantity, it is clear that B1 became widespread in the Aegean in the 12th century, whilst E1-E4 are 11th century. C1 is also 12th century. D is a 10th and 9th century type found

Figure 2.9: E2.IIIa.2a, #299, from Phaistos, scale 1:1 (Sapouna-Sakellarakis, Pl. 6, No. 194).

at Lefkandi, whose open-ring is analogous to the otherwise dissimilar 'Monachil' fibulae from Spain, 'Megiddo' fibulae from Israel, and 'Cassibile' fibulae from Sicily (Carrasco et al. 2014, 96, Fig. 1; Catling and Catling 1980, 239; cf. Pare 2008, 93, Fig. 5.12); whilst these other types share the positioning of protuberant features and have the same catch-plate, my D does not. C2 may well be Roman (cf. Ridgeway 1901, 582, Figs. 133-5). C3 is another outlier, but the chance that it is a misshapen A or B is reduced for it does not share the characteristic large spring of the former groups.

E-Fδ

See Figure: 2.9; Volume: 2, Plates: 2-4; Volume: 3, 6-75, #84-1188; 576-588, #9202-9407.

The origin of the arch bow is contentious. Blinkenberg (38-40) felt it originated in Greece, but Alexander and Hopkin (1982, 406) place it to Central or Northern Europe, if only for its distribution from Scandinavia to Italy. Most notable are how Aegean arch bows diverge from their European counterparts. The bulk of Italian and Balkan arch bows, as already mentioned, are decorated (Lo Schiavo 2010, Pls. 3-105). The cohesiveness of the Aegean E group is that they are not decorated: the most distinguishing features are instead the size of the spring and whether the bow is symmetric. The lack of decoration is divergent from A-B, and so is the quantity. Where before only a few fibulae were found per site, now there are many, suggesting their use had, in certain areas by the 10th century, become somewhat integrated with dress and local manufacture.

In terms of chronology, E1-E4 are available from the 12th century on. E5 is markedly later, marking the shift from thin bow to a more sturdier version, and the catch-plate often widens to catch-plate 2b. Catling and Catling (1980, 239-40) place this in the 9th century at Lefkandi, where the E series appears to be reintroduced after a hiatus in Middle-Protogeometric/Late-Protogeometric. A different picture is found at Athens, where E5 never materialises (Müller-Karpe 1962).

The difficulty distinguishing E5s from F1/Fδ1, is negated by taking the layout of forearm and catch-plate into account. Es have a full-length forearm whilst Fs have a catch-plate at mid-forearm and Fδs have a high catch-plate and no forearm. We see here a clear divergence from Fs emanating from Thessaly and Fδs emanating from Rhodes. Thessalian fibulae generally take on the catch-plate-groups 12-15 whilst Rhodes takes group 9. This is a position shared with the later divergence between BF and BH. Another feature of the F/Fδ series is the moulding of the stem, often rhomboidal as in F2 and Fδ3/4, that shows a progenitor feature that becomes standard in later types.

The vast majority of the F series are symmetric, with asymmetry caused by a high catch-plate rather than a deliberate bending of the forearm. From F-BL spring sizes are notably smaller; there are only few large springs, and they are decidedly early, E2, E4, J3-4, N1-2, and O2. The number of turns in the spring increase from one to three, although this is difficult to quantify due to damage and publication quality. Unfortunately, many later fibulae from Izmir, Lindos, and Pherai end up indeterminably in F/Fδ. Such issues decline for the rest of the typology as protuberant features increase. Kilian (25) places F to the 8th and 7th century and Fδ may be similarly assigned (Boardman 1967, 208; Coldstream and Catling 1996, 124; Sapouna-Sakellarakis, 84). #9241 was, for example, found in a Late-Geometric-late pithos (Coldstream and Catling 1996, 123-4).

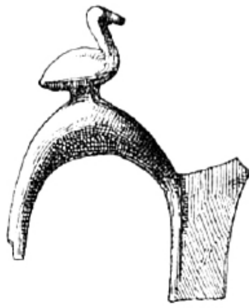


Figure 2.10: G1.VIIIc.9k, #1214, from the Acropolis at Lindos, scale 1:1 (Blinkenberg, 93, Fig. 95).

G-H

See Figure: 2.10; Volume: 2, Plates: 4-6; Volume: 3, 75-88, #1189-1398.

G-H are grouped for the addition of the waterfowl. There are clear links to the Fδ and M series, e.g. G1->Fδ1, G2->Fδ3, G4->Fδ5, G5->Fδ7, and G6->M4. Just as notable as the waterfowl, G-H fibulae have an exclusively high-catch-plate. 97% of G and 100% of H were found in Rhodes. They date between 850-650 BC (Sapouna-Sakellarakis, 99-100).

A waterfowl is featured on a unique square catch-plate, variant 11h, #2887 from Lousoi, whose profile, AH, is familiar with Thessalian examples. Whilst G-H are, besides #1236, not found on the mainland, waterfowl often feature as incised decoration on the face of mainland catch-plates, employing repertoire common to vase painting (DeVries 1974, 119; Hampe 1936), and as stand-alone bronzes (Strøm 1995, 62-6).

I

See Volume: 2, Plate: 6; Volume: 3, 88, #1399-1407.

Group of few examples that appear to be a progenitor of the U-V series, and are assigned to Period 3 with other examples from Pherai.

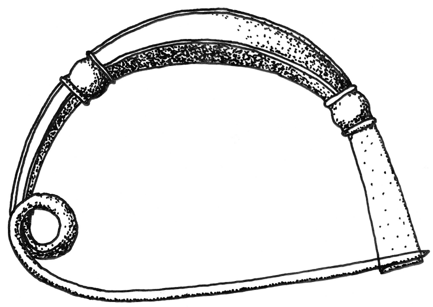


Figure 2.11: K4.XIIIc.6a, #1520, from Lefkandi T.13, scale 1:1 (after Popham *et al.* 1980, Pl. 173).

J-Q

See Figure: 2.11; Volume: 2, Plates: 6-11; Volume: 3, 88-114, #1408-1821.

These comprise fibulae with two primary protuberant features, commonly at prow and shoulder. J1, J3, J4, and N are the earliest, dating to the 11th and 10th century. Catling and Catling (1980, 237) have argued J1 is a development of the Cypriot asymmetric arch fibulae, noting #20 from Lefkandi and a further 10 J's from Athens in Submycenaean contexts, against examples in Late-Cypriot IIIB contexts. The direction of 'influence' is less clear, in part depending on the high or low Aegean chronology, and even if there were a direct stylistic borrowing the Aegean series has multiple variants, J1-J7, that Cyprus does not (cf. Giesen 2001). Indeed, the Cypriot series goes in another direction, R. J has the bead at low-mid-stem whilst K at shoulder or hind, and are dated 11th to the 8th century. K5 may be dated to the 9th century, with examples from Kerameikos T.41 (#1531-5; DeVries 1972, 113) and Lefkandi (#1531). L are squat, a development Catling and Catling (1980, 238-9) argue from K3, but the distribution is not as restricted as they suggest: 28 (60%) are from Lefkandi, whereas the remaining 18 are from 7 other sites. M have a mid-high-catch-plate and low rhomboidal stem, giving away their consistency with a Thessalian provenance; Kilian (34) assigns them to the 8th and 7th century. N is an early group, indicated by their large springs and relatively thin wire. O, P, and Q are particularly heterogeneous in style and distribution, and appear to show a creative manufacture that never quite gets going. An O example is found with Subprotogeometric II pottery in SP.4

Figure 2.12: T1.Ia.3a, #1840, from Lefkandi T.32, scale 1:1 (Popham *et al.* 1980, Pl. 186).

at Lefkandi (Popham et al. 1980, 136); others are in Protogeometric contexts at Athens (Müller-Karpe 1962, 108-9) and Nea Ionia (Smithson 1961, 173-4), though one example (#1753) from Perati is as early as LH IIIC (Konstantinidi 2001, 137; Pare 2008, 89, Fig. 5.10: A1). Boardman (1967, 206) dates P to the 7th century. The group variation in J-Q is slightly greater than in most super-groups; consistent with their wide, regional spread.

After this fairly haphazard start (but not for J, K, M, or G), the remaining profile-groups become more internally consistent, and also more prolific. They are easier to identify for their distinct arrangement of protuberant features, thus allowing a more robust typology.

R-T

See Figure: 2.12; Volume: 2, Plates: 11-12; Volume: 3, 114-117, #1822-1860.

R-T are fibulae with three unobtrusive features. R is unequivocally Cypriot; only one, an R3, is found in our study area. S is a complex type of only two unique examples. R dates to the 10th and 9th century (Birmingham 1963, 91-3, 95-7; Pedde 2001, 487, 490, Fig. 1.6); S is unclear. T1 is a type introduced to Lefkandi in the 9th century. Catling and Catling (1980, 242) question whether their inspiration is from Italy and, though Italian fibulae share a wider catch-plate (e.g. Lo Schiavo 2010, Pl. 38), this is not enough to negate the possibility of convergent adaptation. The groups of this super-group are fairly

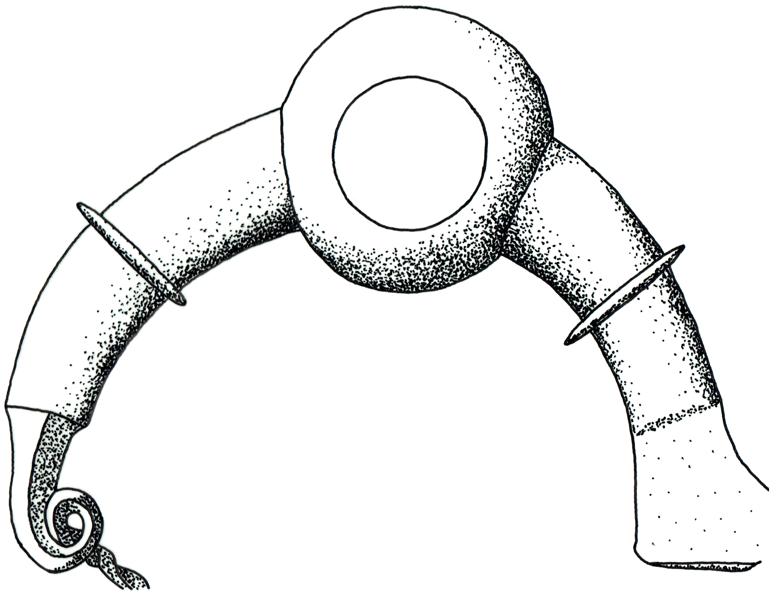


Figure 2.13: U1.XXIa.15–, #1889, from Olympia, scale 1:1 (after Philipp 1981, Pl. 60, No. 1004).

dissimilar.

U-Y

See Figure: 2.13; Volume: 2, Plates: 13-15; Volume: 3, 117-151, #1861-2415.

Three main groups of protuberants where the centre is usually dominant, and there is a significant level of 'inter-object citation' (for discussion of this term see Section 5.1.1.4 on page 224; Sørensen 2015a, 89), including the use and position of interspersed discs and hollowing of one or more bosses for encrustation, suggesting a close point of manufacture. The catch-plate is almost always a variant of the Descending Horizontal (groups 14-15). The distribution of these groups is overwhelmingly at Pherai.

Further subdivision of U at the stem could be carried out, some being tall or short, with a rhomboidal lower-stem. Kilian dates U, V, and Y to the 8th century (Kilian, 36-8, 40), and W and X to the 8th and early-7th (ibid. 37, 61).

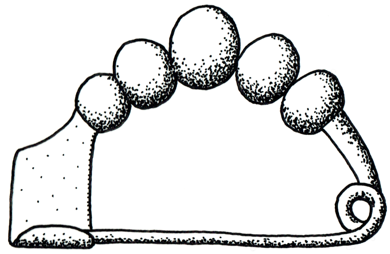


Figure 2.14: AC7.XXIVc.9b, #2587, from Ialysos, scale 1:1 (after Sapouna-Sakellarakis, Pl. 9, No. 277).

Z-AG

See Figure: 2.14; Volume: 2, Plates: 15-24; Volume: 3, 151-180, #2416-2870.

As each group develops, additional features are found along the bow until the whole length is covered. These groups have a divergent distribution easiest to spot, where surviving, by catch-plate-group. AE-AF have Square catch-plates (consistent with a Thessalian production), whilst AC-AD more usually have a Vertical catch-plate (consistent with an Asia Minor Coast production).

Z is dated to the 8th and 7th century (Kilian, 129; Kilian-Dirlmeier, 39). AA is assigned to the 8th century by Kilian (38), but an example from Vrokastro Bone Enclosure XII, #534, was found with Protogeometric-B/Early-Geometric pottery (Hayden 2002, 12), whilst another from Knossos North Cemetery T.104, #177, contained Protogeometric-B to Early-Orientalising pottery (Coldstream and Catling 1996, 139-40). In addition, AA examples are found in Cyprus in the 9th century (Birmingham 1963, 97). Sapouna-Sakellarakis (57) dates AA between the 8th and 7th century. AAδ may be slightly earlier, being found in the tomb of the Rich Athenian Lady, #2498 (Smithson 1968), and Pithos 23 at Fortetsa, #2499 (Brock 1957). AAδ are also found in Bulgaria (Gergova 1987, 24, Pl. 2, Nos. 24-27).

AB is unusual for having a very wide, regional distribution yet small overall quantity. Dusenbery (1998, 981-3) argues that the spring and pin were made separately, attached using a rivet, which is at odds with the usual understanding that such evidence indicates an ancient repair. In addition, the examples from Samothrace (#2512-3, #2521, #2524-6,

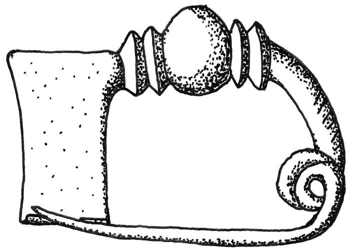


Figure 2.15: AN1.XXIVa.9a, #3168, Knossos North Cemetery MF.78, scale 1:1 (after Coldstream and Catling 1996, Fig. 159).

and #2530) appear to be made in two halves and joined together, as shown by seam marks (ibid.). Caner (49) dates AB to the 8th and 7th century (cf. Gergova 1987, 24-5, Pl. 2, Nos. 28-35).

AC and AD are dated by Sapouna-Sakellarakis (59), and AE by Kilian (118), to the 8th and 7th century. AF has a very close association to BH. BH is tentatively placed in super-group BF-BH for its high poised stem and diamond cross-section: it feels like BF but their distributions (and catch-plates) rarely overlap, perhaps indicating a parallel development. AF are dated to 850-650 BC (Kilian-Dirlmeier, 37) and AG to the 8th and 7th century (Sapouna-Sakellarakis, 85). AE, AF, and AH are also found at the Argive Heraion with a *terminus ante quem* of 450 BC (Strøm 1988, 185).

AH-AQ

See Figure: 2.15; Volume: 2, Plates: 24-30; Volume: 3, 180-221, #2871-3527.

AH and AI are dated to the late-8th and 7th century (Felsch 2007, 136; Kilian, 132; Kilian-Dirlmeier, 39), as are AJ (Boardman 1967, 206). AM are found in Assyria and Babylonia, and dated by Pedde (2001, 488, 490, Fig. 2.12) to the 7th century. AN have been found in a Late-Geometric-late pithos at Knossos (#3168; Coldstream and Catling 1996, 123-4), and are dated by Klebinder-Gauß (2007, 34) to the 8th and 7th century, whilst AO is dated to the 7th century (ibid. 35). AP is not a homogeneous group. AQ could be a development from AH; they share the square catch-plates common to Thessaly, and are here assigned

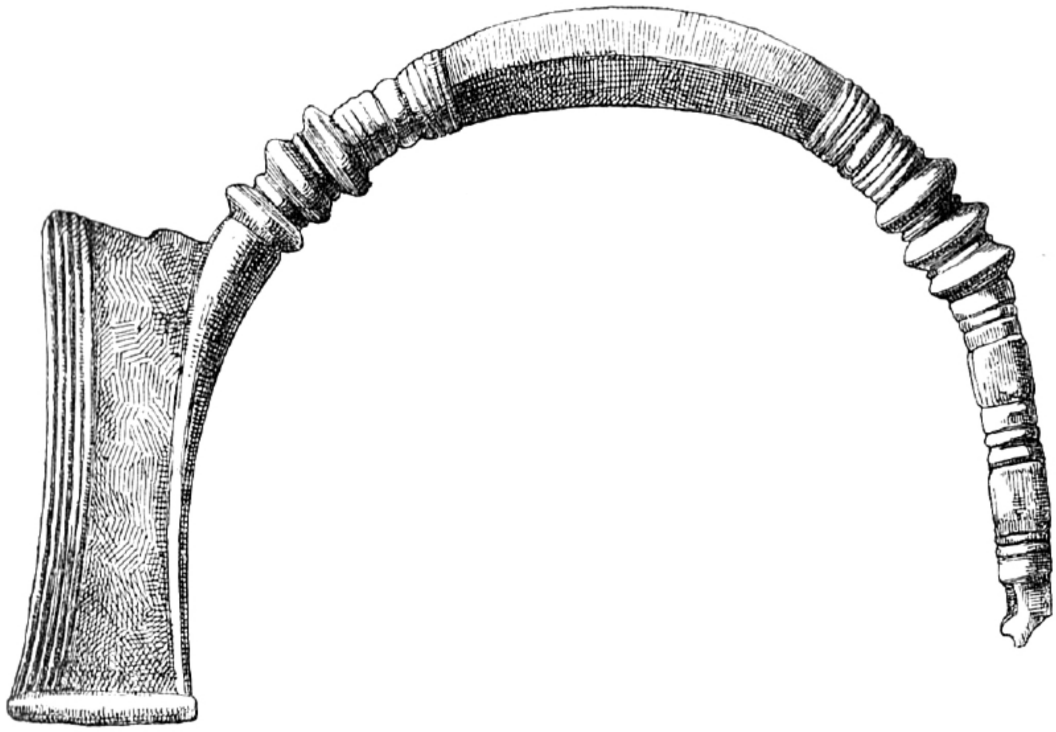


Figure 2.16: AR4.XIIId.9j, #3535, from the Acropolis at Lindos, scale 1:1 (Blinkenberg, 91, Fig. 91).

to Period 3.

AR-AS

See Figure: 2.16; Volume: 2, Plates: 30-31; Volume: 3, 221-232, #3528-3707.

An intermediate group whose protuberant features, although spaced along the length of the bow, are not dominating. 98% (N=180) are from Rhodes, and although the examples from Ida (AR2) and Troy (AR1) are unique variants, they share Stemmed Vertical catch-plates that are consistently found at Lindos. It is difficult to judge whether there are many more variants of AS, as Blinkenberg (1931) and Sapouna-Sakellarakis published only ten drawings between them; they show between 9 and 15 discoids each, depending on size. They probably date to the 8th and 7th century (Caner, 35; Sapouna-Sakellarakis, 67, 77).

Figure 2.17: AU1.IXb.15d, #3777, from Pherai, scale 1:1 (Kilian, 91, Pl. 36, No. 1004).

AT-AZ

See Figure: 2.17; Volume: 2, Plates: 31-35; Volume: 3, 232-264, #3708-4215.

These are termed Dolphin for having a swollen back and dorsal swelling or finial at either side; AT-AY are dated by Kilian to the 8th and 7th century (Kilian, 25, 84, 95). AZ is 7th century (Boardman 1967, 206; Klebinder-Gauß 2007, 28). AT-AX have a low rhomboidal stem and Descending Horizontal catch-plate. This, alongside their continuous development of style, support my later argument of manufacture at Pherai (see Section 4.4). AU-AX stand out for their incised decoration. However, fibulae found at Pherai and Philia, especially AE-AF, BE, and BH, are also decorated though in a different manner. Although their morphology and decoration has obvious similarity to examples in Italy (Lo Schiavo 2010, Pls, 139-183, 236-279), and a scattering across the Balkans (cf. Glogović 2003, Pls. 49-52; Novotna 2001, Pls. 18-21), those examples have a narrow foil catch-plate, in definitive contrast. Hence, only when profile, cross-section, and catch-plate match in combination, do they have an Italian provenance, as #4132 and #4133 from Olympia (cf. Lo Schiavo 2010, Pl. 243, No. 3374).

BA-BD

See Figure: 2.18; Volume: 2, Plates: 35-36; Volume: 3, 264-268, #4216-4282.

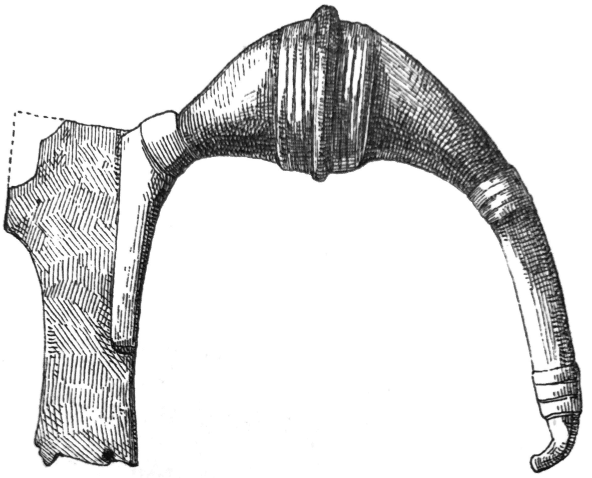


Figure 2.18: BA5.VIIIk.9k, #4221, from the Acropolis at Lindos, scale 1:1 (Blinkenberg, 105, Fig. 116).

This super-group has two broad trajectories. BA and BC seem to follow from AY-AZ by forming a deep leech shape, dated to the 8th and 7th century (Klebinder-Gauß 2007, 31), whilst BD, a disparate group, seems to be the forerunner for the BE series, but not necessarily. On the other hand, a number of BA examples and a rare mould have been found in Bulgaria (Gergova 1987, 28-30, Pls. 3-5, Nos. 47-67). K3-4 may be a progenitor for BE, or perhaps they run in parallel. BD have been found in a Late-Geometric-late pithos at Knossos (Coldstream and Catling 1996), a niche in T.292 with Middle-Geometric to Orientalising, at Sellada with Geometric to Early-Orientalising (Sapouna-Sakellarakis, 37-8), and with Late-Geometric pottery at Agora T.XVII at Athens (Müller-Karpe 1962, 127).

BE-BEδ

See Figure: 2.19; Volume: 2, Plates: 37-38; Volume: 3, 268-289, #4283-4616.

Of the Sail fibulae, the classic BE3 variant is perhaps the most famous, and takes its place at the forefront of many museum collections (though oddly not the Ashmolean, despite the rich number in store). The most probable reason is their early depiction of ‘narrative

Figure 2.19: BE3.VIb.11d, #4336, from Thebes, scale 1:1 (Source: Author).

art', including figures of warriors, horses, ships, swans, and other floral and geometric decoration on their sail-like catch-plate (Bates 1911; Hadaczek 1903; Reisinger 1916). Hampe (1936) dedicated a separate volume, and a look at the plates reveals this preoccupation with the catch-plate rather than the fibula itself. DeVries (1972, 117) has sketched their development over time, placing them between 850-750 BC, however, his earlier 9th century examples are here my K5's with a rounded cross-section. DeVries (1972, 114) argues shallow narrow cross-sections are early 8th century, and they develop more deeply and widely in the late-8th and early-7th century (DeVries 1974, 88; Kilian, 108). The chronology of the catch-plate shape is not yet settled (DeVries 1974, 87; Smithson 1968, 111). The majority are without context, being prized in the 19th and early-20th century AD, many are said to have been plundered from Thebes (DeVries 1972, 113). Blinkenberg (147-49) combined them in his typology as '*attico-béotiens*', however, the recent finds from Philia lend weight to putting this designation into question (Kilian-Dirlmeier 2002). Although the distribution shows a wide diversity of sites and regions, there are no concentrations anywhere outside of Athens, Thebes, Pherai, and Philia. This is in contrast to the concentration of popular types at individual sites at this time. In terms of variants, they increase at Pherai and Philia with a higher stem and unusual combination of flanks and beads at prow and shoulder. They date between 850-750 BC.

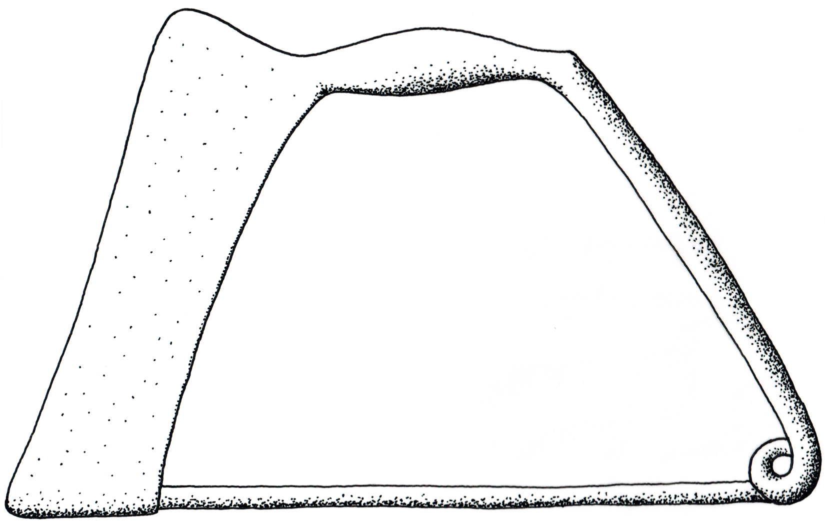


Figure 2.20: BG1.VIIIl.9h, #4957, from Exoche, scale 1:1 (after Sapouna-Sakellarakis, Pl. 23, No. 669A).

BEδ has the same morphological features as BE, with high rhomboidal stem and bead on shoulder and prow, and a Sail catch-plate, but it now has between one and six domes along the bow. Again, many have no provenance, and some appear too good to be true, such as those in Heidelberg, purchased by Hampe (1971; Donder 1994, 30). They can be of considerable size, indeed up to 270mm in length (e.g. #4585).

BF-BH

See Figure: 2.20; Volume: 2, Plates: 38-42; Volume: 3, 289-336, #4617-5367.

Morphologically similar, BF and BH are actually quite distinct. BF's have a rounded arch bow, vertical catch-plate, and rhomboidal stem that starts below the shoulder. They are produced in Rhodes. BH have a flatter bow, a Square or Apex catch-plate, and its stem comes higher at the shoulder. BH are typically Thessalian in manufacture, with a great number of variants (25) too, seemingly produced between Philia and Pherai. They total 137 examples. BG, a plain variant that morphologically looks as though it may be a progenitor of BH, is, however, different in character and provenance. 95% come from Lindos alone, with some 249 examples, and there are only 3 variants. This is evidence of

Figure 2.21: BK2.IVb.–, #5397, provenance unknown, in the Ashmolean, scale 1:1 (Source: Author).

mass production in clear contrast to the individual variety of the BF and BH groups.

BF is dated to the 8th and 7th century (Sapouna-Sakellarakis, 77). BH is dated by Kilian (113) to the 8th and 7th century, and there is an example (#5298) at Kalapodi in the ritual deposit, dated 750-700 BC (Klebinder-Gauß 2015, 194; Niemeier 2016, 234). I assume BG to be of similar date.

BI-BL

See Figure: 2.21; Volume: 2, Plates: 42-44; Volume: 3, 336-340, #5368-5432.

The crescentic super-group is quite distinct from its neighbouring groups, but placed here because they have been found together with a K5 progenitor of the BE series, indeed in a chain in Kerameikos T.41 (#1532, #5379, #5380, #5381, and #5382). BI has the unusual protrusion of the bow front down to a low catch-plate, bearing some resemblance to AAδ. The petal bead on BI4 has some resemblance to CO but they are not chronologically contiguous. Indeed, BI is probably 10th century, whilst CO is 6th century. BJ's provenance can be hypothesised based on their catch-plates. BJ and BK date to the 9th century; BJ being found in Kerameikos T.41 (DeVries 1972, 113), and BK being found at Lefkandi P.45 and T.36 (Popham et al. 1980, 241). BJ are distinct for their finer stem and forearm,

Figure 2.22: BU2.XXIVa.21a, #5630, from Tumulus S-1 at Gordion, scale 1:1 (Caner, 128, Pl. 51, No. 818).

and more adept decoration. BL, also largely 9th century, is not a homogeneous group, but makes sense when taken in combination with cross-section and catch-plate.

BM-CE

See Figure: 2.22; Volume: 2, Plates: 44-53; Volume: 3, 340-368, #5433-5882.

Here marks the shift from single piece to two-piece fibulae with replaceable pin. This super-group is determined by anchor bows with five distinct protuberant feature groups, save BR and BQ4, each having six. There is considerable between-group citation, where the features at anchor are shared but the style of central feature changes between group. The sharpness of the features is also notable; they would feel quite different to the fibulae discussed above, and with their thick bows are generally heavier. The catch-plate is the key to identifying local examples versus imitations.

The groups also cover a considerable chronology, from the 8th to the 5th century. The critical question is the date of the destruction of Gordion, c.800 BC, for only Tumulus W is earlier, containing CP1, CP3, DD1, DG1-3, DH3, and DH7. By the time of Tumulus MM, c.740 BC, a huge amount of variation has been created. All the following groups are thus in Period 3 (800-600 BC), whilst it is the later CK-CKδ and CM-COδ groups, with Pivot hinges, that are Period 4 (600-400 BC).

The dating is complex. Some groups that are found in the 8th century are still to be found

Figure 2.23: CEδ1.XXVIIb.19h, #5883, from Thymbra, scale 1:1 (Caner, 148, Pl. 59, No. 1030).

in 6th and 5th century city mound contexts, such as BT and BU (Caner, 134-5). BW is dated to the 8th and 7th century (Caner, 137, 144), BX likewise (ibid. 148-9, 174). BY is dated to the 7th century (Bischop 1996, 150) and BZ to the 8th and 7th century (Caner, 136). BN is dated to the 7th century (Caner, 156-7) and BO to the 7th and 6th (Caner, 144, 151); Felsch (2007, 140) dates an example to the 5th century, whilst Bischop (1996, 146) and Klebinder-Gauß (2007, 60, 63-4) refer to the 7th century. BP is dated to the 8th to the 6th century (Caner, 129), BQ to 8th and 7th (Sapouna-Sakellarakis, 129), BR to 8th and 7th (Bischop 1996, 150; Caner, 149-50), BS to the 7th (Caner, 109), BT to 8th and 7th (Caner, 135, 140), BU to 8th to the 6th (Caner, 134-5), and BV to 8th and 7th (Caner, 148). CA is dated to the 7th century (Caner, 140), CB to the 8th and 7th (Caner, 174; Klebinder-Gauß 2007, 61-2), CC to 8th and 7th (Bischop 1996, 149; Caner, 136, 174), CD to the 8th (Caner, 138, 174), and CE to 8th and 7th (Klebinder-Gauß 2007, 62).

CEδ-CFδ

See Figure: 2.23; Volume: 2, Plates: 53-55; Volume: 3, 368-371, #5883-5926.

CEδ is dated to the 8th and 7th century (Bischop 1996, 152; Caner 148-9; cf. Dusenbery 1998, 980), as are CF and CFδ (Caner, 161, 166; Pedde 2001, 487, 490, Fig. 1.8).

CG-CI

See Figure: 2.24; Volume: 2, Plates: 55-57; Volume: 3, 371-373, #5927-5968.

The image originally presented here cannot be made freely available via ORA because of copyright.

Figure 2.24: CH8.XXVIIf.23m, #5959, from Tumulus MM at Gordion, scale 1:1 (Caner, 173, Pl. 67, No. 1169).

The image originally presented here cannot be made freely available via ORA because of copyright.

Figure 2.25: CJ1.XXVb.21a, #5994, from Tumulus S-1, NE charred deposit at Gordion, scale 1:1 (Caner, 114, Pl. 44, No. 659).

Distinct for their scales, these anchor groups are divided by their number of protuberant feature groups. CG is dated to the 8th (Tumulus S) and 7th century (Boardman 1967, 206; Caner, 161-2), as are CH and CI (Caner, 146-9).

CJ-CL

See Figure: 2.25; Volume: 2, Plates: 57-59; Volume: 3, 374-384, #5969-6129.

CJ is a cohesive group with some similarity to CR and CS. The features of CJ are closer together than the latter. CK is interesting for none are found in Anatolia. It may be that an itinerant smith produced them closer to the sanctuary sites in the Aegean, or they show imitation.

Figure 2.26: CMδ1.XXVIb.19d, #6162, from Elis, scale 1:1 (Marshall 1911, Pl. 67, No. 2846).

CJ may be placed to the 8th to the 6th century (Caner, 94-5, 99, 116; Klebinder-Gauß 2007, 55; Philipp 1981, 310). CK are supposedly dated to the 8th and 7th century, based on similarity to Gordion, though none are found at Gordion (Philipp 1981, 315); rather, they are found in Greek sanctuary contexts, namely the Argive Heraion, Perachora, and Olympia in particular. All 22 CK and six CKδ examples were found in the Central Aegean Mainland, indicating a local origin. That they have a pivoted pin suggests they may actually be of the 6th century and are here assigned to Period 4. CKδ may thus also be after the 7th century. CL, found at Gordion, are dated to the 7th century (Caner, 158-9).

CM-COδ

See Figure: 2.26; Volume: 2, Plates: 59-62; Volume: 3, 384-394, #6130-6298.

The Pivot Anchor super-group is distinct morphologically for having a hinge to support the pin, rather than slot or spring. The development from a simple hinge to those elaborately decorated has chronological bearing. The next most important point is that none have a ‘Hilt’ catch-plate, another chronological and geographic marker. Instead, they have a riveted ‘Eye’ catch-plate. The group shares fundamental characteristics: a symmetrical round bow adorned with flanked beads, later developing to petals, and very fine, technically exquisite versions of the 5th to the 3rd century (CM4; CO8). We further see a shift where most are produced in the Aegean and Bulgaria than in Anatolia, which is instead producing Riveted fibulae (DK). The earliest are 6th century, and they make up the bulk of

Figure 2.27: CU4.XXVIIa.21a, #6630, from Gordion Tumulus MM, scale 1:1 (Caner, Pl. 49, No. 764A).

fibulae of the Classical period, mainly dating to the 5th and 4th century (Bader 1983, 118, Pl. 38; Brøns 2014, 88; Vasić 1999, 102, Pls. 51-56). Kilian (156) dates CM, CN, and CO to the 6th and 5th century, whilst Kilian-Dirlmeier (96) is a little more generous, allowing the 7th to the 4th century (see also Walker and Goldman 1915, 426). The technically exquisite COδ are closer to the 4th century (Richter 1937, 294).

The late Pivot fibulae show a very strong change from the variety of the Geometric and Archaic periods.

CP-CX

See Figure: 2.27; Volume: 2, Plates: 62-68; Volume: 3, 394-418, #6299-6677.

The main Anchor 3 groups are here, they have three groups of features, and they show much inter-group citation: the protuberant features are similar between variants of different groups. Groups are defined by the type of feature at centre (except CR, which is defined by the features at anchor). There is a notable variation of size in this super-group.

CP includes examples from Tumulus W at Gordion going back into the late-9th century, if the destruction is set at 800 BC, whilst others are later, the 8th and 7th century (Caner 87). The groups shall be assigned to Period 3, whilst Tumulus W examples shall be overridden to Period 2. CPδ is found at Ephesus (Klebinder-Gauß 2007, 51). CQ is dated to the

Figure 2.28: CY6.XVIIIa.21a, #6700, from Gordion Tumulus MM, scale 1:1 (Caner, Pl. 38, No. 494).

7th and 6th century (Caner, 109-11), and CR and CS to the 8th to the 6th (Boardman 1967, 206; Caner, 118-23; Sapouna-Sakellarakis, 126). Caner (95-6, 120-1) dates CT to approximately the 7th century, and CU to the 8th and 7th century (Caner, 119). CV is dated to the 8th to the 6th century (Caner, 121-3; Klebinder-Gauß 2007, 57) whilst CW is perhaps 7th and 6th century (Caner, 120), and the technically fine CX are suggested to be 8th century (ibid. 123).

CY-DAδ

See Figure: 2.28; Volume: 2, Plates: 68-69; Volume: 3, 418-424, #6678-6774.

These groups are heavier in general. 37 examples were found in Tumulus MM, suggesting an 8th century date (Caner, 92). CZ is later, dated to the 7th and 6th century (Caner, 98-9, 105); DA is dated to the 8th and 7th (Caner, 69, 105; Kilian 152) and DAδ to the 7th (Pülz 2009, 149).

DB-DH

See 2.29; Volume: 2, Plates: 70-74; Volume: 3, 424-444, #6675-7094.

The image originally presented here cannot be made freely available via ORA because of copyright.

Figure 2.29: DH3.IVg.21a, #6963, from Boğazköy, scale 1:1 (Caner, Pl. 19, No. 242).

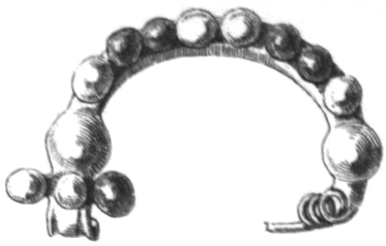


Figure 2.30: DI1.XXIXa.23b, #7095, from Olympia, scale 1:1 (Furtwängler 1890, Pl. 22, No. 375).

Anchor 2 groups. DB is dated to the 8th and 7th century (Caner, 85, 105), and DC from the 8th to the 6th (Caner, 184-5; Philipp 1981, 294-5). Some DC examples have an affinity with Lo Schiavo's Types 280-1 (Lo Schiavo 2010, 584-6, Pls. 354-6). DD is dated to the 8th century (Caner, 62), DE to the 8th and 7th (Boardman 1967, 206; Caner, 103), and DF to the 7th and 6th (Caner, 88-9, 95-7, 100-3; Klebinder-Gauß 2007, 53).

DG are generally 8th and 7th century, though 17 are found in Tumulus W at Gordion of the late-9th century (Caner, 59-60). DH are dated to the 8th and 7th century (Caner, 86, 105); 46 are found in Tumulus MM. Two DH examples are uniquely riveted, #6940 and #7007.

DI-DT

See 2.30; Volume: 2, Plates: 74-78; Volume: 3, 444-458, #7095-7325.

The primary groups, DI, DJ, and DK have a very similar morphology of the bow: it is the variation at anchor that makes them distinct. Groups DL-DP are eclectic. DQ has

Figure 2.31: ED1.Ib.8d, #7425, from the Argive Heraion, scale 1:1 (Source: Author).

an unusual cross-section, and rivets feature only on the anchor beads. DR-DT show the adoption of cross-bars, some are fixed, and Vassileva (2014, 224) considers this peculiarity a Greek imitation. A feature of the Anatolian series is the later adoption of a double pin with ‘Case Lock’ (catch-plate-variant 25a). The trouble is most have been destroyed, so it is very difficult to take this into account in the typological series.

DI, DJ, and DK are dated from the 8th to the 6th century (Caner, 76-8, 83-4; Klebinder-Gauß 2007, 45-7; Philipp 1981, 307). DL is from Tumulus III in Gordion, so 8th century. DM is dated to the 7th or early-6th century (Caner, 94), DN to the 8th and 7th century (ibid. 79), and DO, DP, DR, and DS are also 8th and 7th century (Caner, 78; Philipp 1981, 307). DQ is dated to the 7th or early-6th century (Caner, 95; Klebinder-Gauß 2007, 50).

DU-EF

See Figure: 2.31; Volume: 2, Plates: 78-83; Volume: 3, 458-468, #7326-7486.

Triangular fibulae are characteristic of the Near East, and show a divergence from the arch bows of the 11th and 10th century. There is more variety than depicted in my typology since I only cover types found in the study area (cf. Birmingham 1963; Pedde 2000; Stronach 1959).

DU are probably 8th and 7th century (Sapouna-Sakellarakis, 131). DV are dated to the late-8th and early-7th century (Pedde 2001, 487, 490, Figs. 1.10 and 1.11), and DW, DX, DT, and EC to 8th and 7th, or possibly 6th (Caner, 180-2; Sapouna-Sakellarakis, 132).

Figure 2.32: EH4.XXI.–, #7727, from the Argive Heraion, scale 1:1 (Source: Author).

Pedde (2001, 492-4) dates ED to the 6th century; DX and EA and are dated from the end of the 7th to early-5th, and DY and EC to the Achaemenid period, the 5th and 4th century. EE is dated to the 8th and 7th century (Caner, 183), and is a disparate group. EF is dated by Caner (179-81) to the 8th and 7th century.

EG-EIδ

See Figure: 2.32; Volume: 2, Plates: 83-85; Volume: 3, 468-511, #7487-8175.

A type from the Asia Minor coast distinguished by the size of boss in relation to the fibula. EG are more triangular. It is not clear where this super-group should fit in the overall typology; I could have placed it after profile-group L.

EG, EH, EI, and EIδ may be dated to the 8th and 7th century (Boardman 1967, 206; Caner, 45; Klebinder-Gauß 2007, 32). #7510, an EG1, was found in a Late-Geometric-late Pithos at Knossos (Coldstream and Catling 1996, 123-4).

EJ-ES

See Figure: 2.33; Volume: 2, Plates: 85-87; Volume: 3, 511-515, #8176-8225.

Figure 2.33: EJ3.Ia.5b, #8178, from Exoche, scale 1:1 (Sapouna-Sakellarakis, Pl. 47, No. 1553).

Figure 2.34: EU3.XXXIb.15a, #8245, from Aegina, scale 1:1 (Sapouna-Sakellarakis, Pl. 55, No. 1724).

EJ-ES represent later types mostly found at Olympia, with particular influence from Italy. EJ, EJδ, EK, and EL are too few to date (Philipp 1981, 263; Sapouna-Sakellarakis, 114). EM1 corresponds with Lo Schiavo's (2010, 376-20) Types 389-393 and EM2 to Type 384 (Lo Schiavo 2010, 765-71); both are late-8th and 7th century. EN1 corresponds with Lo Schiavo's (2010, 755-60) Types 378-379, whilst EN2 to Type 380; both are dated to the 8th century.

EO is found with two unique examples on Rhodes with uncertain date. EP, a pivoted type with a catch-plate turning up at the toe (17a), is dated by Philipp (1981, 319-20) to the 6th and 5th century. EQ1 is Lo Schiavo's (2010, 679-713, 727-8) undecorated Serpentine fibula Types 343-7 and 352b, dated late-9th and 8th century. EQ2 is Type 370, dated 8th century (Lo Schiavo 2010, 746-9, Pls. 526-7). ER is uncertain as only a portion of the single example survives. ES corresponds to Lo Schiavo's (2010, 613-7) Type 302, dated from the 11th to the 9th century, and is also found in an Early-Protogeometric context at Knossos (Coldstream and Catling 1996, 91, Fig. 24, No. 158; Pl. 270).

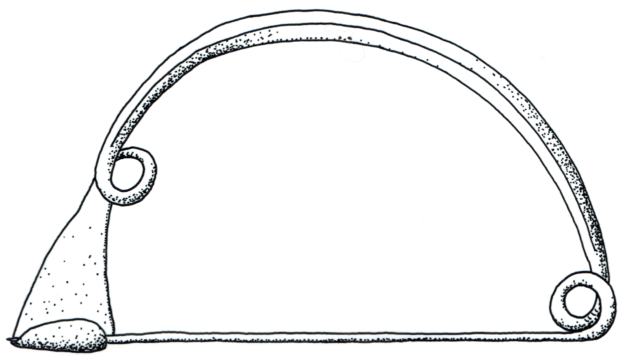


Figure 2.35: EW1.XIIIa.7c, #8274, provenance unknown, scale 1:1 (after Blinkenberg, 80, Fig. 70).

ET-EU

See Figure: 2.34; Volume: 2, Plates: 87-88; Volume: 3, 515-516, #8226-8255.

For ET-EU see Buchholz (1986). ET is dated by Pare (2008, 93, Fig. 5.12) to the 9th century, though Carrasco et al. (2014, 96, 107, Fig. 1) provide an unconvincingly early date from the 13th to the 9th century for examples from Spain. EUs are principally found in Cyprus and date to the 8th century (Giesen 2001, Pls. 43-59; Pare 2008, 93, Fig. 5.12). EU3 examples with pivot in place of the spring are found at Kamiros and Aegina, and may indicate a later date.

EV-EW

See 2.35; Volume: 2, Plates: 88-89; Volume: 3, 516-518, #8256-8280.

EW1 and EW2 with forearm loop are largely recognised as an Illyrian type (cf. Gergova 1987, 71, Pls. 9-12; Vasić 1999, Pls. 25-30), whilst EW3 and EW4 with multiple loops may have a wider though rarer distribution. EW is dated by Kilian-Dirlmeier (48) to the 8th and 7th century, and an example (#8264) is found at Emporio Period IV (Boardman 1967, 206). EV is not datable on present evidence.

Figure 2.36: EX3.XIIIa.1a, #8350, from Vergina LXVI.E, scale 1:1 (Bräuning and Kilian-Dirlmeier 2013, 280, Fig. 228, No. 24α

EX-FF, FN, and GF

See Figure: 2.36; Volume: 2, Plates: 89-92, 94 and 99; Volume: 3, 518-565, #8281-9026; 575, #9198; 595, #9518-9519.

Alexander dates EX and EY between the 10th and end of the 6th century (Alexander 1965, 8, Fig. 1). FN is his type IVaii (Alexander 1965, 17, Fig. 9; cf. Lo Schiavo 2010, Pls. 705-8). Most examples are assigned between the 8th and 7th century in this study (cf. Strøm 1995, 73).

FA, the ivory or bone plaques fixed onto a violin fibula, have been found in a 7th century Middle-Orientalising polychrome pithos (no. 33) at Knossos (Coldstream and Catling 1996, 250, Fig. 54, No. 172, Pl. 284), 6th century contexts from Halae and Olynthus (Goldman 1940, 426-7; Robinson 1941, 100), an early-6th century grave at Corinth (Blegen, Palmer, and Young 1964, 185), and at Emporio Periods II, III, and IV, from the 8th to the 6th century (Bischop 1996, 140; Boardman 1967, 206). The most prominent find-spot is the sanctuary to Hera Limenia at Perachora. An FA may be depicted on a black figure Attic dinos signed by Lydos dated c.560-540 BC; it is extremely rare for a fibula rather than pins to be depicted on pottery (Figure: 1.7 on page 14; Brøns 2014, 67).

Figure 2.37: FH1.Ia.16a, #9031, from Pherai, scale 1:1 (Kilian, Pl. 43, No. 1250).

Figure 2.38: FI1.XVIIb.2d, #9118, from the Argive Heraion, scale 1:1 (Source: Author).

GF are uncertain.

FG-FH

See Figure: 2.37; Volume: 2, Plate: 92; Volume: 3, 565-570, #9027-9115.

The two FG examples were found at Kamiros; one with a Protocorinthian *aryballoi* (Blinkenberg, 81). For FH compare Lo Schiavo's (2010, 360-70, Pls. 183-210) Type 169 and examples from the Adriatic Coast (Glogović 2003, 37-42, Pls. 35-42); they are dated largely to the 8th and 7th century (Kilian, 103-5).

FI

See Figure: 2.38; Volume: 2, Plates: 92-93; Volume: 3, 571-572, #9116-9146.

Figure 2.39: FJ8.Vf.–, #9185, from Ialysos Zambico T.CXXXVI, not to scale (Sapouna-Sakellarakis, Pl. 47, No. 1549A).

Figure 2.40: FP1.—.–, #9408, from Ephesus, scale 1:1 (Marshall 1911, Pl. 10, No. 1036).

FI is to be tentatively dated to the 7th and 6th century, with one example (#9134) from a Late-Geometric context (Strøm 1995, 72, Note 246).

FJ-FO

See Figure: 2.39; Volume: 2, Plates: 93-94; Volume: 3, 572-576, #9147-9201.

FJ are dated by Caner to the late-8th and 7th century (Caner, 48; cf. Lo Schiavo 2010, 894-5, Pl. 736, Type 460). The date of FK is uncertain. FN is part of an EY or FD Spectacle fibula (Lo Schiavo 2010, 882, Pl. 704, Type 450). FO, a hammered sheet fibula with three examples found in Boeotia, may be of 7th or 6th century date due to the Orientalising face.

FP-FU

See Figure: 2.40; Volume: 2, Plates: 94-96; Volume: 3, 588-590, #9408-9440.

Figure 2.41: GA2.—.9h, #9452, from Ialysos Sanctuary of Athena, scale 1:1 (Sapouna-Sakellarakis, Pl. 41, No. 1457).

FP, a brooch with bird fixed to a pin, could be 7th century (Pülz 2009, 148-9; cf. Evans 1893, 205, Fig. 7). FQ may be 8th century (Blinkenberg, 277). FR is more common in Italy and of uncertain date (cf. Lo Schiavo 2010, Pls. 737-9). FS and FT are probably 6th century or later. FU is likely 6th century and provides the only inscribed fibulae (#9428 and #9434) found in the Aegean (see on page 284; Blinkenberg, 280; Cahn 1950, 190; Philipp 1981, 318).

FV-GA

See Figure: 2.41; Volume: 2, Plates: 96-97; Volume: 3, 591, #9441-9452.

A disparate super-group of figurative fibulae including Equidae, Panthera, and humanoid figures attached to or forming the bow. They are loosely dated from the 8th to the 6th century (Sapouna-Sakellarakis, 100-2). FV, the Aloni horse, is supposedly 10th century, and there are dissimilar examples in Poland, Croatia, and Slovakia that possess the unusual pin configuration (e.g. Gedl 2004, Pls. 1-22; Glogović 2003, Pls. 46-7; Novotna 2001, Pl. 2).

Figure 2.42: GB4.—.–, #9456, from Sanctuary d'Orthia, Sparta, not to scale (Thompson 1909, 287, Fig. 2).

GB-GC

See Figure: 2.42; Volume: 2, Plates: 97-98; Volume: 3, 591-592, #9453-9471.

All from Sparta, these are orientalising plaques that are fastened to fibulae and assigned from the 8th to the 6th century (Blinkenberg, 276-7; Dawkins 1929).

Figure 2.43: GD2.Va.2a, #9491, from Philia, scale 1:1 (Kilian-Dirlmeier, Pl. 93, No. 1459).

GD-GE

See Figure: 2.43; Volume: 2, Plate: 99; Volume: 3, 592-595, #9472-9519.

GD are fibulae used for attaching plates, such as bronze, bone, or ivory spectacles (GD2 for EX or FA), round metal brooches (GD1 for FJ, see #9510), or the GB-GC plaques. Since the date of Spectacle fibulae are 8th to the 5th century, it is unclear where to place these except where there is a closed context such as at Assos (Bischop 1996, 155-6; cf. Caner, 47-8; Felsch 2007, 139-40; Kilian, 156-7; Lo Schiavo 2010, 845-9, Pls. 632-42, Types 435-7). GE is uncertain.

2.5.3 Cross-section-variant series

The cross-section series is more straightforward. The key distinction is between groups I-XVIII and XIX-XXVIII. The former are cross-sections of lengths of bows or wire whilst the latter are cross-sections of beads or bosses adjunct to the bow or wire. The more complex shapes are not necessarily later in date; for instance, some variants from V and XVI are decidedly early. The stylistic variation uncovers a regional and local diversity of manufacture, yet the difficultly of assigning variant designations due to inadequate publication renders the cross-section data less useful than the profile or catch-plate series.

See Volume: 2, Plates: 100-113.

I-III The sections are a length of wire, taken from a rod or casting. The earliest form is Ia, a round piece of wire, and also IIIa, where the wire is twisted. Both have a wide, regional spread.

IV-V Sections that are flattened vertically (IV) and horizontally (V).

VI-IX These sections are like the hull of boats, starting with eggshell-thin concave sections (VI). There is a 3D element to these sections. VIIa-VIIc are convex with a central ridge whilst VIId-VIIf forms a cross at the centre of the bow. VIII is a plano-convex version of VI, whilst IX has the addition of finials to the sides; IXa is convex whilst IXb-IXg are increasingly swollen.

X X are amygdaloid and more pronounced than VIII.

XI-XVIII Here are lengths of wire taken from a rod or casting, and unlike the round cross-sections I-III, these have sharp edges. XI is three-sided. XII is four-sided and perpendicular to the horizon. XIII is rhomboidal, whilst XIV has the addition of knobs. XV is pentagonal, XVI hexagonal, XVII septagonal, and XVIII octagonal.

XIX-XXIII The following super-groups mark the shift to identifying the cross-section of the most prominent protuberant feature towards the centre of the bow. These bosses are usually supported by wires with cross-sections of the preceding groups. Bosses are defined by their diameter which is more than double the diameter of the supporting wire. XIX are Bosses, XX are Knobbed Bosses common to Asia Minor, whilst XXI have cut-outs for attachments or encrustations; XXI are common to Thessaly. The encrustations are almost entirely lost, but may have included amber or precious stones. XXII are sliced, and the smooth finish is lost. XIII are cuboid; they are usually accompanied by a variety of beads.

XXIV-XXVIII Beads are generally less distinct than bosses, being less than double the diameter of the supporting wire. It is common for bows to have only one boss whilst if they have beads they have many. XXIV are standard beads; they are usually smooth and in a variety of shapes. XXV are discoids; XXVc-e resemble a diamond, and their sides are sharp. XXVI are petal beads common to Period 4. XXVII are ellipses, often thin and sharp. XXVIII are beads with round balls or petals.

XXIX-XXX XXIX is usually a rectangular cross-section punched with rivets common to the DI-DP profile-groups. XXX has rivets on two planes.

XXXI The Collared Boss group is exclusive to the ‘cassibile’ fibulae of profile-group EU; they are quite distinct from the Aegean and Anatolian series and are found in the Near East, Cyprus, and Central and Western Mediterranean (Buchholz 1986, fig. 9; Giesen 2001).

2.5.4 Catch-plate-variant series

The catch-plates are quite easily divided visually by those that are: folded wire (1), hammered wire (2-8), ‘Vertical Plates’ (9-10), ‘Square Plates’ (11), ‘Horizontal Plates’ (12-14), and those with ‘Eyes’ (19), ‘Horns’ or ‘Hilts’ (21-22), ‘Riveted Hilts’ (23), and so on. Such group shapes have distinct regional distributions, and also important local variation. The catch-plate series provides significant evidence for manufacture location. Two profiles that are alike can be deemed local if they possess closely matching catch-plates, whilst profiles that appear quite distinct may be shown to be closely related due to a finial affixed to a catch-plate. Catch-plate data is the least well recorded, since they were prone to breakage during deposition.

At super-group-level the catch-plate data is less rewarding as the regional and local insights afforded by group and variant are not taken into account.

See Volume: 2, Plates: 113-29.

1 The first group are simple wire bows where the catch is simply folded and not hammered into a pin guard. It therefore covers a few of the earliest fibulae

of the violin type, however, it is much more prevalent in the Spectacle fibulae (EX-EY) common in Period 3. Unlike most catch-plates that are designed to offer some protection from the pin, these offer little.

2-8 The second super-group is made up of catch-plates where the wire or rod is hammered into shape. Each group and variant is quite distinct, such as 4b, common to the Balkans (Gergova 1987, Pls. 14-7; Vasić 1999, Pls. 33-8), 7c, almost exclusive to thin wire bows, or 8g, in the shape of a hand, more common to the Near East (e.g. Pedde 2000, 227, Pl. 46, No. 626).

9-11 Here lies the important ‘plate’ style common to the Aegean area. The grouping of 9, 10, and 11 overshadows important regional distinctions; 9 is common to Rhodes, whilst 10 and 11 to the mainland (see Table 4.5 on page 186).

12-14 These horizontal plates are often difficult to distinguish at variant-level because the distinctive feature at the apex is often missing.

15-17 Plates that elongate into a foil are common to Thessaly and Italy. 15 often have a finial which provides regional distinction (e.g. Lo Schiavo 2010, Pl. 344), whilst fibulae of Italian provenance have catch-plates akin to 16a: sharp narrow foils that do not descend like 15. 17 are later in date, Period 4, and variations of this catch-plate are found across the Adriatic (e.g. Glogović 2003, Pls. 54-7; Lo Schiavo 2010, Pl. 342).

18-19 This super-group is interesting for its wide distribution across Anatolia and the Aegean, and their use on fibulae which appear to be derivatives or imitations of profiles that, on present knowledge, originate in Central Anatolia. They belong to Periods 3 and 4.

20-24 Hilted catch-plates are common to Anatolia, especially those with rivets, and share a fashion of rivets on the profile of the DI-DP groups. The style of catch-plate is a useful indication for provenance in Central Anatolia or a development from the Asia Minor Coast.

25 The Case Lock acts to protect the pin and catch-plate. Often the case is held in place by a catch-plate of the preceding groups. The overall effect is quite removed from the preceding examples.

26 This super-group was created for one catch-plate of tentative provenance, and is not included in my analyses.

27 An elaborate spiral catch of Period 1, the two examples predate and are independent of the Spectacle brooches (EX-EY) common to Period 3 (Alexander 1965; cf. Bader 1983, 16, Pl. 1, No. 3; Vasić 1999, 17, Pl. 2, No. 23).

2.5.5 Summary

Read in conjunction with the variant descriptions (Plates: 1-129) and catalogue (Appendix G) it is clear that the most significant aspect of fibulae is their variety. It is also apparent that fibulae can and should be categorised at different levels of stylistic similarity. The hierarchical typology made up of super-group, group, and variant, enables the typologist greater control in their analyses that a traditional fixed-typology would not allow. Indeed, the subdivision of variants betray the craftsman's hand, and their ability to create new styles through a desire for innovation, or conversely, copy-error. The consumer or distant observer may not, of course, recognise the variation at variant-level, and that is where the groups and super-groups come in. Moreover, the higher levels provide us with different orders of information at the cultural level. The next chapter begins to chart the data according to distribution and chronology in preparation for the analyses of Chapters 4 and 5.

Chapter 3

Nominal Data

3.1 Nominal data overview

The order of analysis is to reveal the principal patterns in a historical perspective to better situate the research questions to be addressed with the network and diversity analyses of Chapters 4 and 5. In those chapters, case studies shall be used to test such hypotheses, and lay the foundation to address both the value of fibulae and what diversity was for; discussed in Section 5.3.

3.1.1 Database

10,282 fibulae were inputted and classified in the database as described in Chapter 2; the records may be found, with references, in Appendix G (Volume 3). With 15 useful fields this makes approximately 150,000 relevant data points. The database software is FileMaker Pro 16.0.3.302 and chart visualiser package Tableau Desktop 10.3.5. FileMaker Pro is an excellent cross-platform database system and Tableau is a leading data-visualiser software designed to prioritise data analysis and design rather than the coding language behind it. The data from FileMaker Pro was exported as an XLSX document for Tableau to read. The radial tree diagram, maps, and typology were drawn in Adobe Illustrator and Adobe InDesign CS6. Finally, this document was created in LyX 2.3, a user-friendly processor based on TeX/LaTeX. The Bibliography was integrated using BibTeX and managed by Mendeley Desktop.

3.1.2 Confidence codes

The incomplete nature of the artefacts and the varying quality of their publication required a confidence code that grouped data by identifiable features. The number of confidence codes is 27 due to the three variant-categories that make each artefact-type: the profile, cross-section, and catch-plate, and their three possible stances: identifiable at variant, group, or unidentifiable. A count of data by confidence code is provided in Table 3.1. The most important category, the profile, was identifiable at variant level in 7,389 records (72% of total), and 9,519 at group level (93% of total); a considerable number given that 251 fragmentary fibulae (2% of total) were unidentifiable in any category. FileMaker Pro and Tableau enable the analyst to choose the desired confidence for each analysis, so if they wanted to filter data definable by both profile-variant and cross-section-variant they would be dealing with some 6,663 (65%) of the records. Important groupings, taken by combining the relevant confidence codes, are recorded in Table 3.2.

3.1.3 Variant counts

Table 3.2 also lists the total number of variants. This shows that there are, on average, 46 fibulae per profile-group (a ratio of 46:1) and 8 fibulae per profile-variant (a ratio of 8:1). The variant ratio is not inconsistent with other typologies: Blinkenberg had 2,431 fibulae in 206 types (12:1) and Lo Schiavo (2010) has 8,168 in 471 types (17:1), as well as further ‘*Varietà*’. Charting the fibula count by profile-group shows an immediate unevenness of

Confidence	Variant	Group	Number	Percent
1	PF, XS, CP	-	2,906	28%
2	PF, XS	CP	867	8%
3	PF, XS	-	2,890	28%
4	PF, CP	XS	77	1%
5	PF, CP	-	45	0%
6	PF	XS, CP	169	2%
7	PF	XS	136	1%
8	PF	CP	4	0%
9	PF	-	295	3%
10	-	PF, XS, CP	300	3%
11	-	PF, XS	329	3%
12	-	PF, CP	35	0%
13	-	PF	427	4%
14	XS, CP	PF	137	1%
15	XS	PF, CP	373	4%
16	XS	PF	480	5%
17	XS, CP	-	15	0%
18	XS	CP	4	0%
19	XS	-	127	1%
20	-	XS, CP	75	1%
21	-	XS	66	1%
22	CP	PF, XS	19	0%
23	CP	PF	30	0%
24	CP	XS	1	0%
25	CP	-	151	1%
26	-	CP	73	1%
27	-	-	251	2%

Table 3.1: Data recorded by confidence code given as a percentage of total fibulae (N=10,282). The confidence indicates which features were coded given the artefact's preservation and publication quality. PF = profile; XS = cross-section; CP = catch-plate (Source: Author).

Grouping	Confidence codes	Total fibulae	Percent	No. of variants	Ratio
Profile at variant	1-9	7,389	72%	888	8:1
Profile at group	1-16, 22-23	9,519	93%	208	46:1
Cross-section at variant	1-3, 14-19	7,799	76%	166	47:1
Cross-section at group	1-4, 6-7, 10-11,14-22, 24	8,971	87%	31	289:1
Catch-plate at variant	1, 4-5, 14, 17, 22-25	3,381	33%	148	23:1
Catch-plate at group	1-2, 4-6, 8, 10, 12, 14-15, 17-18, 20, 22-26	5,281	51%	20	168:1

Table 3.2: Category-variants and category-groups, and the number of fibulae within each (Source: Author).

the data (Plate: 132). The top 14 profile-groups, 7% of the total (N=208), contain 50% of the recorded assemblage. This unevenness is not an arbitrary reflection of typological design: indeed, the primary goal of the typology was to subdivide at a roughly equivalent level of complexity (see Section 2.2.1.1 on page 44), rather this unevenness is an important cultural residue. Coupled with the fact that half of the profile-variants have only one known example, the skew shows several contingent features. First, diversity of form was the norm: experimentation and innovation of profile-groups, or prototypes, was common practice. The evolutionist presumption that stylistic variation is a result of copy-error or cultural drift needs to be questioned, including the extent to which these factors have a varying prevalence amongst different artefact-classes (see below on page 171; cf. O'Brien and Lyman 2009, 235). Second, if the above is true, were fibulae in particular, rather than rings or swords, subject to an unusually high level of variation? Third, was this stylistic variation consumer led; did people want, to borrow Knappett's (2005, 148) phrase, 'individualising' fibulae, and did stylistic diversity, or rarity, carry a social power? Fourth, is the popularity of a small number of variants restricted to a small number of production sites, and is there regional divergence?

Cross-section ratios are greater. There are about 289 fibulae per group (289:1) and 47 fibulae per variant (47:1), and they are just as unevenly distributed (Plate: 133). The

Figure 3.1: The difficulty of distinguishing the cross-section-variant by drawing convention; only few include the luxury of the additional drawing telling us which (Sapouna-Sakellarakis, Pls. 18-9, Nos. 593, 602 and 614). Not to scale.

top 11 cross-section-variants, 7% of the total (N=166), contain 50% of the assemblage. Naturally, this similarity with the profile data lies upon their close dependency. Whilst some profile-groups have several cross-section choices the majority of profile-variants and cross-section-variants are dependent. However, assigning cross-section codes is measurably more difficult than for profiles. For fibulae published by drawing, only a few have a separately drawn cross-section; the exceptions are recent publications, notably Philia (Kilian-Dirlmeier 2002), Kalapodi (Felsch 2007), Lefkandi (Popham et al. 1980), and the Knossos North Cemetery (Catling 1996). The remainder use drawing conventions that are not universal; for example, the shading of the lower half of certain profile arches could indicate a concave, three-sided, or plano-convex section that is only identifiable because of the additional cross-section drawing (Figure: 3.1). Very few fibulae have the additional drawing in Sapouna-Sakellarakis' catalogue. It is certain the database contains errors in the cross-section coding, particularly in group VIII. Those fibulae published with a low resolution photograph (or no image at all) are even harder to code, and so given a lower confidence code accordingly.

The ratios of catch-plates are, on average, 168 fibulae per group (168:1) and 23 fibulae per variant (23:1). It is important to note that the greatest loss of data is in the catch-plate, identifiable at variant level in only 33% of the records (N=10,282). Larger catch-plates, such as the square or rectangular 'Sails', are more often damaged or missing entirely. Damaged examples are often coded at group-level, for instance 9–, 10–, or 11–. Nevertheless, the similar unevenness of catch-plates (Plate: 134), where the top 12, 8% of the variants (N=148), contain 50% of the assemblage, can only reinforce our appreciation of the dependence each variant category has upon the other. The question is whether there was a restriction placed over the craftsman by the prototype (*sensu* Gell 1998), where the jeweller felt restricted to use a prescribed selection of catch-plate-variants for a given profile? Or more simply, were there only a few types of catch-plate known to them?

For the reasons of dependence and fewer identifiable examples for cross-section and catch-plate-variants, the majority of the forthcoming analysis is initially based on the profile-group and profile-variant. The profile data is best recorded and intuitively the most important feature of a fibula as any fibula typology will show. However, the other variant categories contain important information, especially for questions of provenance, and will be used when relevant in the following chapters.

3.1.4 Location and region counts

Whilst 10,282 fibulae feature in the database this number includes Blinkenberg's entries from other regions. The regions were coded as shown in Table: 3.3 and Figure 3.2. Removing those fibulae either without site provenance or outside the study area leaves 9,916 fibulae found at 223 sites across the Aegean and Anatolia. Unless otherwise stated, the remaining data analyses of this thesis are contained to the 9,916 fibulae from Regions 1-7.

A fruitful discussion comes from arranging the data by region. These boundaries were drawn on intuition, with Tartaron's (2013, 186, Table 6.1) maritime landscapes and Morris's (2000, 196, Fig. 6.1) material culture regions in mind. These groupings will be compared to the fibula distributions mapped in Chapter 4, and the reader is free to draw different conclusions by drawing boundaries of their own; they are not fixed. It is well-known that maps are a product of our conceptions, and risk obscuring the land and seascapes understood by those of past communities. Ethnographic study demonstrates that mapping was understood as a series of vista transitions as much as relations by distance;

Region Code	Region	Fibula Count
1	North Aegean Mainland	595
2	North Aegean Coast	2,330
3	Central Aegean Mainland	1,205
4	Aegean Islands	331
5	Crete	250
6	Asia Minor Coast	4,055
7	Central Anatolia	1,150
8a	Greece (Unknown)	80
8b	Anatolia (Unknown)	92
8c–	Unknown	35
9a	Italy	22
9b	Cyprus	67
9c	Levant	69
9d	Balkans	1
All	All	10,282

Table 3.3: Region codes (Source: Author).

knowing where one is, is by remembering journeys previously made (Ingold 2000, 219, 231, 237; Istomin and Dwyer 2009, 36). All this is to say the regions prescribed are *etic* and impose a somewhat arbitrary structure to the data (Melas 1989, 140).

The next piece of information is the fibula count by site (Figure: 3.3; Plates: 135-137). The distribution is surprisingly uneven. A decisive 63.3% of fibulae (N=9,916) are recorded from just six sites: Pherai (1,806), Lindos (1,586), Ialysos (1,064), Gordion (829), Philia (570), and Ephesus (418). Thereafter come Izmir (264), Emporio (244), Vergina (228), Lefkandi (165), and Olympia (160). However, this decline in count is not accompanied by an equally dramatic decline in profile-group variety, indeed Olympia has 49 profile-groups against Pherai's 62, and yet Pherai has 11 times the fibula count. The average number of fibulae per site is 88.5 whilst the median is just three. 93% of sites (N=223) have fewer than 100 fibulae, 73% have fewer than 10, and half have less than two. Other sites have none. It must be hypothesised that sites possessing only one or no fibulae reveal not a dearth of archaeological recovery, or indeed deposition practice, but a conscious rejection of fibulae as an item of jewellery or clothes fastener. Did those communities reject fibulae in favour of straight dress-pins or buttons (Elderkin 1928, 333; Lorimer 1950, 338)?

Figure 3.2: Regions discussed in the text; fibulae found outside these areas are excluded from the analyses (Source: Author).

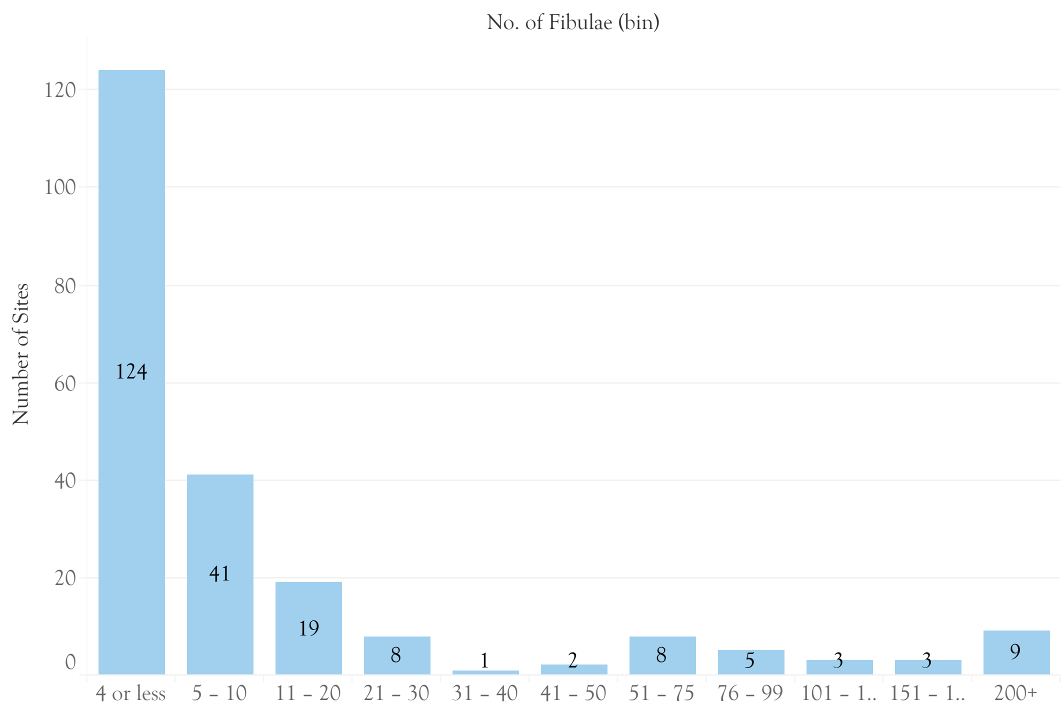


Figure 3.3: Histogram showing the number of sites per fibula count (Source: Author).

In any case, the unevenness of site counts do have a regional dimension (Figure: 3.4). First, the coastal areas of Asia Minor have the highest fibula count (40.9%) by a wide margin, due primarily to Rhodes, despite this region being less well excavated than the Central and Western Aegean (Broodbank 2013, 36-53). The North Aegean Coast is next (23.5%), heavily skewed by Pherai, then the Central Aegean Mainland (12.2%), and Central Anatolia (11.6%). It is striking that Crete (2.5%) and the Aegean Islands (3.3%) have so few fibulae even though the count per individual site is not unusual (Plates: 135-137). The North Aegean Mainland (6%) also has few recorded fibulae even though across the Adriatic Lo Schiavo (2010) has recorded 8,168 in South Italy. This must be a combination of geography, culture, and historiography.

Combining type counts and location counts shows us the spread that each profile-variant had (Plates: 138 and 139). The charts are ordered by number of fibulae per profile-variant. If a variant has a larger number of fibulae should it be found at a greater number of locations? The data is striking, squares (distinct locations) above the line (number of records)

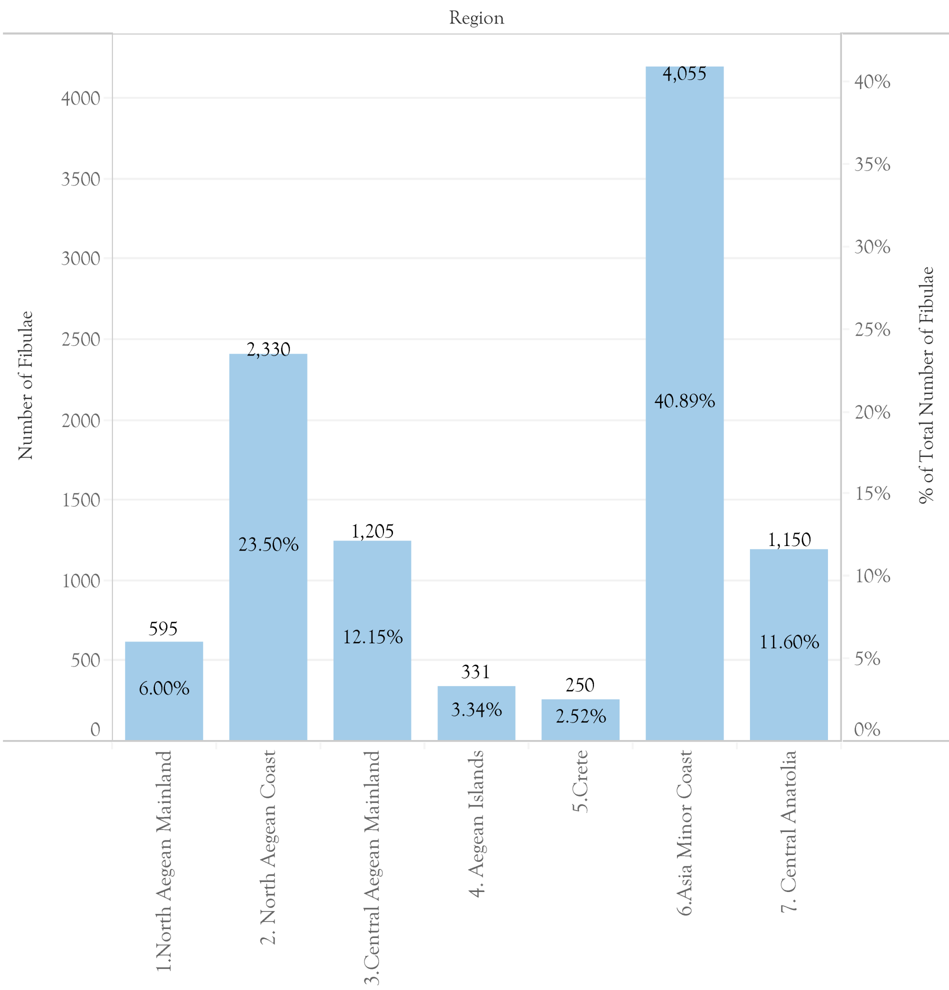


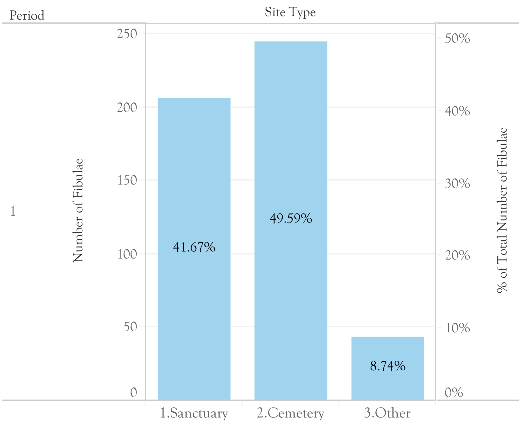
Figure 3.4: Fibula count by region. N=9,916 (Source: Author).

have a wider distribution relative to their total counts than those below. Data below the line is much more restricted. Profile-variant BG1 has 263 examples at only six sites (44:1) and V1 has 136 at just two (68:1). Conversely, DK2 has 71 examples at 20 sites (4:1), BE3 has 60 examples at 20 sites (3:1), and B1 has 37 examples spread across 23 sites (2:1). At this overview stage, we can immediately see that chronologically early fibulae, such as E1, E2, and B1, are spread over a very wide range of sites, whereas later types often appear to be more clustered and held together. This hypothesis is discussed in Section 5.2.3.

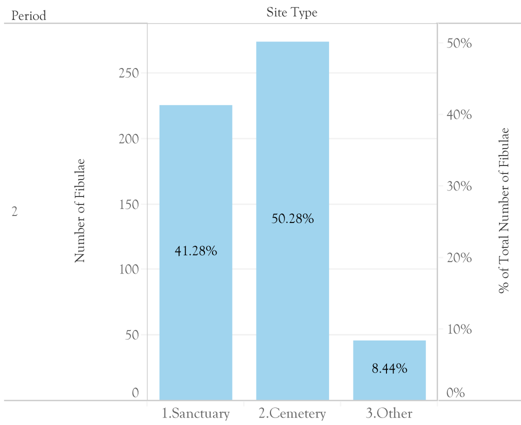
There is a powerful regional dimension to this data (Plates: 140 and 141). The charts are ordered by number of fibulae per variant. Evidently some profile-variants have a large number of examples across a large number of regions, but there are some fibulae that seem particularly mobile. For example, B1 is spread across 6 regions with 35 examples and CQ6 is found in 5 regions with only 7 known examples.

3.1.5 Site-types

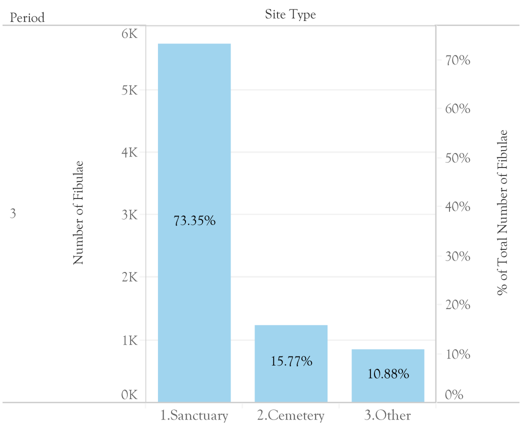
Reviewing fibula data by site-type shows an overwhelming preponderance for deposition at sanctuaries, with 70.3% of recorded data, against only 19.2% from cemeteries (N=9,916). The remaining 10.5% are from sites whose context is unknown or 'other', a small minority of which come from houses and cellars. There is a critical chronological distinction here (Figure: 3.5). Of 9,916 fibulae, 9,093 can be assigned to periods; 823 are without date. Selecting 12th and 11th century fibulae, Period 1, returns just 492 examples (5.4% of the total); selecting 10th and 9th century fibulae, Period 2, returns only 545 examples (6% of the total). This means that 88.6% of all examples post date 800 BC. Indeed, some 7,824 fibulae (86% of total) are from Period 3 alone, c.800-600 BC. Moreover, the distribution by site-type shows a sharp contrast post 800 BC: of the 12th to the 9th century examples 49.9% are from cemeteries, 41.5% from sanctuaries, and 8.6% other (Figure: 3.5a and b). However, by the 8th and 7th century, this has dramatically shifted to only



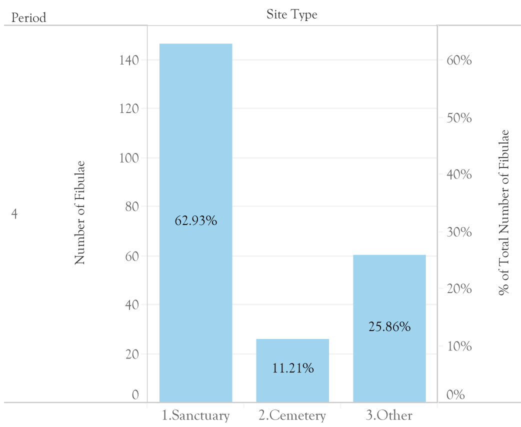
(a) Period 1 (1200-1000 BC). N=492.



(b) Period 2 (1000-800 BC). N=545.



(c) Period 3 (800-600 BC). N=7,824.



(d) Period 4 (600-400 BC). N=232.

Figure 3.5: Fibula count by site-type: (a) Period 1; (b) Period 2; (c) Period 3; (d) Period 4 (Source: Author).

15.8% from cemeteries, 73.4% from sanctuaries, and 10.9% other (Figure: 3.5c). This is consistent with a huge rise in metal dedications in the 8th and 7th century (Blinkenberg, 22; Snodgrass 1990, 287; Whitley 2001, 144-6, 311, Tables 7.1 and 12.1).

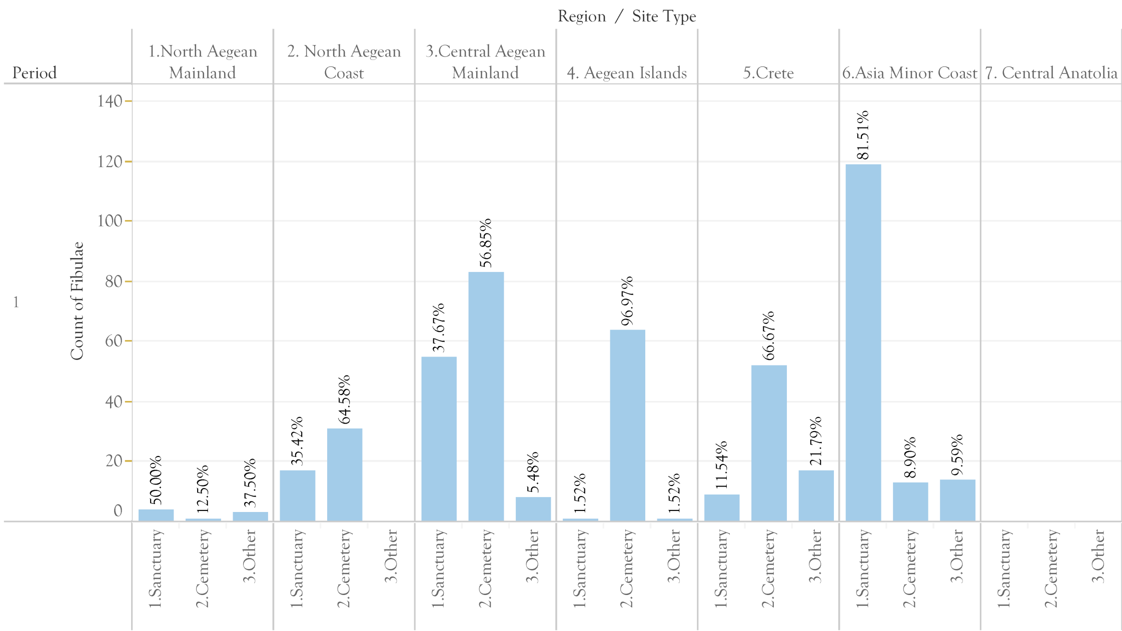
Period 4 is not too dissimilar to Period 3 in terms of site-type proportions, but the count drops greatly to just 232 (Figure: 3.5d). If the chronology is right, by the 6th, and especially the 5th century, fibulae are very rarely visible in any context across the Aegean and Anatolia. This is not because metal dedications were declining, to the contrary, rather the dearth in fibulae must be explained in terms of a change in fashion or dress styles.

3.1.6 Site-types by region

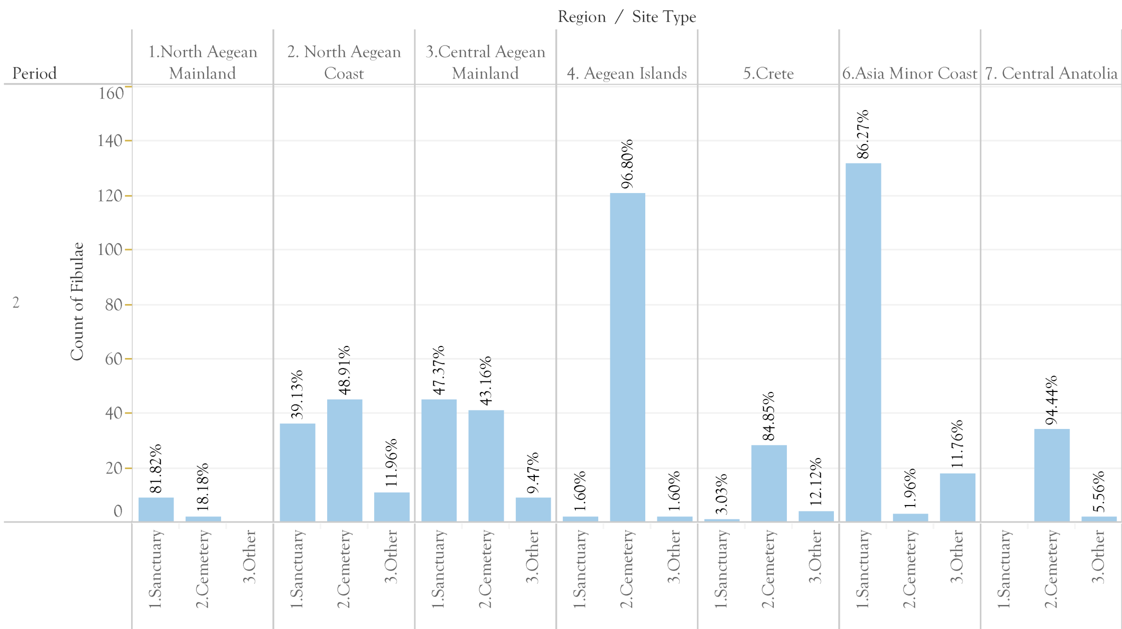
I can begin to explain the low counts of Cretan and Aegean Island fibulae by adding the site-type variable. Regions with high fibula counts have a 81%-89% provenance from sanctuaries whilst Crete and the Islands have, at first sight, a markedly different deposition pattern: only 18% and 15% respectively. Fibulae in Crete, at least, appear to be dedicated to the dead rather than a deity. The Aegean Island data is skewed by Lefkandi's assemblage of 164 fibulae, and Lefkandi is chronologically early. In Central Anatolia the pattern is also quite different. About half the fibulae are found in tumuli, with 175 from Tumulus MM at Gordion alone; the other half are found throughout the settlement, including in numerous cellars (Caner, 3-13; Körte and Körte 1904).

The period data adds detail (Figure: 3.6). The first thing to stress is that the period data is assigned by profile-groups and not on individual assemblages that may span one or more periods. The dating of profile-groups found at cemeteries is more secure than those found at sanctuaries. Since groups are assigned by period there is the problem where groups lie close to the edge of another; more problematic for groups said to have been produced over many centuries. Indeed, one scholar has said that forms often do not change for centuries (Dusenbery 1998, 970). By the end of the thesis I shall have shown this is simply incorrect. There is scarce evidence that more than a handful of fibula groups were produced over centuries without significant variation and development.

The profile-variants most difficult to distinguish are E1-E5. This erroneously raises the percentage of sanctuary dedications in the North Aegean Mainland (Region 1) and Central Anatolia (Region 2) in Periods 1 and 2. On close inspection many of these examples are likely Period 3, but to assign them new variant codes would contradict the principles the typology was designed: style not chronology. Thus, the important information for the North Aegean Mainland, Asia Minor Coast, and also Central Anatolia (Regions 1, 6, and also 7), is that in Periods 1 and 2, having removed the sanctuary figures, they have far fewer fibulae than in the North Aegean Coast, Central Aegean Mainland, Aegean Islands,

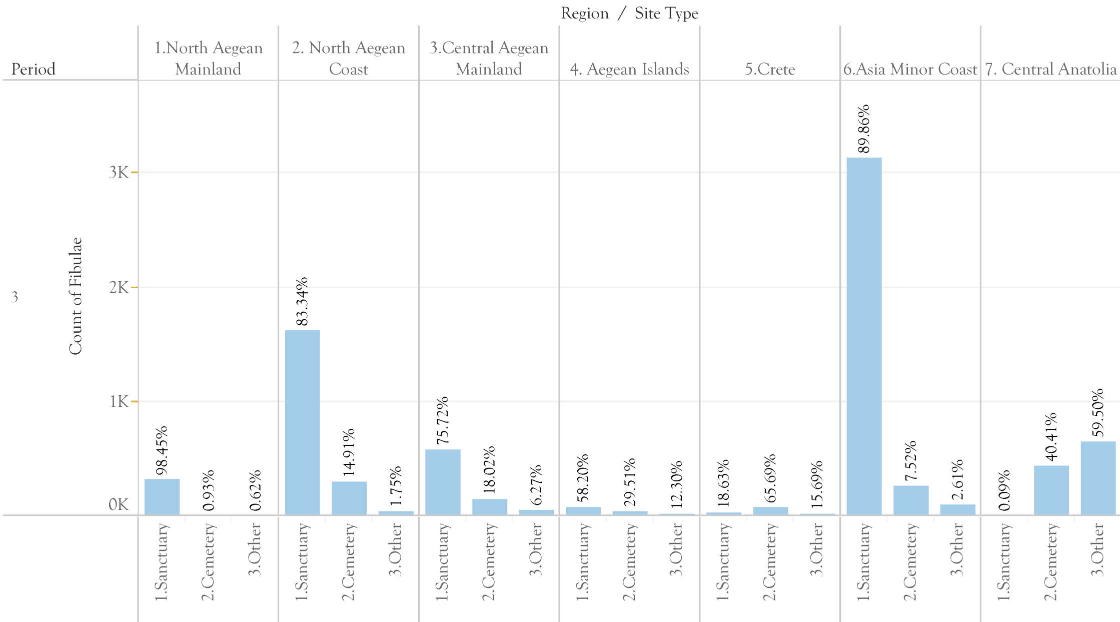


(a) Period 1 (~1200-1000 BC). N=492.

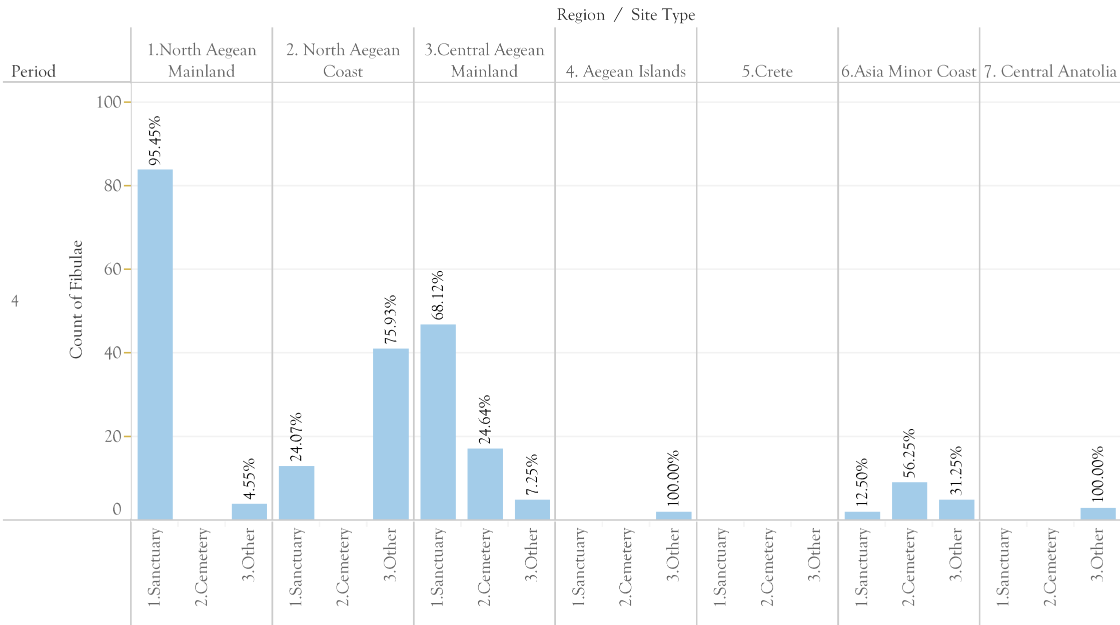


(b) Period 2 (1000-800 BC). N=545.

Figure 3.6: Fibula count by site-type and region (Source: Author).



(c) Period 3 (800-600 BC). N=7,824.



(d) Period 4 (600-400~ BC). N=232.

Figure 3.6: Continued.

and Crete (Regions 2 to 5). This situation dramatically changes in Period 3 where Region 6 has the highest count and Region 7 has the third highest, after Region 2.

Having dampened the sanctuary figures in Period 1 and 2 we see a great propensity for cemetery dedication; in contrast, by Period 3, there is a dramatic shift to sanctuary dedications in all regions save Crete (Region 5) and Central Anatolia (Region 7); regions that have different fibulae use.

In terms of count, it is clear that Regions 1, 4, and 5 get left behind in Period 3; they do see a rise, but they become peripheral to wider patterns. Yet by Period 4, there is still further divergence. Fibulae use across the study zone has all but vanished. Region 1 has the most (only 88), manufacturing the late Pivot fibulae (profiles CM-COδ), whilst Crete has none, and the Aegean Islands only two. It is possible that some of Gordion's production continued into the 6th and possibly the 5th century but it is difficult to tell for the chronology comes from the Tumulus mounds of the late-9th to the 7th century (Sams 2011). Mapping the diachronic count of fibulae visually confirms this picture (Plates: 142-145).

What is clear is the remarkable increase in number of fibulae in the 8th and 7th century, as well as the fundamental shift from cemetery to sanctuary find spot. Why after this striking rise of popularity are they hardly to be seen in the 6th century? Amongst this general trend certain regions used fibulae more than others, and there must be clear differences in style of dress and deposition practices. It is evident that the five top sites (Pherai, Lindos, Ialysos, Gordion, and Philia) have local production, whilst other sanctuaries (and perhaps almost the whole island of Crete) appear to be importing their fibulae from a wide but specific set of locations. This will be discussed when looking at networks in Chapter 4 and assemblage diversity in Chapter 5.

How can I explain this varying distribution? Firstly, it is affected by cultural practices, as a reflection of deposition patterns rather than everyday circulation (Schiffer 1972).

Secondly, there is the importance of sanctuaries and votive practice, as well as exchange and loci of production (cf. Baumbach 2009; Gunter 2009; Niemeier 2016). The nature of these distributions will be explored in Chapters 4 and 5.

3.1.7 Material type

The following table displays the count of material types recorded in Regions 1-7 as well as 8a and 8b (Table: 3.4a). Some fibulae are composed of multiple materials, such as the ivory Spectacle (profiles FA, FB, and FC) that is attached to a bronze or iron pin, or the Beaded fibulae (profiles FG and FH) where other materials are threaded onto a wire bow. Notwithstanding the fact that precious metals were often recycled in antiquity (Linders 1990), there are three main points to be made. Evidently, copper-alloy has an overwhelming presence, supporting both the functional nature of fibulae and stylistic variation that bronze affords. The recording of precious metals are few, and yet whilst I must be cautious about reading into the counts, it is clear that the Central Aegean Mainland and Asia Minor Coast have the most diversity, with the largest number of material types present. Finally, the presence of iron must be broken down, as only half are the primary fibula material (Table: 3.4b). 35 records are for repair: such as rivets to the stem to support a new spring and pin, a rivet to the spring to strengthen it, or a new pin made wholly of iron. 31 are for certain groups of the 6th to the 4th century Pivot fibulae (profiles CM, CN, and CO), an invention where a replaceable (bronze or iron) pin is pivoted on the stem. 44 likely formed the fibula for the ivory/bone Spectacle fibulae (profiles FA, FB, and FC) whilst one instance is of decoration. Caution is required for reading into the regional dimension for iron use due to quality of publication, especially where it is not reported whether the rivets are of iron (at Lindos they are often of bronze). I can, however, consider the chronological dimension for iron as primary material for fibulae, although the disproportionately high corrosion of iron make many of them unidentifiable at profile-group, and therefore date. For Period 1 there are 12 fibulae (out of 492 records = 2.4%), for Period 2 there are

Region	Bronze	Iron	Silver	Gold	Electrum	Glass	Amber	Ivory/Bone
1. North Aegean Mainland	587	38	4	0	0	0	0	1
2. North Aegean Coast	2,300	33	8	1	0	0	1	25
3. Central Aegean Mainland	1,038	90	24	4	0	0	14	146
4. Aegean Islands	300	25	0	3	0	0	0	36
5. Crete	233	17	0	0	0	0	0	4
6. Asia Minor Coast	3,926	46	27	24	13	2	4	66
7. Cental Anatolia	1,143	1	5	1	1	0	0	0
8a. Greece	64	1	7	9	0	0	0	4
8b. Turkey	90	0	1	1	0	0	0	0
Grand Total	9,681	251	76	43	14	2	19	282

(a) Metal counts; some fibulae have several metals.

Region	Iron fibula	Repair	Spring rivet	Needle	Hinge pin	Ivory specatcle fibula	Decoration
1. North Aegean Mainland	6	3	0	1	28	0	0
2. North Aegean Coast	10	12	1	2	3	5	0
3. Central Aegean Mainland	49	2	0	4	0	34	1
4. Aegean Islands	17	4	2	0	0	2	0
5. Crete	14	0	0	0	0	3	0
6. Asia Minor Coast	44	0	0	2	0	0	0
7. Cental Anatolia	0	0	0	1	0	0	0
8a. Greece	0	0	0	1	0	0	0
8b. Turkey	0	0	0	0	0	0	0
Grand Total	140	21	3	11	31	44	1

(b) Iron uses; almost half of iron use (44.2%) is recorded as a secondary material (N=251).

Table 3.4: (a) total material count by region and (b) iron use (Source: Author).

20 (out of 545 = 3.7%), for Period 3 there are 34 (out of 7,824 = 0.4%), and for Period 4 there are 0 (out of 232 = 0%). The key find-spots are Athens with 20 fibulae (out of 112 records = 17.9%), Kalapodi with 11 (out of 80 = 13.8%), Lefkandi with 17 (out of 165 = 10.3%), and Lindos with 38 (out of 1,586 = 2.4%). The iron fibulae from Lindos are without figures and difficult to identify in my typology.

Figure 3.7: Wire fibula production technique (Carrasco et al. 2014, 100, Fig. 4).

3.1.8 Manufacture and *chaîne opératoire*

It is surprisingly difficult to pin down the exact mode of production from visual examination. For the early arch bows (A-E5), and those without protuberant features (profiles EK, ES, ET, and EV-EY), it is likely that a piece of round wire was cast or a strip was taken from a rectangular plate (Carrasco et al. 2014, 99-103). The wire was heated and the spring coiled over a rod, the catch-plate would be hammered, and the pin shaped in the original cast or annealed and filed (Figure: 3.7). Any incised decoration could be applied thereafter.

Fibulae with swelling or protuberant features, about 87% of the assemblage (N=9,916), must have been cast prior to being worked. The principal method of casting is the lost-wax technique. This is done by sculpting a model of the intended fibula in beeswax and over it layering clay to form an investment mould (Maryon and Plenderleith 1958, 634-5; Noble 1975, 368). A runner is left to allow the wax to pour out as the mould is heated. Now empty, the mould is turned the other way up and the bronze poured in. Once cooled the mould is broken away and the fibula is subject to further working and hammering, including to the catch-plate, and finally polished. Orfanou (2015, 206-10) has distinguished four degrees of working: 'as-cast', 'slightly worked', 'worked', and 'intensely worked', showing clearly distinguishable crystalline microstructures, provided a Scanning Electron Microscope is at hand. Of 10 fibulae from Pherai, three were slightly worked, three worked, and four intensely (ibid. 214, Fig. 7.19).

A mould from Miletus is preserved (Figure: 3.8) showing a fibula very close to my CH1.XXIVa.20e variant (Treister 1995, 169-70), but it is marginally different due to the uniformity of the three flanked beads (which appear closer to profile-variant CJ1). This was a two-piece mould where each half would be pressed together, being tied or pegged at each corner, thus it need not be broken to reveal the finished object (cf. Karageorghis 1989, 442; Tölle 1966, 92). Note, the ornament to the left of the fibula could not have been cast at the same time, as the molten bronze is poured in through vents located at both the top and bottom of this mould. In all probability, this mould was instead for making wax models, as casting bronze would risk a defect at the join of the moulds at the fibula perimeter. The wax models, by contrast, could be smoothed before casting in an investment mould as described above. Two further moulds from Anatolia, from Kalehöyük-Kaman and Bayindir-Antalya, support this conclusion (Anadolu 2004, 31).

I know of one mould from the Aegean mainland, from Kalapodi, that could be part of a two-piece mould. The design is similar to an FD2, a rare type made usually in silver (Figure: 3.9). On the reverse, the mould is signed EYDA which the excavator's consider to be the name of the goldsmith (Felsch 2007, 140). In the absence of other moulds, it is nevertheless possible to posit the manufacture technique from the count of near-perfect

Figure 3.8: A 6th century slate limestone jewellery mould from Miletus (Tölle 1966, 92, Fig. 1).

Figure 3.9: A mould from Kalapodi (Felsch 2007, 140, Pl. 32, No. 518).

examples, especially when they are found together; usually in a grave, and sometimes one at each shoulder. Many such pairs are actually different in size as well as minor detail, as though one piece was made after the other, consistent with individual production using the lost-wax technique. 246 fibulae (2.5% of total) are published as being one of a pair or chain.

Incidentally, the Miletus mould supports, alongside the relief sculptures (Figure: 1.8 on page 16) and figurative profile-variants FY1, GA1, and GA2, that fibulae of Asia Minor were worn 'falling down'. Fibulae with the well-known Sail catch-plate, BE¬.VIII¬.11¬, characteristically have their figurative decoration facing the other way, with the pin at the bottom of the fibula. There are only a few exceptions: #4332, #4348, and #4374. The analysis of manufacture technique may, in part, explain why so few fibulae are the same: an important point when it comes to the question of diversity.

3.1.9 Colour

A note should be made on colour (Giumlia-Mair *et al.* 2010a, 258-60). Whilst gold, silver, and electrum fibulae are obviously distinct in colour, there is variation amongst copper-alloy examples as well. The fibula's colour may mislead us today, as they have been subject to a lengthy deposition and changing conservation techniques. De Cou (1905, 192) describes the cleaning technique used for the excavation of the Argive Heraion: first, the bronzes are placed with a layer of zinc scraps in a bowl of water diluted with 10% hydrochloric acid. Second, at intervals of two days the pieces are brushed and re-immersed. Third, upon removal from the bowl they are placed in a solution of 10% potash for 24 hours, then removed and placed in distilled water. Finally, they are dried and covered in a coat of melted white wax to await polishing.

> Its result is to leave the surface of the bronze entirely free from Verdigris and covered with a dark brown deposit which in no way interferes with the clearness of the finest details (de Cou 1905, 192).

Figure 3.10: Colour shift in copper-alloys with different tin contents (Fang and McDonnell 2011, 56, Fig. 1).

But it is not only post-deposition factors such as cleaning that have determined the colour of bronze fibulae. The inclusion of high levels of tin, zinc, and to a lesser degree, lead, as well as the standard of smoothness or polishing, have a significant influence on the colour (Chase 1994, 94; Jones and MacGregor 2002, 5). When tin is about 15%, a reduction in redness gives the copper-alloy a golden hue, but when greater than 18%, the colour becomes more silvery (Figure: 3.10). The addition of zinc greater than 15% provides a more yellowy than gold appearance, whilst a lead content of 5-10% reduces both yellow and red: dimming the alloy (Fang and McDonnell 2011, 54-7; Giumlia-Mair 2015, 493).

Finally, the colour at point of manufacture, perhaps a golden red, would within weeks become blacker and dull, only later acquiring the patina so often seen in the museum today (Gettens 1970, 57). A 'converted' offering, produced directly for the deity or deceased, would thus be a different colour to a 'raw' one (*sensu* Snodgrass 1990), more likely to have attained a dull, verdigris patina over several years.

In some cases, the colour of copper-alloy was chosen by the craftsman. In a sample of 119 fibulae from Thessaly, there is a wide range of composition in terms of tin and lead content (Orfanou 2015, 219, Fig. 7.22a), although today the colour is fairly consistent. Two examples, despite not having any unusual composition, have a teal colour, similar to some in the Ashmolean Museum (cf. #3719, #4144, #4380, #4409, and #4608) where there is a wide range of colour. Whether this is representative of how they would have looked in antiquity is another question.

3.1.10 Composition

Several recent studies have looked into the composition of fibulae to assess their provenance (Bonev et al. 2015; Felsch 2007; Giumlia-Mair et al. 2010b; Orfanou 2015, 224). In terms of provenance, on the whole they provide inconclusive results, and this is discussed in Section 4.2.3.2 on page 176. On the other hand, the content of bronze is significant in terms of manufacture ease and decoration. An important element is lead, well-known to have been used at >c.2% to increase the fluidity of the molten metal, allowing an easier fill of an intricately decorated mould, whilst also lowering the melting point (Craddock and Giumlia-Mair 1988, 319; Giumlia-Mair et al. 2010b, 479). At the same time, a high lead content (>c.5%) could cause the artefact to crack under hammering (Bonev et al. 2015, 118; Giumlia-Mair 2015, 486-7, Figs. 3 and 4; Orfanou 2015, 212-3). Orfanou confirms that this knowledge was carefully dealt with by craftsmen producing fibulae at Pherai: the lead content was consistently reduced as the required intensity of work (hammering) increased (Figure: 3.11). Incidentally, a high lead content provides a method to determine whether an artefact was *not* manufactured by hammering (Bonev et al. 2015, 119). A clear contrast in lead content appears in fibulae with deep, detailed decoration of the bow and narrow rolled foil catch-plates, evidently cast with a high lead %, against those with a flattened paper-thin Sail catch-plate where the lead-content is below 2%. Giumlia-Mair et al. (2010b, 478-9) show that some Italian fibulae were produced in several parts, where the bow would have a higher lead content than the pin and catch-plate. This suggests craftsmen carefully managed metal contents to make different types of bronze jewellery.

Figure 3.11: Tin (Sn) and lead (Pb) content for ‘as cast’ (A), ‘slightly worked’ (B), ‘worked’ (C), and ‘intensely worked’ (D) (Orfanou 2015, 211, Fig. 7.14b).

3.1.11 Size and repair

The problem of preservation heavily affects measurements of fibula length; only 32.4% of data is recorded with a total length. I include data from Regions 8a and 8b in this subsection (N=10,088). Historically, length has been measured from the outer edges of the spring and catch-plate, so data on the arch diameter is not easily available. The data availability is thus also dependent on the loss of the catch-plate. Larger catch-plates are more fragmentary, especially those from Pherai, and the results therefore depress average length. Nevertheless, a recovery of 3,264 (32.4%) measurements is still informative (Figure: 3.12). This chart is more difficult to interpret than it appears. At the outset it is clear that fibulae can vary in size dramatically, being as small as 15-29.9mm (482: 14.8%) and as great as 270mm: the average is 71mm. Fibulae larger than 180mm are not exceptional, amounting to at least 40 when including fragmentary examples. Over half the data is between 30-59.9mm (1,749: 53.6%). The sharp and steady decline in number as length exceeds 45mm is influenced by the tendency for larger fibulae to have more frequently suffered damage during deposition, particularly at the catch-plate; in other words, the decline is probably shallower. It may be hypothesised that fibulae have a practical length of 20-120mm (3,085: 94.6%), and to assess this the scholar can investigate the frequency of repairs, shown in yellow (Figure: 3.12). Although a small sample (only 71 out of all

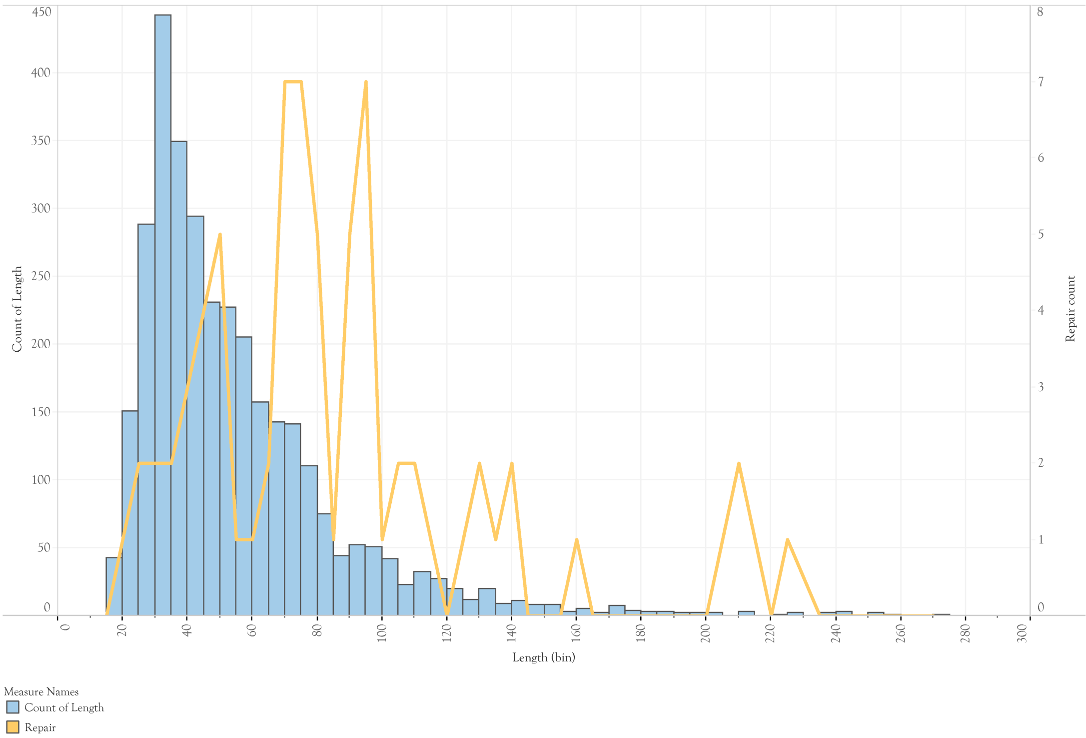
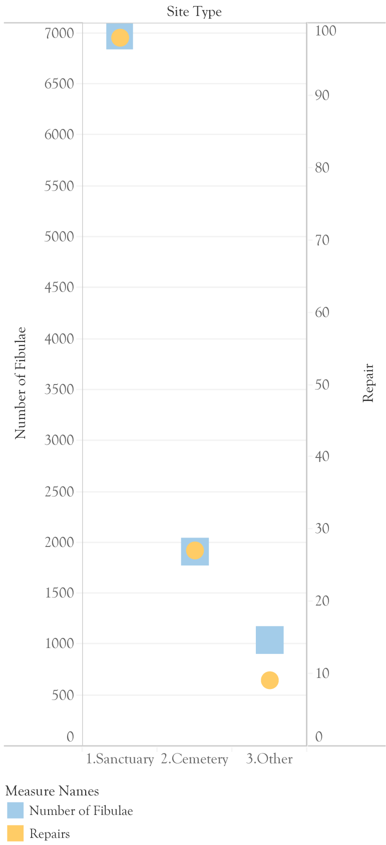


Figure 3.12: Length count in bins of 5mm, and the number of repairs (Source: Author).

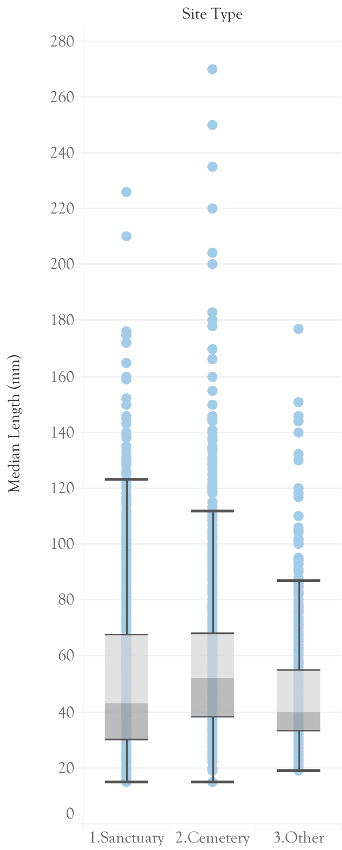
140 repairs have total length data) this chart clearly shows that fibulae of all sizes were repaired and thus had a practical use in antiquity. In addition, it shows that larger fibulae were more likely to be repaired, presumably because they were more likely to suffer a broken pin, not only because of their greater size, but the heavier fabric it can be assumed larger fibulae were intended.

If repair suggests a longer use-life, it is possible to plot whether the use-life of a fibula was a factor in dedication by site-type. Might a fibula made not for wearing but dedication, a converted offering, be more likely found in a sanctuary rather than tomb, and without evidence of repair? Here I look at all fibula repairs, but because looking at site-types I remove Regions 8a and 8b, leaving 134 repairs in total. The reality is that frequency of repair is the same for sanctuary dedication, with a ratio of about 1:71, as it is for cemeteries, also with a ratio of 1:71 (Figure: 3.13a). Fibulae worn in life and repaired were just as likely to be dedicated to a deity as the deceased (DeVries 1974, 92).

As the range of fibula size is large (and there can be a wide range of sizes for the same



(a) Number of repairs by site-type



(b) Length by site-type

Figure 3.13: Repairs (a) and length (b) by site-type (Source: Author).

type), it must be hypothesised that size was not a factor for type of offering, but a concern of function: a large fibula may be at the shoulder for a cape, whilst smaller fibulae were for shawls, sleeves, or finer material, including the shroud. Fibulae could have many functions (Alexander 1973, 191). Moreover, fibulae must have been subject to value, prestige, and experience: small fibulae are harder to discern, and the viewer may have to step closer to see them and their details; a larger fibula, more valuable, is a greater statement of wealth. It could be pondered whether a large fibula was used for clothing an oversize deity (Neils 2009), but the evidence is clear: larger fibulae (>180mm) are more often found with the dead than a deity (Figure: 3.13b). The count is striking considering the sanctuary sample is 70.3% of data to cemeteries 19.2% (Figure: 3.5 on page 116). Indeed, the median length of sanctuary fibulae across the study area is 43mm against 52mm for cemetery fibulae, almost 20% smaller.

Comparing the data by region informs us of significant variation (Figure: 3.14 on the next page). Overlaying repair by region is equally interesting. As a ratio, fibulae were much more likely to be repaired in the Regions 1 to 4 than Regions 5 to 7. Naturally, Anatolian fibulae, being two-piece, are not listed with repairs, since the pin was designed to be replaced. The sanctuary ratios of Regions 1 and 2 compared to Region 6 are important. This is a working hypothesis since the data may be skewed due to preservation and publication.

In terms of length, there are several notable points (Figure: 3.15). First, whilst larger fibulae are reserved for the grave, the very largest are squarely found in mainland Greece, and consulting my database, about half are from Attica. Second, and more importantly, the median and average length of fibulae in the West Aegean is significantly greater than that of Asia Minor/Anatolia. The average of the North Aegean Mainland, North Aegean Coast, and Central Aegean Mainland is 71mm and the average of the Asia Minor Coast and Central Anatolia is 44mm: fibulae of the former are some one and a half times larger. There are all sorts of caveats to this point: to what extent is the sample skewed because of deposition practice, the dedication of small fibulae for the gods, or the different choice of catch-plate? It is difficult to tell the extent that the longer catch-plate of the West Aegean

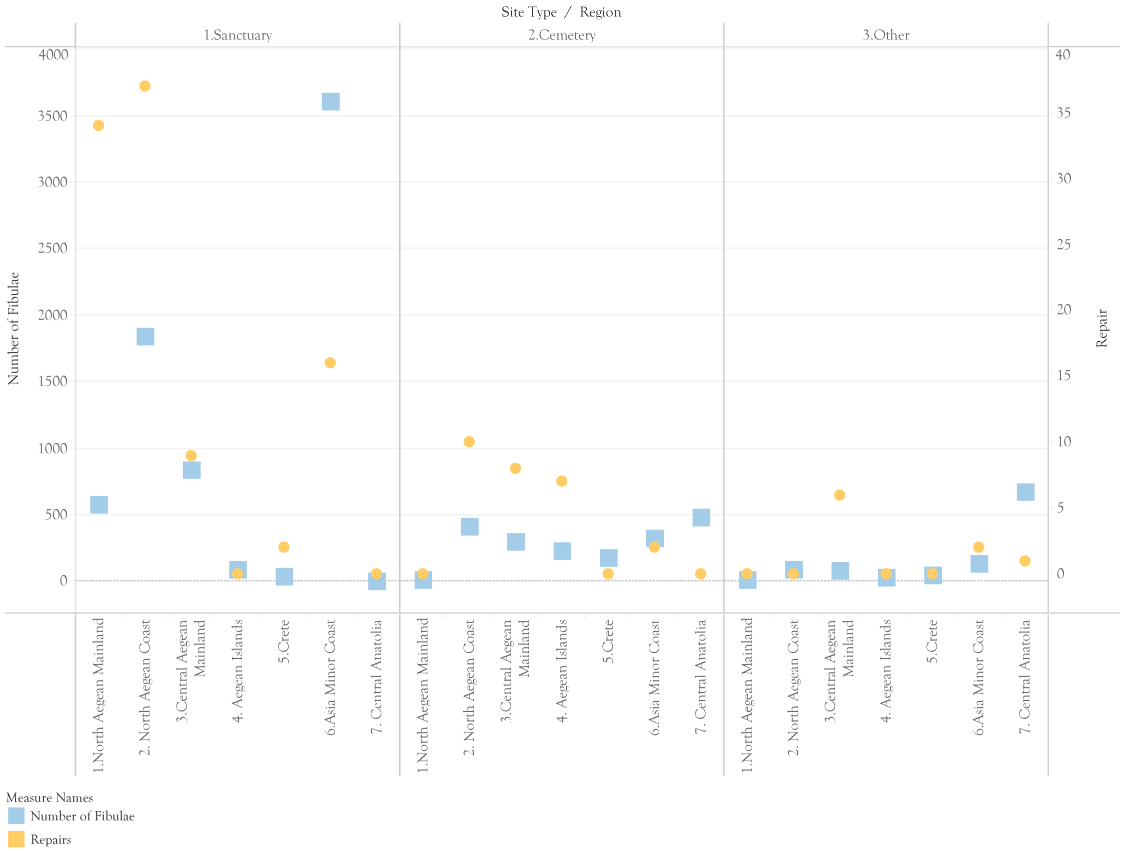
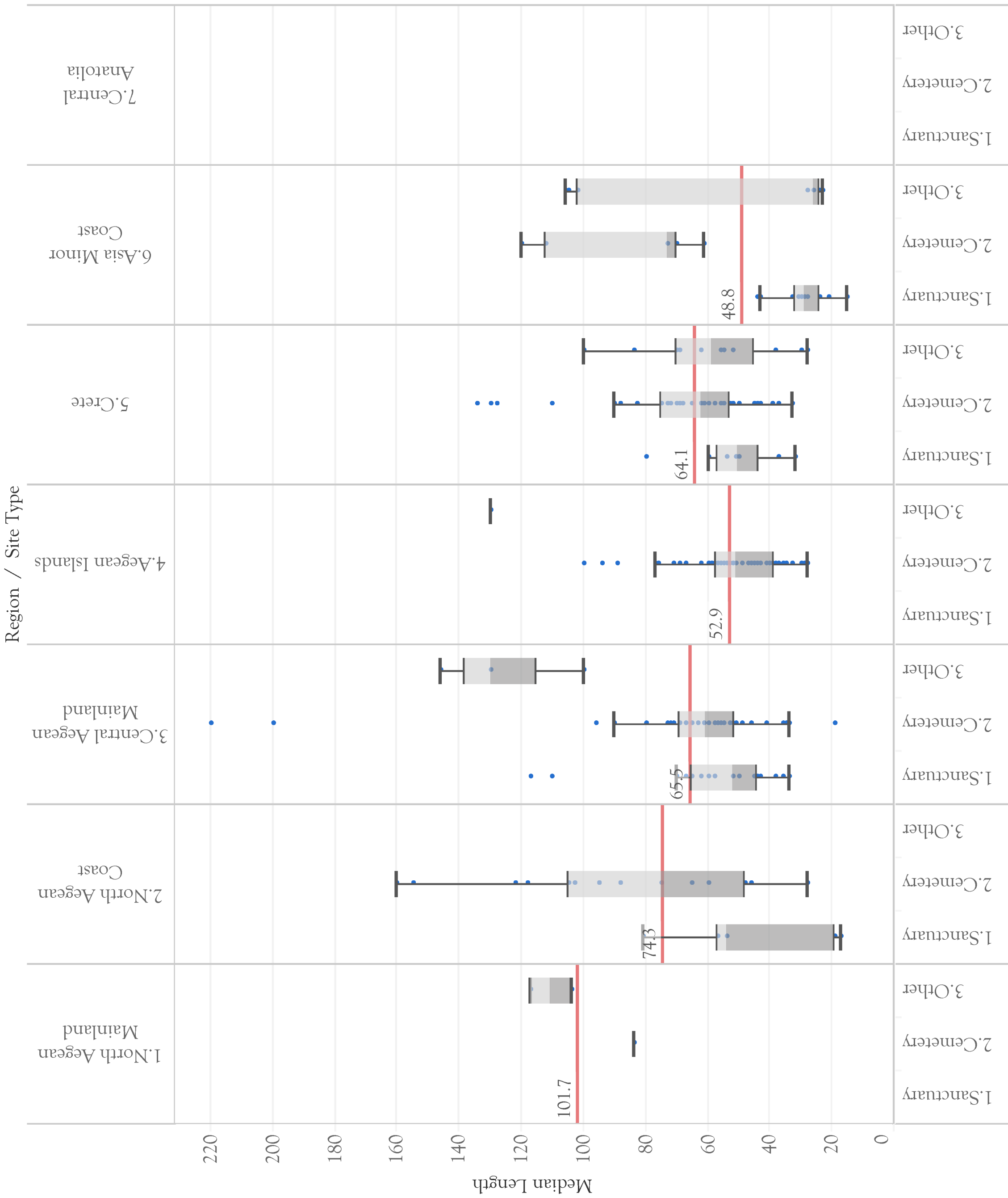


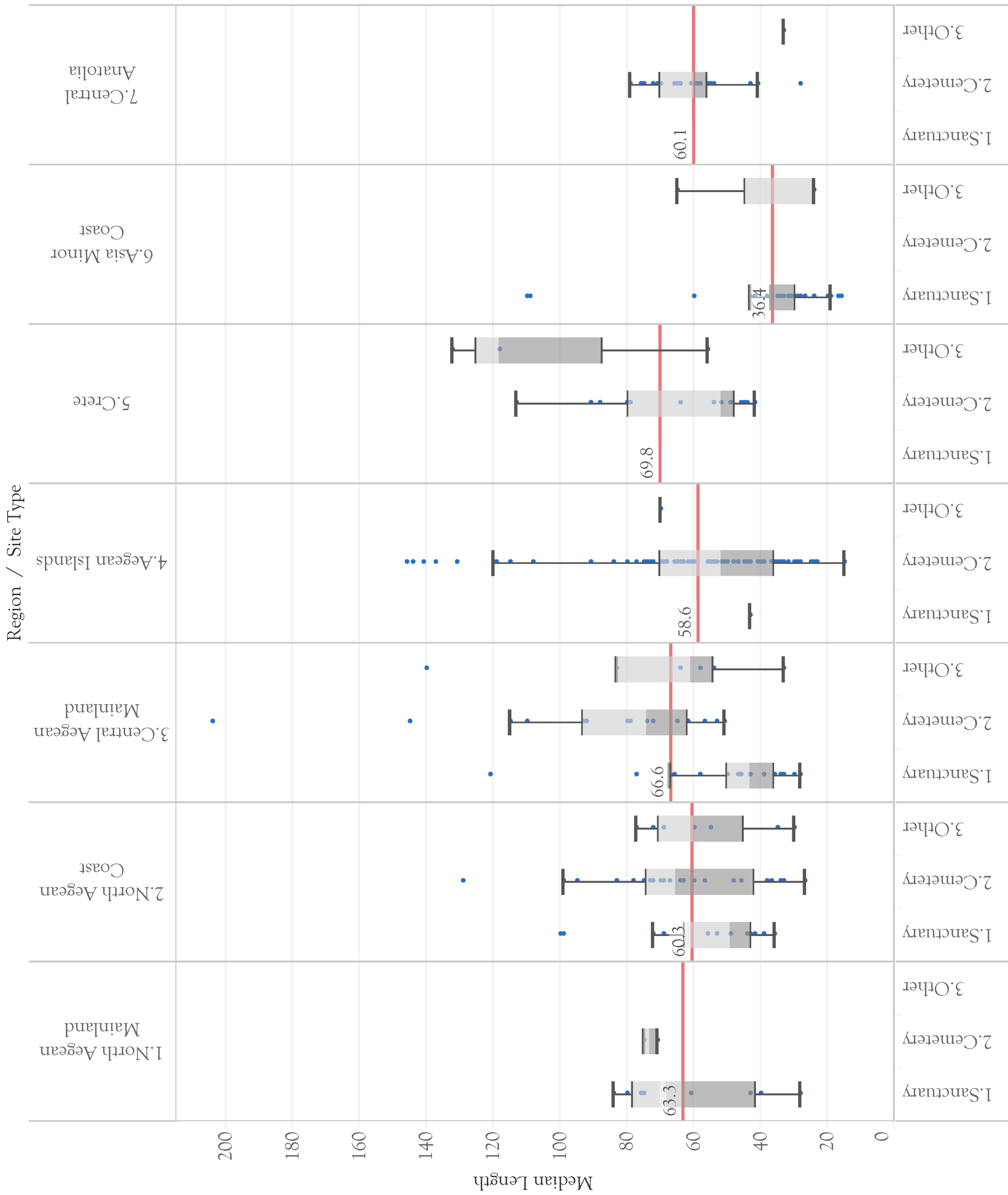
Figure 3.14: Repairs by site-type and region (Source: Author).

accounts for the increase in size. Alternatively, do we witness a cultural phenomenon? Were fibulae in the East Aegean smaller than those of the West because the clothes people wore were different in style (cf. Lorimer 1950, 345, 363)? Or did they prefer less ostentatious jewellery? Finally, there is a chronological, not only regional, dimension. Late fibulae (Period 4: 600-400 BC) are smaller. The average length for the whole sample is 54mm whilst the average for Period 4 examples is 40.6mm.



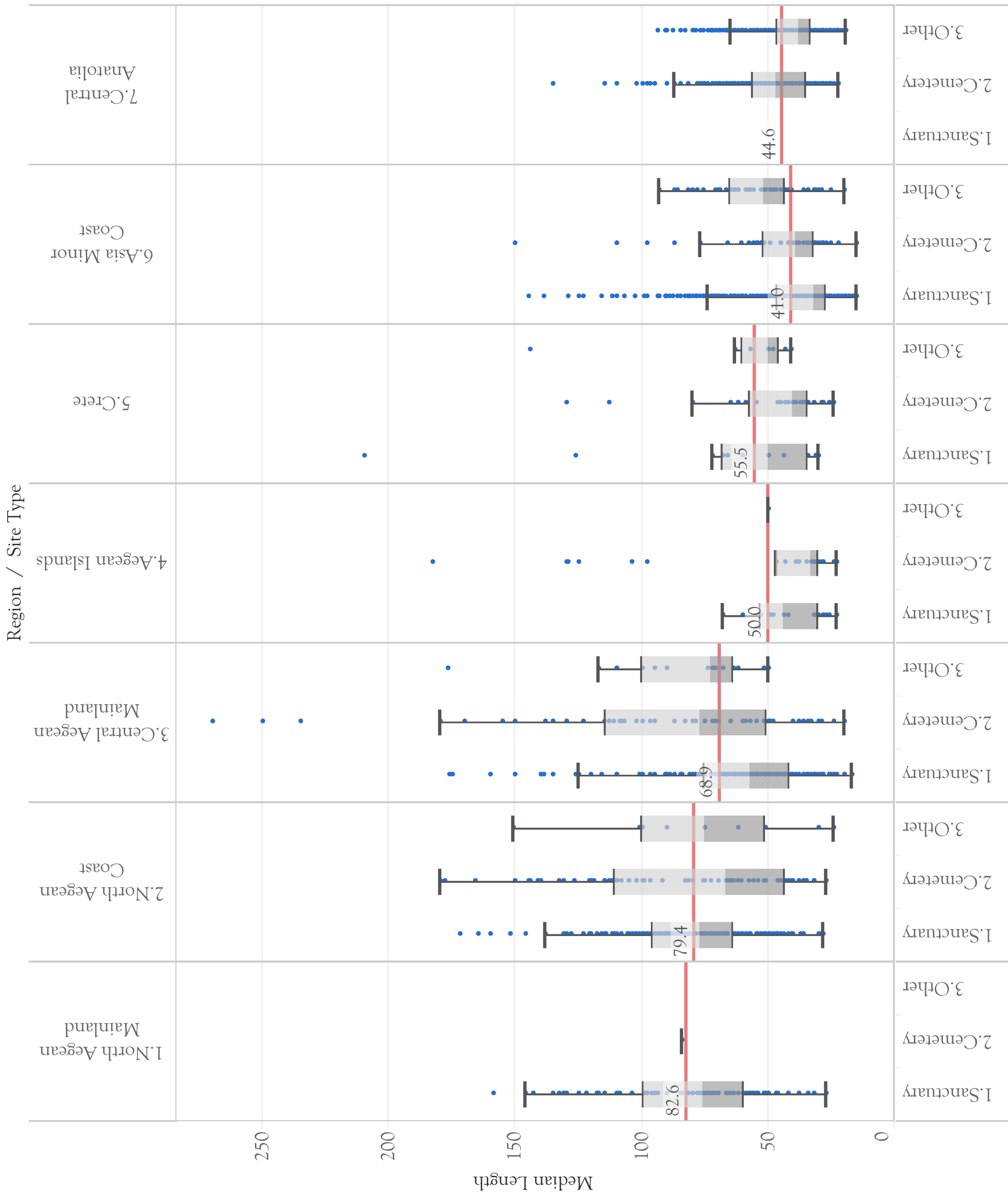
(a) Period 1 (1200-1000 BC).

Figure 3.15: Length box-plots by region and site-type (Source: Author).



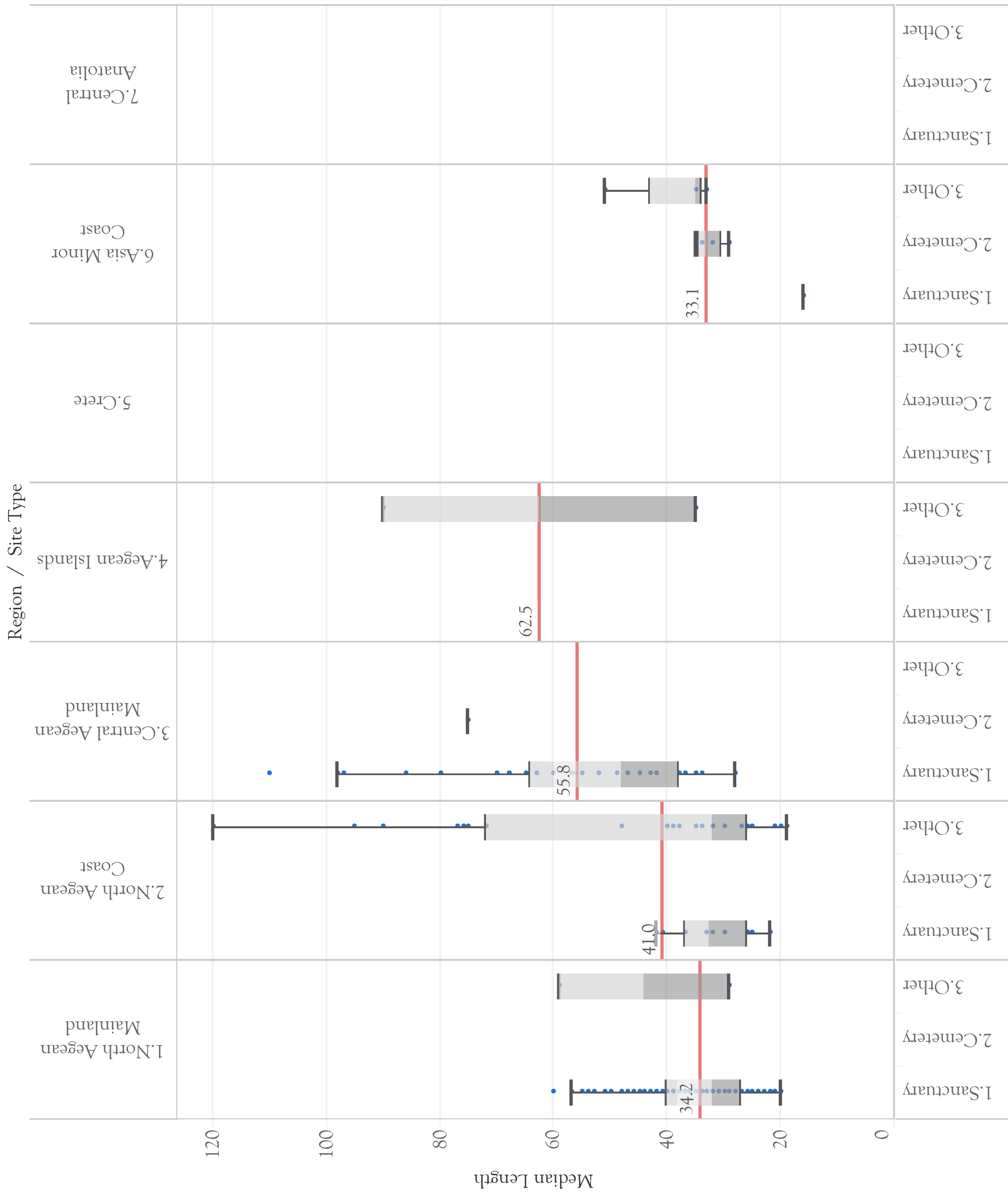
(b) Period 2 (1000-800 BC).

Figure 3.15: *Cont.*



(c) Period 3 (800-600 BC).

Figure 3.15: *Cont.*



(d) Period 4 (600-400~ BC).

Figure 3.15: *Cont.*

3.2 Summary

To summarise this sketch sets the stage for the main data analyses. Commencing with the undeniable, fibulae were practical objects, manufactured with copper-alloy in a wide range of sizes, consistent with a range of uses and clothing types. Furthermore, they were often fairly plain. Yet, in spite of their functional value, there are clear indications that they possessed a powerful semiotic role in the societies they were situated. They are both highly personal objects and objects on display in life and death. It is no accident that the data is so skewed to dedication in the sanctuaries at Pherai, Lindos, and Ialysos, and to some cemeteries but not others. It is not accidental they have been recovered in two, or just one, in number at the majority of sites. It is crucially important that fibula types are so diverse; both stylistically and regionally. The number of variants being so easily distinguishable suggests a desire for uniqueness rather than a residue of copy-error or stochastic variation.

The network analyses of Chapter 4 will look at the shared-presence of types and identify production locations using a manufacture test. It presents hypotheses of interaction that can be explored by case study. There are two kinds of diversity to explore in Chapter 5. The first is site assemblage diversity. This is complimentary to a network analysis, in that it tries to explain distribution based on expected diversity and any divergence from that expectation. The second is stylistic diversity. Does diversity increase over time; do certain groups exhibit more diversity than others, indicating a different regional or cultural diversity rate?

Chapter 4

Networks, Similarity, & Exchange

4.1 Methodology part 2: assemblage distribution and connectivity

The first part of this chapter analyses fibula distribution to show a minimum dimension of connectivity between sites previously unstudied; heretofore impossible due to the incongruity of regional typologies (Caner; Kilian; Sapouna-Sakellarakis). The traditional method to explore connectivity is to map similar artefact-types to show their distribution, and create groups of regional styles or *koiné* (Blinkenberg, 16, 284-5; Coldstream 1968; Handberg and Gadolou 2017; Lemos 2002, 212). Alternatively, the similarity between sites may be measured where 'nodes' are sites and 'edges' are the relationships between them, often determined by artefact count or number of types (Collar et al. 2015, 12-4; Figure: 4.1). This is known variously as Network Analysis, Social Network Analysis, Correspondence Analysis, and Agent-Based Modelling, but they are essentially similar, and the results may be diachronically assessed by ceramic phase.

Figure 4.1: Types of basic network: (a) lattice linked by close distance, with cabotage/coasting; (b) random (or directed); (c) small world with close distance and long links; (d) scale-free with high centrality, hub sites (Östborn and Gerding 2015, 310, Fig. 3).

4.1.1 Problems with assemblages and networks

The most obvious problem is that the archaeological record is incomplete. How does the analyst uncover the level of interaction, or connectedness, via only those artefacts that did happen to get both deposited and excavated (Figure: 4.2)? Second, the deposition practice may have a meaning out of kilter to the question the analyst is interested; indeed, the artefact itself is only a 'slice of history', and not a picture of the organisational framework that conditioned it (Binford 1981, 201; Clarke 1973, 16; Schiffer 1985, 20). Finally, sites may exhibit only a handful of connected objects over centuries of use. The objects themselves may be chronologically fuzzy, and when no connected objects are found, that does not necessarily confer no contact (Manning and Hulin 2005, 282-5; Östborn and Gerding 2015, 314; Sherratt 2015, 75). To come to terms with these issues entails appreciating that the results of a network analysis are only hypotheses, most data being missing, and monitoring the data for chronological contiguity.

These, unfortunately, are the simpler problems, for recent scholars, evolutionary archaeologists in particular, have dealt us a range of more complex ones. The most important

Figure 4.2: The deposition of durable artefacts (Schiffer 1972, 158, Fig. 1).

is cultural drift, where it has been demonstrated that new variants may appear stochastically (e.g. via transmission copy-error or one-off creations), and are then independent of natural selection (Figure: 4.3). Trait A comes under selection and increases in prevalence. Shortly after, Trait C came to be favoured and Trait A goes out of use. Finally, Trait B was never selected, it represents stochastic variation (O'Brien and Lyman 2009, 235). Indeed, it is also possible that Trait C preceded A and comes back into popularity, called character-state reversal (O'Brien et al. 2016, 74). Thus *the variation measured (e.g. profile-variants) may not be meaningful* (cf. O'Brien and Lyman 2003, 18; Read 2007, 199; Schiffer and Skibo 1997, 32; Shott 2010, 887).

The rate of cultural drift is partly dependent on the innovation rate and population size, but also tool use and occupation span (Dunnell 1988, 187; Shennan 2011, 1073). Historically, scholars have assigned stylistic traits to cultural drift and functional traits as akin to natural selection (O'Brien and Lyman 2003, 2; O'Brien and Lyman 2009, 235). Ancient metalwork has been subject to this dichotomy (Figure: 4.4). This is unfounded; stylistic traits are at least 'quasi' functional, under weak selection, or to an equal extent, just in a different mode, ideational rather than material (Read 2007, 267, 289; Sackett 1990, 38; Shennan and Wilkinson 2001). This discussion can go a step further, and refute the tendency for evolutionists to see the selection of functional traits, the fitness of one artefact

(a) Hypothetical model of natural selection (O'Brien and Lyman 2009, 235).

(b) Simulation of traits under drift. The changing proportions are due to random copying over time rather than selection or meaningful variation (Steele et al. 2010, 1350).

Figure 4.3: Hypothetical model of natural selection (a) and traits under drift (b).

over another, go hand-in-hand with progress (Flannery 1972, 400; O'Brien and Lyman 2009, 245). Artefact variants are selected not for functional but ideological advantage, as a means to gain a lead in agency relations (*sensu* Gell 1998). Variants are selected by people because they were thought to be effective; variation can be restricted if power is deemed to be consolidated. In this understanding stylistic variation is desired to enhance the status and survival of individuals involved in its creation (Binford 1963, 92). The concept of cultural drift should be reserved for variants that are indeed non-meaningful, and it reminds scholars that it is possible to create a network where the relationships between sites are defined on meaningless attributes. The defining feature of fibulae is style, which I will argue is far removed from the concept of cultural drift.

Another issue is whether second- and third-generation artefacts are imports or simply an adaptation of the first-generation import. This is clearer in the case of local pottery imitation, as a petrographic analysis is possible. Ongoing similarity between fibula assemblages, such as the continued use of a catch-plate style, could in fact represent no connectivity at all; evolutionary archaeologists call this convergent adaptation or parallel innovation (Crema et al. 2014, 289; Heggarty et al. 2010, 3840; and represented by Clarke in Figure: 2.3 on page 49).

Figure 4.4: The separation of the *Prähistorische Bronzefunde* series into functional and symbolic (Jockenhövel 2011, 12, Fig. 4).

4.1.2 Emphasising process

Scholars have tried to circumvent these issues by looking less at material contacts and more to process. The fundamental instigator for what scholars now call 'Mediterranean Archaeology' was connectivity; an idea that came to the fore in *The Corrupting Sea* (Horden and Purcell 2000) and *The Making of the Middle Sea* (Broodbank 2013). Connectivity is based on the presupposition that sea transport was substantially cheaper than land, so that coastal sites became disproportionally connected, with the prime mover being 'inescapable redistribution' caused by Mediterranean micro-environments (Halstead 1990, 149; Horden 2005; Purcell 2005). Morris (2003, 50) coined the term 'Mediterraneanisation', the connecting up or 'globalising' of Mediterranean regions: a dynamic process that could move forwards and backwards. Whilst convincing, neither concept was well rooted by evidence; nor was it clear when it began (Morris 2003, 44, 48). Mediterraneanisation is now less glossy, and it has been demonstrated that not everywhere came to be connected in the same way or at the same time (e.g. Riva 2010; Pappa 2013, 31). Nevertheless, the connectivity process is an excellent explanatory tool for Mediterranean history.

One of the problems of understanding connectivity is whether its increase actually causes greater similarity or whether, by contrast, increased connectivity drives increased regionalism? Whilst similarity can demonstrate a level of connectivity, dissimilarity cannot prove a lack of connectivity. In terms of fibulae, should scholars be looking for convergence in style or evidence of their import? Measuring the latter will provide more concrete evidence for connectivity.

Another branch of network analysis has also sidestepped the archaeological assemblage by idealising the network. Rather than question the ambiguity of the material record, the goal is to theorise the network that would have allowed such material culture to be carried. Such analysts begin with ranking sites by site density within a certain distance, then increase the rank based on site size and presupposed directionality (Rivers et al. 2013). Such an ideal network depends on 'optimisation' in choosing trade on a least cost basis, such as transport cost in the context of currents and prevailing winds (Leidwanger 2013; Östborn and Gerding 2014, 77), rather than social reasons. Yet, by ignoring any political and cultural constraints or opportunities involved in the process of connectivity, the models grapple with only part of the picture.

4.1.3 Further problems: network analysis today

The problems now highlighted demonstrate that the creation of artefact-type distribution maps, an aim of *Prähistorische Bronzefunde*, is an unsustainable endeavour; rather, the relationships between the distributions need to be explained or at least hypothesised. In addition to the problems above, further risks lie in the methodologies, namely binarisation and attribute definitions. Ostborn and Gerding's (2015) in-depth network analysis of Hellenistic bricks falls squarely into this trap, although the overall methodology is exemplary. They define 13 attributes of brick similarity and argue that 9 shared-attributes between sites is the 'critical network' threshold; >9 shared-attributes overly fragments the results where similarity was in fact present. <9 attributes was discounted to minimise the risk of defining edges without a 'close causal link' (Östborn and Gerding 2015, 319). The trouble lies in their attributes which, as with any typology, undoubtedly skew their results. Firstly, they are 'hierarchical' in that: 'the value of one attribute limits the possible values of another. The structural use of a context determines the function to a considerable degree' (Östborn and Gerding 2015, 315).

Hierarchy is here used incorrectly. The purpose of hierarchy is to assess different degrees of similarity or behavioural complexity: it is not supposed to assess different *levels* of behavioural complexity at the same time. This is most obvious where two attributes (size and thickness) are merely different measures of the same dimension. Furthermore, five of the attributes are binary yes/no categories, and it has been shown that binary data provides network visualisations substantially different to weighted data, depending in particular on the threshold selected (Heggarty et al. 2010, 3842; Peeples and Roberts Jr. 2013, 3008). Bricks with a stamp present (a binary yes/no attribute; not a range of types) may be more similar or connected to others with a stamp, or they may not. The analyst would need to know which type of stamp was present and whether stamping was applied to all bricks in the batch. Without this information this attribute may be arranging the entire dataset erroneously to less than, equal to, or more than the critical 9 attributes.

The other issue with network data is that it relies on a scientific certainty where absent or ambiguous data is eliminated. For instance, in recent network studies O'Brien *et al.* (2016, 79-80) ignore classes containing three or fewer specimens, whilst Jennings (2016, 100) ignores sites/nodes with single instances. Understandably this circumvents a sample size problem and it is easier to understand the remaining data, but that removed is entirely arbitrary: few examples are as much a peculiarity of reality as archaeological recovery. Furthermore, scientific analysis has a tendency to favour attributes that are easily measured and weighted, thus ignoring an artefact's other, culturally salient, qualities. Sørensen (2015b, 743-4), cautioning against a 'new-empiricism', argues that some objects (or attributes) are deliberately vague, possessing a 'virtual dimension... powerful due to the lack of clarity' (Sørensen 2015b, 759). When Jennings decides to remove the 'placement position' attribute of his decorative elements study because it is 'not universally applicable' (Jennings 2016, 92, 93: Fig. 1), and yet, goes on to infer that a 'Divided Wave' scheme may have been an emblem of a social warrior identity (ibid. 110), it is a conclusion far removed from his analysis of distance similarity. Becoming more scientific risks widening the gap between studying *etic* and *emic* attributes. Indeed, one could argue that the geometric decoration was not symbolic at all, rather a vague 'generative agent in the reading of the image' (Sørensen 2015b, 749), or latent power in the objects ongoing agency relations (*sensu* Gell 1998). This is to say that, despite the critique now given, the analyst must get stuck into the problems rather than concoct a method that appears to avoid them.

4.1.4 Summary

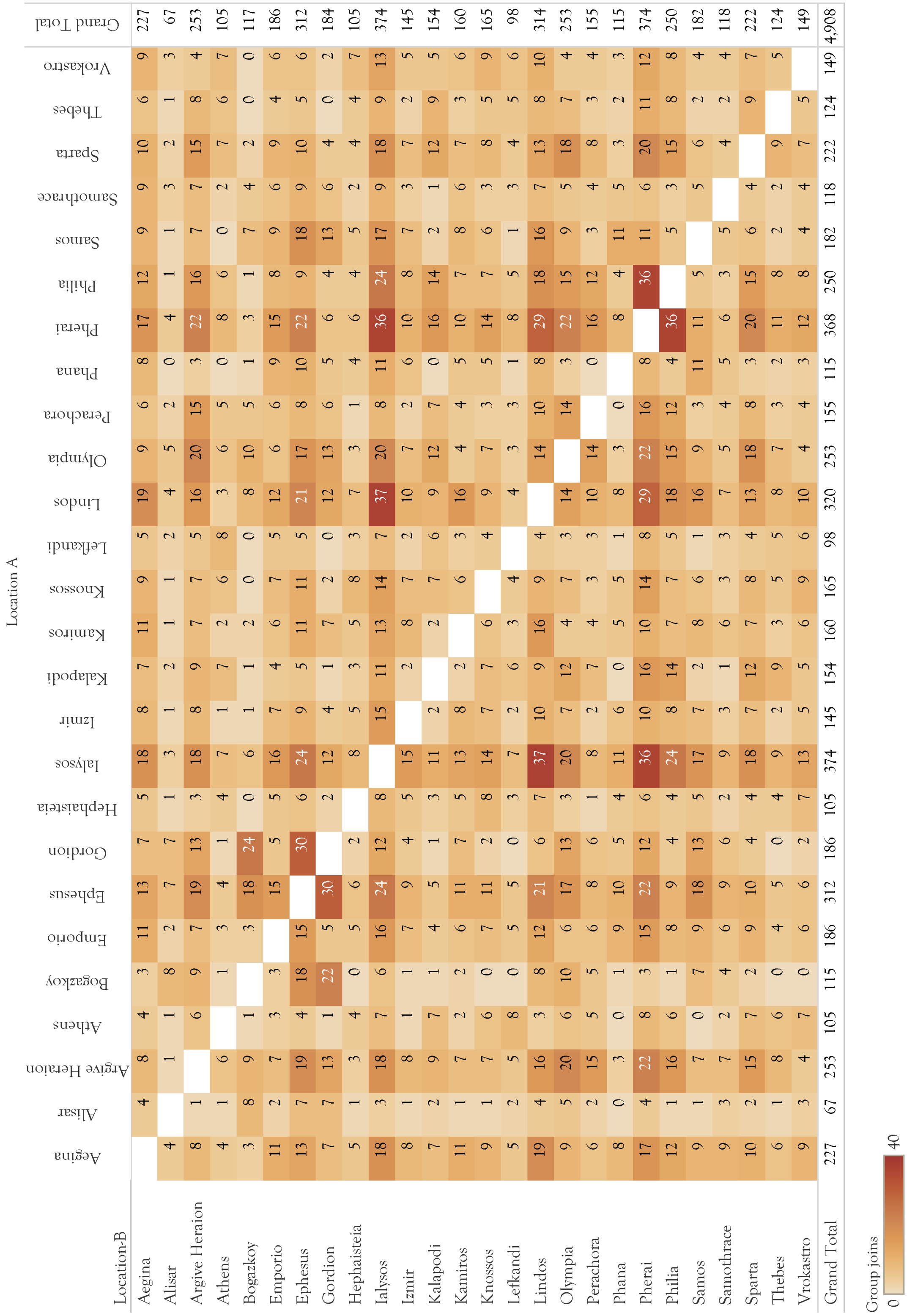
The benefit of network analysis is not to explain social network processes but rather uncover relationships that need interpretation; it is a first and not a last step (cf. Munson 2015, 430). The important point is that network analyses present hypotheses to be tested by further contextual case study. The Achilles' heel is that the evidence from which a hypothesis was created is largely that needed to test it, and it is woefully incomplete. The accepted approach is to compare a number of hypotheses created using different models and methods to show the power of relationships between them. My similarity network will be based on shared-presence and counts, and visualised by matrix diagrams and maps. I will argue that a hypothesis of where objects originate goes some way for determining direction and weight of the results.

4.2 Site assemblage analyses: first attempt

4.2.1 Shared-presence counts

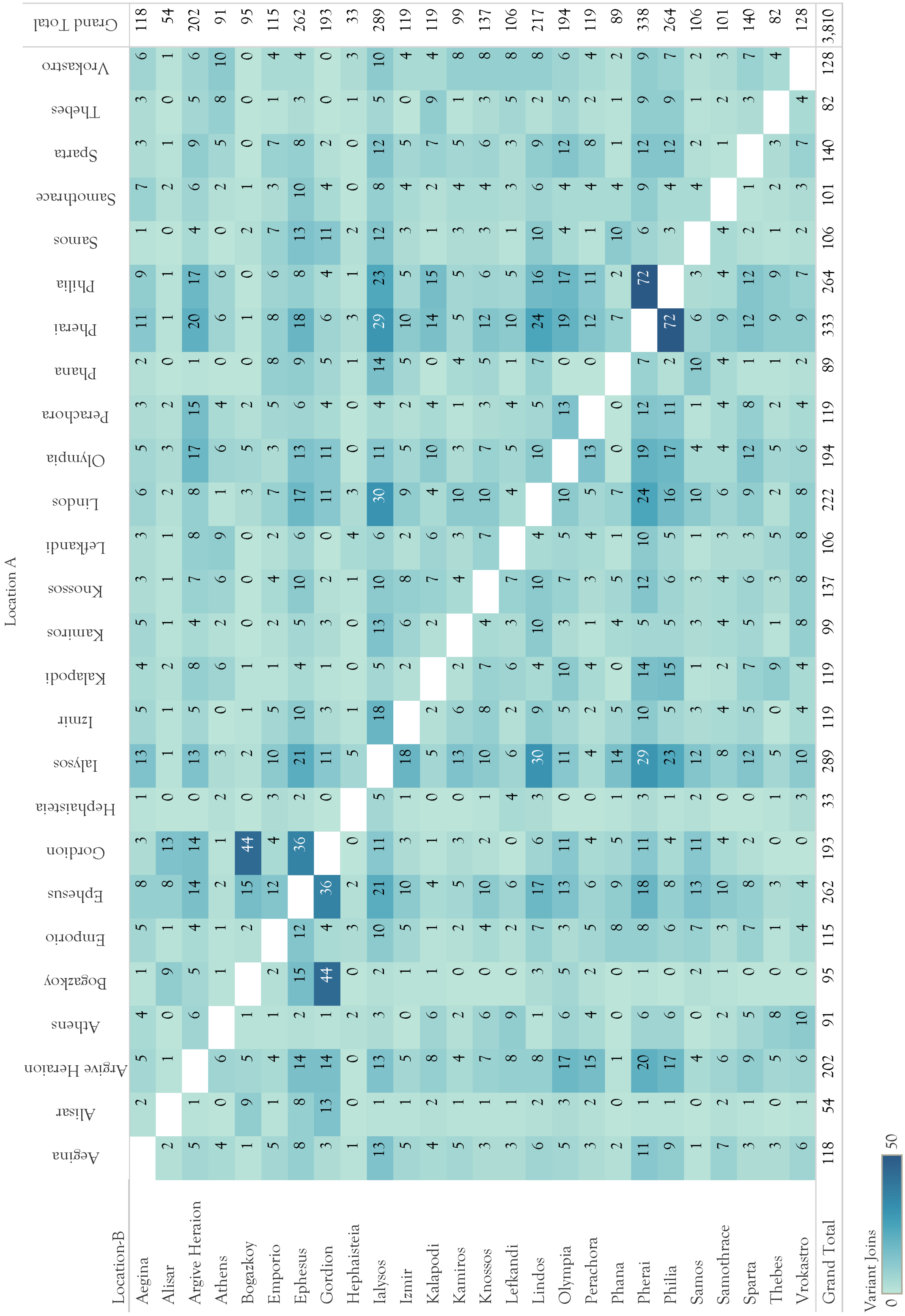
The first analysis is a count of shared-presence of profile-groups and profile-variants between sites. Shared-presence is a count of binary data. 26 sites with highest profile-variant richness are included. The data is given in Appendix A, and the number of shared profile-groups (a) and profile-variants (b) is given in Figure 4.5. For clarity, brown matrices are for profile-groups and blue matrices are for profile-variants. Darker colours show a greater shared-presence. The data is normally ordered alphabetically by site for consistency. The site with the combined highest shared-presence, or for brevity, 'joins', is Pherai (374 groups and 338 variants), and if lines on a map were drawn (which, despite reservations, they will) Pherai would have the most. Shared-presence is the sum of individual joins; each join being the presence of a particular profile-group or profile-variant between two sites. Pherai has of course the largest sample size, perhaps this sum of shared-presence is inevitable? On the other hand, Olympia and the Argive Heraion with more than ten times fewer fibulae, have the 5th and 6th, and 6th and 7th, highest join counts.

In any case, there is a diversity of shared-presence across the data, and it appears as though the larger sanctuaries have a greater share of the connections. Before discussing what these connections represent let me continue this line of reasoning and give context to the join counts. I present two indexes, dependent one upon the other, that can be applied to the group and variant matrices (Figure: 4.6). For concision the rest of this discussion will focus on variants (Figure: 4.6b). The first index is the percentage of the total profile-variants of Location-A that have a shared-presence with Location-B; so reading down from Location-A-'Pherai': 7% of Pherai's profile-variant types may be found at Aegina, 1% at Alisar, and so on. The second is the reverse of that, the percentage of Location-B's total profile-variants that have shared-presence with Location-A; so reading across from Location-B-'Pherai': 31% of Aegina's profile-variant types may be found at Pherai, 4% of



(a) Matrix of profile-group shared-presence count.

Figure 4.5: Shared-presence counts between 26 sites (Source: Author).

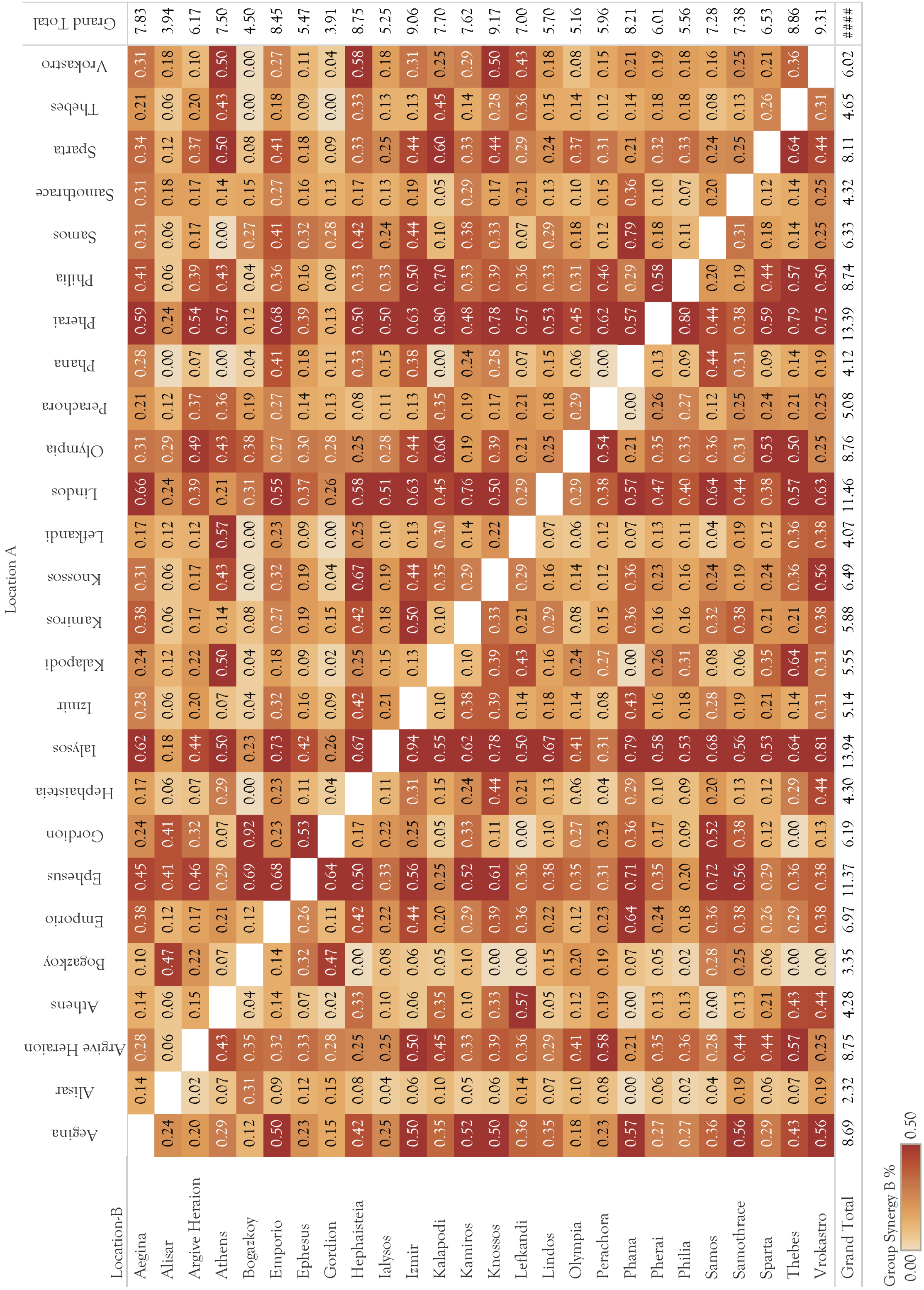


(b) Matrix of profile-variant shared-presence count.

Figure 4.5: *Cont.*

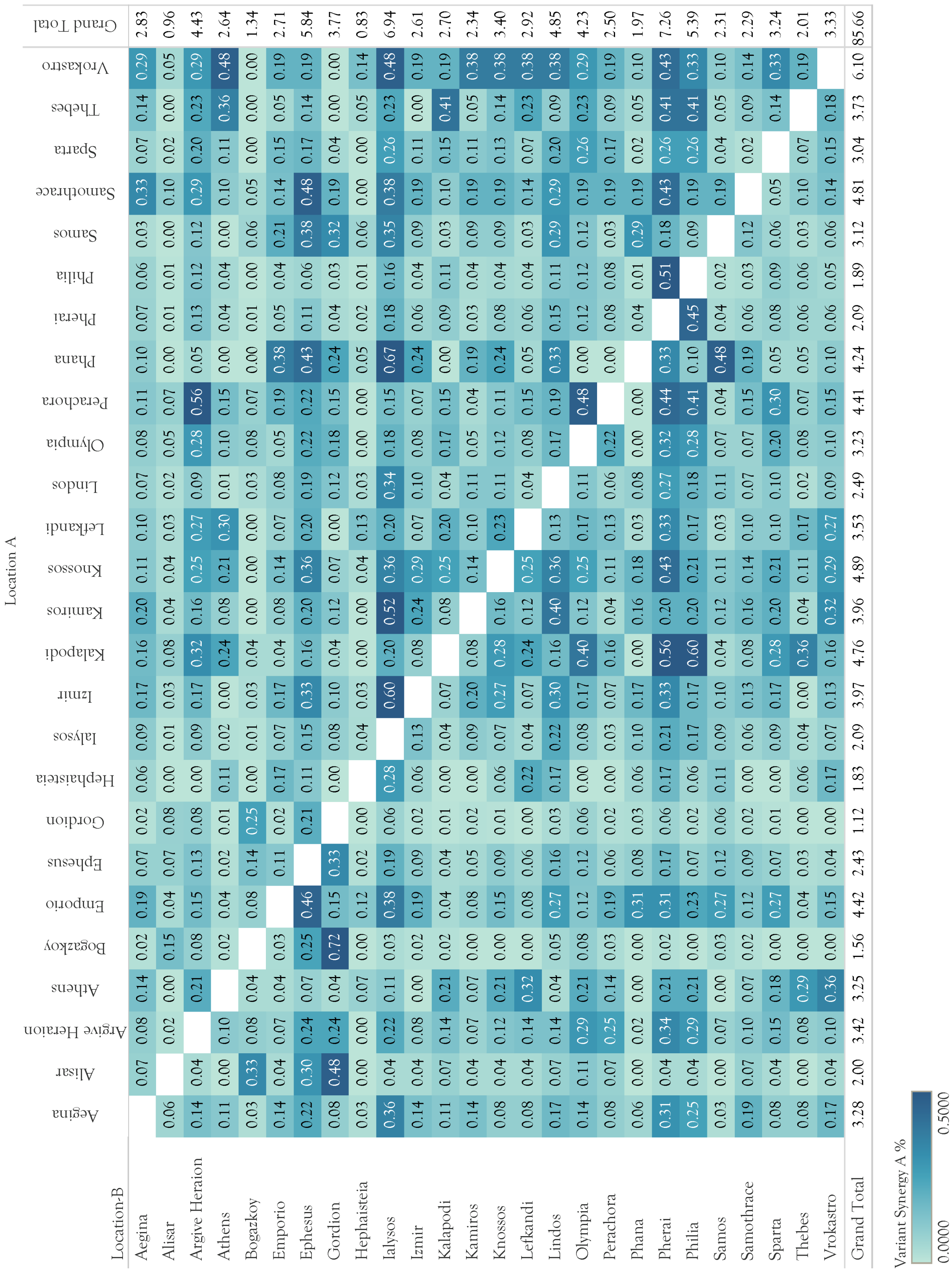
Alisar's, and so on. The average of the two scores is given in Figure: 4.7, hence the matrix is symmetric, and the data is ordered by highest shared-presence. The results are different to the counts in Figure: 4.5 now that they take into account varying sample size. They show, with a pinch of salt, how much one assemblage 'looks like another'. The top three averaged assemblages are Gordion-Boğazköy (49% similarity), Pherai-Philia (48%), and Athens-Vrokastro (42%). In addition, there is the cumulative shared-presence: the top three are Vrokastro (4.71), Pherai (4.66), and Ialysos (4.52). Again, before discussing the nature of this similarity, there is one more test.

The Location-A and Location-B data poses some interesting questions (Figure: 4.6b). As an example, reading down from Kalapodi (Location-A) to Pherai (Location-B) reveals a shared-presence of 0.56: 56% of Kalapodi's profile-variant types may be found at Pherai. Reading across from Kalapodi (Recipient-B) to Pherai (Location-A): Kalapodi's profile-variants are found in only 9% of Pherai's profile-variant richness. According to this table, if there is to be a direction to the shared-presence between these two sites, Pherai definitively comes out on top. Indeed, Pherai often appears to have the upper hand, consistently having other sites assemblages looking more like it than looking like them, as depicted by the positive disparity results (Figure: 4.8a); Kalapodi's is distinctively negative (Figure: 4.8b). Disparity is the difference between the readings from Figure: 4.6b; so for Pherai-Kalapodi, it is 0.56-0.09 = 0.47. A similar picture is drawn by Boğazköy and Gordion: 72% of Boğazköy's types may be found at Gordion; the reverse is 25%. That is not to say with certainty that fibulae found at Boğazköy are imported from Gordion, but that designs and moulds have a close level of similarity. Reading across the matrix (Figure: 4.6b) a number of Location-B sites have quite a strong (greater than 30%) shared-presence in Location-A assemblages: Athens (3 sites), Ephesus (7 sites), Gordion (4 sites), Ialysos (10 sites), Lindos (5 sites), Pherai (14 sites), and Philia (5 sites). Reading down the matrix, those same sites have a low percentage of their types found in Location-B. Similarly a number of assemblages look like many others. A site could be dominated by, exchanging ideas with, importing from, or exporting to another. These are (3 or more sites with



(a) Matrix of profile-group shared-presences. The x-axis (Location-A) shows the percent of shared profile-groups the y-axis (Location-B) has as a percentage of its (Location-B's) total profile-groups. The y-axis shows the reverse.

Figure 4.6: The shared-presence of sites as a percentage of their total profile-variants (Source: Author).



(b) Matrix of profile-variant shared-presences. The x-axis (Location-A) shows the percent of shared profile-variants the y-axis (Location-B) has as a percentage of its (Location-B's) total profile-variants. The y-axis shows the reverse.

Figure 4.6: *Cont.*

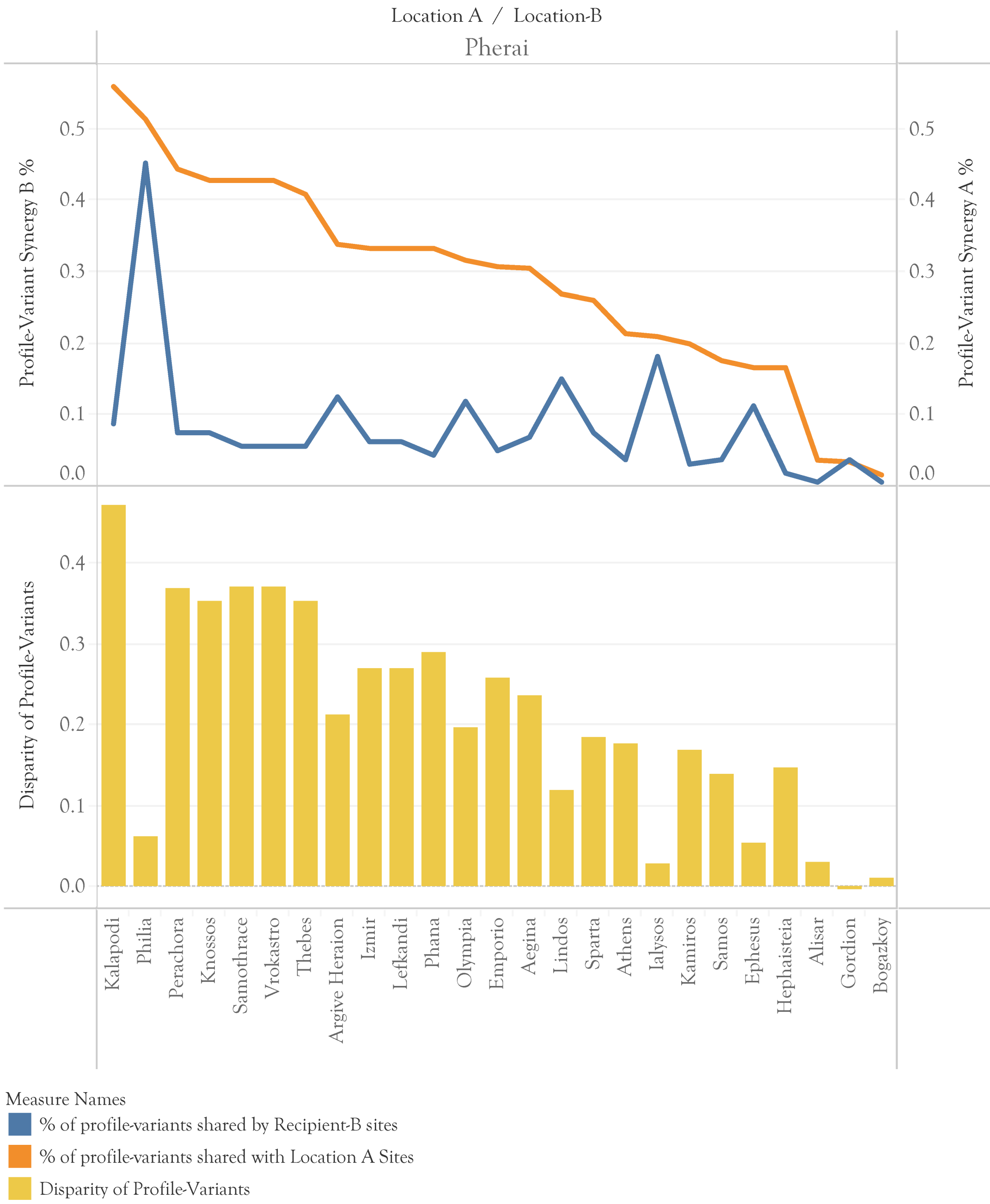
Location-B \ Location A	Vrokastro	Pherai	Ialysos	Knossos	Ephesus	Argive Heraion	Olympia	Kalapodi	Lindos	Philia	Emporio	Samothrace	Perachora	Izmir	Lefkandi	Kamiros	Sparta	Phana	Aegina	Athens	Thebes	Samos	Gordion	Alisar	Bogazkoy	Hephaisteia	Grand Total
Vrokastro		0.24	0.27	0.33	0.11	0.19	0.19	0.18	0.24	0.19	0.17	0.14	0.17	0.16	0.32	0.35	0.24	0.10	0.23	0.42	0.19	0.08	0.00	0.04	0.00	0.15	4.71
Pherai	0.24		0.20	0.25	0.14	0.23	0.22	0.32	0.21	0.48	0.18	0.24	0.26	0.20	0.20	0.12	0.17	0.19	0.19	0.13	0.23	0.11	0.07	0.02	0.01	0.09	4.70
Ialysos	0.27	0.20		0.21	0.17	0.16	0.13	0.12	0.28	0.17	0.23	0.22	0.09	0.37	0.12	0.31	0.17	0.38	0.23	0.06	0.13	0.22	0.09	0.02	0.02	0.16	4.54
Knossos	0.33	0.25	0.21		0.22	0.18	0.18	0.27	0.23	0.13	0.15	0.17	0.11	0.28	0.24	0.15	0.17	0.21	0.10	0.21	0.12	0.10	0.04	0.04	0.00	0.05	4.15
Ephesus	0.11	0.14	0.17	0.22		0.18	0.17	0.10	0.17	0.07	0.29	0.28	0.14	0.21	0.13	0.12	0.12	0.26	0.15	0.04	0.08	0.25	0.27	0.19	0.19	0.06	4.14
Argive Heraion	0.19	0.23	0.16	0.18	0.18		0.29	0.23	0.11	0.20	0.11	0.19	0.40	0.13	0.20	0.11	0.17	0.03	0.11	0.16	0.16	0.09	0.16	0.03	0.08	0.00	3.93
Olympia	0.19	0.22	0.13	0.18	0.17	0.29		0.28	0.14	0.20	0.08	0.13	0.35	0.13	0.13	0.09	0.23	0.00	0.11	0.16	0.16	0.09	0.12	0.08	0.08	0.00	3.73
Kalapodi	0.18	0.32	0.12	0.27	0.10	0.23	0.28		0.10	0.35	0.04	0.09	0.15	0.07	0.22	0.08	0.22	0.00	0.14	0.23	0.38	0.03	0.02	0.08	0.03	0.00	3.73
Philia	0.19	0.48	0.17	0.13	0.07	0.20	0.20	0.35	0.15		0.14	0.11	0.24	0.10	0.10	0.12	0.17	0.05	0.16	0.13	0.24	0.05	0.03	0.02	0.00	0.03	3.64
Lindos	0.24	0.21	0.28	0.23	0.17	0.11	0.14	0.10		0.15	0.17	0.18	0.12	0.20	0.09	0.26	0.15	0.21	0.12	0.02	0.06	0.20	0.04	0.05	0.04	0.10	3.63
Emporio	0.17	0.18	0.23	0.15	0.29	0.11	0.08	0.04	0.17	0.14		0.13	0.19	0.18	0.07	0.08	0.21	0.34	0.17	0.04	0.04	0.24	0.09	0.04	0.05	0.14	3.56
Samothrace	0.14	0.24	0.22	0.17	0.28	0.19	0.13	0.09	0.18	0.11	0.13		0.17	0.16	0.12	0.18	0.03	0.19	0.26	0.08	0.09	0.15	0.11	0.08	0.03	0.00	3.55
Perachora	0.17	0.26	0.09	0.11	0.14	0.40	0.35	0.15	0.12	0.24	0.19	0.17		0.07	0.14	0.04	0.24	0.00	0.10	0.15	0.08	0.03	0.09	0.07	0.05	0.00	3.45
Izmir	0.16	0.20	0.37	0.28	0.21	0.13	0.13	0.07	0.20	0.10	0.18	0.16	0.07		0.07	0.22	0.14	0.20	0.15	0.00	0.00	0.09	0.06	0.04	0.02	0.04	3.29
Lefkandi	0.32	0.20	0.12	0.24	0.13	0.20	0.13	0.22	0.09	0.10	0.07	0.12	0.14	0.07		0.11	0.08	0.04	0.09	0.31	0.20	0.03	0.00	0.04	0.00	0.18	3.23
Kamiros	0.35	0.12	0.31	0.15	0.12	0.11	0.09	0.08	0.26	0.12	0.08	0.18	0.04	0.22	0.11		0.15	0.18	0.17	0.08	0.04	0.10	0.07	0.04	0.00	0.00	3.15
Sparta	0.24	0.17	0.17	0.17	0.12	0.17	0.23	0.22	0.15	0.17	0.21	0.03	0.24	0.14	0.08	0.15		0.03	0.07	0.14	0.10	0.05	0.03	0.03	0.00	0.00	3.14
Phana	0.10	0.19	0.38	0.21	0.26	0.03	0.00	0.00	0.21	0.05	0.34	0.19	0.00	0.20	0.04	0.18	0.03		0.08	0.00	0.05	0.39	0.13	0.00	0.00	0.05	3.11
Aegina	0.23	0.19	0.23	0.10	0.15	0.11	0.11	0.14	0.12	0.16	0.17	0.26	0.10	0.15	0.09	0.17	0.07	0.08		0.13	0.11	0.03	0.05	0.06	0.02	0.04	3.05
Athens	0.42	0.13	0.06	0.21	0.04	0.16	0.16	0.23	0.02	0.13	0.04	0.08	0.15	0.00	0.31	0.08	0.14	0.00	0.13		0.32	0.00	0.02	0.00	0.03	0.09	2.95
Thebes	0.19	0.23	0.13	0.12	0.08	0.16	0.16	0.38	0.06	0.24	0.04	0.09	0.08	0.00	0.20	0.04	0.10	0.05	0.11	0.32		0.04	0.00	0.00	0.00	0.05	2.87
Samos	0.08	0.11	0.22	0.10	0.25	0.09	0.09	0.03	0.20	0.05	0.24	0.15	0.03	0.09	0.03	0.10	0.05	0.39	0.03	0.00	0.04		0.19	0.00	0.05	0.08	2.71
Gordion	0.00	0.04	0.07	0.04	0.27	0.16	0.12	0.02	0.09	0.03	0.09	0.11	0.09	0.06	0.00	0.07	0.03	0.13	0.05	0.02	0.00	0.19		0.28	0.49	0.00	2.45
Alisar	0.04	0.02	0.02	0.04	0.19	0.03	0.08	0.08	0.05	0.02	0.04	0.08	0.07	0.04	0.04	0.04	0.03	0.00	0.06	0.00	0.00	0.00	0.28		0.24	0.00	1.48
Bogazkoy	0.00	0.01	0.02	0.00	0.19	0.08	0.08	0.03	0.04	0.00	0.05	0.03	0.05	0.02	0.00	0.00	0.00	0.00	0.02	0.03	0.00	0.05	0.49	0.24		0.00	1.45
Hephaisteia	0.15	0.09	0.16	0.05	0.06	0.00	0.00	0.00	0.10	0.03	0.14	0.00	0.00	0.04	0.18	0.00	0.00	0.05	0.04	0.09	0.05	0.08	0.00	0.00	0.00		1.33
Grand Total	4.71	4.66	4.52	4.15	4.14	3.93	3.73	3.73	3.69	3.64	3.56	3.55	3.45	3.29	3.23	3.15	3.14	3.11	3.05	2.95	2.87	2.71	2.45	1.48	1.45	1.33	85.66

Average Variant Synergy % 0.00 – 0.50

Figure 4.7: Average profile-variant shared-presence, as a percentage of total profile-variants between sites (Source: Author).

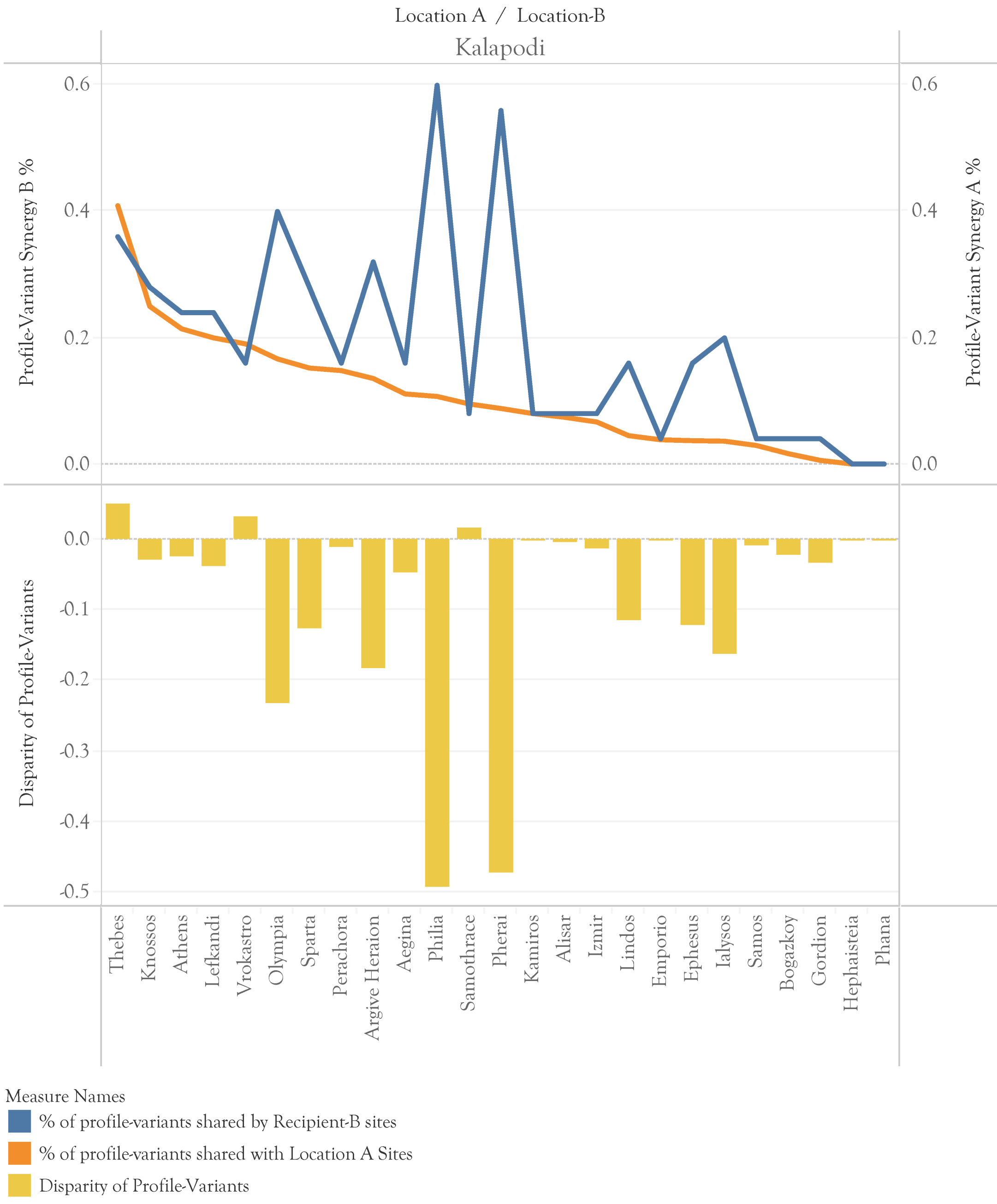
greater than 30%) Alisar (3 sites), Emporio (4 sites), Izmir (4 sites), Kalapodi (5 sites), Kamiros (3 sites), Knossos (4 sites), Perachora (5 sites), Phana (6 sites), Samos (3 sites), Samothrace (4 sites), Thebes (4 sites), and Vrokastro (9 sites). The site Hephaisteia has no shared-presence greater than 30% with any site: Hephaisteia's assemblage is dissimilar to other sites. This evidence is consistent with the lower diversity ratios these sites possess that I discuss in Chapter 5: for each variant there are few examples (see Figure: 5.8). Ultimately I am questioning whether these sites are secondary to the production found at larger assemblages. Aggregating the percent of shared-presence of Location-A and Location-B sites draws a summary diagram where the distance between them shows the relative disparity (Figure: 4.9). Nine sites have their types more present in others against 17 recipients.

Finally, the matrix data (4.6b) may be plotted on a map (Plate: 146). To avoid visual entanglement three sites are initially plotted: Pherai, Ialysos, and Gordion. The lines represent the largest percentage of the profile-variants that either one of the sites being compared possesses. In this case, central sites have a greater disparity for all lines plotted, as a minimum 20% similarity is used. The direction following this logic is out from the central site, and Pherai trumps Ialysos, if marginally (21% to 18%). The lines are drawn in darker and thicker steps at intervals of >20%, >30%, >40%, and >50% shared-presence. At first sight, the map appears to show a convincing representation of profile-variant distribution and connections between assemblages. Indeed, it represents the count of binary shared-presence of types. Stronger links between geographically close sites makes sense intuitively, and the clear circular coastal flow of shared-presence around the Cyclades is revealing. It is not impossible to imagine a jeweller (or their agent) leaving Ialysos with their moulds (or wares), and stopping off at Ephesus, then Phana, across to Pherai, down to Aegina, and then Crete; the classic anti-clockwise cabotage model (Figure: 4.10).



(a) Disparity of assemblage similarity (joins as a % of total variation) from Pherai.

Figure 4.8: Disparity of Pherai and Kalapodi (Source: Author).



(b) Disparity of assemblage similarity (joins as a % of total variation) from Kalapodi.

Figure 4.8: *Cont.*

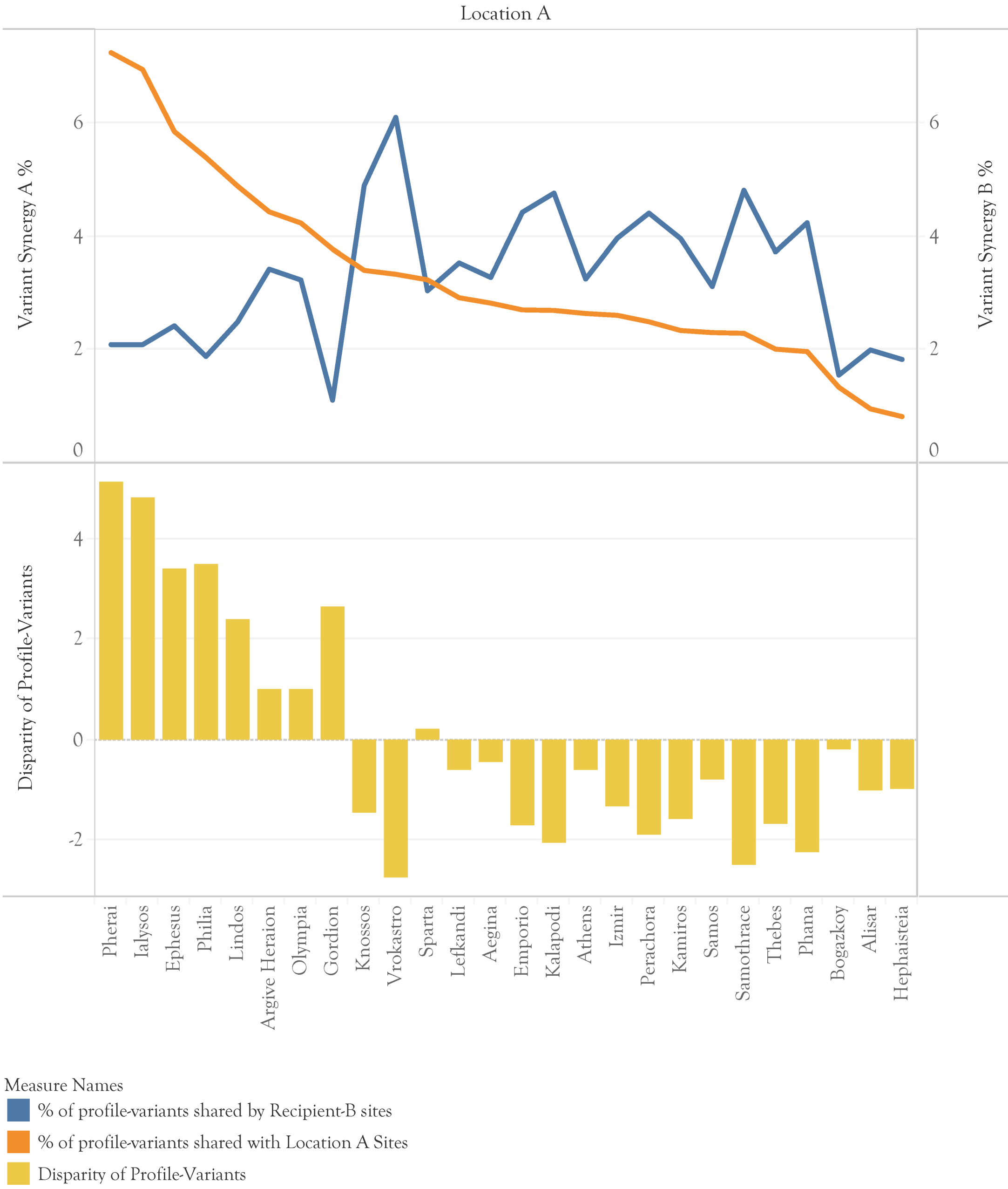


Figure 4.9: Disparity between shared-variants as a % of their totals between Location-A and Location-B (Source: Author).

Figure 4.10: Prevailing currents in the Aegean Sea (Tartaron 2013, 98, Fig. 4.5).

4.2.2 Is this valid?

The contention of this thesis is that to paint such a picture is to mislead. Networks based on the presence of shared-types between sites demonstrate a flawed methodology; their results just as contentious as a network of artefact counts. This is a list of the issues:

Similarity

1. A ‘matching’ type at two sites may not match at all but derive from an earlier separation in the evolutionary tree (Figure: 2.3 on page 49), be the result of adoption via horizontal transmission, or an adaptation, perhaps presenting a circular or indirect link.

2. The shared-presence data is based on profile-variants but this does not mean joins are from the same workshop; indeed, they are only rarely. A cross-analysis with the cross-sections and catch-plates can assist, notwithstanding the fact that a confident distinction of cross-sections requires handling the material.

Significance

3. Fundamentally, the data is not even, indeed, as shown, it is quite the opposite (Plate: 132). Certain profile-variants are dramatically more popular than others. Creating a network giving equal value to each join where the popularity is unknown creates misleading results; a stray profile-variant is of different significance to a popular type being manufactured in large number, or the import of a series of variants from the same group.

4. A network of shared-variants only superficially takes account of the directionality of the material between sites. Without a weight the network is unable to rank the joins, and makes no attempt at explaining them.

5. To what extent does shared-presence actually represent a tangible connection between two sites, and what does it mean? Single objects, or any number of objects, may not represent a direct or meaningful connection. Archaeologists lack the history of how the object got there and why, and where it may have travelled in between.

6. Objects that look the same may have no shared meaning. There are two points here: first, the reception of an object may vary in different cultural contexts, and second, it is possible to arrive at the same design fortuitously (Hodder 1982, 8).

Sampling

7. Archaeological recovery adds an element of chance into the data. Moreover, artefact damage restricts identification to group rather than variant level in 28% of the data (N=9,916), thus reducing the number of determinable joins. Loss of catch-plates affects 68% of the data.

8. Artefacts may be missing from the record because they were melted down or looted in antiquity (Linders 1990).

9. For an assemblage with a low richness there is a larger margin for sample-size error.

There is not a great deal archaeologists can do to negate the sampling issues that arise from damaged and missing data. Damaged artefacts are very problematic; the catch-plate often provides a key regional distinction of fibulae with the same profile-type, yet the uneven loss in this data can be as unrelated as the composition of the soil it was buried or disturbance through continued tomb use (Catling 1996, 543-4; Orfanou 2015, 161). One purpose of dividing the typology into profile, cross-section, and catch-plate was to be able to utilise as much fragmentary data as possible. Artefacts looted in antiquity or never deposited due to deposition practices is problematic, but more manageable. Indeed, negative evidence is an important indicator for cultural practice. For instance, should a sanctuary deposit contain 1,000 pins and only 20 fibulae, I would argue it unlikely that thieves stole only the fibulae and not the pins. Moreover, it would be odd if pilgrims dedicating clothing fasteners dedicated their pins and jealously held onto their fibulae; rather, the significance may be that they did not use fibulae to fasten their clothes in the first place. This can be corroborated by other evidence, such as dress styles (Lorimer 1950), and that sites in high pin/few fibulae regions have a different source for their fibulae than regions with high fibulae/few pins. Sites with few fibulae show much more diverse assemblages (in terms of number of types to counts, as well as spread across profile-groups), such as Olympia and the Argive Heraion (see Chapter 5). There are only 699 fibulae in the Peloponnese in my catalogue against some 5,000 pins (Kilian-Dirlmeier 1984); whilst at a site with a high proportion of local types, like Lindos, there are 1,583 fibulae against just 42 pins (Blinkenberg and Kinch 1931, 75). Moreover, Kilian-Dirlmeier (2002, 175-200) has shown that, at Philia, the proportions of dedication types diachronically rise and fall together. The purpose of this aside is to suggest that point 8 is perhaps less problematic overall; caution instead needs to be applied in specific cases of wholesale looting of an entire cemetery. The final point, 9, is somewhat related; I addressed the sample-size issue for diversity already (above, plotting against a background expectation), and here it is addressed by restricting my analysis to sites with a profile-variant richness greater than 30 (cf. Kintigh 1989, 26-7; Shennan 1997, 79).

Next, I address the first two significance issues, points 3 and 4, by weighting the binary network. One weighting method is summing the count of shared-fibulae, and not just the unique count of shared-types. Naturally, the results reflect the assemblage size (Figure: 4.11). To reduce this problem I turn this figure into a % of its overall assemblage (Figure: 4.12a). Note the overall assemblage is counted, of course, by identifiable profile-variants, and not the total number of fibulae to ensure like-for-like comparison. The results look like the shared-presence matrix in Figure: 4.6b, but there are important differences. The first matrix would depress edges between sites with a low percentage of shared-variants. The latter takes into account for just which variants that sharing is taking place. A small number of variant-types, if popular, may make up a large percentage of the joined assemblage, thus providing a more realistic picture of how much ‘this site looks like that one over there’. Generally speaking, the results are consistent between the charts (cf. Figure: 4.12a and Figure: 4.6b), however, there is more contrast in the latter. For example, reading across from Location-B Gordion the site Alisar now has 56% of its profile-variants having a shared type with Gordion, whereas in Figure: 4.6b only 48% of its profile-variants were shared. The Argive Heraion has now 14% of its profile-variants having a shared type with Gordion, whereas in Figure: 4.6b it had 24% of its profile-variants shared: though almost a quarter of the types were shared the actual number of shared fibulae is fewer. Plotting this data on a map only reinforces the links that I had uncovered, suggesting a high level of interaction between these sites (Plate: 147).

Here a binary unique count of shared profile-variants under-reads (only occasionally over-reads) the relationship between two sites whilst the sum of shared profile-variants usually over-reads it (only occasionally under-reads). Averaging the two leaves one matrix (Figure: 4.12b). Here are the key points. First, Izmir (7.06), Vrokastro (5.89), and Knossos (5.73) have the highest cumulative shared-presence. These site’s assemblages were dependent on a large number of other sites. Gordion, Alisar, and Boğazköy naturally have the least being so removed geographically. Looking between sites it is possible to see the extent that sites were dependent to Gordion: Boğazköy (79% against 39%) and Alisar (52% against 7%). There are very strong similarities between Pherai and Ialysos (33% and 20%), and Ialysos and Lindos (39% and 44%). Is this surprising when Pherai is much further away from Ialysos than Lindos? Indeed, more than fifty percent of Lindos’ variants are not found at Ialysos. Izmir’s assemblage is strikingly close to Ialysos’ (69%), and has only a single shared-type with Gordion. Distant sites have similarity with Gordion: 34% of Ephesus’ assemblage, 19% of the Argive Heraion’s, and 18% of Olympia’s respectively. Hephaisteia’s assemblage does not look similar to any others so far recorded.

Despite the reservations with network analyses the exercises so far have demonstrated that a large number of patterns lie in the fibula assemblages. However, I have not quite argued for the validity of points 3 and 4 since I still cannot be sure which direction the artefacts

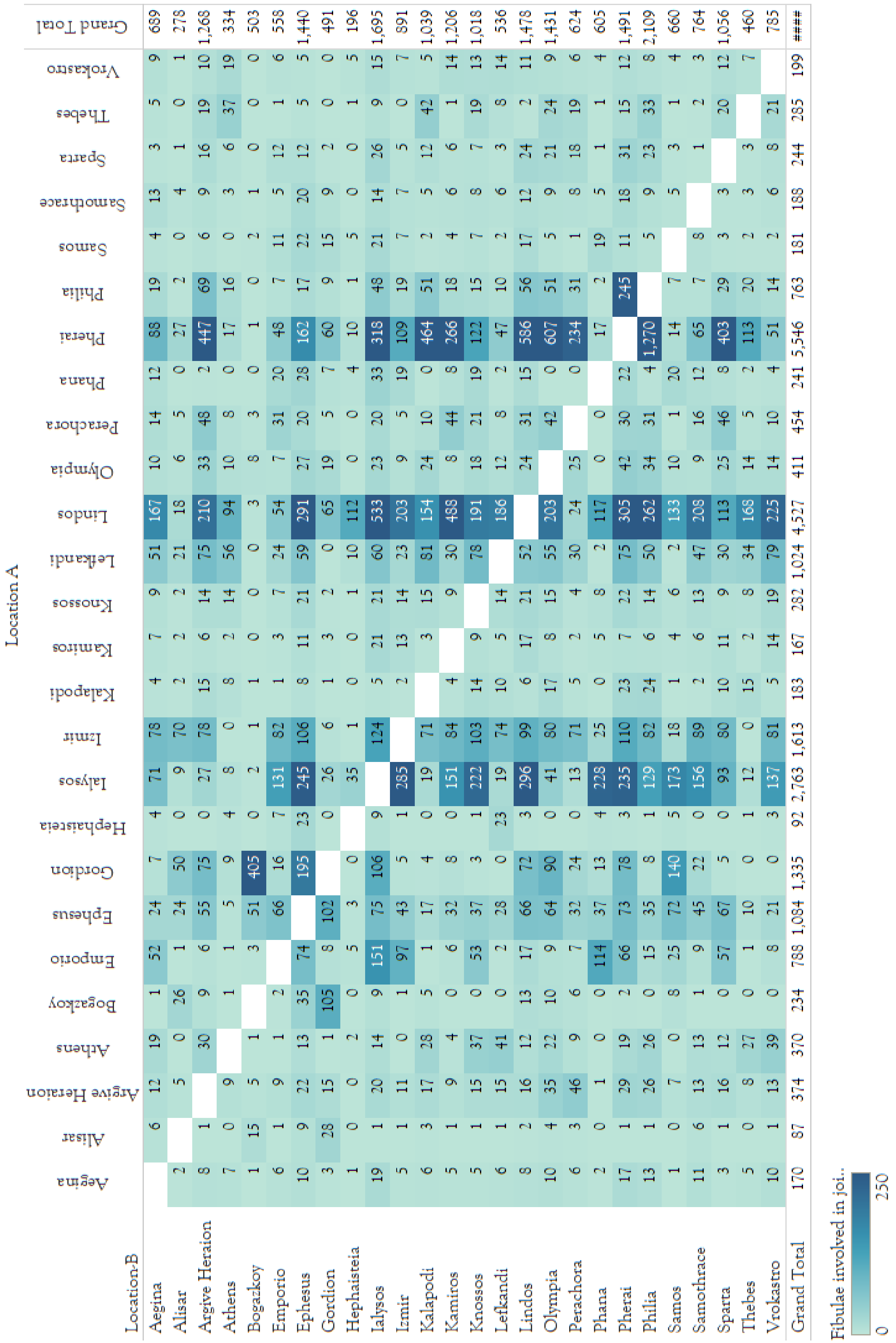
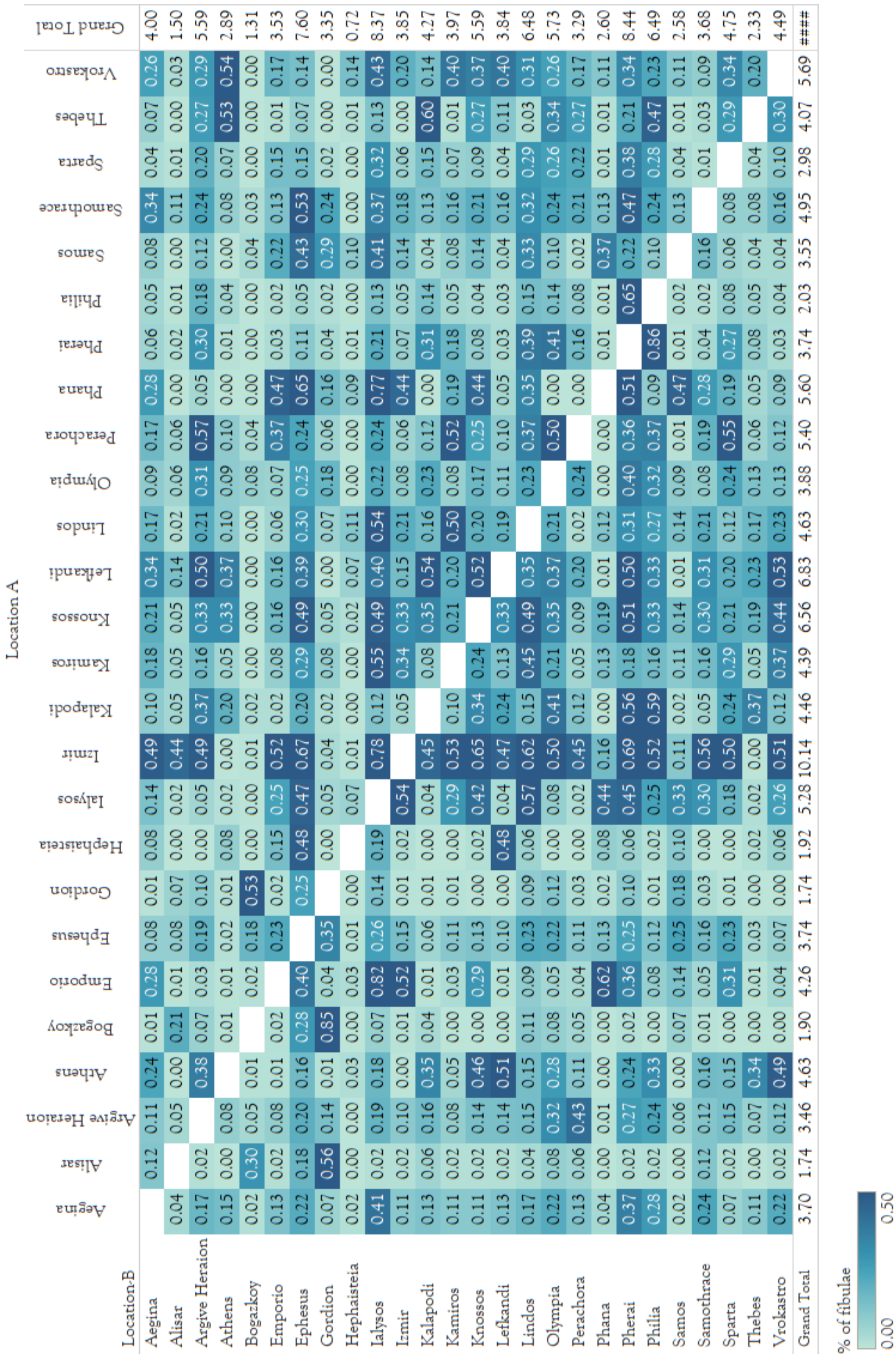
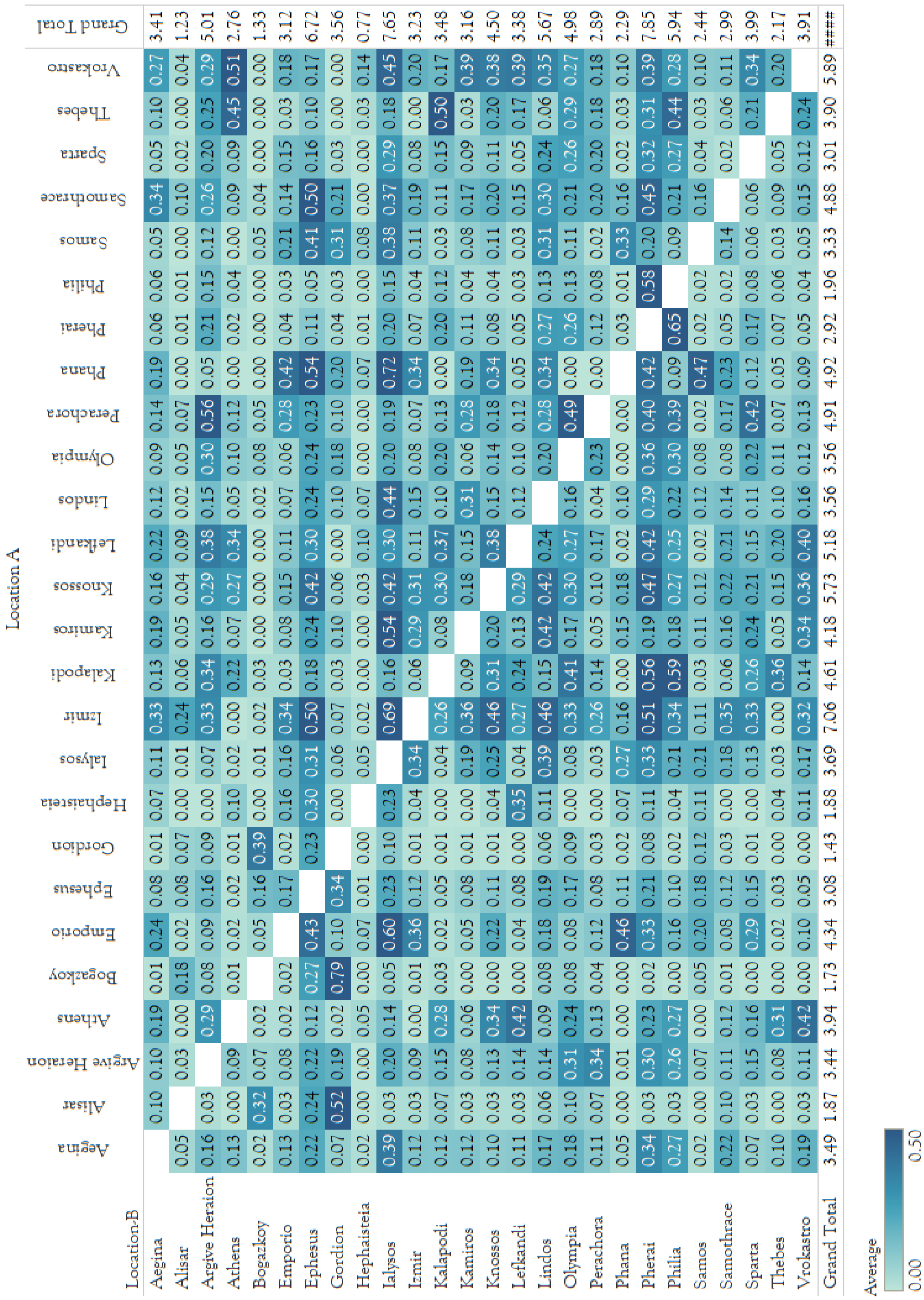


Figure 4.11: Count of fibulae whose types are shared between the sites (Source: Author).



(a) Weighted shared-presence of profile-variants.

Figure 4.12: Weighted profile-variant synergy (Source: Author).



(b) Average results of Figure: 4.6b and 4.12a.

Figure 4.12: *Cont.*

were moving. I need to know this before I can appreciate what is meant by the weight of shared-presence. No doubt the importance of each join varies; for example, a join between sites of two fibulae made by the same hand is more important than two fibulae of the same profile-variant but different manufacture. In addition, the measure does not yet address the issue of evenness: for though one fibula may be a copy of a popular variant at another site, it is still just one artefact. Moreover, it is not known whether these results are being skewed by parallel development. It is not known whether the larger shared-presence is in fact a recipient-site taking one variant, and then making the rest of their fibulae look like it, perhaps even exporting them back to where the innovation took place. So, I need to consider which types represent a direct rather than indirect link. To make a start at resolving this, the next step is to look at manufacture location, and then I shall return to the most fundamental concerns, those which underpin the network, the nature of similarity itself: points 1 and 2.

4.2.3 A manufacture test

Traditionally, archaeologists have ascribed a manufacture source based on find frequency by location. Archaeologists know that why the artefact was found (because they found it) or why it was deposited (because it was thought appropriate to dedicate rather than recycle) does not necessarily relate to where it was produced. Archaeologists know the archaeological record represents a sample. Thus, it is understandable that scholars have shied from earlier work that assigned fibula groups to production areas or ethnicities (Blinkenberg, 16; Snodgrass 1976, 76). Yet provenance is vitally important. It makes a whole lot of difference where the fibula came from when it was dedicated to Hera at the Argive Heraion (Strøm 1995; 1998). A worshipper commissioning a local jeweller to produce a fibula, a traveller from Gordion taking their very own fibula to dedicate, or an itinerant craftsman peddling designs from Ialysos, matter a great deal in terms of the social significance and biography of the dedication.

There is a method that relies less on artefact frequencies and instead on the peculiarities of manufacture, akin to identifying the craftsman's hand. Yet I do not need to look so much at the craftsman's details, as Hampe (1936) has for the Sail fibulae or Beazley (1956) for vases (Whitley 1997), but *the frequency of category-variant variation*. This variation shows the innovations (and mistakes) of a workshop as it produces fibulae: variation that is commonplace; partly a result of the way they are made, each requiring a new wax model, and partly a result of demand for individualising fibulae. This thesis identified the variants of the same groups in the hierarchical and logical structure of the typology, and this can be displayed on a radial tree diagram (Plate: 152). Profile-variants, on the outer ring, are hereby the minor innovations (or mistakes) made within the profile-groups on the middle ring: themselves divided by super-groups on the inner ring.

The manufacture test is simple: the greater the fraction of variants a site has of a group, the more likely it was a source of production. It is true that a workshop did not necessarily produce all variants of each group, or that archaeologists will recover all variants at one site (perhaps a variant was exported or another site created another), and so a secondary test is required, that is based on the traditional frequency method. A percentage of the global assemblage must be present to affirm a hypothesis for production. This percentage is a sliding scale; the more variants of a group a site possesses the lower the threshold required (Table 4.1). There are special cases of course, particularly for the most widely distributed profile-groups such as, E, F, M, and EX, in part because they are much harder to successfully subdivide. In certain cases, the test may be over-ridden if 3 or 4 variants are contiguous, such as M1, M2, and M3. Variants that are contiguous are more alike than those at either end of the group, as the typology ordered variants in increments. Profile-group M does not present a group subdivision error, where variants M1-M3 do not share a real similarity with M4-M7: they do; rather, the obvious division is in the catch-plate. Catch-plates, as I shall show, are important indicators for provenance.

Going site-by-site, I re-work the network matrices above to hypothesise an 'export-only' matrix and an 'import-only' matrix. The results of the manufacture test are marked ac-

PF variants/group	% of global assem.	PF variants/group	% of global assem.
1/1	~	5/9	>70%
2/2	>70%	6/9	>65%
2/3	>75%	7/9	>55%
3/3	>65%	8/9	>40%
3/4	>70%	9/9	>30%
4/4	>60%	6/10	>70%
3/5	>70%	7/10	>55%
4/5	>65%	8/10	>40%
5/5	>55%	9/10	>30%
4/6	>75%	10/10	>25%
5/6	>60%	7/11	>65%
6/6	>50%	8/11	>40%
4/7	>80%	9/11	>30%
5/7	>65%	10/11	>25%
6/7	>50%	11/11	>20%
7/7	>40%	8/12	>60%
5/8	>70%	9/12	>45%
6/8	>60%	10/12	>30%
7/8	>50%	11/12	>20%
8/8	>40%	12/12	>20%

Table 4.1: The manufacture test. A site that meets the required number of variants per group and the minimum % of total fibulae passes the test and is considered a manufacturer of that fibula group (Source: Author).

Result	Definition
1	Profile-groups that pass the test, and were manufactured locally
2	Profile-groups that fail but I argue were highly likely manufactured
3	Profile-groups where the evidence is unclear
4	Profile-groups that are certainly imports or imitations

Table 4.2: Manufacture test result scores (Source: Author).

cording to the score set out in Table 4.2. A result of 1 or 2 indicates that the profile-group was manufactured at the site; a result of 3 indicates the profile-group was probably not manufactured at a site, but it is unclear; whilst a result of 4 indicates that the profile-group was almost certainly not manufactured locally.

It could well be argued that the definition of result 2 is not scientific and there is truth in that. It is based on a number of factors: first, intuition; second, whether the catch-plates are consistent with fibulae with a result of 1; and third, whether there is a good range of variants in a group present. In all likelihood, members of that group were produced in the vicinity of the site and it is perhaps the result of archaeological recovery or artefact damage that a full set of variants are not present. The purpose of the manufacture test is to make the data much clearer: it is much easier to see which fibulae were almost certainly local (result 1) and those that were imports (result 4). Some 'imports' may, in rare cases, have been produced on-site by an itinerant craftsman bringing their local mould, however, I will suggest an alien fibula more likely came to the site with their dedicator. The results of this test thus add a direction to the network and helps unearth the character of each site's fibula assemblage. Initially, I test its validity with Pherai.

4.2.3.1 Pherai and the manufacture test

The site of Pherai is situated about 13km inland from the Pagasetic Gulf. The find spot of the 1,824 fibulae identified from Pherai, accounting for 78.2% of the assemblage in the North Aegean Coastal Region (N=2,330; see above on page 110), is largely lost. The indication is that they came from within and around the Temple of Zeus Thaulios (or

Ennodia) (Kilian 1975, 6-8; Mili 2015, 30). The dating of them is broad, the 8th and 7th century, with a few outliers to the Submycenaean and as late as the 4th century. Despite these difficulties the assemblage is as follows:

1. The richness of profile-variants is 159; of 1,500 identifiable the diversity ratio is 9:1 (1,681 are identifiable at profile-group).
2. There are 93 cross-section-variants and 59 catch-plate-variants.
3. The average length is 76mm although the material is fragmentary; only 255 samples (13.9%) meet the criteria for total length.
4. There are 37 examples of repair (2.5%).

Pherai has the second highest richness of profile-variants in the data, and also the highest count of fibulae. This reduces the diversity of the assemblage to nine fibulae per variant (9:1). The reality, however, is very uneven (Figure: 4.13). A scholar might suspect that the highest counts (F1, V1, and U1) are of fibulae produced locally, whilst a small count suggests manufacture error, random innovation, or import. A high count may suggest the use of two-piece moulds. Making a judgement based on artefact count, potentially skewed by deposition practice and archaeological recovery, is problematic.

A visual overview of the data is provided for profile-variants and profile-groups in the radial diagram (Plate: 152). *Looking at the variants (the outer-ring), it is critical that there are many groupings based on the contiguous presence of profile-variants over several groups (the middle-ring)*. This is summarised in Table 4.3. The data includes damaged profiles only identifiable at profile-group; otherwise a particularly disturbed assemblage might render the results disproportionally low. The second column is the 'Fraction of variants' present in each group; found working around the radial diagram. The percentage 'Percent' is the number 'No.' of fibulae found at the site against the global population 'Global No.', on present evidence, whilst the next column shows the result of the manufacture test 'MTest Result' (cf. result scores in Table: 4.2). Note, profile-groups with

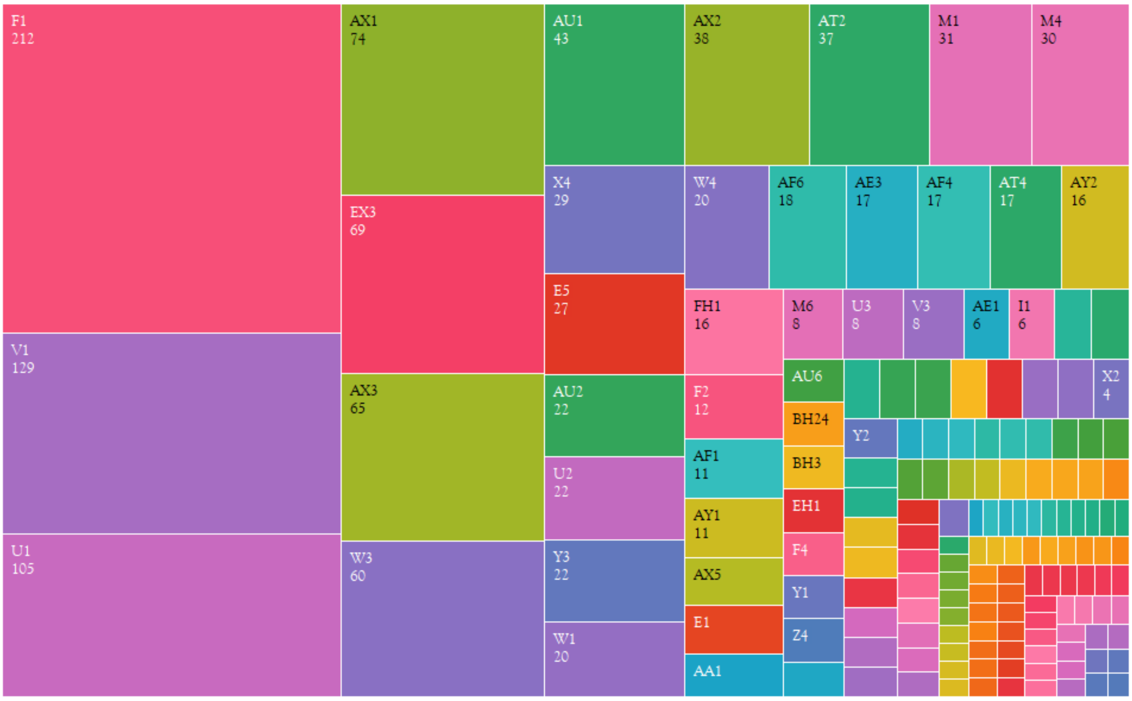


Figure 4.13: Evenness of profile-variant's at Pherai; the quadrangle colour represents an individual variant; its size its proportion (Source: Author).

fewer than 50% of profile-variants, or less than 3 profile-variants, whichever is greater, are excluded from the table for concision.

Profiles deemed to be of local manufacture (result of 1) are:

- F (4/4), U (6/7), V (4/4), W (4/4), X (4/5), Y (3/4), AE (9/12), AT (4/4), AU (8/8), AW (5/5), and AX (8/8).

These 11 groups (59 variants; 1,110 fibulae) make up 66.0% of Pherai's fibulae identifiable at profile-group. It is not contentious to confirm Kilian's (1975, 163) argument that Pherai was a centre of fibula production. Groups that are highly likely of local manufacture (result of 2) are:

- E (3/6), I (1/2), M (5/10), AF (6/12), AY (2/2), and EX (4/9).

I affirm E5 as highly likely for their catch-plates (12-15). Those 6 groups (21 variants) comprise 353 examples; 20.9% of identifiable profile-variants. Thus, I contend 86.9% of

PF-G	Fraction	Percent	No.	Global No.	MTest Result
E	3/6	6.9%	40	576	Yes (2)
F	4/4	81.2%	233	287	Yes (1)
Fδ	2/9	0.7%	3	419	No (4)
I	1/2	66.7%	6	9	Yes (2)
K	2/9	2.7%	3	111	No (4)
M	5/10	69.6%	78	112	Yes (2)
Q	2/6	16.2%	6	37	No (3)
U	8/9	80.6%	145	180	Yes (1)
V	4/4	89.6%	146	163	Yes (1)
W	4/4	86.3%	107	124	Yes (1)
X	4/5	84.1%	37	44	Yes (1)
Y	3/4	72.7%	32	44	Yes (1)
Z	4/6	27.6%	8	29	No (3)
AE	9/12	51.8%	44	85	Yes (1)
AF	6/12	54.2%	58	107	Yes (2)
AH	5/10	25.4%	15	59	No (3)
AI	2/5	8.5%	5	59	No (4)
AT	4/4	90.9%	60	66	Yes (1)
AU	8/8	90.3%	84	93	Yes (1)
AV	1/1	100.0%	2	2	No (3)
AW	5/5	75.0%	6	8	Yes (1)
AX	8/8	86.7%	216	249	Yes (1)
AY	2/2	48.3%	29	60	Yes (2)
BE	4/9	10.9%	24	220	No (3)
BH	9/25	21.5%	29	135	No (3)
CN	4/11	7.9%	5	63	No (4)
CO	4/8	7.1%	4	56	No (4)
EH	3/6	2.5%	8	316	No (4)
EI	4/8	2.5%	6	239	No (4)
ER	1/1	100.0%	1	1	No (4)
EX	4/9	30.7%	142	463	Yes (2)
FH	1/1	26.7%	23	86	No (3)
GD	3/4	8.9%	4	45	No (3)

Table 4.3: Manufacture test for Pherai (Source: Author).

examples from Pherai were locally made. For some groups, production is unclear (result of 3):

- Q (2/7), Z (4/6), AH (5/10), AV (1/1), BE (4/9), BH (9/25), FH (1/1), and GD (3/4).

Thus, that is 7 groups (29 variants); 111 examples; 6.6% of Pherai's assemblage. Finally, there are sporadic finds easily identifiable by looking at the radial tree diagram. In addition, EI (4/6) is included as they have non-local catch-plates 9. So, those that are imports or imitations (result of 4) are:

- B (1/4), C (1/3), Fδ (2/9), K (2/9), O (1/5), T (1/5), AA (1/6), AC (1/15), AD (1/5), AI (2/5), AO (1/7), AP (1/3), AQ (1/5), AZ (1/6), BA (1/5), BB (1/4), BD (1/3), BEδ (2/6), BG (1/3), BL (1/2), CJ (1/6), CM (2/4), CN (4/11), CO (4/8), CR (1/9), DA (1/4), DK (1/9), DS (1/3), EE (1/3), EG (1/2), EH (3/6), EI (4/8), ER (1/1), EW (1/4), EY (1/2), FA (1/6), FU (1/2), and GE (1/1).

That is some 107 records (54 variants) that make up 6.4% of Pherai's assemblage. It is highly likely these were the result of import or an itinerant craftsman.

The few imports are marked by the low ratio of fibulae to variants; in contrast to the high ratio for variants said to be, or highly likely, locally manufactured (Table: 4.4). This simple method of analysis begins to show how one site, a major producer of fibulae, operated in the ancient world. 87% of its fibulae are determined as local, 7% I am unsure, and 6% posited as imports. As I display the data from the other sites I shall start to show convergences and dissimilarity, thus presenting networks of exchange and different kinds of site function.

MTest Result	% of total	Records	Variants	Ratio
1	66	1,110	59	19
2	21	353	21	17
3	7	111	29	4
4	6	107	54	2

Table 4.4: Summary of Pherai's manufacture test (Source: Author).

4.2.3.2 Pherai and composition analysis

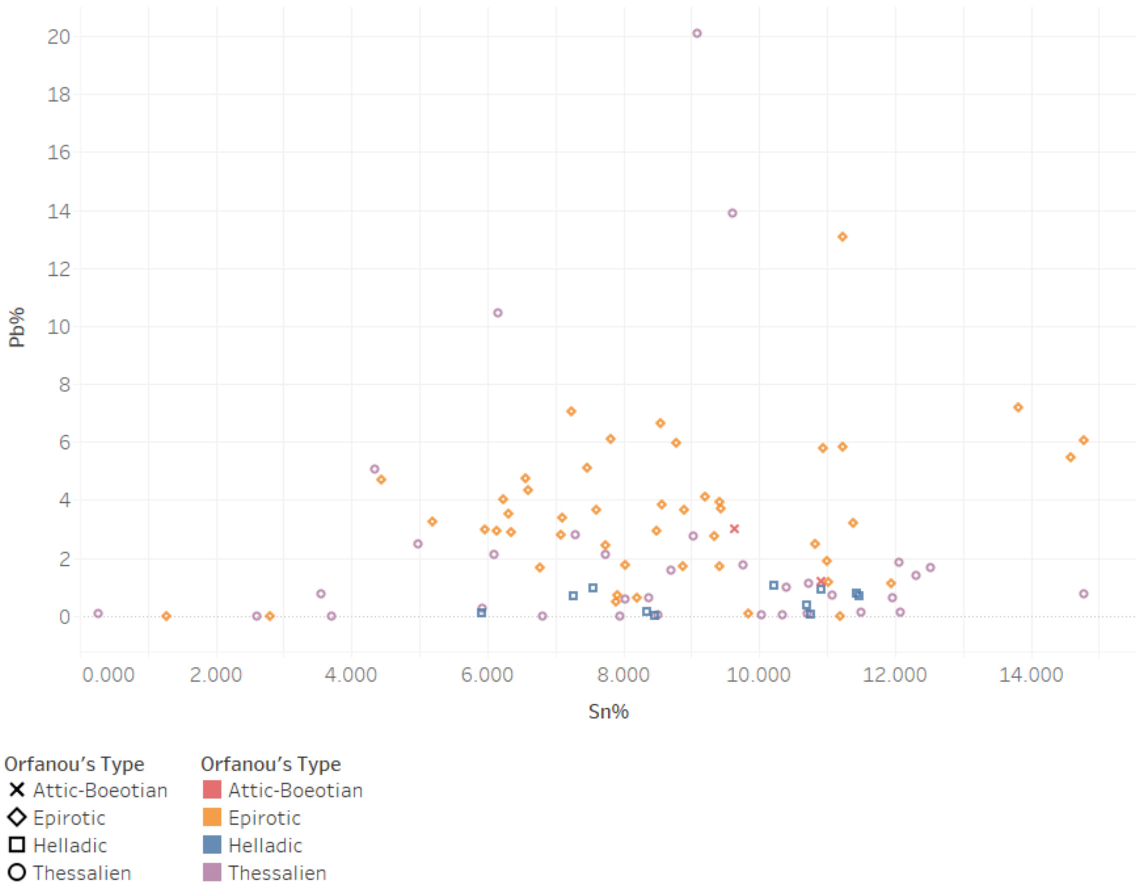
How do the results of this test compare to a composition analysis? Orfanou investigated 119 fibulae from Pherai that she grouped into 'distinct regional traditions' (Orfanou 2015, 216) on a map: 'Epirotic', 'Thessalian', and 'Helladic' (Figure: 4.14). Orfanou aimed to explore different regional workshops and the techno-cultural choices exercised by different communities (ibid. 218-9). For Orfanou, the diagnostic indicators were tin (Sn) and lead (Pb) values; but antimony (Sb), arsenic (As), copper (Cu), iron (Fe), nickel (Ni), and zinc (Zn) were also measured. The results are reproduced here (Figure: 4.15a); the graphics somewhat obscure the data, so I place a chart alongside that uses smaller marks (Figure: 4.15b). Further, I separate 'Helladic' from 'Attic-Boeotian'. One of Orfanou's marks was excluded as 'non-diagnostic' but elsewhere she determines it as 'Thessalian' (ibid. 501-2), which it clearly is. Orfanou makes two main distinctions: first, that there is a clear-cut difference between 'Epirotic' and 'Thessalian' groups, and second, that 'Helladic' fibulae never have more than 3% lead (though note after separating 'Helladic' from 'Attic-Boeotian', 'Helladic' have no more than 1.07% lead). On the first point, my display of the same data shows that any pattern is far from clear. Whilst a good number of 'Epirotic' examples have more lead there are many that do not, indeed there is considerable overlap, and now I have included the additional mark, there are four 'Thessalian' examples with more than 5% lead. I contend very little can be argued (contra Orfanou 2015, 224); in particular, caution must be applied because the measurements have margin for error, dependent on the precision of the technique, X-Ray Florescence (XRF), and the state of any artefact corrosion (Craddock 2009, 44; McNeil and Selwyn 2001, 609-12). Indeed, the location selected for surface analysis is crucial; on the one hand, higher content

Figure 4.14: Map of fibula types according to Orfanou (2015, 218, Fig. 7.21).

of lead may be found at the lower part of the mould (it is not always known which way up the fibula was cast) due to gravity, and higher contents of tin and lead may be found at the surface depending on the rate of cooling (Giumlia-Mair 2015, 484). Whilst the 'Helladic' data is more promising, why is there so much overlapping?

My first question is whether the lead percentage is determined by the level of intensity of work required, as Orfanou proved earlier (see Figure: 3.11 on page 129)? The designs on the 'Epirotic' fibulae may have been easier to produce with higher lead, as being softer would allow deeper incision along the bow. Perhaps the 'Helladic' fibulae employed low lead to create harder surfaces, especially in the catch-plate, allowing the very sharp decoration of which they are characteristic?

(a) Orfanou's chart (Orfanou 2015, 220, Fig. 7.22b).



(b) Adaptation of Orfanou's chart (after Orfanou 2015, 379-86, Appendix II).

Figure 4.15: Lead and tin presence in 119 fibulae from Pherai.

Second, to what extent is measurement error a factor? An example may be demonstrated by measurements provided of two parts of the same fibula, #3765. Orfanou does not individually cross-reference her examples against Kilian's catalogue, and Kilian records this example as one, now broken, whilst Orfanou (2015, 476-7) treats them separately. Though the lead is about the same, the tin quantity varies at 8.78% and 11.23% between them.

My main issue, however, is the way the data is grouped. Orfanou decides to interpret her data with the cultural groups set out by Blinkenberg rather than following Kilian's caution, whose typology is of Pherai itself. Indeed, Orfanou avoids types and sub-types as 'neither their dating is clearly defined nor are the minor variations in their shape, decoration or size necessarily distinctive of different technologies' (Orfanou 2015, 218). Despite the excellence of Blinkenberg's typology, it is 93 years old, and on top of that these particular groups were ones he was particularly tentative about. 'Epirotic' fibulae, according to Blinkenberg (106-7), are assigned westward of Pherai because of the similarity in design to Italic examples across the Adriatic; indeed, he calls them '*épirotes*' because no other type of fibula was found at Dodone: but in fact only very few fibulae, 10 fragments, are reported for Dodone (Carapanos 1878, 94). Blinkenberg tries to create a cultural type between Italy and Thessaly where there is a gap, despite revealing the critical difference between Italic and Thessalian fibulae, the catch-plate, where Italic ones are narrow foils whilst the Thessalian descend into the foil (ibid. 107). The actual data shows that 87.7% of 'Epirotic' examples (AT, AU, AW, and AX) are found at Pherai, and my manufacture test assigns 100% of the 'Epirotic' variants to Pherai.

I do not dispute the 'Thessalian' designation. The 'Helladic' group is simply erroneous, as is its placement by Orfanou to Attica-Boeotia (Figure: 4.14). Blinkenberg was unable to assign this group (VII) to a particular place, noting they are found all over the Aegean, save to suggest a probable manufacture location in Thessaly; the majority being found at Pherai (Blinkenberg, 130). Indeed, a significant portion I argue were manufactured at Pherai, my profile-groups AE and AF, and at Philia, profile-group BH. The result of this

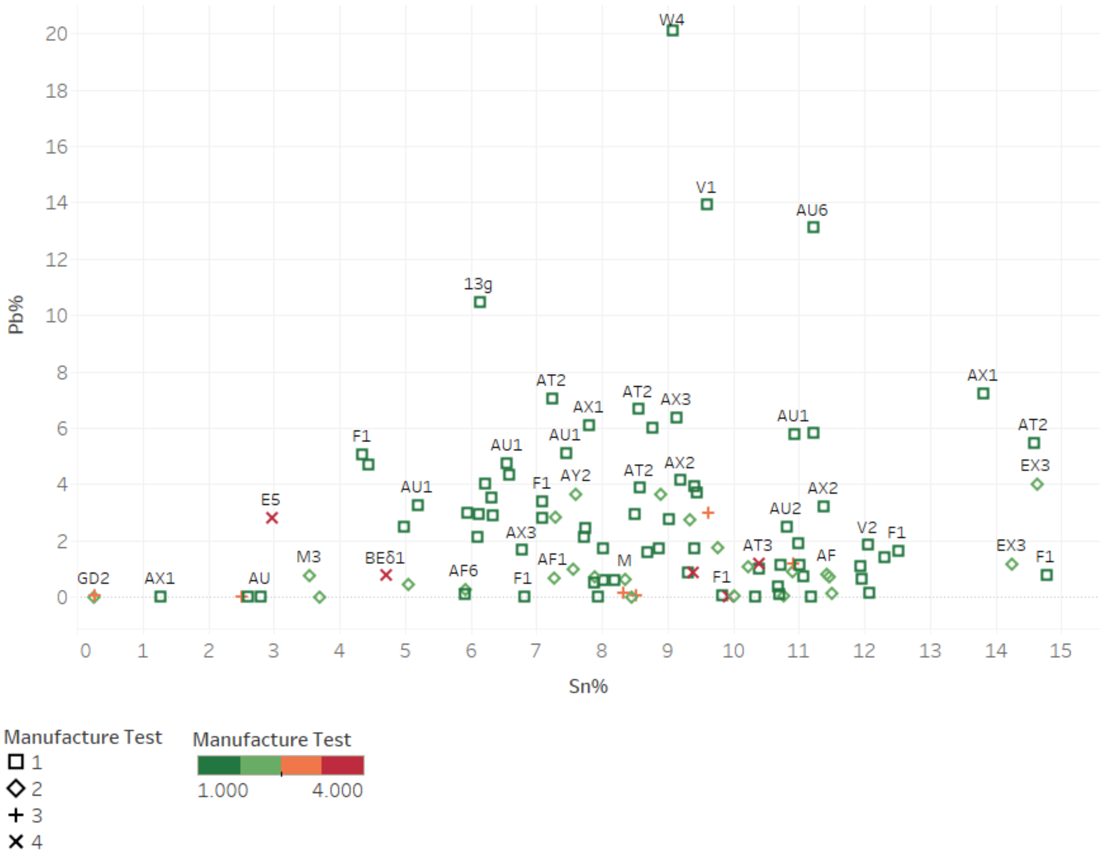


Figure 4.16: Sn% and Pb% according to the manufacture test (Source: Author).

discussion is to look at the data from a different point of view: that these three groups of fibulae were produced at Pherai itself. Data determined to be manufactured locally are shown in dark and pale green (Figure: 4.16). The results are not clear-cut, but demonstrate that most fibulae had a similar composition of tin and lead: an efficient amount, perhaps. If anything, the choice of Thessalian catch-plates (groups 10, 12-15, and variant 11d) should affirm local production (Figure: 4.17), in addition to the contiguous profile-variants (Plate: 152). The catch-plate choices look fairly distinct on the matrix, but in fact the 'Epirotic' AX shares at least three distinct catch-plates with the 'Thessalian' groups F-Y, whilst F itself also shares three catch-plates with AU-AY. Even more significant, the finial designs adorning *all variants* of both 'Epirotic' and 'Thessalian' catch-plate-groups *match exactly*. Finials from other regions are quite different (e.g. Glogović 2003, Pls. 49-57; Vasić 1999, Pls. 44-50). Positing that all three groups of fibulae were of local manufacture, I suggest the tin-lead scatter seems fuzzy, because it shows that a broad range of tin and lead content was used for production at Pherai; it has nothing to do with provenance. Orfanou's states:

> To conclude, chemical compositions of the fibulae on the whole seem to reflect the respective typological groupings too, as fibulae attributed to different regional workshops have also provided consistent chemical compositions. For all the Greek fibulae types, namely the Epirotic, Thessalian and Helladic types, a similar alloying pattern to produce binary tin bronze emerged, whereas the possibility of distinct lead-rich copper ores used in northern Greece is noted (Orfanou 2015, 224-5).

The second statement is not inconsistent with my thesis. The first statement is erroneous and shows the danger of relying uncritically on a typology. If additional evidence was needed to affirm my contention for production at Pherai, I can test Orfanou's data on the Sb, Zn, Ni, Cu, As, and Fe content (Figure: 4.18 a, c, and e). There is a clear overlap consistent with the three groups being produced in the same location.

I then see whether I can answer my first question: whether the choice of lead content was related to the design of fibula the craftsman was trying to create. In this respect it is quite clear, objects requiring deeper grooves in the bow used higher lead; objects requiring a very precise incision decoration for the catch-plate had, frequently, their lead removed. This is consistent with the material properties of lead use in bronze (Giumlia-Mair 2015).

Next I measured the manufacture test against the remaining composition data (Figure: 4.18 b, d, and f). The results are fairly convincing: fibulae said to be (or highly likely) manufactured locally are clustered in green. Unfortunately, there are few examples I might suspect as imports in the data, as Orfanou chose to favour the three groups for her methodology. Thus, I am unsure whether the examples highlighted in red, that according to the manufacture test I consider to be imports, are statistically significant. Nevertheless, in all four charts they seem to be somewhat removed from the main clusters. Whilst the tin quantity varies, all red examples bar one have less than 1.19% lead. The antimony and arsenic levels are generally higher. Yet I suspect these six examples were from a multitude of different locations, so no further interpretation may be made.

Profile-group FH is interesting, being low in lead and tin, and though I am cautious with this profile-variant I look to the catch-plate (16), a suspected Italian narrow foil. Of the

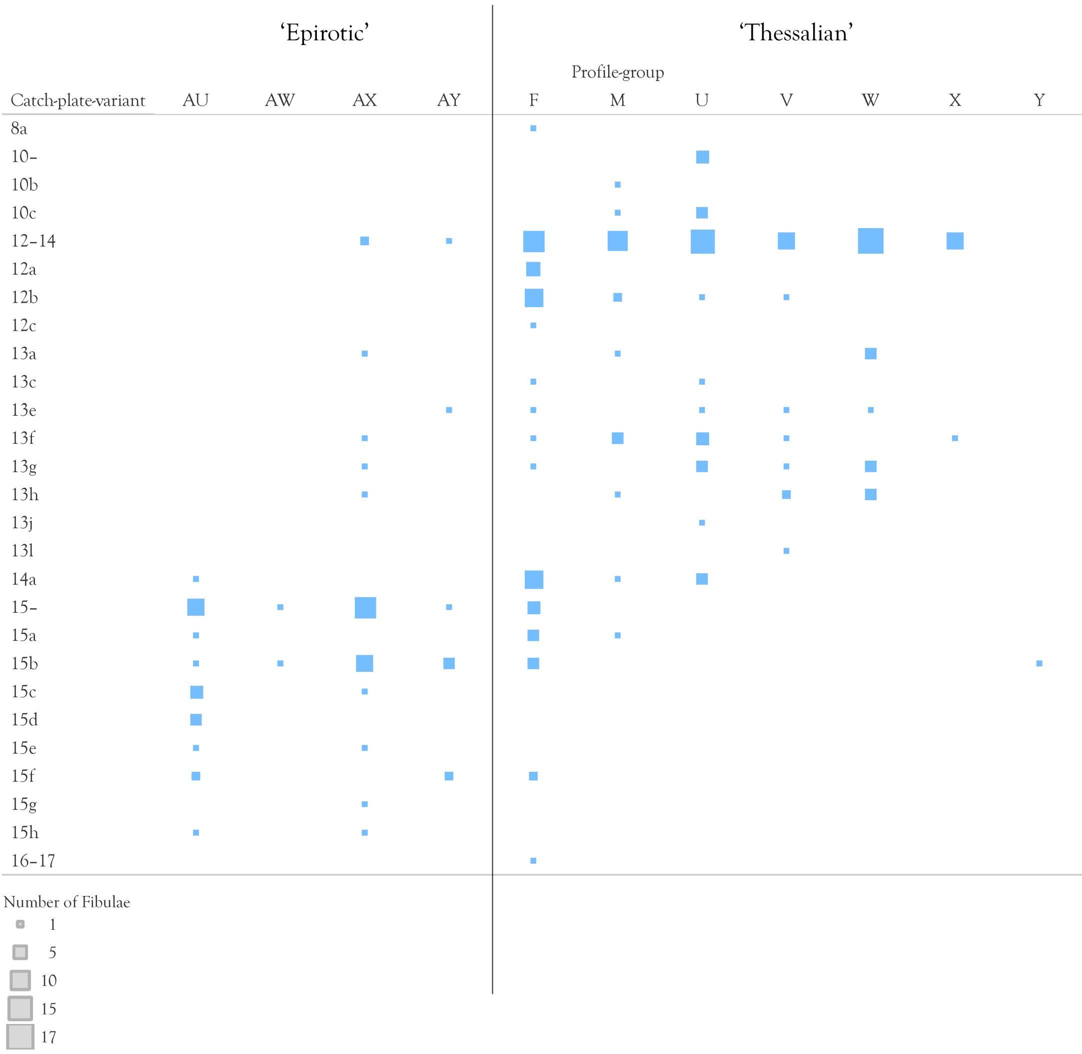
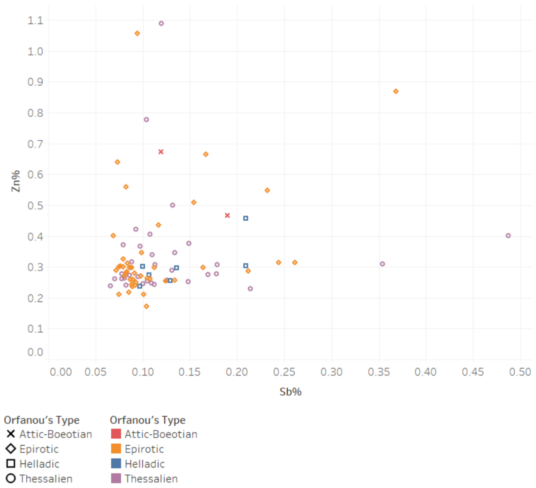
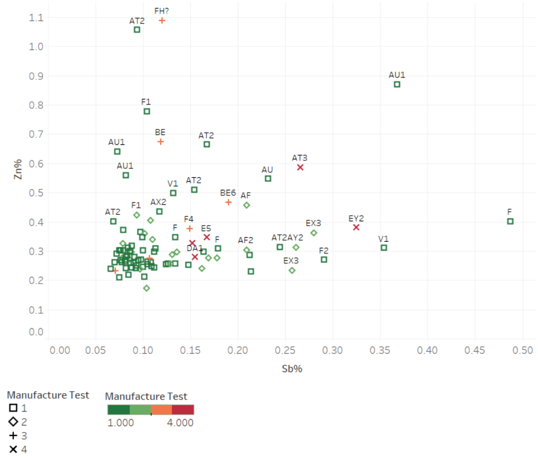


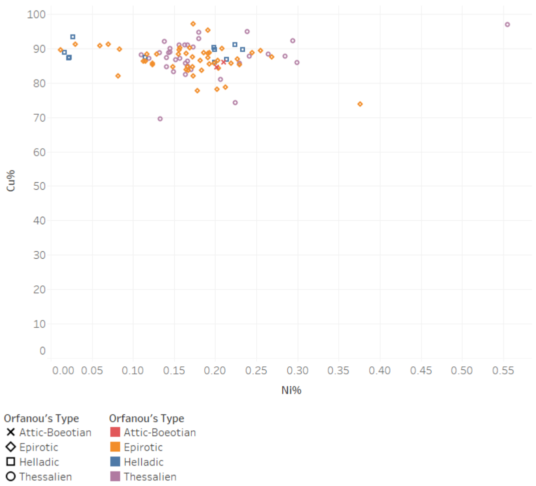
Figure 4.17: Matrix of catch-plate counts of 'Epirotic' fibulae (AU-AY) and 'Thessalian' fibulae (F-Y) (Source: Author).



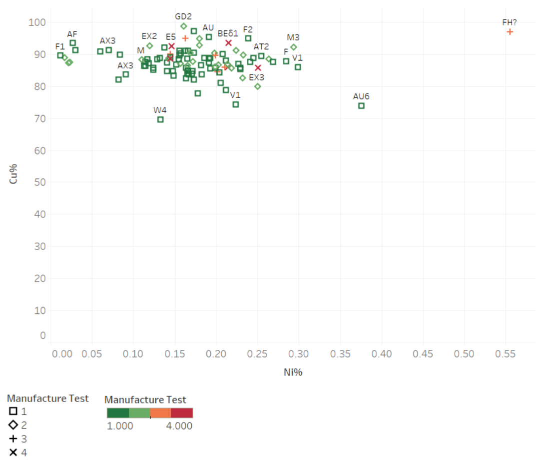
(a) Sb% and Zn%



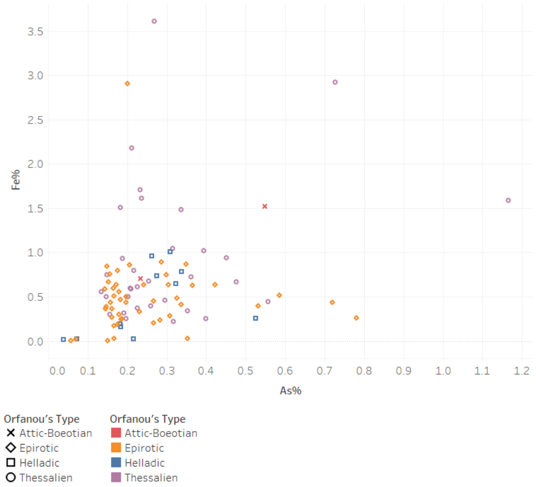
(b) Sb% and Zn%



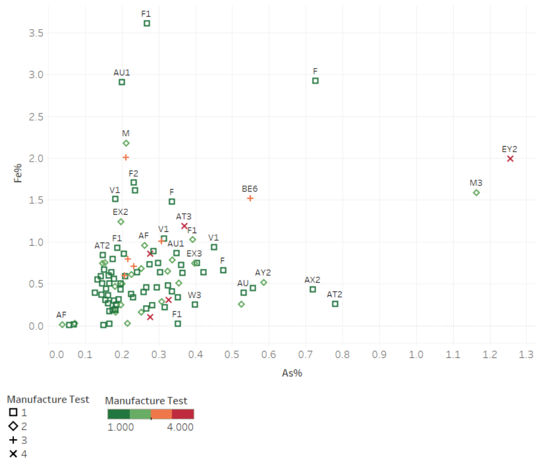
(c) Ni% and Cu%



(d) Ni% and Cu%



(e) As% and Fe%



(f) As% and Fe%

Figure 4.18: Element % according to Orfanou and the manufacture test (Source: Author).

18 such foils identified at Pherai none are on brooches manufactured at Pherai, rather 13 are on FH's (where amber and bone was threaded onto the wire); one Italic Serpentine fibula (ER); two others I am unsure of (an E5 and F1); and two without the bow surviving. It would be interesting to measure more examples of this catch-plate to see whether the results are consistent with import rather than local production compositions. This section shows how fundamental typology is to archaeological research, and needs more detail, not less, as I shall show shortly.

4.2.4 How similar is profile-variant similarity?

To see whether I was right to question the validity of the profile-variant matrices in Section 4.2.1 requires a closer look at the individual examples, and the aid of the catch-plate data, that I chose to filter earlier because of limited data (see Section 3.1.3 on page 106). The catch-plate is the most revealing indicator; being carefully chosen by the craftsman, it has a vivid regional distribution (Table: 4.5 a and b). The data shows distinct regional variation between the three major manufacturers of fibulae; it is not a case of most examples being found in a region, as already expected (Blinkenberg 1926; Kilian 1975; Kilian-Dirlmeier 2002; Sapouna-Sakellarakis 1978), but up to 95%. Asia Minor Coast fibulae cluster around catch-plate-group 9, the Vertical catch-plates, and a small number of types popular in Central Anatolia. The North Aegean Coast, based in particular on Pherai, use catch-plates groups 10 and 12-15; whilst Central Anatolia, most especially Gordion, has a dominance in catch-plate-groups 21-23 and 25. The Central Aegean Mainland has the most diverse spread, having some of everything except catch-plate-group 3. Crete shows a fascinating exclusion of types from the North Aegean Coast and Central Anatolia, perhaps because these groups are mid-late in date, even though my current understanding has Crete importing most of its (small number) of fibulae.

Depicting catch-plate-variants by region adds more nuance (Plates: 148 and 149): showing, where groups overlap, which particular variants are involved. Just one example is

(a) 11e, #4325, from Charonea (Hampe 1936, Pl. 6, No. 140).

(b) 11f, #1538, from Lefkandi (Popham et al. 1980, Pl. 110).

Figure 4.19: Catch-plate-variant style: 11e with short neck and 11f with long neck. Not to scale.

enough to cast light on the use of catch-plates to address the issue of provenance. Catch-plate-variants 11e are found mostly in the Central Aegean Mainland whilst 11f, a development of 11e, are also found in the Aegean Islands, specifically at Lefkandi (Figure: 4.19). This type of Sail plate has a wide neck; a feature that helps differentiate the popular BE profile-group, a group that has a wide distribution and several probable locations of manufacture (Strøm 1995, 72-5). At a regional level the group data (Table: 4.5) showed, for example, the North Aegean Mainland (where Philia is located) and the North Aegean Coast (where Pherai is located) shared a wide spread of catch-plate-groups, whilst the variant data (Plate: 148 and 149) shows that the North Aegean Coast had the far greater diversity.

Now I have shown the importance of catch-plates, I can plot the profile-variant shared-presence data between Pherai and Ialysos with the actual examples (Plate: 150). I have to show the data in this way as about 66% of catch-plate-variant data is missing, which would apply too large a filter for a network matrix, with damaged catch-plate data excluding shared-profiles erroneously. Yet, my diagram shows that it is risky to make assumptions of assemblage similarity using profile-variant's alone, as some have multiple cross-section and catch-plate options. The overview shows that most joins are weighted: one site having significantly more than the other (e.g. E1 9:4; U1 105:2; EH1 4:56).

Region	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	27	Grand Total
1.North Aegean Mainland	2	11		1	1	3	1	2	3	17	81	3	26	4	9	2	1	2	59					4			232
2.North Aegean Coast	74	28		4	7	19	5	15	25	30	15	31	107	20	91	18	12	6	26	5	2		14	2	2		558
3.Central Aegean Mainland	50	87		5	16	19	9	4	28	19	120	5	5	6	7	29	3	3	20	6	11	6	20	13	1	1	493
4.Aegean Islands	1	73	3		15	17	4	35	18		16	1		1						1			1				186
5.Crete	6	52		2	9	14	4	5	29		12																133
6.Asia Minor Coast	3	150	1	19	66	24	10	17	1,875	6	16			2	6	11		3	17	59	45	11	29	43	10	1	2,424
7.Central Anatolia		5			12		1	11	1									1	4	17	392	113	127	24	16		724
Grand Total	136	406	4	31	126	96	34	89	1,979	72	260	40	138	33	113	60	16	15	126	88	450	130	191	86	29	2	4,750

Catch-Plate-Group

Number of Fibulae: 1 – 50

(a) Count of catch-plate-groups by region.

Table 4.5: Summary of catch-plate-groups by region (Source: Author).

Region	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	27	Grand Total
1.North Aegean Mainland	1%	3%		3%	1%	3%	3%	2%	0%	24%	31%	8%	19%	12%	8%	3%	6%	13%	47%					5%			5%
2.North Aegean Coast	54%	7%		13%	6%	20%	15%	17%	1%	42%	6%	78%	78%	61%	81%	30%	75%	40%	21%	6%	0%		7%	2%	7%		12%
3.Central Aegean Mainland	37%	21%		16%	13%	20%	26%	4%	1%	26%	46%	13%	4%	18%	6%	48%	19%	20%	16%	7%	2%	5%	10%	15%	3%	50%	10%
4.Aegean Islands	1%	18%	75%		12%	18%	12%	39%	1%		6%	3%		3%						1%			1%				4%
5.Crete	4%	13%		6%	7%	15%	12%	6%	1%		5%																3%
6.Asia Minor Coast	2%	37%	25%	61%	52%	25%	29%	19%	95%	8%	6%			6%	5%	18%		20%	13%	67%	10%	8%	15%	50%	34%	50%	51%
7.Central Anatolia		1%			10%		3%	12%	0%									7%	3%	19%	87%	87%	66%	28%	55%		15%
Grand Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Catch-Plate-Group

% of Total Number of Fibul.. 0% – 100%

(c) % of catch-plate-groups by region. N=4,750.

Table 4.5: *Cont.*

Figure 4.20: Fibula #2780 from Pherai. An instance of a profile (AF2) common to Thessaly adopting a catch-plate common to Asia Minor, likely 9a, if the lower half conforms to expectations (Kilian 1975, Pl. 56, No. 1564).

Second, Pherai's fibulae more often have the Descending catch-plates (15), or Square (11) or Vertical-Sail catch-plates (10) whilst Ialysos has the popular Vertical catch-plates (9), as expected (Table: 4.5). So, to put this into context of their total assemblages (not just the joins), and keeping in mind only 51% of catch-plates (at group) survive, Pherai has just 17 Vertical catch-plates to Ialysos' 530, and there is just one instance of a Vertical catch-plate used on a distinctly Thessalian fibula, #2780 (Figure: 4.20). Pherai has 252 Horizontal catch-plates (12-14) to Ialysos' zero, and with the Vertical-Sail catch-plate (10) Pherai has 27 and Ialysos has 1.

Taking this information into account I can assess the joins based on each fibula as a whole (Plate: 150). Blue designates true type-similarity, where it is highly likely an actual fibula moved between the two locations. The number of fibulae is harder to ascertain (not every fibula in the group would have moved); certainly the sum is far fewer than suggested in the weighted matrix shown above (Figure: 4.11 on page 165). For instance, E1 and E5 show one or two links whilst others are dissimilar, usually because of the catch-plate. U1, Y2, AA1, AC1, AE1, AF1, AF4, AH1, EG1, EH1, EH4, EI1, EY2, and FH1 show abundantly clear similarity. There are thus 18 blue joins out of 28 = 64%. Green shows a tentative link, demonstrating similarity at group-level, where the idea of the fibula was shared but perhaps adapted with local features (e.g. Knobbed bows and Horizontal catch-plates). B1 is tentative; the catch-plates in these examples are different. Fδ2 share the swollen bow though the one at Pherai has a Tapered Finial at the apex. T5 share 3 groups of incision but they are composed differently. AT4 and BL1 share their bow but have different catch-plates, whilst BE2 and EE1 seem to have slightly different characteristics in general. There are 8 green joins = 29%. Red shows no link; the profile-variant similarity is too broad to show a variant join, but there is still some design similarity. AF7 looks like an Ialysos variant adapting features of the AF range. GD have a different cross-section and catch-plate. The number of red variant-joins equals 2 = 7%.

Making a count of unique variant-joins (let alone total counts) is significantly less than shown in Figures: 4.5 and 4.11 but, I argue, shows real similarity: blue at variant-level, and green at group-level.

4.2.5 Summary of initial results

It is impossible to go into such detail for each site-site analysis as 484 such diagrams would be needed, but now I can judge the quality of the network data generated by the Pherai-Ialysos results. Shockingly, of the data purporting to show distinct profile-variant joins only 59% is proved accurate. *Almost half the network (41%) is erroneous.* This was not unexpected, but it does have grave ramifications for network analyses more generally. Networks are ultimately based on similarity, and the strength of that similarity is determined by the quality and detail of subdivision given by the typology used. It is thus easy to arrive at misleading results: particularly for studies based on established typologies perhaps left unscrutinised. Despite this, 87% of the data joins at group-level. This is much more encouraging. It suggests that only a small minority of the data does not show a link at group-level. Crucially though, group joins would suggest a different network than variant joins. Group joins present a similarity of design, a *koiné* if you like, not necessarily any real movement of fibulae that the variant analysis aims to uncover.

How can I make a network analysis based on these problems? The answer for fibulae, I contend, lies by filtering the results with the manufacture data. If I look again at the Pherai-Ialysos diagram (Plate: 150) I can see that all bar one of the types affirmed as being manufactured by either site, are blue: indicating a real join. This result is perhaps because the variants identified with manufacture location are very distinctive, and their distribution is weighted heavily to one site (the second feature of the manufacture test). So, filtering data will reduce the count of the actual contact between sites, but it is a test that does not require the time-consuming site-site diagrams to be successful. There are much more important benefits. It provides a filter of likely export, which suggests the resulting data is directional, and meaningful. It means that the similarity data is comparable; each site-site network is based on the same kind of data: movement of artefacts rather than a mixture of circular, weak, and strong links, or cultural ideas. Whilst the overall join percentages will be lower, the data revealed will have comparable meaning, and so there will be a measurable relative difference between them. Thus, I hereby go some way to accounting for the similarity and significance issues (points 1-5, see Section 4.2.2 on page 161) that created a false network in the first half of this chapter. I can now look into which direction these fibulae were travelling, not just for Pherai and Ialysos, but the 26 sites in the network analysis.

4.3 Manufacture test results

The following data is a count of profile-groups through Regions 1-7 (refer back to page 172 for an explanation of how to read the tables). Profile-groups with fewer than 50% of profile-variants, or less than 3 profile-variants, whichever is greater, are excluded from the tables for concision. Excluded groups are either imports or where the data is unclear.

1. Aegina

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	3/6	1.0%	6	576	No (4)
Fδ	2/9	0.7%	3	419	No (4)
Y	2/4	4.5%	2	44	No (4)
AC	4/15	5.2%	6	115	No (4)
ANδ	1/1	33.3%	1	3	No (4)
BE	2/9	1.8%	4	220	No (4)
CP	2/4	8.6%	3	35	No (4)
CR	2/9	1.3%	2	156	No (4)
EI	2/8	0.8%	2	239	No (4)

Table 4.6: Manufacture test: Aegina (Source: Author).

2. Alisar

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
BM	4/10	6.7%	4	60	No (4)
BN	2/5	16.7%	2	12	No (4)
DC	2/4	46.2%	6	13	No (3)
DF	2/5	12.2%	6	49	No (4)
DW	2/5	50.0%	9	18	No (3)
EC	1/1	100%	1	1	No (3)
EF	7/8	78.4%	29	37	Yes (1)

Table 4.7: Manufacture test: Alisar (Source: Author).

3. Argive Heraion

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	4/6	3.3%	19	576	No (4)
AE	2/12	3.5%	3	85	No (4)
AF	2/12	1.9%	2	107	No (4)
AX	2/8	0.8%	2	249	No (4)
BV	1/1	12.5%	1	8	No (4)
CB	2/4	28.6%	2	7	No (4)
CK	1/1	40.9%	9	22	No (3)
CKδ	2/2	66.7%	4	6	Yes (2)
CS	2/6	3.2%	2	62	No (4)
CU	4/10	9.4%	5	53	No (4)
DK	2/9	2.3%	2	87	No (4)
EV	2/5	62.5%	5	8	No (3)
FA	2/6	2.3%	5	220	No (4)
FI	5/5	93.5%	29	31	Yes (1)

Table 4.8: Manufacture test: the Argive Heraion (Source: Author).

4. Athens

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
B	2/4	4.9%	2	41	No (4)
E	4/6	6.9%	40	576	Yes (2)
J	5/7	19.2%	10	52	Yes (2)
K	3/9	6.3%	7	111	No (3)
BD	2/3	25.9%	7	27	No (3)
BE	3/9	6.4%	14	220	No (3)
BEδ	2/6	5.3%	3	57	No (4)

Table 4.9: Manufacture test: Athens (Source: Author).

5. Boğazköy

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
BM	5/10	16.7%	10	60	No (3)
BO	2/7	16.7%	6	36	No (4)
BT	2/4	13.6%	3	22	No (4)
BU	6/10	13.1%	16	122	No (3)
BW	3/7	16.7%	4	24	No (4)
CF	3/6	17.6%	3	17	No (4)
CJ	4/6	5.9%	7	118	No (4)
CQ	2/3	25.0%	4	16	No (4)
CR	2/9	1.3%	2	156	No (4)
CS	2/6	3.2%	2	62	No (4)
DC	2/4	23.1%	3	13	No (4)
DF	3/5	20.4%	10	49	No (4)
DH	5/11	13.5%	21	155	No (3)
DJ	3/6	13.9%	11	79	No (4)
DK	4/9	9.2%	8	87	No (4)
DM	1/1	100%	1	1	No (3)
DQ	2/4	33.3%	2	6	No (4)

Table 4.10: Manufacture test: Boğazköy (Source: Author).

6. Emporio

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	2/9	12.2%	51	419	Yes (2)
AL	2/6	57.7%	45	78	Yes (2)
CR	4/9	33.3%	52	156	No (3)
FA	3/6	4.1%	9	220	No (4)

Table 4.11: Manufacture test: Emporio (Source: Author).

7. Ephesus

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	2/6	1.9%	11	576	No (4)
Fδ	2/9	2.1%	9	419	No (4)
M	2/10	3.6%	4	112	No (4)
T	2/5	18.2%	4	22	No (4)
AO	4/7	22.2%	8	36	Yes (2)
AZ	2/6	10.3%	3	29	No (4)
BA	2/5	10.5%	2	19	No (4)
BM	4/10	13.3%	8	60	No (3)
BO	4/7	25.0%	9	36	No (3)
CF	2/6	29.4%	5	17	No (4)
CH	4/8	21.1%	4	19	No (3)
CJ	2/6	16.1%	19	118	No (3)
CP	2/4	17.1%	6	35	No (3)
CPδ	4/4	100%	7	7	Yes (1)
CR	6/9	23.1%	36	156	Yes (2)
CS	2/6	50.0%	31	62	No (3)
CU	2/10	17.0%	9	53	No (3)
CV	3/9	15.8%	3	19	No (4)
DAδ1	1/1	100%	4	4	Yes (2)
DF	2/5	4.1%	2	49	No (4)
DK	2/9	3.4%	3	87	No (4)
DQ	2/4	33.3%	2	6	No (4)
EG	2/2	2.3%	3	129	No (4)
EH	3/6	6.3%	20	316	No (3)
EI	6/8	40.6%	97	239	Yes (2)
EIδ	2/2	100%	4	4	Yes (2)
FA	3/6	9.1%	20	220	No (3)
FL	2/2	100%	2	2	Yes (2)
FM	2/2	100%	2	2	Yes (2)
FP	6/6	100%	9	9	Yes (1)

Table 4.12: Manufacture test: Ephesus (Source: Author).

8. Gordion

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	2/9	0.7%	3	419	No (4)
M	3/10	8.0%	9	112	No (4)
BM	7/10	46.7%	28	60	Yes (2)
BN	3/5	50.0%	6	12	Yes (2)
BO	3/7	27.8%	10	36	No (3)
BP	5/6	56.8%	21	37	Yes (2)
BS	1/2	66.7%	2	3	No (3)
BT	4/4	81.8%	18	22	Yes (1)
BU	8/10	80.3%	98	122	Yes (1)
BV	1/1	62.5%	5	8	No (3)
BW	5/7	25.0%	6	24	Yes (2)
BZ	9/9	84.6%	44	52	Yes (1)
CA	2/2	100%	3	3	Yes (2)
CB	2/4	28.6%	2	7	No (4)
CC	4/6	43.8%	7	16	Yes (2)
CD	3/3	100%	8	8	Yes (1)
CF	2/6	11.8%	2	17	No (4)
CH	6/8	73.7%	14	19	Yes (1)
CI	5/5	100%	8	8	Yes (1)
CJ	4/6	62.7%	74	118	Yes (2)
CL	4/5	61.5%	8	13	Yes (2)
CP	3/4	28.6%	10	35	No (3)
CQ	3/3	50.0%	8	16	Yes (2)
CR	5/9	7.7%	12	156	No (3)
CS	3/6	24.2%	15	62	Yes (2)
CT	2/2	43.8%	7	16	Yes (2)
CU	8/10	43.4%	23	53	Yes (1)
CV	2/9	36.8%	7	19	No (3)
CY	7/7	94.6%	53	56	Yes (1)
CZ	2/4	53.8%	7	13	No (3)
DB	3/7	45.5%	5	11	No (3)
DD	5/6	75.0%	12	16	Yes (1)
DF	4/5	55.1%	27	49	Yes (2)
DG	4/5	76.7%	33	43	Yes (1)
DH	9/11	69.7%	108	155	Yes (1)
DI	4/5	25.0%	5	20	Yes (2)
DJ	6/6	53.2%	42	79	Yes (1)
DK	5/9	49.4%	43	87	Yes (2)
DL	1/1	100%	1	1	No (3)
DW	4/5	38.9%	7	18	No (3)
EF	5/8	13.5%	5	37	No (3)

Table 4.13: Manufacture test: Gordion (Source: Author).

9. Hephaisteia

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
K	5/9	27.9%	31	111	Yes (2)
AAδ	3/5	37.5%	3	8	No (3)
AG	2/2	100%	2	2	Yes (2)

Table 4.14: Manufacture test: Hephaisteia (Source: Author).

10. Ialysos

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	8/9	48.2%	202	419	Yes (1)
G	5/9	48.3%	83	172	Yes (2)
H	2/4	5.6%	2	36	No (4)
AA	3/6	5.8%	3	52	No (4)
AC	12/15	40.9%	47	115	Yes (1)
AJ	5/9	25.9%	22	85	Yes (2)
AK	2/2	80.0%	4	5	Yes (2)
AL	6/6	33.3%	26	78	Yes (2)
AN	3/8	25.2%	78	310	No (3)
AP	2/3	42.9%	3	7	Yes (2)
AZ	4/6	20.7%	6	29	No (3)
BF	8/10	56.9%	190	334	Yes (1)
CE	2/2	66.7%	2	3	Yes (2)
DU	2/3	20.0%	2	10	No (4)
EB	2/3	50.0%	2	4	No (3)
EE	2/3	23.1%	3	13	No (4)
EG	1/2	34.1%	44	129	No (3)
EH	4/6	35.1%	111	316	Yes (2)
EN	1/2	25.0%	1	4	No (4)
EO	2/2	100%	2	2	Yes (2)
EY	1/2	13.6%	3	22	No (4)
FJ	3/8	13.6%	6	44	No (3)
FW	3/4	83.3%	5	6	Yes (1)
GA	2/2	100%	2	2	Yes (2)

Table 4.15: Manufacture test: Ialysos (Source: Author).

11. Izmir

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	3/9	2.6%	11	419	No (4)
AJ	3/9	4.7%	4	85	No (4)
AN	2/8	1.6%	5	310	No (4)
EG	2/2	3.9%	5	129	No (3)
EH	2/6	37.0%	117	316	No (3)
FJ	7/8	70.5%	31	44	Yes (1)
GD	2/4	20.0%	9	45	No (3)

Table 4.16: Manufacture test: Izmir (Source: Author).

12. Kalapodi

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	2/6	0.3%	2	576	No (4)
L	2/4	10.6%	5	47	No (4)
U	2/9	1.1%	2	180	No (4)
BD	2/3	18.5%	5	27	No (4)
BE	3/9	4.1%	9	220	No (4)
BEδ	2/6	7.0%	4	57	No (4)
EX	3/9	2.4%	11	463	No (4)

Table 4.17: Manufacture test: Kalapodi (Source: Author).

13. Kamiros

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	3/9	1.2%	5	419	No (4)
J	2/7	5.8%	3	52	No (4)
M	2/9	1.8%	2	112	No (4)
AC	2/15	1.7%	2	115	No (4)
AJ	2/9	3.5%	3	85	No (4)
FG	1/1	100%	2	2	No (3)

Table 4.18: Manufacture test: Kamiros (Source: Author).

14. Knossos

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	3/6	2.4%	14	576	No (3)
Fδ	2/9	1.0%	4	419	No (4)
K	2/9	2.7%	3	111	No (4)
AN	2/8	1.6%	5	310	No (4)
BD	2/3	14.8%	4	27	No (3)
BE	2/9	2.7%	6	220	No (4)
EG	2/2	1.6%	2	129	No (4)
ES	1/1	50.0%	1	2	No (4)
EX	3/9	0.9%	4	463	No (4)

Table 4.19: Manufacture test: Knossos (Source: Author).

15. Lefkandi

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
D	1/1	100%	3	3	Yes (2)
E	5/6	11.8%	68	576	Yes (2)
J	2/7	23.1%	12	52	No (3)
K	6/9	21.6%	24	111	Yes (2)
L	3/4	59.6%	28	47	Yes (2)
T	2/5	50.0%	11	22	Yes (2)
BI	4/5	55.6%	5	9	Yes (2)

Table 4.20: Manufacture test: Lefkandi (Source: Author).

16. Lindos

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	2/6	19.3%	111	576	Yes (2)
Fδ	3/9	17.2%	72	419	Yes (2)
G	2/9	37.2%	64	172	No (3)
H	3/4	94.4%	34	36	Yes (1)
K	2/9	1.8%	2	111	No (4)
V	2/4	1.2%	2	163	No (4)
Y	2/4	11.4%	5	44	No (4)
AA	3/6	32.7%	17	52	No (3)
AC	3/15	4.3%	5	115	No (4)
AJ	5/9	45.9%	39	85	Yes (2)
AN	6/8	57.7%	179	310	Yes (2)
AO	2/7	61.1%	22	36	Yes (2)
AR	2/5	76.5%	13	17	Yes (2)
AS	2/2	93.9%	153	163	Yes (1)
AZ	2/6	24.1%	7	29	No (3)
BA	2/5	57.9%	11	19	No (3)
BB	2/4	66.7%	6	9	No (3)
BF	3/10	41.9%	140	334	No (3)
BG	2/3	90.3%	252	279	Yes (1)
CR	2/9	14.7%	23	156	No (3)
DH	3/11	4.5%	7	155	No (4)
DK	2/9	3.4%	3	87	No (4)
DV	2/6	100%	5	5	No (3)
DZ	1/1	100%	2	2	No (3)
EH	2/6	4.7%	15	316	No (4)
EI	2/8	40.6%	97	239	Yes (2)
FA	3/6	9.5%	21	220	No (3)
FY	1/1	100%	1	1	No (3)

Table 4.21: Manufacture test: Lindos (Source: Author).

17. Olympia

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	3/6	1.4%	8	576	No (4)
U	2/9	2.2%	4	180	No (4)
AX	3/8	2.0%	5	249	No (4)
AY	2/2	6.7%	4	60	No (4)
BE	2/9	5.0%	11	220	No (4)
BV	1/1	12.5%	1	8	No (4)
CF	2/6	11.8%	2	17	No (4)
CK	1/1	13.6%	3	22	No (4)
CS	2/6	3.2%	2	62	No (4)
DC	2/4	15.4%	2	13	No (4)
DI	2/5	20.0%	4	20	No (4)
DO	1/1	100%	1	1	No (3)
DP	1/1	100%	1	1	No (3)
EL	1/1	100%	1	1	No (3)
EM	2/2	50.0%	6	12	No (4)
EP	2/3	40.0%	4	10	No (3)
EQ	2/2	90.9%	10	11	No (3)
EX	2/9	5.2%	24	463	No (4)
FD	1/1	100%	2	2	No (3)
FH	1/1	1.2%	1	86	No (4)
FK	1/1	66.7%	2	3	No (4)
FN	1/1	100%	1	1	No (3)

Table 4.22: Manufacture test: Olympia (Source: Author).

18. Perachora

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	2/6	0.9%	5	576	No (4)
AX	2/8	2.0%	5	249	No (4)
CS	2/6	4.8%	3	62	No (4)
FA	3/6	34.5%	76	220	Yes (2)
FH	1/1	16.3%	14	86	No (4)
FK	1/1	33.3%	1	3	No (4)

Table 4.23: Manufacture test: Perachora (Source: Author).

19. Phana

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	3/9	1.7%	7	419	No (4)
AA	2/6	3.8%	2	52	No (4)
AC	4/15	7.8%	9	115	No (4)
BQ	2/4	54.5%	6	11	Yes (2)
CP	2/4	8.6%	3	35	No (4)

Table 4.24: Manufacture test: Phana (Source: Author).

20. Philia

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	2/6	0.9%	5	576	No (4)
F	2/4	4.5%	13	287	No (4)
Fδ	3/9	1.0%	4	419	No (4)
M	3/10	7.1%	8	112	No (4)
U	2/9	2.2%	4	180	No (4)
V	2/4	8.6%	14	163	No (4)
W	2/4	10.5%	13	124	No (4)
X	2/5	6.8%	3	44	No (4)
Y	2/4	6.8%	3	44	No (4)
Z	4/6	44.8%	13	29	Yes (2)
AE	8/12	12.9%	11	85	No (3)
AEδ	2/2	100%	2	2	Yes (2)
AF	11/12	30.8%	33	107	Yes (1)
AFδ	3/3	100%	6	6	Yes (1)
AH	9/10	39.0%	23	59	Yes (1)
AI	3/5	5.1%	3	59	No (3)
AQ	3/5	42.9%	3	7	No (3)
AT	2/4	7.6%	5	66	No (4)
AU	3/8	6.5%	6	93	No (4)
AX	3/8	6.0%	15	249	No (4)
AY	2/2	3.3%	2	60	No (4)
BE	6/9	8.6%	19	220	Yes (2)
BH	21/25	65.9%	89	135	Yes (1)
BL	2/2	16.7%	4	24	No (4)
CM	4/5	64.5%	20	31	Yes (2)
CN	10/11	65.1%	41	63	Yes (1)
CO	6/8	32.1%	18	56	Yes (2)
EX	2/9	0.6%	3	463	No (4)

Table 4.25: Manufacture test: Philia (Source: Author).

21. Samos

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
Fδ	2/9	0.5%	2	419	No (4)
AC	3/15	6.1%	7	115	No (4)
AO	3/7	8.3%	3	36	No (4)
BQ	2/4	27.3%	3	11	No (3)
CJ	2/6	1.7%	2	118	No (4)
CR	4/9	3.2%	5	156	No (3)

Table 4.26: Manufacture test: Samos (Source: Author).

22. Samothrace

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	2/6	1.0%	6	576	No (4)
AB	4/6	31.8%	7	22	Yes (2)
ANδ	1/1	33.3%	1	3	No (4)
EH	2/6	1.3%	4	316	No (4)
EI	3/8	2.9%	7	239	No (4)

Table 4.27: Manufacture test: Samothrace (Source: Author).

23. Sparta

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
G	2/9	1.2%	2	172	No (4)
U	2/9	2.2%	4	180	No (4)
CR	2/9	1.9%	3	156	No (4)
EX	2/9	1.5%	7	463	No (3)
EY	1/2	45.5%	10	22	Yes (2)
EZ	1/1	100%	6	6	Yes (1)
FA	3/6	4.5%	10	220	No (3)
FH	1/1	5.8%	5	86	No (4)
FQ	2/2	100%	2	2	Yes (2)
FT	1/1	100%	1	1	Yes (2)
GB	9/10	100%	9	9	Yes (1)

Table 4.28: Manufacture test: Sparta (Source: Author).

24. Thebes

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
BE	3/9	12.7%	28	220	Yes (2)
BEδ	6/6	57.9%	33	57	Yes (1)
BK	2/3	14.3%	2	14	No (4)
BY	1/1	33.3%	1	3	No (4)
FO	1/1	66.7%	2	3	No (3)

Table 4.29: Manufacture test: Thebes (Source: Author).

25. Vrokastro

PF-G	Fraction of variants	Percent	No.	Global No.	MTest Result
E	4/6	1.9%	11	576	No (4)
Fδ	2/9	0.7%	3	419	No (4)
J	3/7	9.6%	5	52	No (4)
K	2/9	4.5%	5	111	No (4)

Table 4.30: Manufacture test: Vrokastro (Source: Author).

4.3.1 Manufacture test results

My first chart displays the number (or richness) of profile-groups by site, in red, and the number of groups deemed to be manufactured locally, in blue (Figure: 4.21; Appendix B). The latter includes test results of 1, those that pass the manufacture test, and 2, those that fail but were very likely produced (see Table 4.2 on page 171). A result of 2 is given for profile-groups that possess 3 or more profile-variants and a sizeable number of fibulae. A result of 2 is often given to popular groups with multiple manufacture locations (such as Es or Fδs); they failed achieving 1 because of their large numbers on one hand, and the difficulty of subdividing fibula variants of low complexity. Catch-plate data is also taken into account.

The chart is very clear: 18 sites (69%) likely produced no more than two profile-groups locally; the vast majority of their assemblages are imported. Particularly surprising cases are Boğazköy, with over 133 fibulae, posited to have produced none of its fibulae, as well

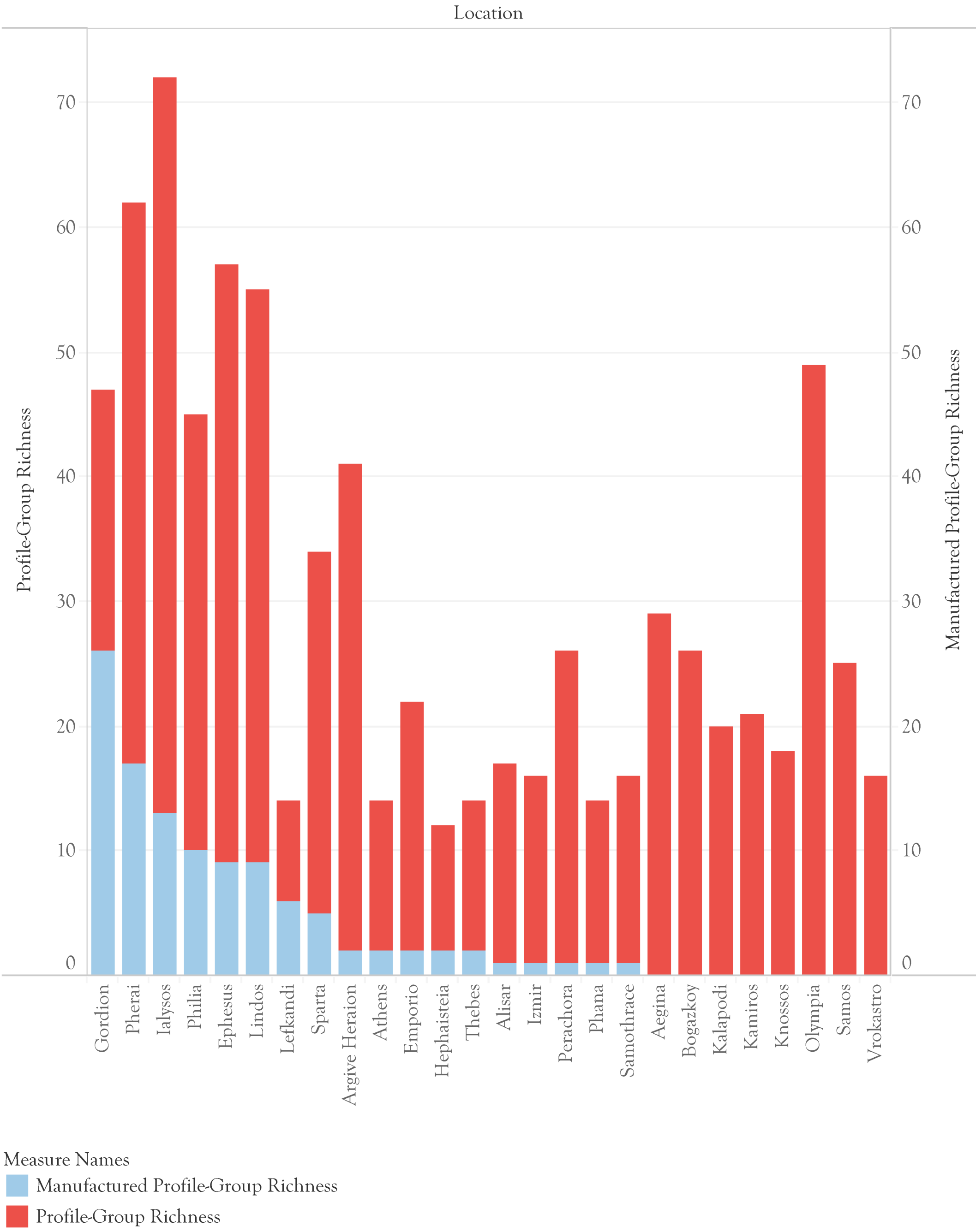


Figure 4.21: Site assemblage and manufactured profile-group richness (Source: Author).

as Knossos and Vrokastro, suggesting that few if any fibulae were manufactured on Crete. Boğazköy may have a high profile-variant richness (Figure: 4.22) and yet as a percentage of the global number of those profile-groups its median result is just 17.6%. Almost all of Boğazköy's variants may be found at Gordion; Gordion by comparison has a median result of 53.2%. Similarly, of all the 18 import sites it can be shown that all of the fibulae (aside from one or two groups) were produced elsewhere.

The second chart shows the number (or richness) of profile-variants by site, in red, and the number of variants deemed to be manufactured locally, in blue (Figure: 4.22). The evidence, being somewhat dependent, is consistent with the profile-groups. The primary manufacture sites have results of more than 50% of variants achieving 1 or 2.

My third chart combines the percentages of groups and variants deemed to be produced locally by site (Figure: 4.23). So far I have been considering counts of unique groups and variants. Displaying the profile-variant count manufactured locally as a percentage of the total assemblages identifiable profile-variants provides clearer results (Figure: 4.24).

90% of Pherai's assemblage was produced locally; Philia by contrast has a result of 63%. The obvious movement of fibulae between the two sites has a greater impact on Philia than Pherai's assemblage. Lindos and Ialysos' results are closer, at 78% and 73% respectively, suggesting a more equal movement of fibulae between them. I suggest greater than 90-95% of Lindos and Ialysos' fibulae were produced on Rhodes itself. According to my results, Gordion produced 88% of its fibulae: the reality was probably more, since of the groups that failed the manufacture test, 11 groups received a result of 3 (the evidence is unclear), whilst only four groups received a result of 4 (almost certainly an import or imitation). Indeed, only 12 fibulae received a result of 4 out of 769 fibulae identifiable at profile-variant, meaning it is feasible that up to 98.5% of Gordion's assemblage was produced locally.

According to the manufacture test import sites are evident. They include the major sanctu-

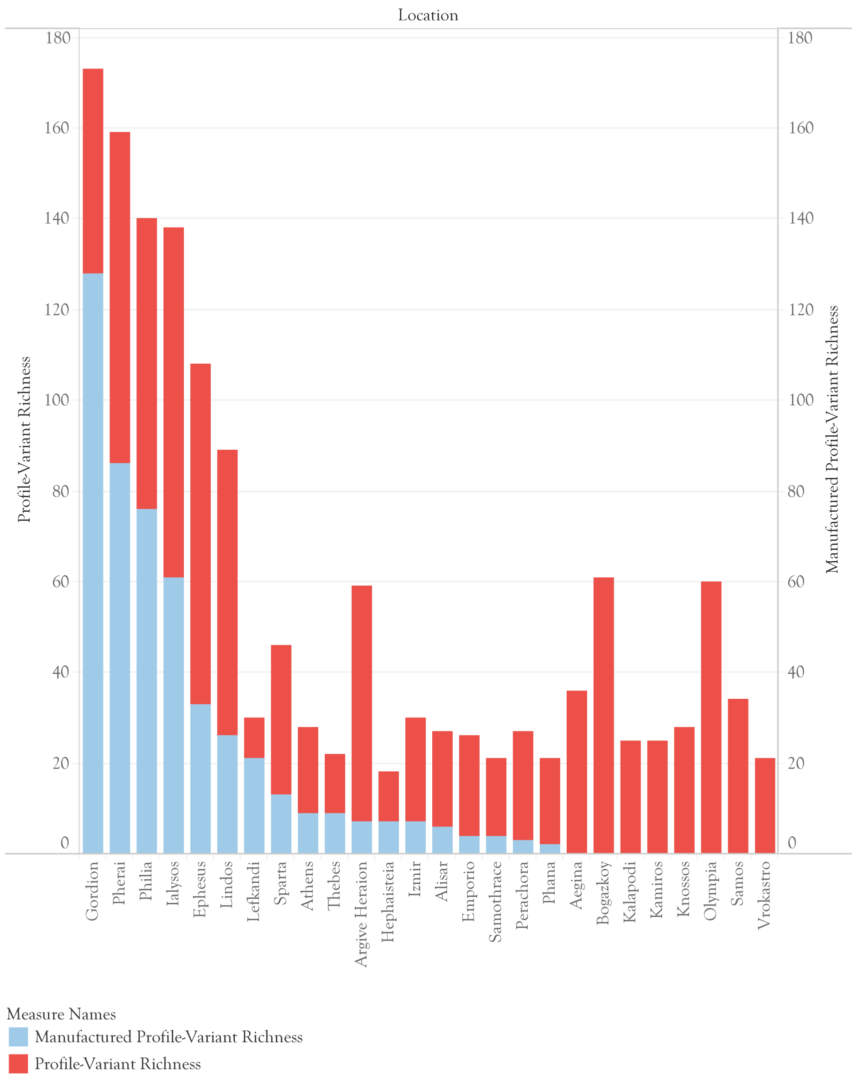


Figure 4.22: Site assemblage and manufactured profile-variant richness (Source: Author).

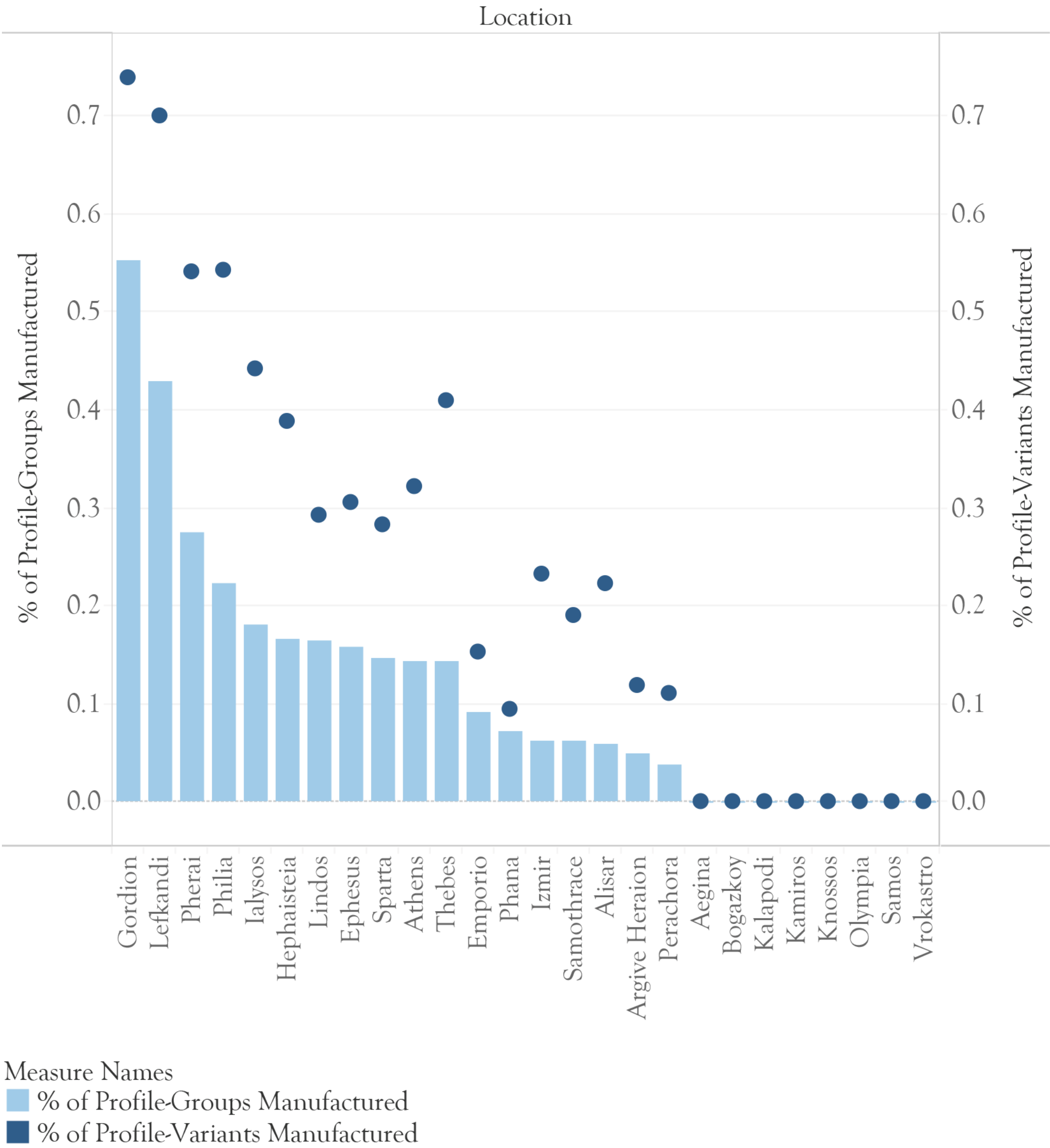


Figure 4.23: The percentage of profile-groups and profile-variants manufactured by site (Source: Author).

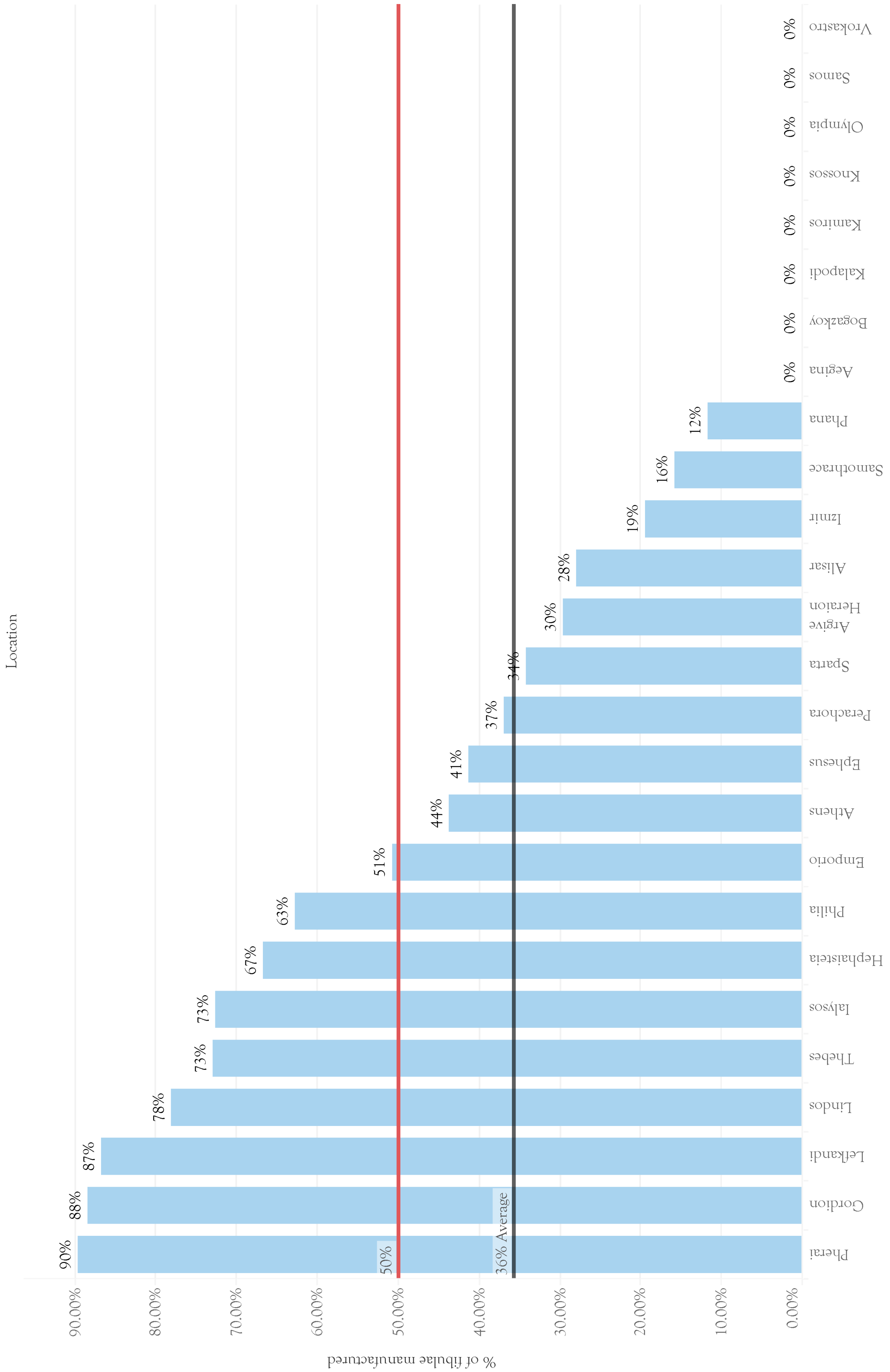


Figure 4.24: The percentage of fibulae manufactured locally by site (Source: Author).

ary sites of Olympia, the Argive Heraion, Samos, Kalapodi, Aegina, Phana, Samothrace, Izmir, and Perachora. The results from Perachora, the Argive Heraion, and Izmir have 37%, 30%, and 19% fibulae produced locally, due to the production of local groups (FAs, FIs, and FJs respectively). The great majority of variants remain imported. There is a possibility that Crete and to a lesser extent the Aegean Islands (save Euboea) produced no fibulae locally. It is possible an itinerant craftsman produced some of the examples, but their production was short lived since the relevant sites possess only a few profile-variants per group. The other possibility is that deposition practices are distorting the results: the sporadic presence of variants being a result of a desire not to deposit fibulae but recycle them into other objects. Yet, if this were the case I should not be able to pinpoint a production location elsewhere. The fibulae from Knossos and Vrokastro (and the rest of Crete) can all be posited to come from the Aegean Mainland, Euboea, or Rhodes. This radical interpretation is consistent with the very low relative count of fibulae found on Crete, as discovered in Chapter 3. Other cemetery sites however, such as Lefkandi, Thebes, and Athens, appear to be producing the majority of their deposited fibulae.

The next major argument I would like to advance is that the unevenness of fibula distribution noted in Plate: 132 is not a distortion by uneven deposition practice or archaeological recovery, but rather an approximate picture of local fibula use in the ancient Aegean and Anatolia. The use of fibulae in dress was not uniform; the low counts in Period 1 (1200-1000 BC) and Period 2 (1000-800 BC) show they were used by not more than a minority of the population, and there were regional differences. Fibulae never became established as an essential item of dress; their abandonment in Period 4 (600-400 BC) only emphasises this. The huge increase in count and stylistic variation in Period 3 (800-600 BC) must be explained for cultural reasons. It becomes clear why three areas dominate the fibula counts in Period 3, namely Pherai, Lindos, and Gordion: the variation is being produced here. They dwarf the data, for the other sites never became loci of fibula manufacture.

The actual movement of fibulae shows diverging results. On one hand, fibulae were not exported in large number relative to the total assemblage. On the other hand, the sanctuary deposits contain almost exclusively imported fibulae. The manufacture data may be placed in a matrix and mapped (Figure: 4.25; Plate: 146). The matrix shows the number of locally manufactured fibula profile-variants found elsewhere. Manufacturers are displayed at the top: thus 40 fibulae likely produced at Pherai are found at Philia, 12 at Ialysos, 11 at Lindos, and so on. The data is ordered so that sites at the left (Location-A) are the largest exporters and sites near the top (Location-B) are the largest importers. Pherai is the largest importer and exporter of profile-variants, but it is only the largest importer because it shares a close exchange of variants with nearby Philia; without Philia, Pherai would move to second largest exporter and joint-eighth largest importer. Gordion is second largest exporter: sending 36 of its profile-variants to Boğazköy and 23 to Ephesus. Gordion imported next to no fibulae, possessing only a handful of variants from other sites. Not a single variant can be shown to have been exported from Boğazköy to Gordion, which scholars might expect if Boğazköy were, contrary to my argument, producing fibulae.

Sanctuary sites were subject to the influx of fibulae, more so than cemeteries (Plate: 151). For example, Olympia and the Argive Heraion each receive 13 profile-variant-types from Pherai, and 7 and 9 from Gordion respectively. That types from Gordion are found at these major sanctuary sites and not a single example can be found anywhere on Crete, and at most only 2 examples from the Aegean Islands, is striking. It strongly suggests that the export of fibulae from Gordion was not an indirect matter: fibulae were not exported and traded around the Aegean. Indeed, fibulae from Gordion have direct export locations: gifts for important deities at major sanctuaries; no doubt in expectation of good favour as described by Herodotus (1.14). It is not clear whether these fibulae were 'converted' offerings, made specifically for a dedication, rather than having a prior use life. The same emphasis lies with Pherai, where its fibulae are exported, the majority are to the major sanctuaries, not cemeteries. Exports from Rhodes are slightly different in nature. Examples from Lindos and Ialysos are found at sanctuaries and cemeteries from Crete to the Asia Minor Coast. That is not to say fibulae from Rhodes were easily exported: the overall numbers are quite low, suggesting fibulae manufactured locally stayed local. Rather,

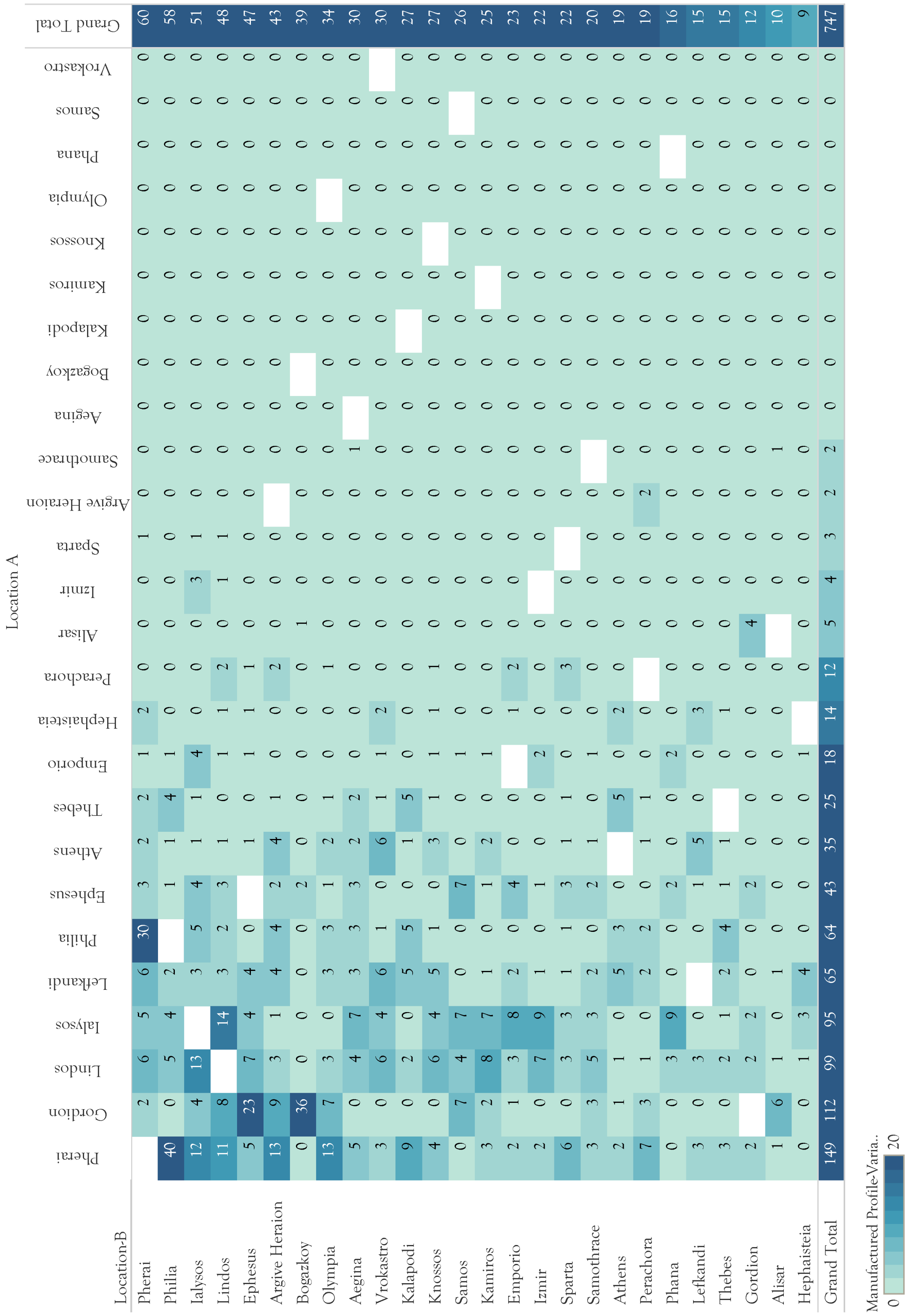


Figure 4.25: Matrix of unique profile-variant exports by site (Source: Author).

it may suggest travellers to Rhodes were able to bring a few home with them. Indeed, the evidence suggests sizeable movement of fibulae was confined locally, between Pherai and Philia, Ialysos and Lindos, and though not so local, from Gordion to Boğazköy.

4.4 Fibula exchange

In terms of fibula exchange there are two elements to consider. One is the value of fibulae that made them desirable and the other are the methods of exchange that give us the specific distribution that has been uncovered. Naturally these features change in importance over time and within each local context of exchange.

Factors of exchange, these are many:

Booty Attestations from ancient authors and representations on pots allude to the fact that raiding was likely widespread in the Early Iron Age (Finley 1977, 54, 63; van Wees 2004, 202-3). Booty bought fame, and trophies, including foreign arms and armour, were dedicated to the gods at local sanctuaries (Ebbinghaus 2014; Niemeier 2016, 241; Whitley 2016). To what extent fibulae ended up in sanctuaries as a result of battle and loot is unclear.

Gifts The notion of gift giving to receive favour or expectation of reciprocity is well known (Helms 1993; 1994; 2013a). Rare, exotic fibulae may have travelled with gifts of textiles (Gleba 2014), and then later dedicated in burial or to the gods.

Imitation The imitation of one imported example is a form of false exchange, where the local copies are indeed local rather than imported. The value of such an item may have been raised if they were still perceived to be exotic. In the case of fibulae imitation, or convergent adaptation, some profile-groups appear imitated; for example between BH and BI, though they are obviously not imitations as the catch-plates, where they survive, are clearly different.

Migrants There are many kinds of migrant who might bring their local fibula, or means of producing fibulae, with them. They may be a person involved in marriage, an itinerant craftsman, migrants in search of new opportunity, or exiles (Gunter 2009, 128).

Pilgrims and Travellers In my mind pilgrims are the most likely cause for the international distribution of fibulae. These are travellers not only with piety as their main concern, but those on diplomatic missions, such as royal emissaries from Gordion, seeking favour from the gods or oracle and military alliances with local city-states. Votives given for safe-passage are also included (Dunbabin 1962; Niemeier 2016, 242-5).

Textiles Though textiles do not survive, the trade in textiles is considered one of the most important to the ancient economy (e.g. Gleba 2014). If it is appropriate for textiles to be fastened with fibulae they may have travelled with textiles for trade or dedication (Neils 2009, 142).

Trade There are two points of view: one argues that trade must have been widespread; the other sees local economies based on agriculture and pastoralism (Bell 2009, 39; Coldstream 2011, 178; Finley 1977, 70; Sherratt 1994, 81). Homer points to non-Greeks, the Phoenicians, who were engaged in trade and Hesiod tells us that wealth is earned from toil of the land; van Wees (2009, 457-60) reads between the lines, by arguing that sea trade was commonplace during agricultural lulls (late-April and August), whilst Winter (1995, 258) considers Homer's 'Phoenicians' as literary trope. 5th century evidence for trade is much clearer, with documented shipping records and taxes (Purcell 2005, 218-22; Yardeni 1994, 70; cf. Revere 1957, 38, 48). Yet, the distribution of fibulae is not consistent with market trade. The distribution of imported fibulae appears to be directed, long-distance exchange, to important sanctuaries (e.g. Olympia and the Argive Heraion). Local exchange is also noted, especially between Pherai and Philia, and between Ialysos, Lindos, and Kamiros.

Possible values of a fibula, these are many:

Bullion The raw value of the material the artefact is made; its weight provides a value when melted down (Linders 1990, 282).

Dedication If fibulae were deemed appropriate to be dedicated to a particular god or the dead, it becomes a valuable artefact-class in that aspect of social life (Baumbach 2009, 204; Snodgrass 1990, 293).

Emotional Fibulae may have possessed an extensive biography of prior ownership through gift giving or as an heirloom (Catling 1995; Whitley 2013a). The number of repairs is consistent with their use before dedication in both sanctuary and cemetery contexts. Personal objects gain an emotional value to their wearer.

Fungibility Whether it was appropriate to exchange a particular artefact-class (Renfrew 2012).

Symbolic Artefacts may be assigned a symbolic value; perhaps representing an identity or social status (Helms 1993).

System stability Artefacts have a value in subsystem stability through several means. One is variation, where a gain or loss of variety may come about to minimise system dislocation (Clarke 1978, 417-20). Another is through agency, where artefacts act as extended agents helping their owners preserve their position (Ebbinghaus 2014, 154-6; Gell 1998, 37).

The results of my network analyses have important ramifications for understanding the exchange, production, and consumption of fibulae in the ancient world. At first sight many assemblages appear similar, but upon closer inspection this similarity dissipates. In general, the evidence shows fibulae did not travel far from their point of production, yet simultaneously, the larger sanctuary sites have drawn in a relatively small number of widely diverse fibulae over long distances. These imports appear to be direct; imported fibulae are not found scattered across small sites on their way to their final destination. This suggests fibulae were neither a commodity for exchange nor a universal item of dress. Instead the manufacture of fibulae was for specific local reasons.

As for the important question of the value of fibulae, this is far harder to ascertain. Value is culturally constructed. Evidently fibulae were rarely valued by the 6th and 5th century when they go almost entirely out of use save for a few areas. Perhaps the most important feature of value is not only the count but the variation. Why did the quantity of fibulae rise twentyfold and diversity tenfold in the 8th and 7th century from the previous period? Does variation reflect a higher value of fibulae at the time, or does it create value itself; is possession of a unique or unusual fibula more valuable than many of the same type?

Chapter 5

Diversity, Style, & Agency

5.1 Methodology part 3: diversity, style, and systems

Diversity measures variety, the number of different elements distinguishable in a given set. Hence, it is the fundamental concept to archaeology as a measure for classification, chronology, and culture. The question is not only how to measure diversity, but of what we are measuring. As I showed in the preceding chapter, measuring profile and catch-plate-variants was useful for looking at manufacture provenance, but is variant-level data automatically meaningful for looking at consumption or chronology? Indeed, consumers may not have been able to tell the difference, and minor details may fluctuate through time without having any discernible chronological implications. A great many variants may be produced in a short time if individualising objects were desired. In other words, if diversity measures difference it is critical to understand which level of difference the analyst is measuring. Let's remind ourselves of the multiple layers of my typology (Figure: 5.1; cf. also Figure: 2.2 on page 47).

On the right I have hypothesised that variant data is useful for understanding production and provenance, group data is pertinent for consumption and chronology, and super-group

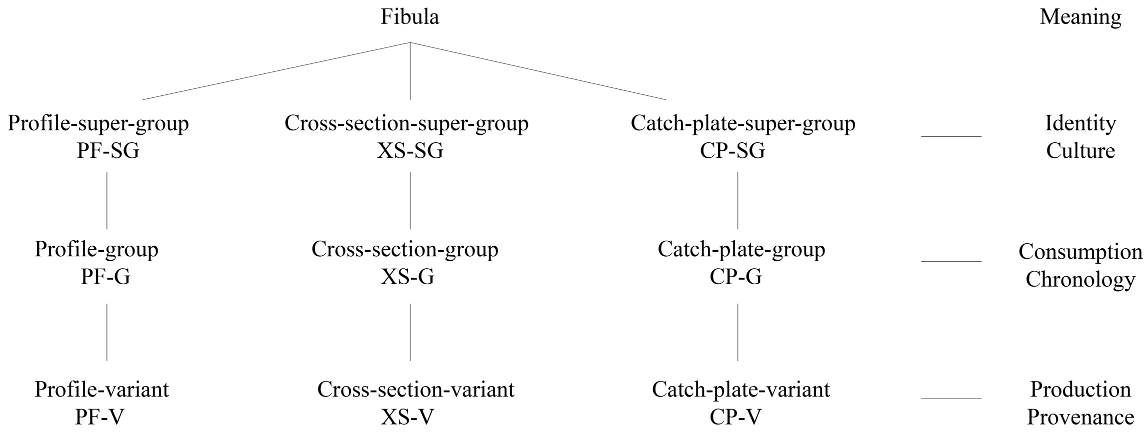


Figure 5.1: A multi-layered typology with different levels of meaning (Source: Author).

data has some relation to identity and culture. I will then be able to see whether my results are shared between the levels, or whether diverging results reveal more nuanced information. Whilst variant data is useful for group and super-group analyses, the analyst may not attempt production or provenance questions where the data is only identifiable at those higher levels. This kind of analysis is not possible with mono-level typologies. Most analysts of diversity ignore typological theory whilst other archaeologists use the term loosely; indeed its varying use is quite hard to follow and so I now present a short review.

5.1.1 Diversity and style in archaeology

Diversity has a rich history. The culture-history paradigm of the early 20th century equated material variety with ethnicity; burial practices, ceramic traditions, or dress accessories were markers of archaeological cultures thought to represent ethnic groups (e.g. Childe 1950, 25; Desborough 1964, 56; Higgins 1969, 144; Sackett 1986, 630; Zerner 1976, 185). This notion was not altogether dismissed by the New Archaeology of the 1960s and 1970s; a key proponent in Britain, David Clarke, instead replaced ‘culture’ with ‘subcultural systems’, be they ethnic, regional, occupational, social, or sex, that material type complexes may be part of (Clarke 1978, 249-61). This was criticised by Binford (1965, 208; 1972, 114), who tried to shift explanation away from the traditional notion of culture to understanding practice in three areas: 'style zones', 'interaction spheres', and 'adaptive areas'. The idea of style zones is relevant here, being a horizon of formal properties of artefact-types without any cultural baggage. For Clarke (1978, 36-7, 317, 412), material culture was polythetic, as were the systems they transposed across. Although Klejn (1982, 62-3, 252-5, Fig. 21) considered this too simplistic, it does allow for the study of how and why artefact variation relates to subcultural systems in particular contexts (cf. Shennan 2004, 7). Yet, at the same time numerous challenges to any straight-forward relation between material culture and culture were being made; the nature of material variation needed to be assessed in its own terms (e.g. Binford 1962, 217-20; 1963, 106; 1972, 127, 151; Hodder 1982; cf. Clarke 1978, 405, note 1; Shennan 2004, 12). The reasons for the disassociation between artefacts and culture were many, not only an emerging symbolic and functional dichotomy, but also concern with manufacture and seasonal occupation (Dunnell 1988; Schiffer 1972). Why, in any case, did visual culture, or style, have to relate to culture:

> The standard representation of the divinity might be different, yet every other cultural parameter connected with the divinity remain the same. In fact, it is an error to imagine that 'culture' in some general sense, is responsible for the visual style of artefacts. Culture may dictate the practical and/or symbolic significance of artefacts, and their iconographic interpretation; but the only factor which governs the visual appearance of artefacts is their relationship to other artefacts in the same style (Gell 1998, 216).

This is a reminder that culture does not necessarily have a possessiveness over variety, and that style can operate independently from subcultures. Yet, however many styles and subcultural processes operate within a culture, a culture is still, in many respects, the sum of its stylistic parts (Gell 1998, 153; cf. Gosden 2005, 196-7). Style therefore, is multi-variate and multi-scalar. In my case, from the level of variant to super-group as from person to culture (Zerner 1976, 186; see above on page 21). Teasing out the diversity, especially layered diversity, helps understand how material culture reflects past populations. The principal question to ask is, what is the diversity for?

5.1.1.1 Creating diversity

Variation arises from the hand of the artisan, and is a meaningful reflection of practice. So, for example, rising diversity may reflect heightened innovation to supply a demand for individualising things for competitive advantage (Knappett 2005, 148-50). It could suggest an increase in cultural contacts; a melting pot where diverse cultures and ideas were shared. Indeed, material can come to mediate such interaction where, for instance, Riva (2010, 84) has argued metal-imitating Bucchero became a transcultural *techne* between the Greeks and Etruscans.

Here diversity creates identity through practice rather than reflecting a fashion. Conversely, a lack of diversity is often said to have been consistent with a rigid political structure. A high degree of control over production could maintain a political ideology, prime examples being the 'Potemkin palaces' of the Mycenaeans, too rigid to adapt to collapse, or the consistent visual machine of Neo-Assyrian art as an enforcing agent of imperial power and ideology (Feldman 2014, 79-110; Sherratt 2001; Winter 1997, 376; 1998, 57). These scholars are essentially looking at material culture as a processual mechanism in what Clarke (1978, 469, Fig. 111) called an information system:

> Information cannot be transmitted in larger quantity than the system's variety allows and the greater the number of connecting channels or networks, the greater the number of coded means of intercommunication (artefacts, activities, speech, writing, etc.), the greater the regulatory potential of the system as a whole (Clarke 1978, 91).

Variety in this way can act as regulatory insulation, redundancy, or a number of oscillating factors as shown in Clarke's general model (Figure: 5.2; Clarke 1978, 73-7). Variety, for Clarke, was essential for system continuity (ibid. 418). Here artefacts have an affective value removed from a mere economy. Yet, how would an analyst measure the affect of an artefact-class?

Figure 5.2: Clarke's general model C (Clarke 1978, 73, Fig. 11).

5.1.1.2 Diversity and society

Diversity can also be discussed in social terms and social stratification. Whitley (1991) rightly argued that regional material diversity presupposes social diversity in Early Iron Age Greece. Regional diversity is not just found by a diversity of material culture, but whether 'the manner of its production, consumption and deposition, is structurally and thus meaningfully related to particular forms of social organisation' (Whitley 1991, 345). For Whitley, this was to be achieved by contextually analysing symbolic systems with ethnological analogy (cf. Hall 2003, 25). Whitley concluded that the material diversity of Early Iron Age Greece showed no settlement hierarchy and no uniform social organisation. Rather, there was a single interaction sphere for 'aristocratic' gift exchange amongst 'big-men' by the end of the 9th century, as alluded in Homer (Grethlein 2008, 36-7; Hall 2014, 127-34; Lemos 2002, 218; Whitley 1991, 364-5; 2016, 216). These explanations suggest diversity is purposeful and agent-led (cf. Schiffer and Skibo 1997, 43); but it remains unclear which features of variety are most important, and important to which subcultural elements.

5.1.1.3 Measuring diversity: style or function?

There is some debate, or confusion then, over material diversity and culture, and especially the substance that scholars measure: style and function. How can I bring all of these elements together? Systems archaeology goes some way to isolating the different parts, regardless whether one uses Clarke's (1978, 249-61) subsystems or Binford's (1965, 208) systematics. The challenge of this approach concerned how to quantify each part, and even if that were achieved how to measure them together? Yet, a contextual approach such as Whitley's falls short of explaining how each regional subsystem worked, or how it could be measured. Rather than working with systems models, scholars have instead argued over where the variability lies within each. Binford's (1962, 219; 1965, 207; 1989, 56-9) method, to separate the primary functional attributes (e.g. technology) from secondary functional attributes (e.g. style) of objects, and to use multiple taxonomies, as opposed to Sackett's (1986, 630; 1990) isochrestic model which treated both together, was not resolved. Isochrestic variation means equivalence in use, resulting from craftsmen selecting different styles for objects which ultimately provided the means to the same end. More recent scholars have continued to argue whether variation is functional or stylistic, treating the former as evolutionary and the latter as stochastic, as discussed above (see Figure: 4.3 on page 144). Cultural drift, and stylistic variation, they argue, is non-meaningful. Binford (1963, 91; 1965, 204) already questioned this, citing Aberle, who stated that style, and the choice of adopting a new style, was a psychological choice, undermining this peculiar false dichotomy (contra Dunnell 1978a; 1978b, 199; O'Brien and Lyman 2003, 17-20; Schiffer and Skibo 1997, 32-4; Shennan and Wilkinson 2001, 578; cf. Brantingham 2007, 396, 406).

Perhaps the oddity arises from our own conception of style and function? If an anecdote is allowed, I recently described the top priority of Anouska Hempel Design (where I work), for any project, as beauty. I was addressing the founder of the London School of Architecture at Somerset House: how did they teach beauty in architecture? The reply, that it does not feature on the curriculum at all was peculiar; beauty for this architect, it seemed, had no role in architecture. To say that style is culturally perceived is true but to say that in certain cases it has no meaning or efficacy is false, regardless of belief, as I shall show. The reality is that 'decoration is intrinsically functional, or else its presence would be inexplicable' (Gell 1998, 74). All material variation is chosen and manufactured by artisans; the real question is not whether it is meaningful, all variation is meaningful on the individual, idiolectic level, rather, does it have an effect on the cultural-subsystem? Indeed, it is agreed that styles will have different meanings in different contexts, but it is not necessarily meaning but effect that is important, as I shall show. The key question, what is variety for, I hope to answer in terms of agency and culture in Section 5.3. Explaining what variety is for in particular contexts circumvents peculiar arguments about style and function. To what extent, then, is stylistic diversity as important for my research questions, as structural diversity is in material practice? Indeed, if style is practice, we may look to style itself and not just 'practice' to address culture (cf. Binford 1965, 205; Robb 2015, 167). Yet, how does a particular artefact-class fit into cultural subsystems in any particular cultural context?

My evidence, jewellery, and my typology, is concerned with style at multiple levels (discussed above on page 21). Style, I argue, is the principal attribute of a fibula's meaning and relevance in subsystems, as opposed to the functional characteristics, such as the strength and weight. The key is stylistic variation. For Gell (1998, 162-3), styles are relations between relations; existing in opposition to other styles, they form a corpus or work of an individual or workshop. In this way, a culture (traditionally including the concept of ethnicity) could happily exist with multiple styles. Certain styles, like the English Enfield and German Mauser rifle have an ethnic dimension (Sackett 1986, 630; cf. Binford 1989, 61), in a similar way that a Corinthian helmet was prized at Olympia (Ebbinghaus 2014, 152-3). On the other hand, this is not so easy to understand in prehistory; the Naue

II sword seems ubiquitous, and personal items seem scattered across regions and style zones. Styles can come to have a personal dimension, 'as a sacred thing, as the man himself' (Beazley 1956, x; cf. Feldman 2014, 20; Gunter 2009, 87; Whitley 1997, 40), but this element is less important than the independent entity a style becomes in the minds constituting a cultural complex. More recently, Feldman (2014, 44) has defined style as, following Bourdieu, the process of social practices and collective memory, a repetition of patterning, and Gunter (2009, 102) has emphasised technological styles (see also Schiffer and Skibo 1997, 28). Yet, how can I measure between the meaningfulness of multiple overlapping styles in the archaeological record? In other words, which styles (or artefact-classes) are more important?

5.1.1.4 Summary

This thesis considers there to be *multiple* levels of styles inherent in *individual* classes of object. My starting point was then, if variants measure production I am investigating practice; if groups measure consumer demand I am investigating consumption practices; if super-groups measure identity I am investigating cultural interaction. Fibulae are a very personal item, and as I continue to think about their levels of style, and their position in several sub-systems, notably burial, every-day life, and religion, I aim to understand their value in the Early Iron Age. Not their exchange value, but their value in those systems, and in keeping them in equilibrium. This may account for their immense rise in diversity and popularity in the 8th and 7th century.

Quantifying these data highlights which variants came to be important and why, hence my very careful consideration of typological theory may become fruitful. Indeed, my *etic* arrangement of types needs to be analysed as important information in itself, not just as a tool for chronology or culture. The variety, or degrees of similarity, existing between different types is an important piece of information known as inter-object citation: 'a feature of those objects that are made in awareness of, or in dialogue with, other objects... a quality that most objects have, but not all' (Sørensen 2015a, 89). Rarities, or unique objects, then, are not typologically insignificant (contra Whitley, pers. com.; Porčić 2015, 1072): quite the opposite, unique variants (there are 338 unique profile-variants in my typology; some 38% of all profile-variants) show something of the character of the communities that made them, perhaps artistic curiosity, mode of manufacture, or demands of the consumer (cf. Etter 1999, 295; Feldman 2014, 17; Sørensen 2015b, 742). In other words, it is variation that is worthy of explanation, and scholars need a set of tools to measure them alongside those suitable for larger samples. If measuring variety of style leads to the explanation of what it, and the resulting styles, were for, the next question is how do I measure it? This is followed by how it occurs, and what does it mean? For if I can answer these questions, I can begin to look into the systems that created it.

5.1.2 Measures of diversity

To reiterate, diversity is the primary analytical concept in archaeology: variation accounts for 'man's extrasomatic means of adaptation' (Binford 1965, 205) on the one hand, and system continuity and dislocation on the other (Clarke 1978, 418). In archaeology the term diversity, when not used loosely, has mostly come to refer to several measures of variation.

Variety ratio

In its simplest form the analyst can take a count of an artefact-class (e.g. fibulae) and divide by the number of variants (i.e. diversity). This provides a rate of variation in the form of a ratio e.g. 1:5. For every five new examples, if the sample is homogeneous, there is one new variant. The ratio is thus a measure of stylistic similarity; again demonstrating the critical importance of typology in archaeology. I call this ratio the 'variety ratio', and it suffers less from age old problems, such as site size and occupation length, than other measures.

A larger site inevitably has a greater diversity but it does not necessarily have a greater rate of variation. Indeed, if the rate of deposition is consistent with the rate of production, the rate of variation should be consistent, allowing comparison of sites of different periods and size. The problem instead lies with deposition practice: a manufacture site may have a consistent variety ratio, but a cemetery may not, as sporadic deposits may be made out of kilter to the actual variation in circulation at the time (see above Figure: 4.2 on page 143). For this reason, variety ratios are not often seen in archaeological literature (cf. Shott 2010, 890).

Richness and evenness

Instead, archaeologists often measure richness, the total count of distinct types in an assemblage, and evenness, the relative proportion of types within it (Kintigh 1989, 26). In other words, richness is essentially synonymous with variety; if scholars say total variety they mean total richness, whilst evenness shows us whether the variety is dominated by a few types or not. The sample size causes the greatest problem: assemblage richness is limited by small sample sizes, whilst larger assemblages inevitably have greater richness, which can reach a plateau of maximum richness (Shott 2010, 889-900). Occupation span has similar issues. One method attempting to circumvent these problems is random sampling. Kintigh (1984, 45; 1989, 26-9) showed how the analyst could estimate an expected diversity at any given sample size by creating random samples, then plotting the real data to see if an assemblage were more or less diverse than the 'background population' would suggest. A classic example is Conkey's analysis of Magdalenian sites in Western Europe. Conkey (1980, 618-20) argued that sites with a greater diversity (i.e. assemblage richness) were aggregation sites as opposed to dispersion sites with low diversity. The question was whether Altamira's engraved bone assemblage was, in fact, significantly more diverse in terms of richness than at other sites, for it had a much larger sample size. Using random sampling Kintigh was able to show that it was: Altamira's assemblage was more diverse than expected (Figure: 5.3). Nevertheless, the problem of ascertaining the

Figure 5.3: The classic case of Altamira: expected diversity based on random sampling (Kintigh 1984, 48, Fig. 3).

background or 'parent' population has not been resolved (Baxter 2001, 719; McCartney and Glass 1990, 526; Shennan 1997, 51; Shott 2010, 889; Steele et al. 2010, 1349). Estimating a population through sampling in archaeology is wholly problematic since the sample is rarely representative of in-circulation material but instead deposition and post-deposition practices, and so here I do not conduct random sampling (Etter 1999, 290). Nowadays, scholars tend to use Nieman's (1995) work, which takes into account evolutionary archaeologist's expectations of neutral evolution, or cultural drift (Porčić 2015, 1072; Premo 2014, 106), but these still do not adequately overcome the foundational problem of the method, not how to measure diversity, but typology itself.

Thus, whilst the tools for measurement have advanced, like the tools for network analyses have advanced, the basic problems have remained the same for the last 50 years.

Moreover, recent articles on cultural drift and evolution do not cite earlier works on the same topic (such as Binford 1963). For example, Porčić writes:

> Recently, Madsen (2012) and Premo (2014) found a potential problem with the application of neutrality tests in archaeological research. They pointed out that archaeological assemblages are a result of cumulative processes rather than synchronous snapshots of the past (Porčić 2015, 1074).

In short, whilst the technical complexity of the measures increase, perhaps as a desire for progress, a loss of awareness of the wider issues, such as typology or deposition practice, seem to go hand in hand. First, recent scholars tend to ignore variation because of small samples or unique artefacts; small samples being somewhat incompatible with quantitative techniques (e.g. Jennings 2016, 97; Shennan 1997, 79). Second, simulation and theoretical advancements seem limited for they focus on too narrow a range of explanations, and do not question the validity and meaningfulness of the typologies used (Shott 2010, 902). Third, the complexity of the artefacts, often broken or without full information, conflict with ever more precise tools. This is why I am able to go back again to Clarke and Binford, each time finding the issues have been encountered before. I argue the primary goal cannot be to refine the method of measuring diversity further without focusing on the critical question: why does variation occur?

There are three schools of thought encountered in this thesis. First, ignore the issue and create a descriptive best-fit typology of available data (e.g. *Prähistorische Bronzefunde*). Second, measure cultural drift, arguing most stylistic variety is stochastic and non-meaningful. Third, argue variation is used to minimize the maximum amount of immediate system dislocation, but to what extent in each subsystem is up for discussion (Clarke 1978, 418). In fact, these explanations of variation still, on one hand, lie heavily on Montelius's (mis)interpretation of 19th century AD Darwinian Evolution, where each innovation takes its place in a line of ineluctable progress towards complexity (Sørensen 2015a, 86-7), or a wholly arbitrary construction of types on the other (Clarke 1978, 155-60; Read 2007). By 'arbitrary' I mean being abstract in relation to cultural meaning, by

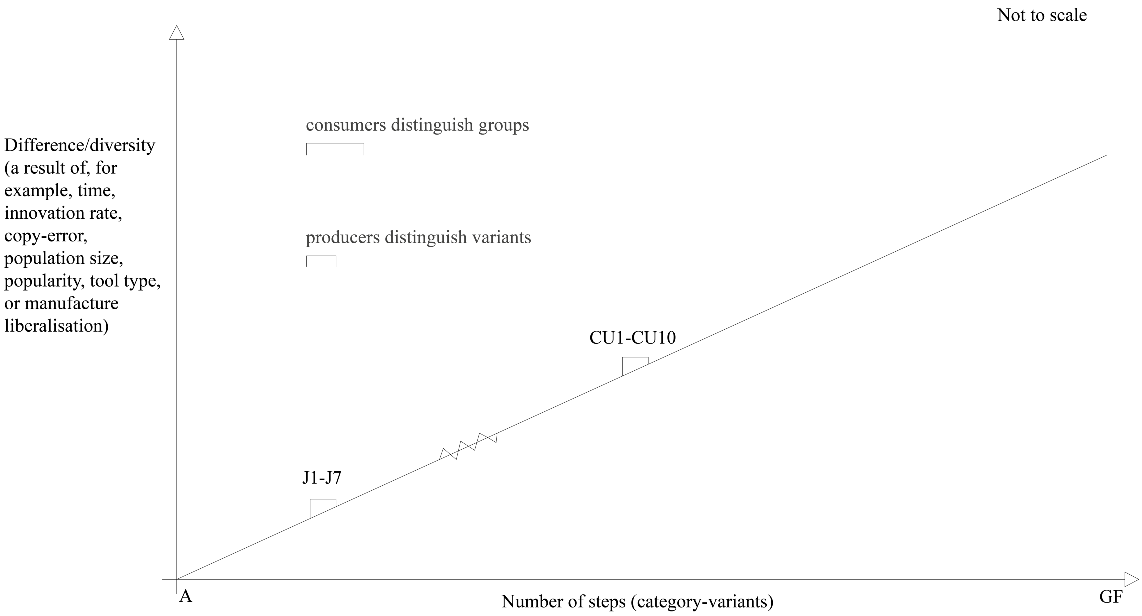


Figure 5.4: Variants of equivalent value, where the difference between a profile-variant J3 and J4 is roughly equivalent to a CU1 and CU2, whilst the difference between a J and CU is markedly greater than between a J and K. (Source: Author).

taking all measurable observations and calculating them together. The latter approach was heavily criticised by Klejn (1982, 262-73), for if you have no inkling of why you are measuring certain attributes you may as well be including observations not even discernable by those who used or made them.

Regardless which theoretical viewpoint is taken, there are in fact multiple factors that determine the amount of variety in the material record, and it is somewhat remarkable that scholars get away with making what appear to be reasoned arguments based on just one or two, or indeed consider that their chosen factors have an effect on all the material. To the contrary, all factors are at play, and each artefact was subject to multiple different ones depending on its context. The chart of my typology (Figure: 5.4) shows the incremental steps of types (x-axis) as an increase in stylistic complexity (y-axis) in absence of chronological data (see above, Section 2.3.2 on page 55). Types close together thus have a greater stylistic similarity to those further apart, and the reason that certain groups have more variants, or are further from others, is therefore important, as discussed in the next subsection (Etter 1999, 302). To recap, I have three measures:

1. Variety ratio: the number of objects per variant-category, looking at the rate of variation within each (be it super-group, group, or variant).

2. Richness: the total number of variants, measuring how diverse a site or artefact-type is; richness being the general meaning of variety. When I say an increase in variety I mean an increase in richness.

3. Evenness: the relative proportion of variants an assemblage or artefact-type has, to see whether certain variants dominate (suggesting local production) or whether it has one of each (suggesting importation).

5.1.3 Factors of diversity

Factors increasing variety, these are several:

Time Sites with longer occupation span may have an increased variant richness for having a larger assemblage. At the same time, this richness can plateau at the maximum variation in circulation, and a large assemblage can appear less diverse than a smaller assemblage. Likewise, a site with short or seasonal occupation may have only part of in-circulation variation.

Population size A larger population is said to increase richness simply due to the increase in man-hours of production (Dunnell 1988, 187; Shennan 2004, 13). Central-place 'hub sites' are expected to have an increased variety due to increased external contact (cf. Binford 1965, 204).

Tools and materials In an experiment 60 persons were motivated to faithfully reproduce a hand-axe using a plastic-knife or metallic-peeler; the markedly different results emerged from a difference in behaviour not intent (Schillinger *et al.* 2017, 650-4). In the case of fibulae the majority were made individually, by sculpting a wax model to create an investment mould. With two-piece moulds identical pieces could be manufactured more easily (see Section 3.1.8 on page 123). It is easier to make variation, willingly or not, using the former method (cf. Gunter 2009, 105). Finally, metal composition affects the workability for decorative incision.

Copy-error The number of errors made through copying, closely correlated to tool type, and the individual nature of production, increase the chances of error. This is one of the main forms of cultural drift, where there is a break from social learning, the idea not being replicated from 'parent to child' (O'Brien et al. 2016, 76; O'Brien and Lyman 2003, 2; 2009, 235; Shennan 2011, 1070; Steele et al. 2010, 1350). The result is exponential; the artisan may copy his error over the original type. In the 20th century AD scholars were less reserved in criticising some fibulae for maladroitness, but in fact, most commented on the technical achievements of pieces whether they appreciated them or not (Hampe and Simon 1981, 111). Fibulae were made by specialists with close control over composition, smelting temperatures, and manufacture techniques. I posit only an insignificant number were mistakes. The related argument, to suggest minor changes (drift) were not important to overall cultural progression (e.g. Porčić 2015, 1072; Shennan and Wilkinson 2001) is simply erroneous.

Manufacture liberalisation If there are many manufacturers there will be higher richness. Controlled manufacture, at a palace workshop, is likely to produce less variety, unless the patron demands individualising items (e.g. Feldman 2014, 28; Knappett 2005, 148). Thinking in terms of networked practices, itinerant craftsmen inevitably have more prototypes to choose from (Feldman 2014, 31-5; Gunter 2009, 83).

Innovation and invention The rate of innovation is dependent on the previous factors, but is also due to curiosity and demand for individualising goods, as well as technological inventions of superior goods (e.g. the Pivot fibulae: profile-groups CK-CKδ and CM-COδ). There is also the question of artistry, imagination, technical virtuosity, and competition (Gell 1998, 38-9). Evolutionists call this 'anti-conformist bias' (Porčić 2015, 1076).

Practical use The use of fibulae for different weights of clothing will create variety of sturdiness and size. Fibulae intended as 'converted' offerings will not need to have such physical characteristics (Snodgrass 1990, 291), unless they were intended to be used by the god or in the afterlife (Muscarella 1967a).

Fashion Certain styles will be favoured for social, symbolic, or aesthetic reasons, as well as tools for secondary agents (discussed in Section 5.3). These factors may have a greater role in jewellery for they being very personal items. I might expect popular styles to have a high regional spread, if the exchange network allowed it. Indeed, popular styles may or may not have increased variety. Consumers may wish for an exact variant copy, as close as the real thing rather than a cheaper imitation.

Imports/exchange Imports add variety that is easy to spot, and also allow for increased innovation and adaptation, where craftsmen borrowed certain elements and adapted them, increasing the pool of available prototypes. The borrowing of foreign prototypes is likely to increase in relation to their perceived value as exotica, rarities, or godly association (Crema et al. 2014, 289; Gunter 2009; Helms 1993, 158; 1994; Whitley 2016).

Factors reducing variety, these are several:

Tradition A desire to keep things as they were; to maintain a status-quo or consistent message such as imperial authority. Evolutionists call this 'conformist bias' (Porčić 2015, 1076). This would normally affect super-group and group-level variety, for variant-level variety may not be noticeable to a consumer/observer.

Controlled production A monopoly of production will act to reduce richness. Variety may become very uneven with a few variants having much higher than usual artefact counts.

Social learning Consistent reproduction of the master's design or patron's request.

Imitation The close replication, rather than adaptation, of desirable objects such as exotica.

Isolation Lack of contact and interaction, thus reducing the pool of available prototypes.

Natural selection The selection of the most functionally efficient variant acts to reduce variation (Brantingham 2007, 407).

Unimportance Where variety is not deemed necessary. Evolutionists would say the object is not under selection and not important in the cultural subsystem. Such a view might argue that a functional priority (e.g. for the Naue II sword) dictates the style to stay the same, or not to be over-invested in scarce resources or time.

Summary

It is evident that some of these factors relate to multiple levels of subsystems and agency, whilst only few could be described as random. It is also clear that some variety occurs (or is lost) through archaeological examination or difficulty in method (such as pinpointing time or population size). Yet, to some extent, all these factors can be understood for our data set. If the analyst can measure where the variety comes from, they can begin to explain why it occurs and what it means. This is the goal of this thesis. Understanding the variation at multiple levels of meaningfulness significantly adds to the network analysis of the preceding chapter. Variety has meaning that is abstracted or overlooked in network analyses that tend to identify similarity at the loss of meaning.

5.2 Assemblage diversity

5.2.1 Assemblage richness, evenness and ratio

The first analysis is of site assemblages. To alleviate the well-known problems of small samples I take sites that have at least 30 fibulae identifiable at profile-variant. 28 sites pass this test (data with small samples are included in Section 5.2.2). I take these sites with their profile-variant counts in a simple matrix, finding that out of 888 profile-variants, 759 are present at these sites in question (85%), whilst the total sample is 6,251 from 7,389 identifiable profile-variants (85%). Using Past 3, I compute this data for diversity indices: Count (Individuals), Richness (Taxa_S), and Evenness (e^H/S); the Ratio computation is simply the count divided by the richness (Appendix C). Profile-group, profile-super-group, catch-plate-group, and catch-plate-variant data is also calculated.

5.2.1.1 Profile assemblage diversity and sample size

Profile richness

The biggest problem with richness is sample size. As assemblage size increases, richness also rises until it reaches a plateau: a total variation available at the time. However, this problem affects the multiple levels of typology differently (Figure: 5.5). The gold line shows the fibula count whilst red dots show the richness. The general trend is for richness to increase with sample size, but it does not do so at the same rate. There are three points of fundamental importance in this chart. The first is that profile-group and especially profile-super-group richness operate independently from assemblage size; the fluctuations thus show real differences in their character and importance. I could posit that sample size increases with profile-variant richness (within-group variation), as more errors and minor innovations occur. Yet, whilst this is the case with the five largest sites, it has no such correlation for the profile-group and profile-super-group. Profile-group and profile-super-group-level richness barely increase with the tenfold rise in fibula count. The second concerns the importance of super-group richness. Looking at profiles it is clear that super-groups represent a high-level group of styles, each quite distinct from the next. In many respects the richness of super-groups should equate to the power and importance of a site in securing access to a far-reaching, worldly selection of fibulae. A rank that I might expect to be roughly similar across other areas of material culture, institutions, regional clout, and, potentially, exotic visitors. The super-group richness turns a ranking based on profile-variant richness on its head. If I take Lindos as an example, its profile-super-group richness is 23, the same as Olympia's, and less than the Argive Heraion's at 24, and yet, Lindos has an assemblage size 10 times larger than those sites. Pherai and Philia, with huge variant richness, have 25 and 18 profile-super-groups respectively. Small assemblages, such as Aegina's identifiable profile count of 55 contains a powerful profile-super-group richness of 17; Aegina having its hands in some 49% of all profile-super-group styles. The third point is that I can begin to see how the character of assemblages differ by site-type and date. Important sites like Lefkandi have a profile-super-group richness of only seven, no doubt because of its early occupation-span where international connections were fewer than in the 8th and 7th century. Gordion too, whilst richest in profile-variants, has only 12 profile-super-groups, likely due to its peripheral location: styles from Gordion radiate towards Greece, but never the other way round. I could argue from this data that Gordion was closed, culturally speaking, whilst the Aegean sanctuary sites were open to visitors and/or the dedication of inter-regional loot. Sites with high profile-variant richness were likely manufacture sites, but this must be corroborated with the evenness and ratio data.

Profile evenness

Evenness represents how even the assemblages are. An evenness of 1 indicates an equal number of fibulae per type, whilst a low evenness shows relatively few types dominated by large counts. It is clear from the chart that evenness reduces as the sample size increases,

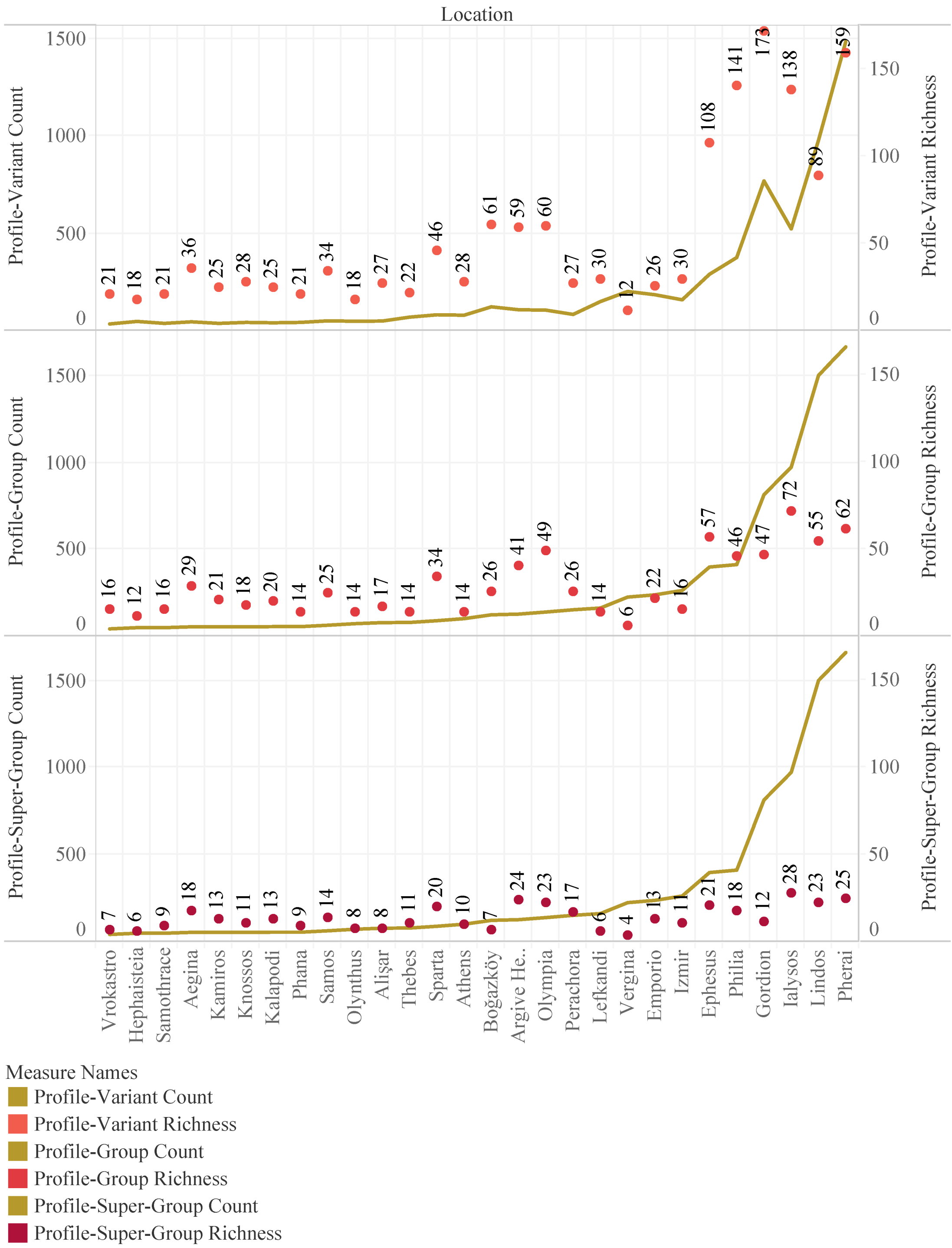


Figure 5.5: Site assemblage profile richness (Source: Author).

but there is bumpy variation along the way (Figure: 5.6). The data is ordered by profile-group counts. Counts are marked with gold lines and evenness with blue dots. I anticipate manufacture sites to have low evenness and import sites to have high evenness. For example, Vergina has a very low evenness for its sample size, suggesting local manufacture of few variants. Olympia has high evenness, suggesting little if no local manufacture; it has one or two of a larger number of variants. The Argive Heraion and Perachora would have a similarly high evenness if they did not manufacture a portion of their assemblage: the round brooches (profile-group FI) at the Argive Heraion, and the bone/ivory spectacle plates (profile-group FA) at Perachora. It should be noted that Philia has a higher evenness than Pherai, indicating a difference in manufacture or dedication practices at the two nearby sites. Pherai was likely the larger manufacturer. This evidence is consistent with my network data and manufacture tests (Chapter 4).

Profile Variety Ratio

The variety ratio is drawn directly from sample size divided by richness, so I expect it to share the sample size issue. However, when I look at profile-group and profile-super-group variants they appear independent from this problem. The sample increases in size by 10 whilst the ratios increase no more than two or three, and they do so inconsistently (Figure: 5.7). The data is ordered by profile-group counts. Counts are in gold and ratios in green. It is easiest to see a pattern against the evenness data, and when letting both scales fill the chart (Figure: 5.8). The data is ordered by profile-variant evenness. Crucially, about half the sites have a profile-variant ratio of less than two. For every two fibulae there is a new variant. This is consistent with the profile-groups, for every three fibulae there is a new group. This is a very important point, and it is quite significant that many sites sit around 1.5 - 2. Equally, they have a high evenness: no fibula-variant dominates the group, and they also have a high richness despite the low count of fibulae. The chart is annotated with the hypothesis that the first 12 sites imported their fibulae, with little or no local production. The next six had mixed production and imports. Note, the important

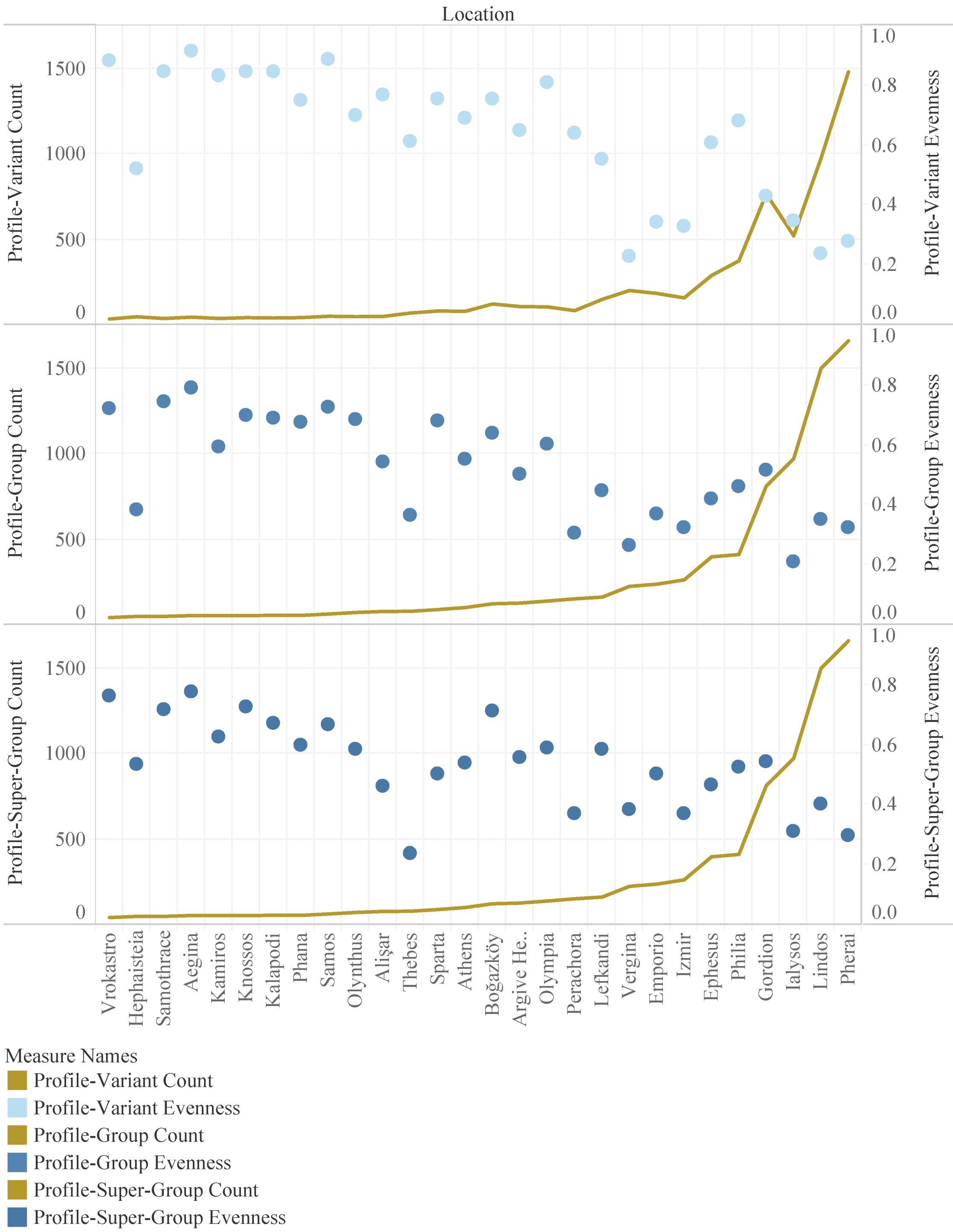


Figure 5.6: Site assemblage profile evenness (Source: Author).

sanctuaries lie within the first 18. Finally, the remaining 10 sites are posited to be manufacturers of fibulae: the ratios are high and the evenness is low. If I were an expert on each site I would agree with this, consistent with the previous chapter. Looking at numbers site-by-site I see that at the manufacturing sites a small number of similar variants or groups dominate the assemblage, with as many as 50-200 of the same profile-variant, whilst at the importer sites, the sanctuaries in particular, there is only a few of each variant.

The reality is not as straightforward since there are other factors that can influence these figures. For example, a cemetery site may have a low ratio and high evenness, not because it were importing fibulae, but because only a handful of fibulae were given to the dead at time of burial, and the next preserved burial with fibulae might have been 10 years later, meaning in-circulation fibulae are missing from the record. I wonder whether this might have been the case at Vrokastro or Knossos, where the occupation span is quite long yet the overall number of fibulae small (Coldstream and Catling 1996; Hall 1914; Hayden 2002). Knossos has, however, a large number of super-groups, and a low ratio of 5 fibulae per super-group, suggesting that it is in fact importing all of its fibulae (Catling 1996, 554), and Vrokastro is not far behind with a ratio of 6.14. Whilst Knossos and Vrokastro are not suited for comparison in terms of date or interment, many being collective tombs, the low profile-super-group ratio is striking, overriding these difficulties. In question is not the rate of deposition but the rate of variation, the chance that the next fibula will be of the same or a different super-group. When I turn to big manufacturers such as Gordion, Pherai, and Lindos, whom all have very high profile-super-group ratios, between 65 and 68, peculiar in itself, the ratio at variant-level is interesting. Gordion has half the profile-variant ratio, and so double the ‘innovation rate’ of Pherai and Lindos, yet its variety is being produced within a more limited set of profile-group and profile-super-group styles, being in a different ‘style zone’. Vergina, with the least even diversity, is an anomaly on all charts, and it is indeed a very odd site, with a very low profile-group richness. Almost all of its burials containing fibulae have the same spectacle fibulae (profile-group EX), which goes to show a very different dress and fibula use, perhaps looking more toward

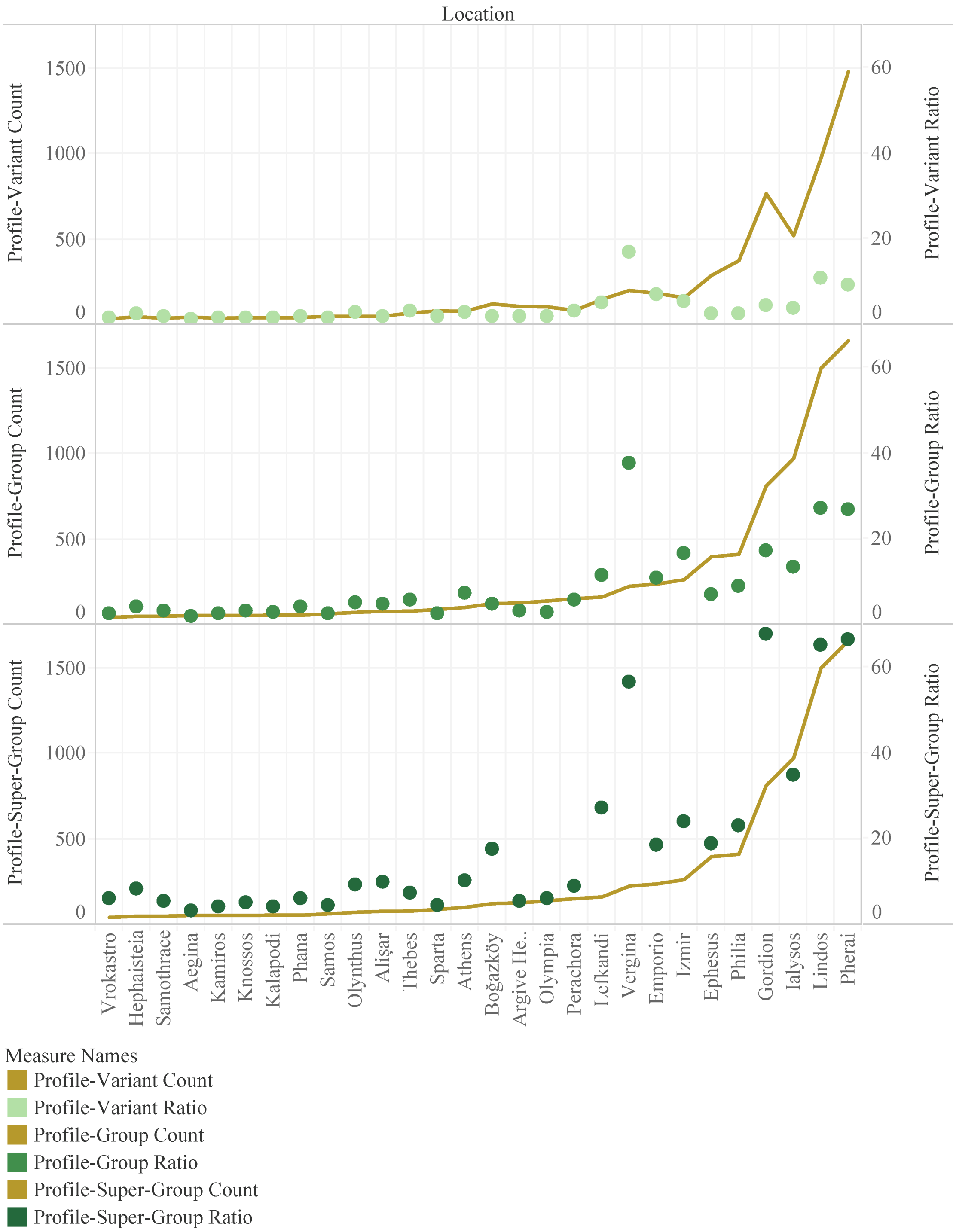


Figure 5.7: Site assemblage profile ratios (Source: Author).

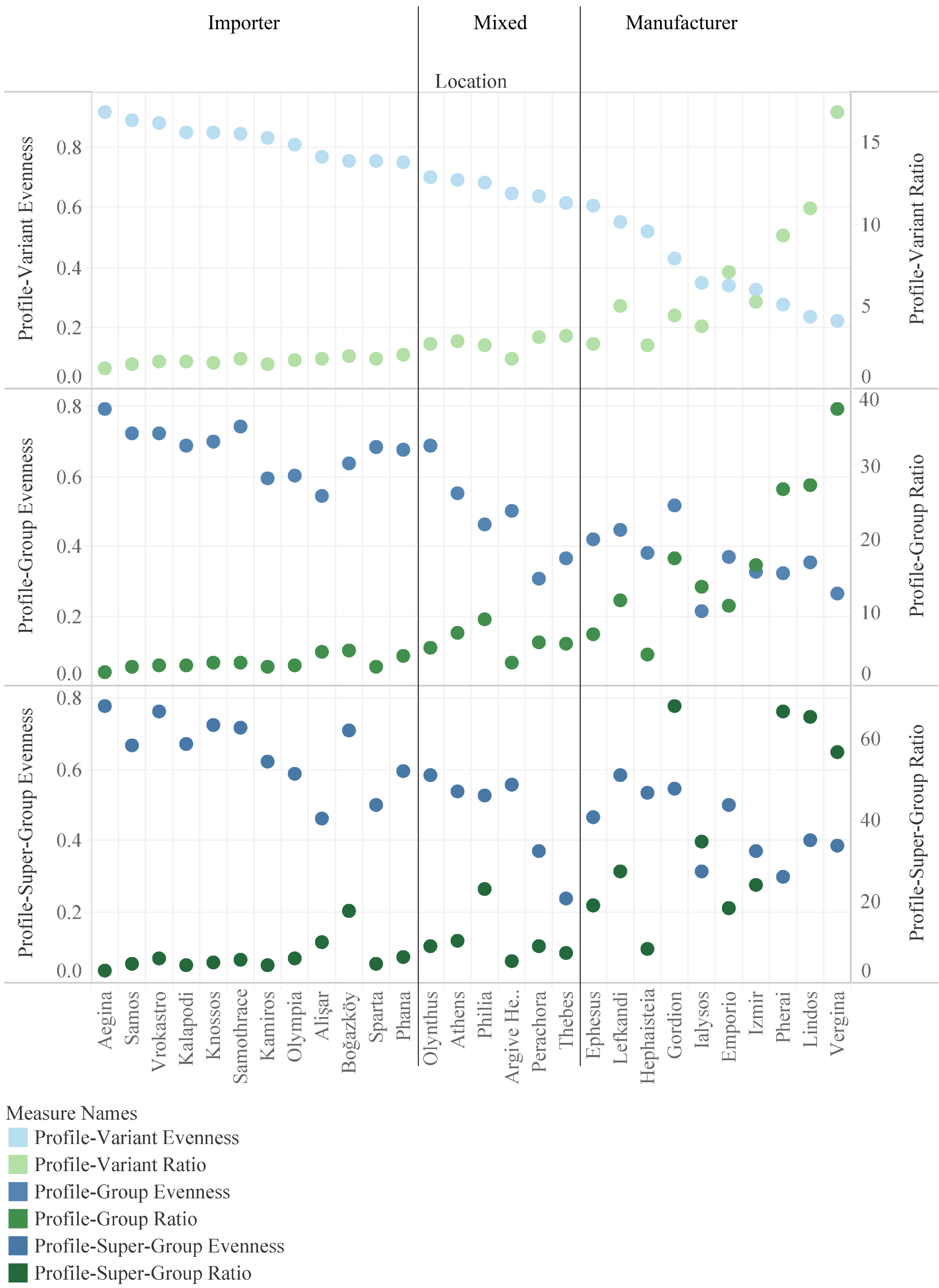
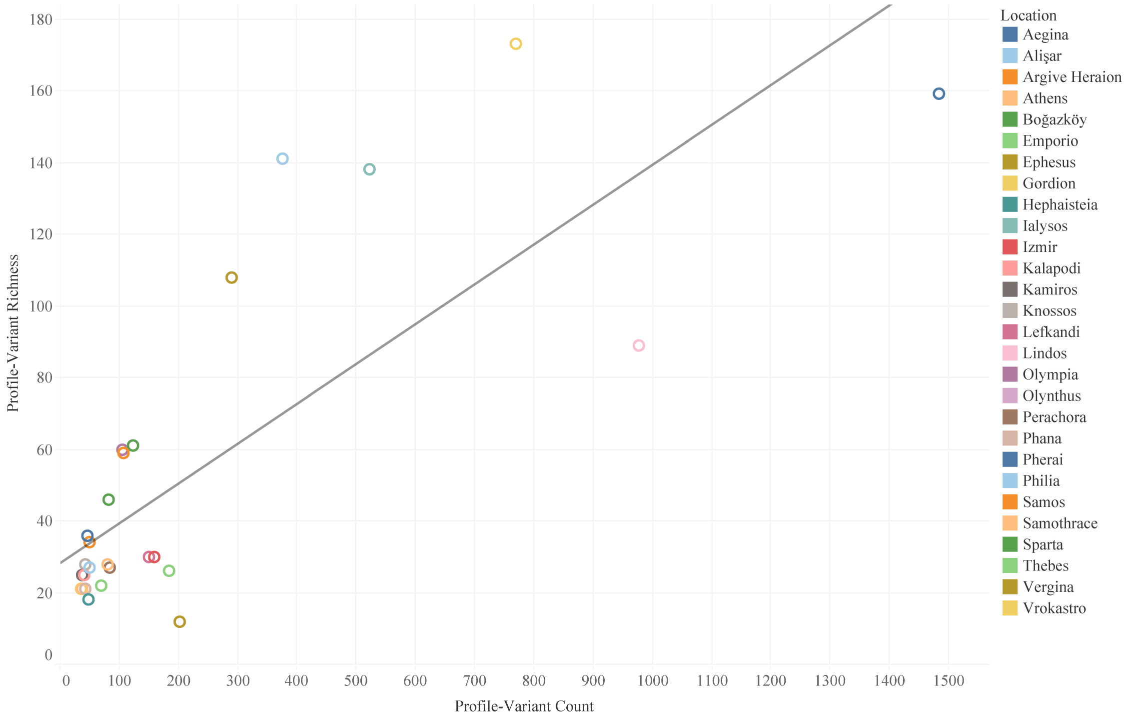


Figure 5.8: Site assemblage profile evenness against ratios (Source: Author).

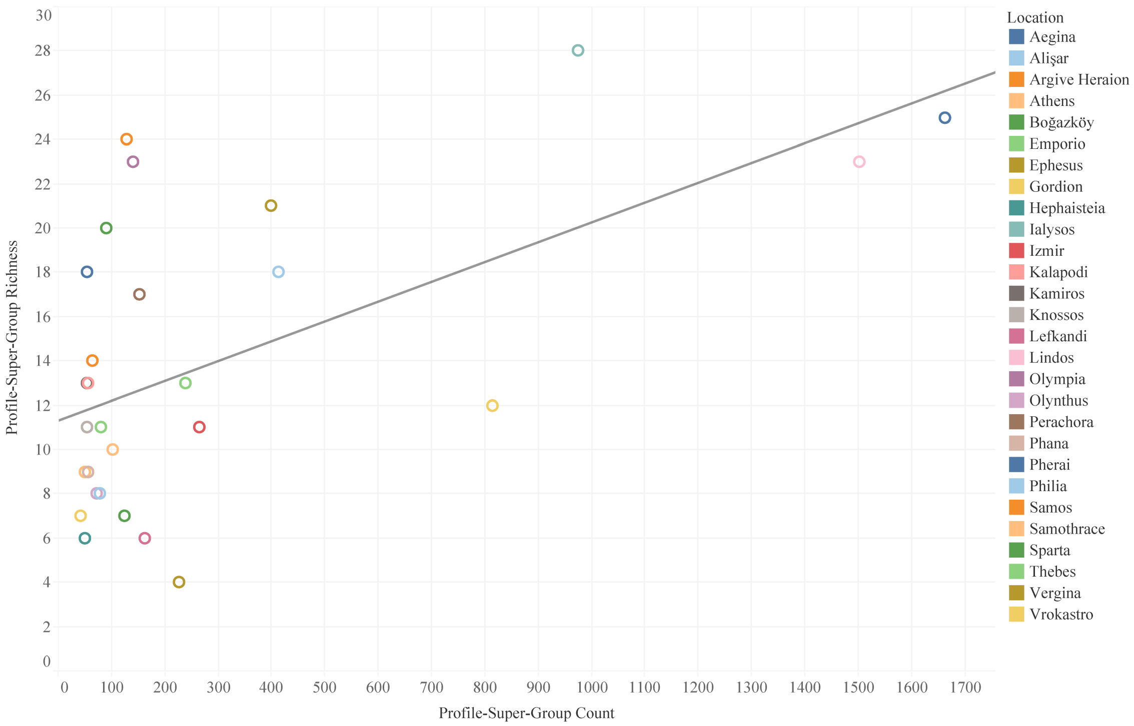
Europe than the Aegean (Alexander 1965; Bräuning and Kilian-Dirlmeier 2013). Philia is unusual for having a low ratio yet a very high richness. It seems to manufacture some of its fibulae, consistent with the manufacture test, whilst the apparent influx of fibulae from nearby Pherai could account for its high richness and high evenness.

Preliminary conclusions

The three-tier typology somewhat circumvents the sample-size problem for richness. I can also show that certain sites have a higher than expected richness using trend lines (Figure: 5.9). These charts show that there is a great variation of richness despite sample-size. Without random sampling I suggest my database is not too far removed from the parent population (of deposition practices in any case). A clear pattern emerges when sites are grouped by sanctuary and cemetery. Sanctuaries have a richer than expected richness of profiles, especially super-groups, indicating a wider reach than cemeteries (Figure: 5.10). The main questions then, aside from my still unanswered question, what is variety for, are: who are dedicating fibulae, where do they originate, and why do they dedicate them? In areas where fibulae in graves are rare, but prevalent in sanctuaries (e.g. the Peloponnese), I might expect fibulae to reflect the broad areas the dedicators or gifts arrived, perhaps with a textile, or conversely, the areas they were looted from, as votive booty. Cemeteries on the other hand may better reflect the choice of fibulae available to the local population (if they wore them). This is, perhaps, supported by the fact that a sizeable number of fibulae dedicated at sanctuaries as well as cemeteries, have evidence of use before dedication via repairs (see Section 3.1.11). In any case, I disagree with the idea that local workshops were producing fibulae for persons to dedicate on-site (e.g. Strøm 1998, 76; Themelis 1983, 165). This only seems tenable on Rhodes, and perhaps Pherai, but the exports from Pherai suggest something more complex. It may be that sanctuary workshops only became prevalent in the Archaic and Classical period, after fibula use had declined (Risberg 1992, 33; 1998, 672).

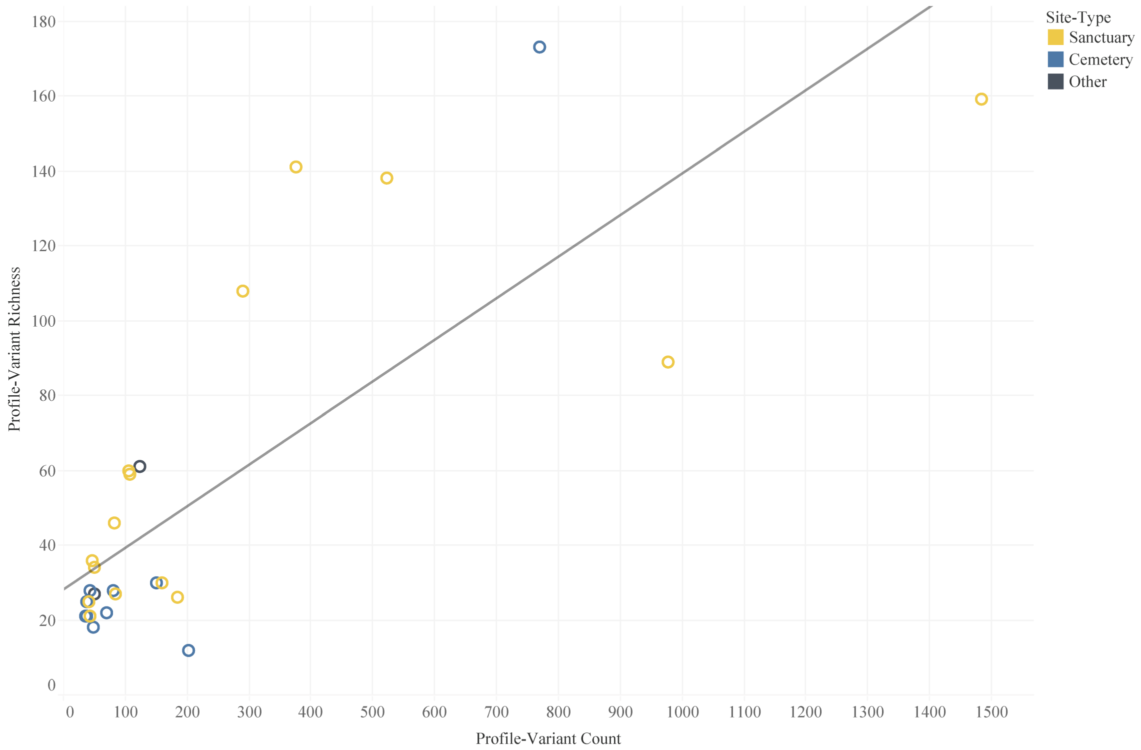


(a) Profile-variant richness with trend.

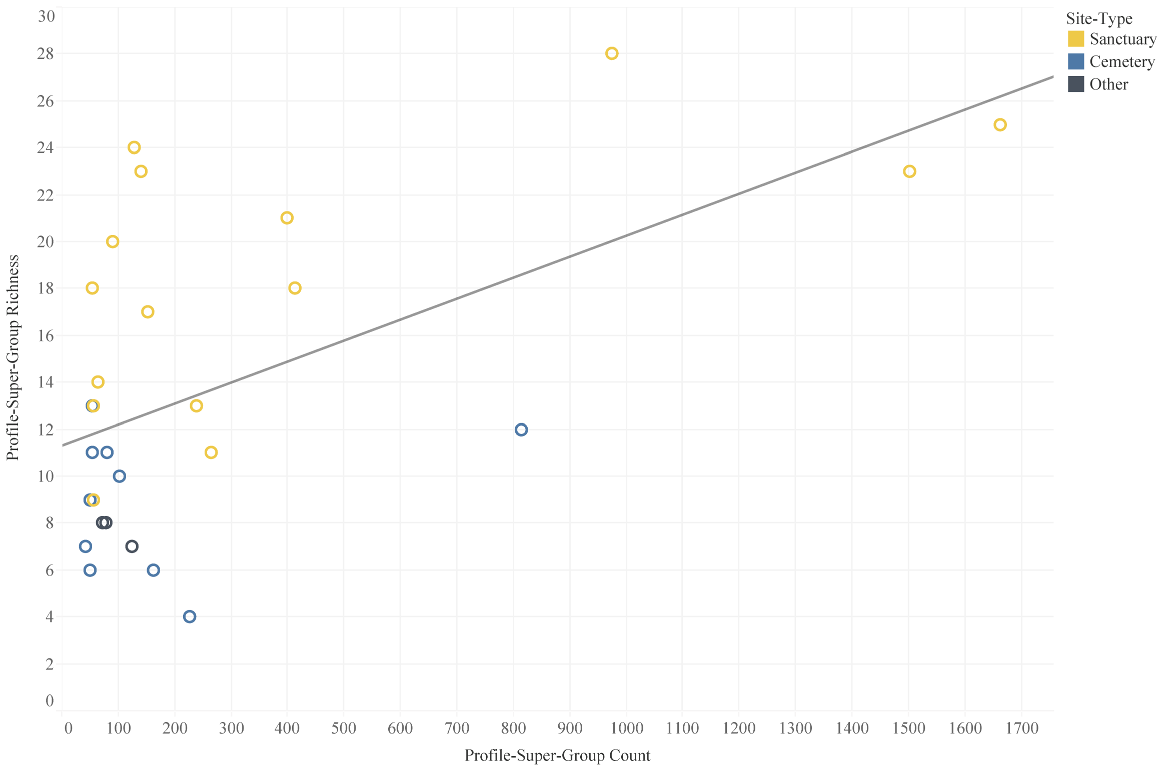


(b) Profile-super-group richness with trend.

Figure 5.9: Site assemblage profile richness with trend lines (Source: Author).



(a) Profile-variant richness by site-type.



(b) Profile-super-group richness by site-type.

Figure 5.10: Site-type profile richness with trend lines (Source: Author).

5.2.1.2 Catch-plate assemblage diversity

Though there is a general increase in catch-plate richness with count, the richness is clearly not determined by it (Figure: 5.11). Save the top six assemblages, the catch-plate-variant richness fluctuates between 8 and 20 as the count increases from 11 to 123. The analyst must be very sceptical of catch-plate-variant richness, however, as the catch-plate-variant is more often unknown, in an inconsistent manner resulting from damage. I may be more confident with the catch-plate-group richness. I have 50% of examples identifiable at group-level as opposed to 30% at variant-level (N=8,812). It is not by chance that I find higher catch-plate richness consistent with those with higher profile richness above. It is telling that a site such as Gordion, that does have a higher count, has a middling catch-plate-group richness, just like with profiles. The Argive Heraion, Perachora, Phana, Sparta, and Samos, all sanctuary sites, have a high catch-plate-group richness, consistent with their wider, if more sporadic, draw in limited quantity. Equally interesting, are sanctuary sites with low richness, like Emporio and Izmir, which I discovered had strong links with Rhodes in the network analysis. These links seem to trump others. Their local production (which is seen again with their ratios and evenness) should only increase richness; their low richness must relate to the style zones they were included in and those they were excluded from.

The evenness data is consistent with profile evenness, showing a clear dominance of certain catch-plates at manufacture sites, especially the 9s in Rhodes and the 12-14s at Pherai (Figure: 5.12). Thebes also has a low evenness, supporting the case for there being local manufacture of square catch-plates (10s) and Sail fibulae (profile-groups BE/BEδ; Blinkenberg, 153-8; DeVries 1972, 113). The high ratio data is consistent with this interpretation (Figures: 5.13 and 5.14). Sites with high evenness and low ratio suggest imports, or show a sporadic deposition, where the delay between each dedication is greater than the rate of innovation. If this were the case, however, I would need to explain why different sanctuaries had substantially different rates of dedication.

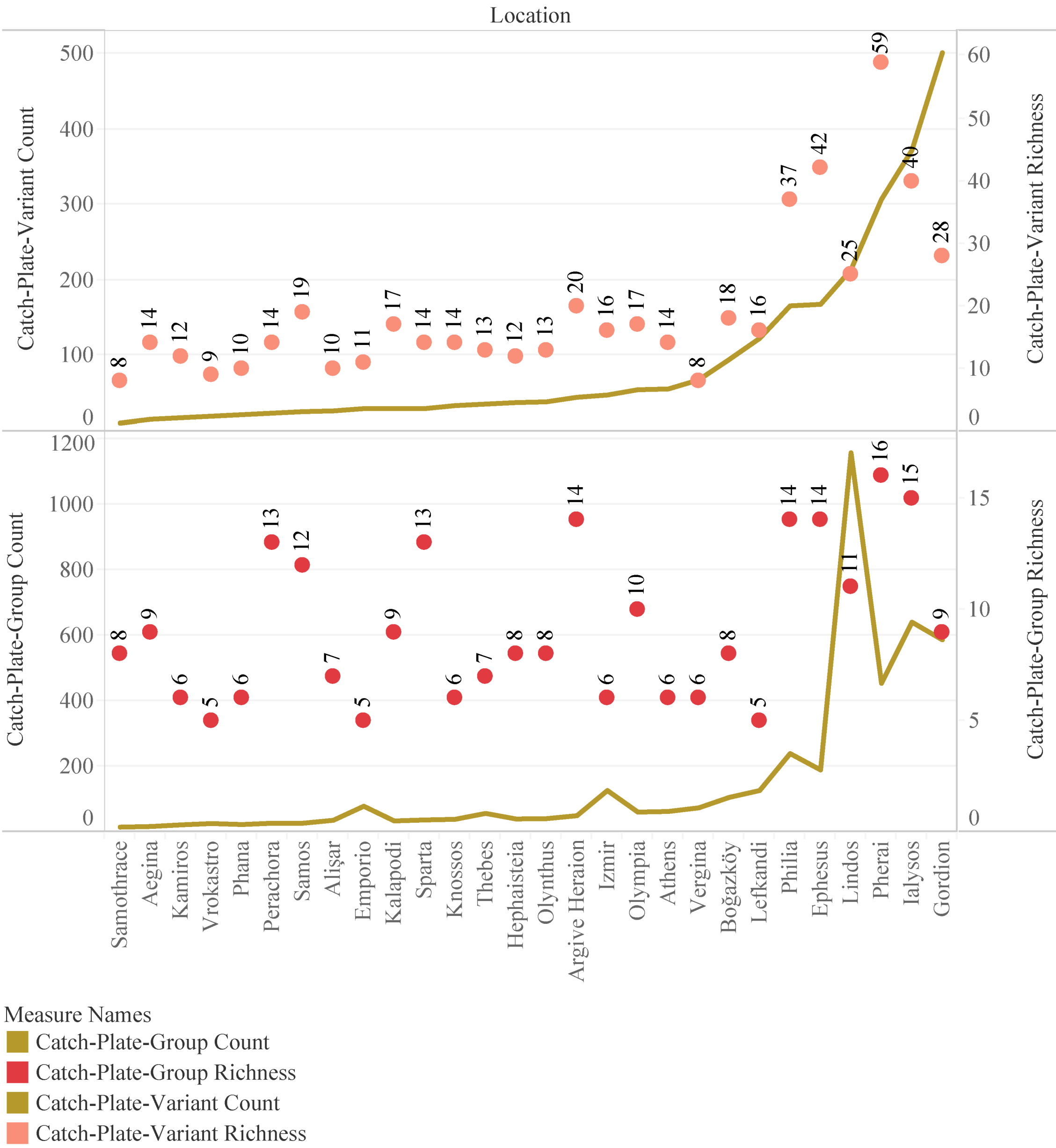


Figure 5.11: Site assemblage catch-plate richness (Source: Author).

There is something of note with the distance between the evenness and ratio values. Lindos has a very high catch-plate-group ratio (105:1), and lowest evenness (0.15), but a not unusual catch-plate-variant ratio (9:1). This suggests that for variants it has a similar innovation rate as other sites, whilst it kept a much closer hold of a catch-plate-group style, the 9s, the Vertical catch-plate. Lindos has a high richness, but it is a local diversity, unlike at Pherai, which seems to have a broader regional pull, with higher richness in regional profile-groups and catch-plate-groups (Figures: 5.5 and 5.11).

5.2.1.3 Initial site assemblage conclusions

I have shown that mathematical accuracy in determining trends is of secondary importance to the general patterns revealed. I reiterate my contention that refining methods of measurement post-typology removes itself from looking at cultural explanations. The key is not the method of examining diversity, for rather it is the levels of difference to be analysed, the typology itself, that determines the results (cf. Binford 1972, 112).

Moreover, too many scholars have overlooked the basic question of how useful their techniques are. My results suggest that the majority of major sanctuaries and some cemeteries did not produce any of their own fibulae, bringing into question whether they had a local craft zone within the sanctuary, or whether the locals did not wear fibulae in everyday life. If the latter, it indicates that in certain areas people used straight-pins or buttons for their clothing (Elderkin 1928, 340-2), and the presence of fibulae in local sanctuaries suggest their dedication by non-local visitors or acquired loot. Naturally, this has important ramifications for the value of fibulae in these areas, as I shall show.

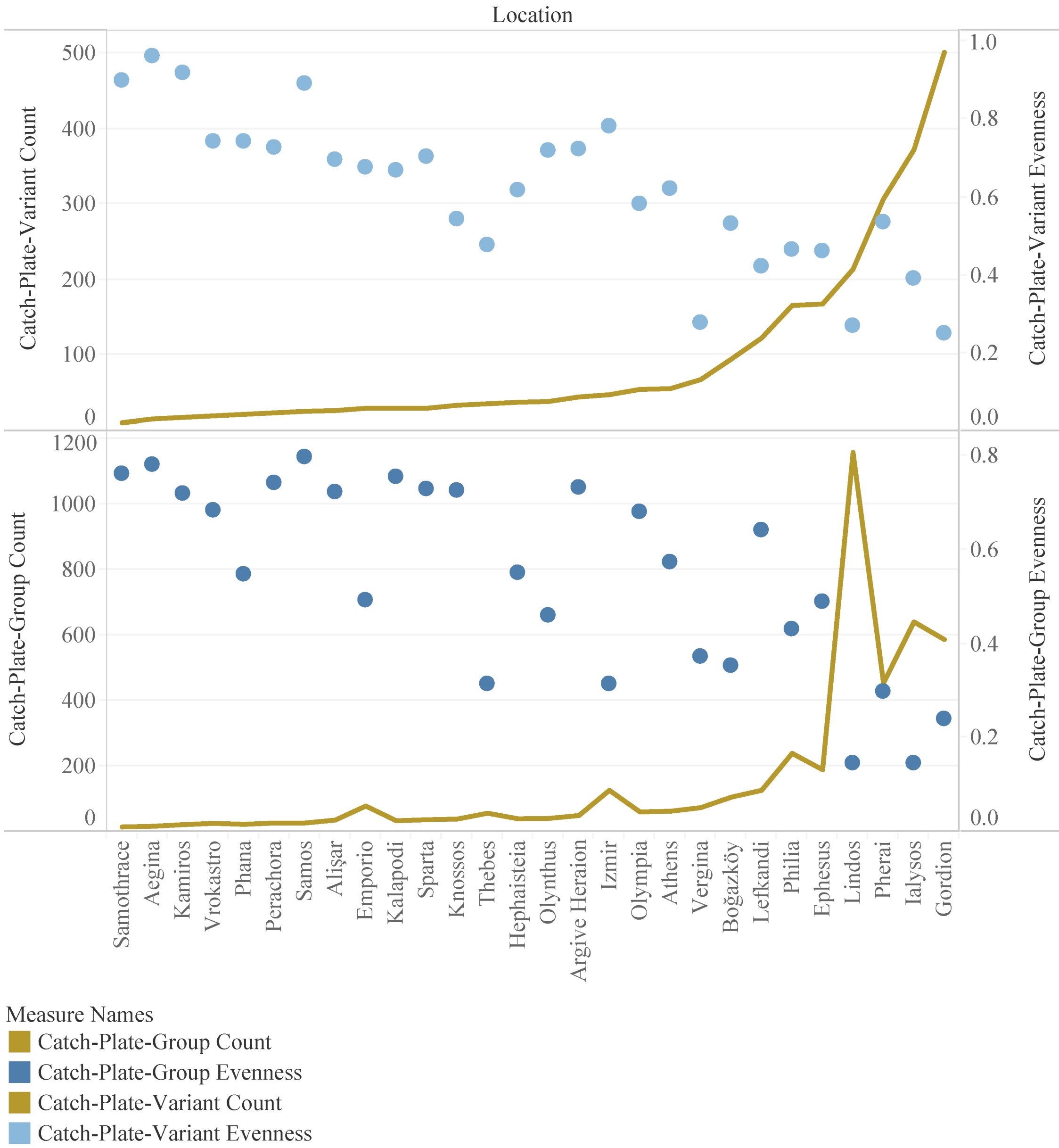


Figure 5.12: Site assemblage catch-plate evenness (Source: Author).

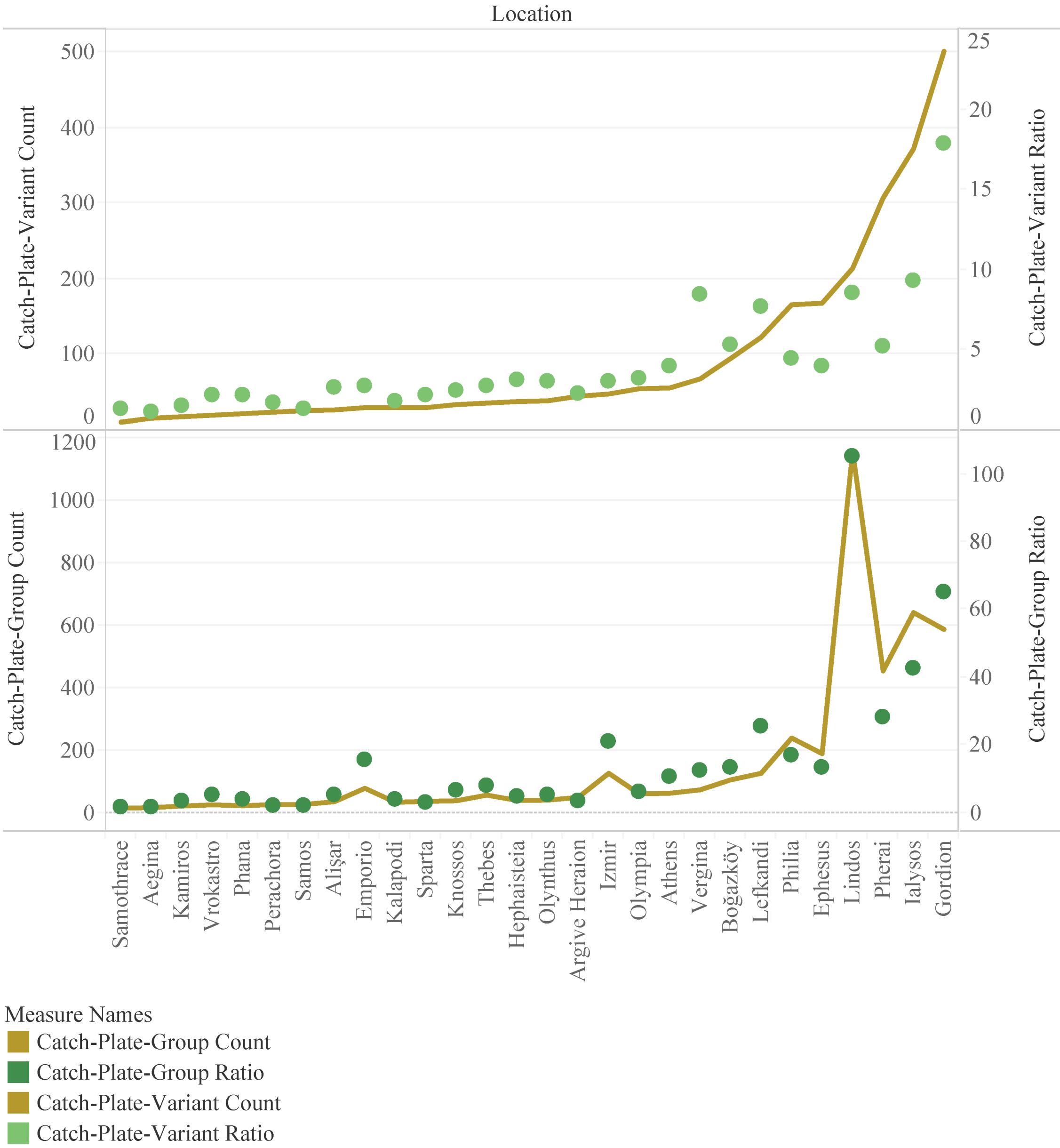


Figure 5.13: Site assemblage catch-plate ratio (Source: Author).

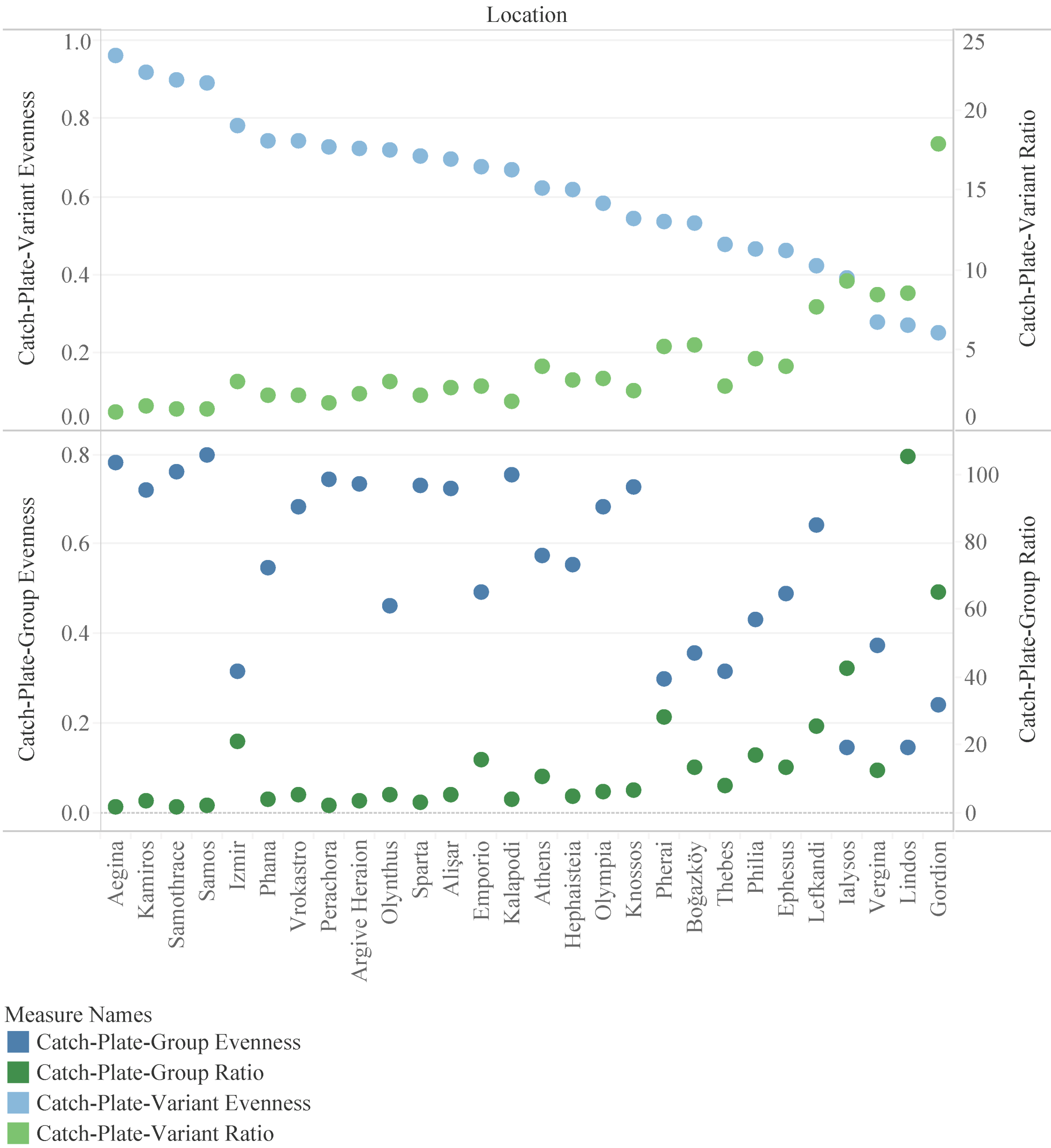


Figure 5.14: Site assemblage catch-plate evenness against ratio (Source: Author).

5.2.2 Regional and site-type diversity over time

Turning to the broader view, we may profit from looking at the data by region and time (Appendix D). Profile-variants are the most informative, so I select data with confidence code 1-9 and Regions 1-7 (see above on page 107 and 112). 7,093 fibulae meet the criteria. Reminding ourselves of the general trend, the huge increase in fibula count and richness in Period 3, the 8th and 7th century, is obvious, despite some deviations (Figure: 5.15). The Aegean Islands and Crete do not share in the spectacular increase in count and richness, though they are receiving more variants than before. Indeed, it is interesting that Crete, which begins with joint-second highest richness in Period 1, has the lowest richness in all subsequent periods. Why does it suffer from this relative isolation?

The next chart is much more informative, where the count is replaced with the variety ratio (Figure: 5.16). The ratio readings are of critical importance. As a rule of thumb, I could say that a ratio above four, on average, indicates a local regional manufacture whilst below four suggests importation. Regions with declining ratios show a shift to imports, being infiltrated by a high richness but low count of fibulae. This includes the Central Aegean Mainland but is most obvious for the Aegean Islands and Crete. The North Aegean Coastal region, including Pherai, shows a total opposite trend to the surrounding regions. Whilst its richness increases the ratio increases far higher, suggesting a decline in diversity as more objects are mass produced, in particular profile-groups V, W, and AY. The export of such variants helps to keep the ratios low for surrounding regions, especially the North Aegean Mainland; Philia, in particular, receives a large number of individual fibulae from Pherai. The Asia Minor Coast, in large part focused on Lindos and Ialysos, show a different trend to the North Aegean Coast. The ratio there actually falls from 10.9 to 6.5. Though still above four, indicating a local manufacture, the drop in ratio, and yet, double the richness of the North Aegean Coast, shows a greater diversity, a greater demand for individualising objects and experimentation, as well as an influx of variants from elsewhere, including Central Anatolia. Fibula use in all regions declines dramatically

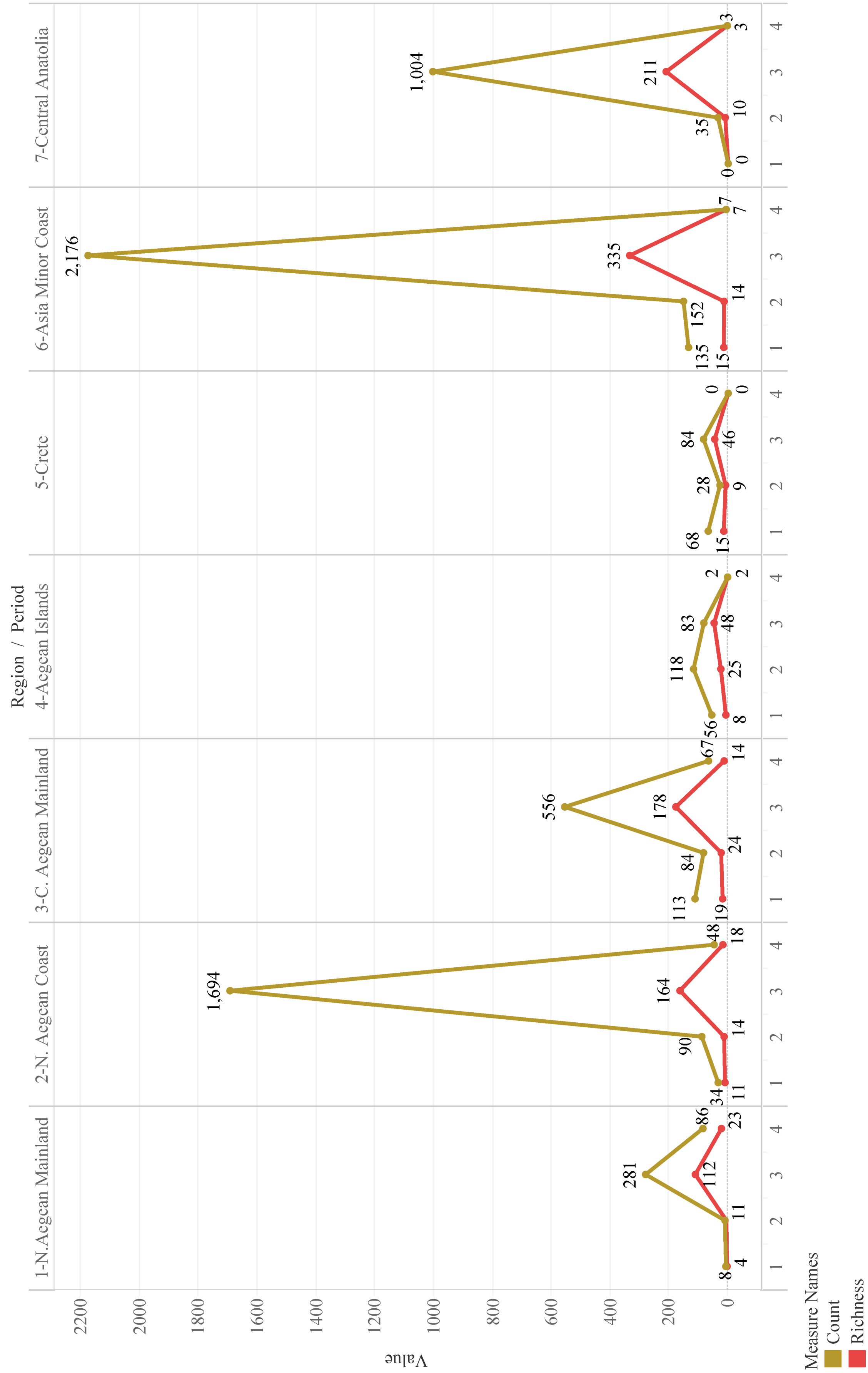


Figure 5.15: Profile-variant count and richness by region and period (Source: Author).

in Period 4. In the case of the North Aegean Mainland and Central Aegean Mainland, the ratio actually increases, perhaps because the smaller number of variants available, though possessing multiple copies, were valuable for their technical intricacy rather than their stylistic diversity.

The third chart adds the site-type data. For simplicity, initially I show a summation of all regions (Figure: 5.17). The important finding is that the variety ratio is fairly consistent between sanctuary and cemeteries. In other words, the diversity is not changing because of the site-type. The crucial contrast lies instead with richness. Though the pattern looks the same, the rate of sanctuary richness increases between Period 2 and Period 3 from 33 to 732, a 22 times increase, whilst the cemetery richness increases only four times, from 71 to 294. Diversity is increasing in the 8th and 7th century, but there is a significant shift to making dedications at sanctuaries instead of cemeteries.

The fourth chart returns regions to the discussion (Figure: 5.18). Starting with the obvious, almost no fibulae from the North Aegean Mainland are found in cemeteries. In the North Aegean Coast, it appears fibulae are being produced in Period 3 for sanctuary and cemetery dedications, whilst the Central Aegean Mainland shows the total opposite. Its sanctuary dedications are richer and more connected than those of the North Aegean Coast, yet almost all are imports. Cemetery material on the other hand may well be being manufactured locally, especially at Athens and Thebes, such as the BE/BEδ groups with Sail catch-plate. Indeed, the rise in ratio for Period 4 Central Aegean Mainland, is due to the late Pivot fibulae (profile-groups CK-CKδ and CM-COδ) as well as Lion Brooch (profile-variant FU1), probably locally manufactured. Regions 4 and 5, the Aegean Islands and Crete, become increasingly peripheral in fibula manufacture and consumption. The Asia Minor Coast is manufacturing a large number of fibula types, but also has many imports, increasing the richness. The low ratio in cemeteries may well be artificial, a result of poor publication quality at Ialysos, Kamiros, and Vroulia, where the variants cannot be identified. Central Anatolia has consistent ratios for the Tumuli as well as the City Mound at Gordion, consistent with local manufacture, but with a fair amount of diversity.

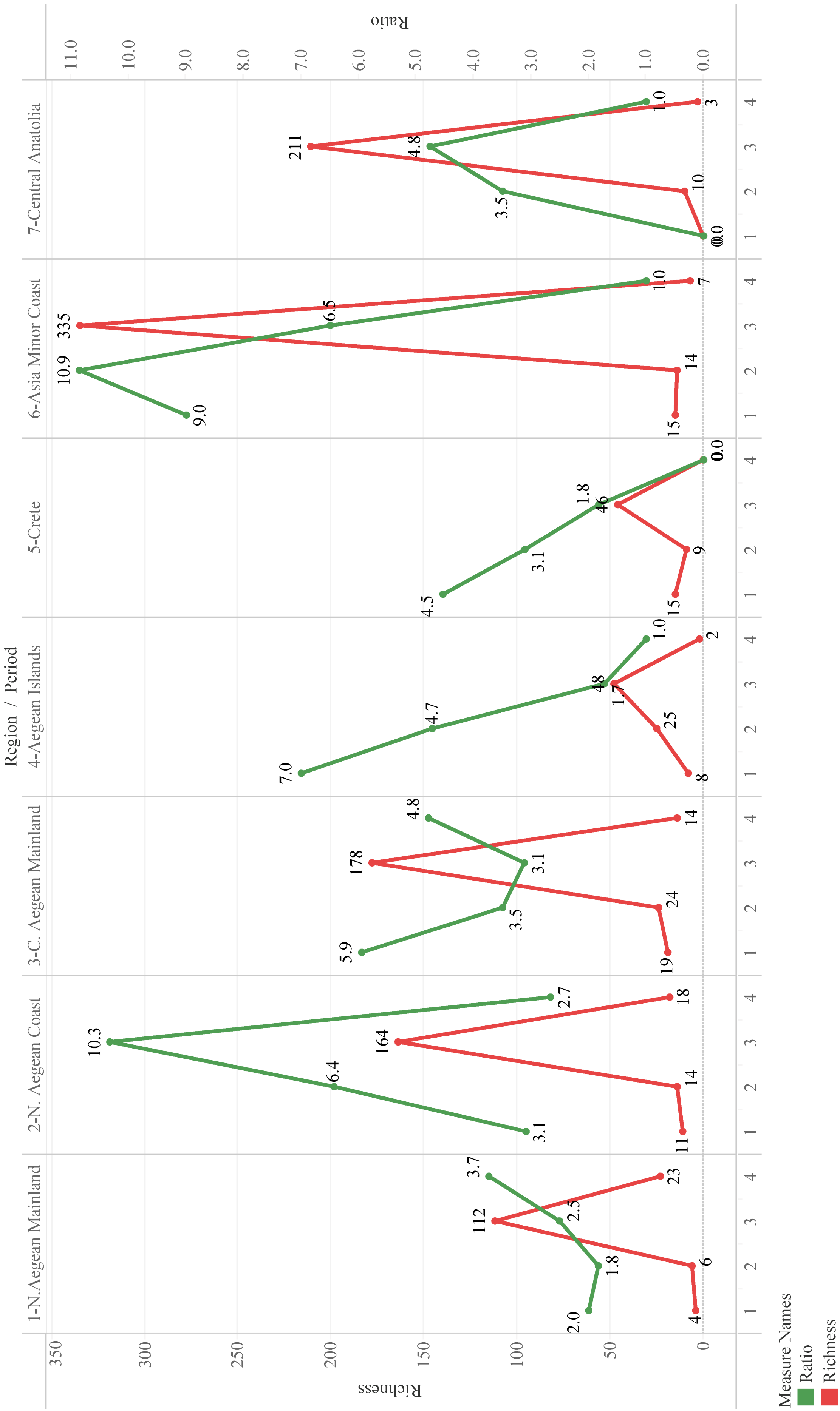


Figure 5.16: Profile-variant richness and ratio by region and period (Source: Author).

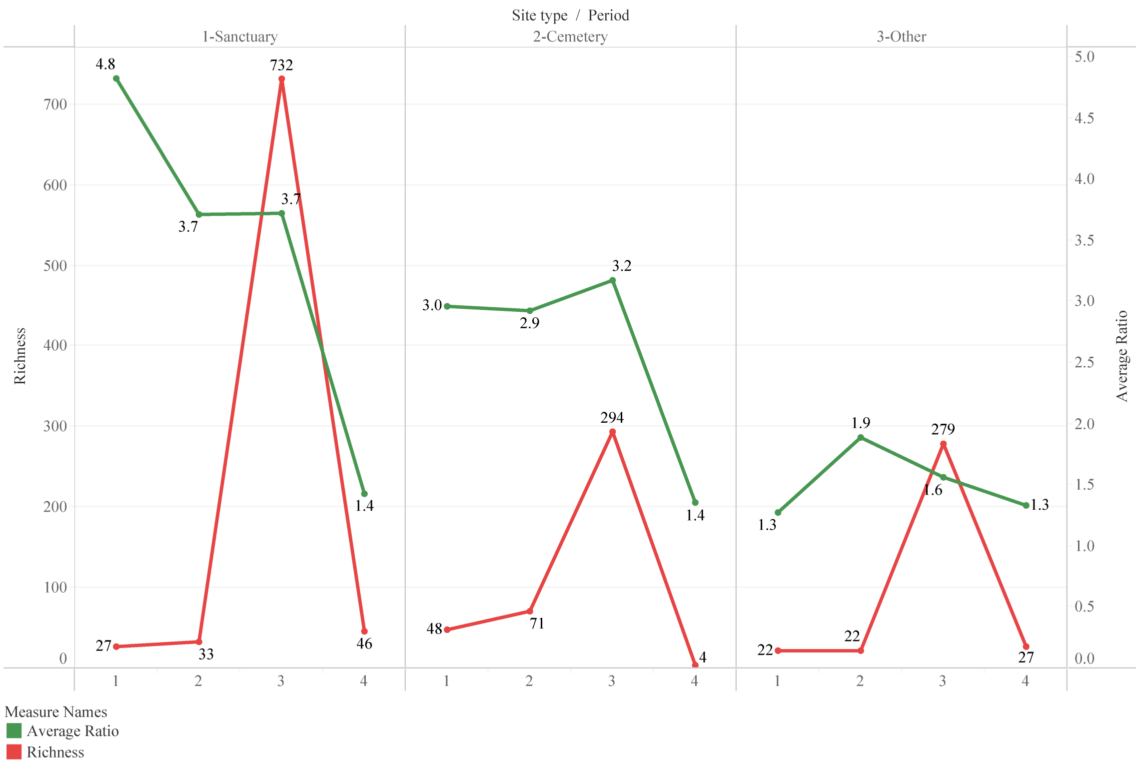


Figure 5.17: Profile-variant richness and ratio by site-type and period (Source: Author).

The Period mark is not especially helpful since very few fibulae were manufactured before the 8th century and production in Period 4 is very difficult to distinguish: Period 3 examples may well be continuing to be manufactured into the 6th century (Caner, 76-8, 83-4, 94-105, 120-3, 129, 144, 151).

The general conclusions from the assemblage diversity analysis is that fibulae were manufactured, by Period 3, in three main areas, namely Pherai, Lindos, and Gordion. Now, it may be that the very high counts from these sites are augmenting the conclusion, however, the evidence from high counts should not be overlooked. Why are there so few fibulae found in large numbers of the same type in other regions? Why is the find of fibulae so sporadic across cemeteries? I would make the case that they were not universally worn: in fact, in many regions and periods, they are very scarce; quite unlike the use and distribution of fibulae in Italy, for example (Brøns 2012; Lo Schiavo 2010; Toms 2006). My hypothesis is that outside of those three main sites, the majority of fibulae were imported, becoming popular dedications in the 8th and 7th century, but easily replaced by other artefact-classes in the 6th. As I showed in the preceding chapter, the modes of fibulae exchange are many, and I argued against a general trade in fibulae. Instead, I anticipate movement by way of international pilgrims, marriage, gifts, and booty.

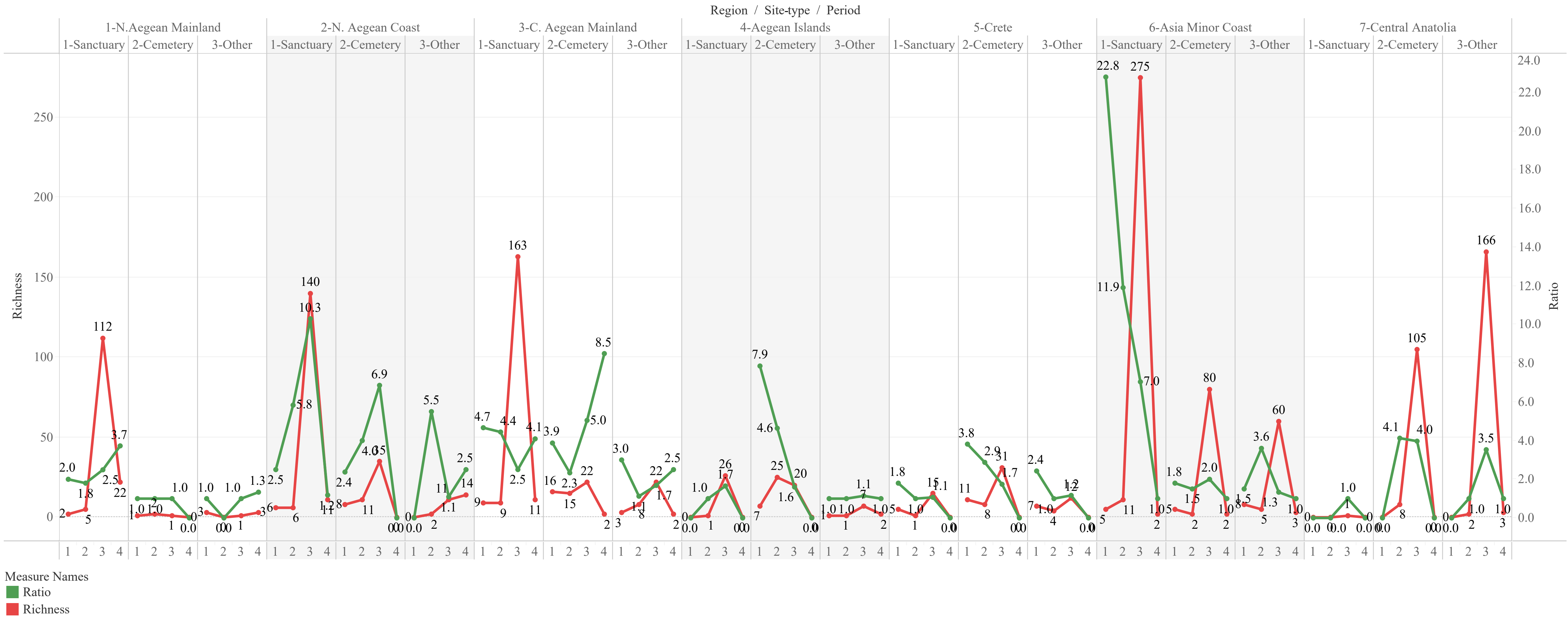


Figure 5.18: Profile-variant richness and ratio by region, site-type, and period (Source: Author).

Diversity measure	Meaning
High richness	Innovative, popular group, lengthy period of production
Low evenness	Innovative, many ideas or copy-errors, and a few popular variants
Low ratio	Unique, individual examples

(a) An innovative combination

Diversity measure	Meaning
Low richness	Static, unpopular group, short period of production
High evenness	Static, even production of variants, or individualising unique variants
High ratio	Mass produced, e.g. using two-piece moulds

(b) A static combination

Table 5.1: Interpretive list of diversity measures (Source: Author).

5.2.3 Artefact-type diversity

Investigating the diversity of profile-groups in terms of profile-variants and catch-plate-variants, is as much a test of the typology's validity as it is meaningful of past practices (Appendices E and F). It is, though, now I have come this far, quite easy to tell the difference. Plate: 153 shows the 208 profile-groups in alphabetic order. This ordering has some meaning as profile-groups closer together are more alike than those further apart; if I have profile-super-groups in the back of my mind, I can tell which profile-groups stand out. For the moment, I can highlight those measures: richness, evenness, and ratio, of profile-variants (above) and catch-plate-variants (below), that deviate from the norm. Average lines are shown, allowing easy view of marks that have a significantly higher or lower than average result. For the most part, deviant profile-groups are unusual in both profile-variant and catch-plate-variant diversity.

The following interpretive list can be used to assess the character of each profile-group of interest (Table 5.1). An innovative combination comprises high richness, low evenness, and low ratio, whilst a static combination comprises low richness, high evenness, and high ratio.

The profile-group with highest richness is BH, with 25 profile-variants, and it has a below average richness of catch-plate-variants, alongside a high catch-plate-variant ratio (Figure: 5.19; Plate: 153). Evenness is not out of the ordinary. These results are not a construction of the typology. High profile richness suggests increased innovation, whilst low catch-plate richness suggests manufacture was controlled at a small number of sites/regions, which is indeed the case. 22 out of 25 BH profile-variants are present at Philia, whilst Pherai has 9; other sites have only one profile-variant each, they are Aegina, Andritsena, Elateia, Haghios Demetrios, Halos, Ialysos, Kalapodi, Knossos, and Olympia.

The preceding profile-group BG is also highlighted, with a low evenness and high ratio, for the very unusual finding of 249 copies of BG1 at Lindos (95% of BG1 and 94% of BGs identifiable at variant-level). BG catch-plate diversity is not unusual, but this is not meaningful, as only 5% of examples have determinable catch-plate-variant data. Indeed, it is possible that the BG1 examples from Lindos comprise more variants despite Blinkenberg and Kinch's (1931, 78) description. BGs, though popular in number are found only in Rhodes.

Profile-group BF were also produced exclusively on Rhodes. The differences between BF and BH, noted in Chapter 2, a result of a divergence in profile-groups F and Fδ, are also diverging in their diversity. BFs have a lower richness than BHs but a comparable ratio. Whilst the catch-plate data is skewed by survivability, the obvious fact that BFs possess the Vertical catch-plate (9s) as opposed to BHs Square Sails (11s) is striking. Despite the great visual similarity between the three profile-groups, it is very interesting that examples from Pherai have a much wider spread, being found at 13 sites, as opposed to the Rhodian, found only at 6 sites.

Another popular fibula style, the profile-super-group G-H, those fibulae with waterfowl adorning the bow (Figure: 5.20), with 208 examples in total, are also found almost exclusively on Rhodes. Only 6 examples (3% of the profile-super-group) have been found elsewhere: two at Sparta and one each at the Argive Heraion, Izmir, Naxos, and Prinias. If Rhodes were a key node in the network of East Mediterranean exchange, why are so

(a) BF5.VIIIa.9i, #4635 (Sapouna-Sakellarakis, 76-7, Pl. 26, No. 847).

(b) BG1.VIIIl.9h, #4957 (Sapouna-Sakellarakis, 73, Pl. 23, No. 669A).

(c) BH8.XXIVh.11d, #5260 (Kilian-Dirlmeier, Pl. 34, No. 485).

Figure 5.19: (a) BF5 fibula from Lindos; (b) BG1 fibula from Exoche; (c) BH8 fibula from Philia. Scale 1:1.

few of its local fibulae exported? Their above average richness and low evenness suggests even though they were innovative and popular, something kept Gs and Hs, like the BFs and BGs, at home.

By contrast, the well-known BE and BEδ Sail-Boat/Domed-Sail fibulae, also with an increased diversity in profile-variant and catch-plate-variant, were popular and widely-spread, in terms of both manufacture and consumption. Their popularity in antiquity was just as desirable as we find them today (Figure: 5.21; Plate 153; cf. especially Hampe 1936; 1971). Of 220 BEs with a known find spot, they were found at 39 different sites across 6 regions. BEδs were rarer, of 57 with a known find spot, they were found at 11 sites across 4 regions. BE/BEδs seem to have a diverse manufacture with at least a Thessalian and Boeotian production, and perhaps another in the Peloponnese or Attica (Blome 1980, 122; DeVries 1972, 113; Kilian-Dirlmeier 1995, 42). They also had a long use-life. 9 of 220 BEs and 2 of 57 BEδs had evidence of ancient repair (a rate of 4%) against 2 of 334 BFs and 1 of 279 BGs (a rate of 0%). In fact, BE and BEδs show a higher than average percentage when I take the total figures for repairs: there are 134 in Regions 1-7 containing 9,916 fibulae (a rate of 1%).

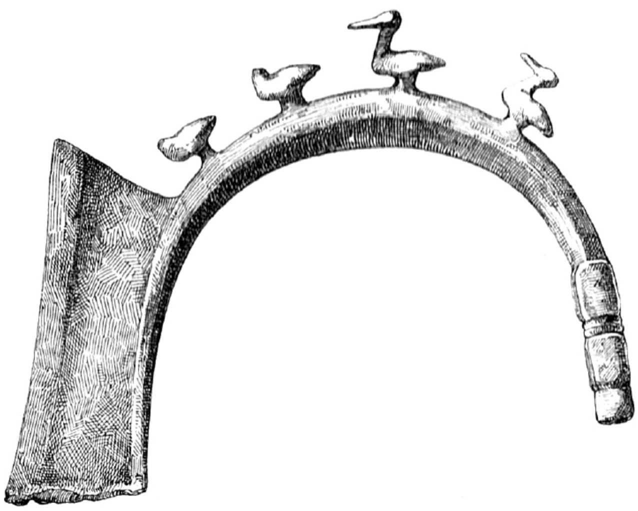
As I shall show in the next section with Odysseus' Domed-Sail fibula, BE/BEδs may well have had notable object biographies as attested for many Homeric objects (Grethlein 2008, 47-8). It is also worth noting that BE/BEδs have a significantly higher propensity to be dedicated with the dead rather than in a sanctuary: some 144 examples are associated with a burial compared to 120 at a sanctuary. This is not a chronological factor, BE/BEδs are Period 3 (800-600 BC); it is their likely progenitor's, profile-variants K5 and K6, that are Period 2 (1000-800 BC). 55% of BE/BEδs are found in cemetery deposits whilst the average percentage of cemetery dedications for Period 3 is just 18%. Indeed, the average percentage for sanctuary dedications in Period 3 was 82% (excluding site-type: 'other').

BFs and BGs were, on present evidence, made for a sanctuary dedication. 86% of BFs and 96% of BGs are found in sanctuary contexts. For Gs it is 90% and Hs it is 100%; Gs and

(a) G3.XIIId.10f, #1236 (Source: Author).

The image originally presented here cannot be made freely available via ORA because of copyright.

(b) G1.VIIIc.9i, #1206 (Sapouna-Sakellarakis, 98, Pl. 38, No. 1399).



(c) H1.XIIId.9k, #1363 (Blinkenberg, 90, Fig. 89).

Figure 5.20: (a) G3 fibula from the Argive Heraion; (b) G1 fibula from Ialysos; scale 1:1. (c) H1 fibula from Lindos; scale 2:3.

(a) BE3.VIb.11d, #4336 (Source: Author).

(b) BEδ3.VIi.11c, #4563 (Hampe 1936, Pl. 8, No. 103).

Figure 5.21: BE3 fibula, probably from Thebes (a); BEδ3 fibula, provenance unknown (b). Scale 2:3.

Hs, like BFs and BGs, also have a below average rate of repair, at 0%. In short, the nature of fibula use and appreciation diverged widely across the Aegean. If Rhodian fibulae did find themselves in other contexts they are overwhelmingly in sanctuaries, strong evidence for the hypothesis that they arrived there as votives from people passing through Rhodes; not as exports with an economic value. It remains a valid hypothesis to consider Rhodian fibulae as 'converted' offerings, made directly for the god, and not necessarily worn for an extended period of time (Snodgrass 1990, 291). These profile-groups are a great contrast to the Sail-fibulae, as Rhodian sanctuaries were to those other sanctuaries, such as the Argive Heraion, Perachora, and Olympia, that have a far lower variety ratio. The former receiving imports but exporting none but few; the latter also receiving imports but not making any, or only very few fibulae, locally.

A profile-group with similar results, DK, is widely different in style. DK is part of the profile-super-group DI-DT, though the three profile-groups DI, DJ, and DK are the principal ones (Figure: 5.22). DK shares a similar popularity to BE, widely-spread, from Gordion to mainland Greece, and is said to be imitated as profile-groups DR-DT at multiple sites in the Aegean (Strøm 1995, 46-8). DI-DK were probably manufactured at a number of locations given their above average richness of catch-plate-variants. In absolute numbers Gordion possesses 25% of profile-groups DI (N=20), 53% of DJ (N=79), and 49% of DK (N=87), but, in terms of type-presence, only 11% of DI catch-plate-variants (N=9), 55% of DJ catch-plate-variants (N=11), and 33% of DK catch-plate-variants (N=9). The catch-plate-variant figures may be erroneous for so many are damaged. However, I can, at least, say there are 9 catch-plate-variants for 20 DI examples, 11 catch-plate-variants for 79 DJs, and 9 catch-plate-variants for 87 DKs, consistent with multiple manufacturers or a long period of production.

Of these fibulae, many are found in the great Tumulus MM at Gordion, dated to c.740 BC (Caner, 8-10; DeVries 2007, 86; Sams 2011, 59). 17 DJs and 34 DKs were found therein. Tumulus MM is unlikely to be the burial chamber of King Midas, being a generation too early, however, the prestige of the burial is without doubt (Figure: 5.23; Muscarella

(a) DI2.XXIXa.23b, #7102 (Philipp 1981, Pl. 68, No. 1104).

(b) DJ3.XXIXa.23b, #7157 (Caner, Pl. 34, No. 436).

(c) DK3.XXIXa.23l, #7255 (Caner, Pl. B, No. 319).

Figure 5.22: (a) DI2 fibula from Olympia; (b) DJ3 fibula from Boğazköy; (c) DK fibula from Gordion Tumulus MM. Scale 1:1.

Figure 5.23: The remains of a king in Tumulus MM at Gordion (Simpson 2012, 150, Fig. 10.1).

1967b, Pl. XVII, No. 87). Aside from fine furniture, a total of 175 fibulae were found in the chamber. Are the popularity of these due in part from this association? Indeed, DJs are found at 19 sites across three regions, with four examples from Olympia, two from Lindos, and one each from Ialysos and Samos. DKs are found at 23 sites across five regions, including three examples each from Lindos and Ephesus, two from the Argive Heraion, and one each from Pherai, Perachora, Paros, and Ialysos. The examples from Regions 2, 3, and 4 are consistent with an Anatolian, if not necessarily Central Anatolian, manufacture (cf. Kilian 1975, 152-3; Klebinder-Gauß 2007, 45-7; Strøm 1998, 46). If I were to consider an itinerant smith, why are they exclusively found in sanctuary contexts in these regions? Rather than positing that people from the Aegean travelled to Gordion and returned with these items, I suggest they were gifts from the Phrygian capital (see below, Section: 5.3.2.2), going hand-in-hand with more famous objects such as the throne dedicated by King Midas at Delphi (Waterfield 1998, *Herodotus* 1.14). But, it is not Herodotus' allusions that are persuasive, rather the fact that profile-variants radiate from Gordion but rarely, if ever, travel the other way around, as I discovered in Chapter 4.

Summary

The purpose of this section is to show that diversity analysis is a very useful tool for assessing the character of artefact-types as well as site assemblages. I have been able to assess how different fibula groups varied in their use and dedication, making an inroad into the character of those that wore and dedicated them. On the whole, though, quantification fails to reach explanation. I can demonstrate the distribution of fibulae and in which direction they travelled, but I can not really answer why they are distributed so, why the variety needed to be produced, especially in the 8th and 7th century, and for that a contextual analysis is required.

5.3 Stylistic variation, individuals and agency

5.3.1 'Fibula agency' and a child burial at Lerna

Explanation needs but one fibula, not 10,282. In this case, the context is the burial of a child, said to be 18 months at time of death, inhumed in a pithos at Lerna in grave PA 6:1 (Caskey 1956, 171-2, Pl. 48; DeVries 1974, 81). In addition to a BE3.VIb.11d fibula (#4337; Figure: 5.24a), there were two bronze rings, a bronze hoop, and two probable iron pins. Of the pottery, the pithos, a cooking pot, one-handled cup, trefoil *oinochoe*, *kantharos,* and *skyphos*, have been dated to Late-Geometric I/II, or, brazenly by DeVries (1974, 92), c.725 BC. Roughly the same time as the Iliad and Odyssey were being performed (see below on page 285). The fibula is 100mm in length, a little smaller than average (122.4mm) and median (111mm) BE3s, and the catch-plate has a simple double line border at top and sides with a bird on each face, one looking forward and the other behind; it may be an early work of Hampe's 'Swan Engraver' (DeVries 1974, 86-7, 97; Hampe 1936, 17; cf. Strøm 1995, 75-6, note 255). Of greater interest, is the context of dedication and its repair in antiquity, where a new spring and pin have been attached by a rivet at the lower stem. This suggests the fibula was much older than the child and thus potentially an heirloom, or, if not an heirloom, a gift with an extended biography, given by a parent at time of death (Whitley 2016, 216). I do not think it likely that such a young infant would characteristically wear a large fibula on their chest and long, sharp iron pins at either shoulder, considering the chance of stabbing oneself at each fall. Moreover, I consider fibulae had a longer use-life than one or two years before breakage: otherwise the repair ratio, about 1:74, would be significantly increased. There is no reason not to consider the Lerna fibula to have been in circulation for a generation or more before deposition. The rich jewellery buried with this child refers to what many believe a girl would have worn in adolescence, a peplos held by two pins and a cloak held by a fibula; arguably the kit the child was destined to wear, in an idealised sense as Whitley (1996, 210, 228; 2002, 219-20; cf. Lemos 2007a, 278) has argued for juvenile warrior graves. Decoration and symbolism in death, as scholars know, was a very important part of the social subsystem in creating and maintaining new levels of status as well as ensuring a restful spirit for the deceased (Garrow and Gosden 2012, 316; Lemos 2002, 218-20; Treherne 1995, 107, 116; Voutsaki 1995). What part does the fibula play in this? The fibula takes a prominent visual position during the funeral in the child's appearance, especially here for it is an exception; it is exceptionally uncommon for a fibula to be deposited in Peloponnese graves, as opposed to pins (Kilian-Dirlmeier 1984). For example, out of 45 tomb-groups published by Courbin (1974, 65, 132), only one fibula was found. Moreover, whilst pithos burials became common in the Geometric Argolid, metal offerings are particularly rare (Hägg 1983, 28-30). The Lerna child burial is thus unusually rich in its display.

5.3.1.1 Art and agency in practice

Gell's (1998) theory for art and agency provides a useful tool to depict the agency relations involved in the biography of the Lerna fibula. In particular, how objects are able to manipulate individuals through the *abduction of agency*, the non-semiotic, non-demonstrative inferences from indexes (Gell 1998, 14-6). Indeed, objects receive a secondary agency

(a) Lerna Fibula: BE3.VIb.11d, #4337 (DeVries 1974, 86, Pl. 15, No. 7).

(b) Harvard Fibula: BJ3.IVb.11e, #5387 (Bennett 1997, Pl. 4).

(c) Domed-Sail fibula from Thebes: BEδ2.VIi.11a, #4549 (Hampe 1936, Pl. 13, No. 15).

(d) Heracles fibula from Ida: BE3.VIb.11d, #4330 (Sapouna-Sakellarakis, 107, Pl. 44, No. 1497). Heracles battles the Siamese Twins (Snodgrass 1998, 28-33).

Figure 5.24: Various decorated 8th and 7th century fibulae with Sail catch-plates. Scale 1:2.

during their production and subsequent contexts of use that can be harnessed by primary agents, whether wittingly or not. To appreciate such a theory the dominant role of semiotics and its underpinning in linguistic theory, that material culture may be read like a text or symbol (Buchli 2000, 365; Hodder 1989; Moore 1990, 91), must be diminished (Whitley 2012, 595). Peircian semiotics is founded upon the principal that objects are symbols, and thus in structuralist terms Saussure argued that the designs (*parole*) may be understood within a contextual corpus (*langue*) (Knappett 2005, 86; Layton 2006, 30). Some narrative decoration on Sail-Boat (BE) or Domed-Sail (BEδ) fibulae may be part of such a scheme, even perhaps a cosmic structure announced in the Homeric Hymns. Bennett (1997, 33-4), in particular, reads the Harvard fibula (#5387) and its companion in New York (#5388), as showing a day/night cycle, with Helios, the disc, holding the harmonious balance at the centre, rising at dawn and falling at dusk (through the parallel fish and bird a-b-c-d-c-b-a sequence; Figure: 5.24b). Bennett (1997, 39-40) reminds us that plated belts were produced, perhaps as a warriors set, with similar iconography. Yet, I would point out that the belt's decoration is consistent with fibulae found at Philia and Pherai whilst the Harvard fibula is from Attica. Not only the decoration, but the stubby necked catch-plate and unusual bead at the base of the pin. Squabbles aside, scholars must remember that the decoration on the fibulae being so small, could hardly be seen. In fact, the affect such a fibula has upon its wearer and audience is more complicated than a narrative reading.

Gell's theory of abduction is based on four terms, and a matrix of 'The Art Nexus' depicts their relations (Figure: 5.25). The theory has been most effectively used in archaeology by Whitley (2007, 185-8; 2012), who shows that, the Delphi Charioteer, dedicated at Delphi, was a powerful index of the patron, Polyzalos, rather than the artist or rider, whilst Garrow and Gosden (2012) consider its role in the abstract quality of Celtic Art. Other scholars have hitherto interpreted Gell's work with disappointing results (e.g. D'Agata 2012, 210; Layton 2003, 461; Mills and Ferguson 2008, 340; Osborne and Tanner 2007; Winter 2007, 42-5). On the other hand, materialist studies have gone one step further but, with risk of gross generalisation, thinking through objects alone they perhaps lose sight of how they act

Figure 5.25: Gell's terminology and The Art Nexus (Gell 1998, 27, 29, Table 1).

within the subsystems that Clarke and Gell had in mind (e.g. Gosden 2005, 194; Knappett 2005, 45-9).

In a rudimentary sense, Gell depicted the general way secondary agents act as extended persons, as extensions of social lives or the institutions that created them. In other words, objects index the agency of primary agents, enabling elites a superior infrastructure to facilitate their goals and ideology than they in person could otherwise achieve (cf. Ebbinghaus 2014; Hayden 1998, 12; Knappett 2005, 169; Robb 2015, 168). I say 'elites' for it

[[[[Recipient^1-A] > Prototype-A] > Artist-A] > Index-A] >>> Recipient^2-P
patron/wearer | PF-G | smith | fibula PF-V | observers
'status anxiety' | popular type | virtuosity | captivating | admiration/inferiority

>>> Recipient^2-A > Recipient^1-P
observers/witnesses | wearer
ascribe | social position

Figure 5.26: Lerna fibula Stage 1 Gellogram: production and use-life (Source: Author).

is those with the resources to expend on materials (amongst other things, such as time), to support their personal status in a world fraught with 'status anxiety' (Duplouy 2015, 59; Whitley 2015, 290). A 'Gellogram' delineates the hypothesised agent-patient relationships of the Lerna fibula before its transfer to the child at burial (Figure: 5.26). Square brackets denote nested agent/patient relations, and each step right shows the extended agency accumulated by the primary agent (Gell 1998, 51-2). Suffixes -A (agent) and -P (patient) mark whether agency is being exerted or received. Relations are marked by > which culminate in the index, and >>> indicates where the abduction takes place.

Stage 1 then, represents the production of the fibula and its wearing by its owner. I do not know of the object's prior biography, and though I know objects of this time often had a rich biography (Grethlein 2008; Whitley 2013a, 400-2; 2016, 216), I assume the parent had the fibula produced. The parent/patron (Recipient^1-A) instigated the manufacture of the fibula variant (Index-A) produced by the smith (Artist-A), taking a design from the available profile-groups known to them (Prototype-A). In its use-life the fibula acted upon observers (Recipient^2-P), exerting power on behalf of the patron by its possession and wearing. This type of power is double-sided, observers (Recipient^2-A) would also have agency over the patron (Recipient^1-P) back through the agency of the index. For they witness the wearing of the fibula and the status it ascribes, the abduction plays a role in maintaining the social structure, captivating both the wearer and observers in their respective roles (cf. Knappett 2005, 165). Indeed, the wearer may feel obliged to wear the index, to not do so may play a small part in system dislocation (as when a boss scolds an employee for not wearing a tie), as variation (in practice) from the norm. If the fibula

Prior abduction events >>>	[[Recipient^0-A] >	Recipient^1-A] >	Index-A] >>>	Recipient^2-P
production and prior use life	gift giver	wearer	antique fibula	observers
time and spacial reach	high status	prior associations	captivating	admiration/inferiority

Figure 5.27: Had the fibula come into the possession of the wearer as a gift, it would carry the associations of those who wore it previously, adding to its power as an index (Source: Author).

had a biography, a spatial reach as much as a history of prior ownership, before coming into the possession of the patron, its power would only increase (Figure: 5.27; Grethlein 2008, 37). I shall discuss the efficacy of the fibula below.

5.3.1.2 The power of abduction

The ensuing phase before transfer of ownership to the child is time. The power of abduction the fibula gives is an accumulation of:

1. The sum of all agent-patient relations.
2. Every abduction event.
3. The cumulative biography; the individuals who had worn it and the memory of them, and the places it had travelled.
4. Its beauty and technical virtuosity.
5. The index efficacy may rise or fall as styles go in and out of fashion, increase in popularity, become rare, or common.
6. Simultaneously the index rises or falls in efficacy as it becomes associated with the status of the wearer and the institutions they are part of.
7. The meaning of the index may shift, and have a different affect on different cultures.
8. Whether they were associated with object narrative in oral poetry, religious practice, national dress, and so on.

[[Recipient^{1}-A]	>	Index-A]	>>>	Recipient^{3}-P
parent/benefactor		fibula		child
grief		biography		idealised status
			abduction symbolism aesthetics	

(a) Stage 2

[[[[Recipient^{1}-A]	>	Recipient^{3}-A]	>	Index-A]	>	Index-A]	>>>	Recipient^{4}-P
parent/benefactor		dead child		objects		practices/rites		community/memory
grievance		idealised		spectacle		spectacle		legitimacy for Recipient^{1}-A
							abduction symbolism aesthetics	

(b) Stage 3

Figure 5.28: Lerna fibula Stage 2 and 3 'Maxogram': transfer of ownership and dedication in burial (Source: Author).

It is very difficult to assess these points for my example, but I can be sure the object still held a power, else why give it prominence in death? Indeed, the transfer of ownership provides an opportunity to increase legitimisation of the parent's and household's status at the funeral, regardless whether the intention was not so sinister (Figure: 5.28a). We can also appreciate the parting of an object worn each day in life, a very personal object, in terms of grief, and a hope that it may be appreciated and used by the child in the afterlife, or perhaps given, by the child, as a gift to a god there encountered (Dodds 1959, 136; Muscarella 1967a, 85). That does not diminish the fact that presenting the fibula to the child increases the status of the family, as extended agency. I have included symbolism and aesthetics in addition to abduction as the active processes during these events. There is no reason to highlight only one to the denial of other factors in this exertion of power 'Maxogram'.

The third stage, then, represents the index at the funeral (Figure: 5.28b). Note, it is still the parent who is primary agent, the parent who is gaining memory, social power, and legitimisation through the funerary spectacle (Index^{1}-A and Index^{2}-A). The dead child, objects, and practices act as secondary agents, exerting the primary agency of the parent upon the community. The use of the fibula, which could have been substituted by any other powerful object, is thus clear, and I can begin to assess its value in maintaining system stability for this family, and by extension the community as a whole.

It is evident that fibulae, like all indexes, had a role in maintaining system continuity at a high level (Clarke 1978, 418) and individual prestige at a lower one (Hayden 1998, 11-5). To what extent is open to debate, and scholars have evidently focussed on the latter.

> Ideology operates most effectively at the routine, non-discursive level of human practice, particularly through its objectification in the material objects that actively mediate social action... The notion that people live their ideology as real implies that *ideology is a taken for granted part of any particular life style*, even that of an élite, which adheres to a particular set of practices and beliefs with deep commitment and not merely as part of a cynical charade (Treherne 1995, 116, emphasis mine).

The objects dedicated to the dead or the gods reiterate social status not simply by message (Shennan 1982, 156), aggrandisement (Hayden 1998, 18-25), or as agent (Whitley 2012), but by being performed. In other words, they partake in a normalising process, legitimisation. In addition to their performance and physicality owing legitimisation, there is also the importance of emotion. Objects are not only status objects but a way of protecting the self, like a skin, during death. Indeed, the dread of death, anxiety, and the loss of the self in the process, seems to terrify those in the Iliad and Odyssey (Treherne 1995, 122-4). One way to transcend this loss, Treherne argued, was by achieving a 'beautiful death' fixed in the memory of the living. Death was preserved in funerary monuments and oral poetry (cf. Grethlein 2008, 37-8). By contrast, the horror was to be forgotten, to be at risk of defilement, not only of body but also accoutrements and personal ornamentation. So often prized by the enemy, the personal grave goods were a direct extension of the body as well as a part of the body (Treherne 1995, 128; Whitley 2016, 215; cf. Gell 1998, 96-154).

5.3.1.3 Legitimacy and the extended mind

I have shown that the Lerna fibula played a role as an extended object in systems of hierarchy and legitimacy, and will now explain how this works in extended and distributed minds (Clark 2008; Dodds 1959; Gell 1998, 221-58; Whitley 2013a). To do so succinctly I look to the theory of distributed cognition on one hand, and minds as social institutions on the other (Castelfranchi 2014, 122). It is clear that objects act as physical and cognitive extensions: robotic arms, or arms and armour, extend our physical qualities (Ebbinghaus 2014, 154-6; Gell 1998, 37; Knappett 2005, 169); computers and notebooks extend our mental ability (Clark 2008, 196-8). Clark and Chalmers (1998, 15) show how a person with Alzheimer's disease uses a notebook for his memory, connected by phenomenological perception rather than internal bandwidth. The only difference being the processing speed, which in some cases may still be faster than a non-Alzheimer's person with limited cognition or when intoxicated. Another example is the Nobel physicist explaining that the work is the paper; he could not do the work in his head (Clark 2008, xxv). Superior cognition is afforded by objects, arranging and labelling them, with or without text. They hold our memories and emotions, including joy, guilt, power, understanding, and hierarchisation. Just as a photograph, brooch, gun, or child's doll holds these qualities in our society; not too unlike the Betel bag for the Kodi of Indonesia (Gell 1998, 126-33; Hoskins 1998, 45-7). Moreover, by holding part of our cognition in themselves, objects have a degree of control over it (Gell 1998, 134-6; Hoskins 1998, 22). Yet nowadays we seem too clever, no object is able to confound us. We feel we can always see through to its logic. Of course, that is not true, and perhaps less true for those who can neither read nor write. Distributed cognition implies distributed or 'fractal' personhood (*sensu* Gell 1998, 140, 221-3). The 'Homeric dividual' is distributed across objects and object biographies; complex social relations are held in things (Whitley 2016, 215; Strathern 1988, 13).

My contention is that social institutions and conventions are stored in minds at the same time as being stored outside minds, in objects. Individuals learn conventions, scripts or ways of interacting in order to minimize subjective uncertainty: if there were no rules for doing, every social interaction would face undue difficulty and mistrust (Castelfranchi 2014, 122). Social learning, or mental tool-kits, allow for success in unusual non-routine actions, such as negotiating a deal, or demonstrating ones status (e.g. *arĕtē*) over another.

Castelfranchi (2014, 122-9) argues that minds are 'cultural artefacts', created to deal with cultural institutions, such as kinship, exchange, and labour. Moreover, humans tend to follow the rules, or scripts, once learnt, for the natural reason they make doing easier. These scripts can exist entirely in the mind as well as distributed across objects (Robb 2015, 169-171). Indeed, we 'play the game', adopting a role, and prescribing roles on others, in order to achieve our goals. The scripts that emerge to play these games are semi-autonomous. Each player is resigned to follow a prescribed role: they 'wear' or 'act' it in order not to fail or interrupt social norms. Even if an individual does not have a benevolent attitude toward following this game, other participants will assume they do, if they go along with it (Castelfranchi 2014, 130, 137; cf. Gell 1998, 128).

This last point is important, for it need not matter whether the object or game is real. It may as well be imagined. Just by going along with the elite-with-fibula is acting to legitimise their status, by acting out the script of being inferior. The cumulative effect of this game-playing is of normalised hierarchy, exclusion, and voluntary deference (Tyler 2006, 378). Even if the elite does not wear the fibula at all times, the elite-with-fibula is still in your mind, as part of a social rule. It is not necessarily enough to have the fibula: one must know how to use it correctly, and one must be allowed to use it. This is the foundation of legitimacy, and begins to explain how objects are tied up with it. It is part of why special hard-to-get-hold-of objects are so lavishly described in Homer; either the detail of themselves (i.e. *ekphrasis*) or their entangled biographies (Whitley 2013a, 399). One need not see the actual object to learn its script, for it is in the mind, and understand that man-with-artefact is to be regarded as more important and powerful than others (Tyler 2006, 385, 392; Tyler and Lind 1992, 164-6).

5.3.2 Fibula power: its factors and emotions

5.3.2.1 Distance, encounter, and admiration

It is possible to consider the specific ways a fibula, as opposed to other metalwork, plays out in social relations with analogy to the physical affordances we encounter jewellery use today. The first crucial point is distance and length of encounter. The distance you are from a person wearing a brooch will directly affect the level of appreciation and understanding you will have, such as its technical intricacies (e.g. beauty) or narrative decoration (e.g. symbolism). Equally, you will not be able to appreciate this if given only a short encounter. Abduction, on the other hand, is more instantaneous and subconscious. Given the opportunity to see the object, the abduction will be fixed within a prescribed cultural framework of expectations. Here abduction, symbolism, and aesthetics are all efficacious depending on cultural psychology (Layton 2003, 454; 2006, 31). As an aside, Professor Whitley used to treat his students of the Praisos Project to a symbolism test, asking them to interpret a tombstone in 30 seconds. Naturally, students expected their answer to fit into the context of Archaic/Classical Crete, clouding the obvious answer that it is Venetian, of the 14th century AD. This type of encounter with a fibula is only possible if the wearer allows you to see it, as well as each face of the catch-plate. The length and distance of encounter affect its semiotic salience.

Recalling our encounter with the fibula worn by Odysseus (see No. 2 on page 10), the decoration is narrated; in this context part of its power lay in the narrative detail that could not be seen, and probably could not be seen if real. This fibula is very similar and of the same period to the one dedicated to the Lerna child; certainly difficult to tell the difference during the funeral ceremony. Odysseus' fibula is likely my BEδ2 (Figure: 5.24c), close to the BE3 variant. Such Domed-Sail fibulae have an unusually wide distribution and many contain obvious Homeric narrative (Figure: 5.24d; Bates 1911; Bennett 1997; Blinkenberg, 163-9; Hadaczek 1903; Hampe 1936; 1971; Perrot and Chipiez 1898, 253;

[[[Recipient^{1}-A] >	Recipient^{5}-A/P] >	Index-A]	>>>	Recipient^{4}-P
parent/benefactor	poet	fibula		community
status/pride	legitimacy	same as Odysseus'		memory
			abduction symbolism aesthetics	

Figure 5.29: Lerna fibula Stage 4: tales of heroic objects (Source: Author).

[[[Artist-A] >	Prototype-A/P] >	Index-A]	>>>	Recipient^{4}-P
poet	BE/FF fibulae	imaginary fibula		community
			abduction symbolism aesthetics	

Figure 5.30: The creation of a prototype by orator and not the craftsman (Source: Author).

Schweitzer 1922, 163). The heroic association of the Lerna fibula if real, and there is no reason to say it would not have played even a small role, adds an additional power to the index (Figure: 5.29). It is difficult to place the agency of the poet, Recipient^{5}, is it before or after Recipient^{1}-A, the parent? In other words, does the poet remark upon a common practice, or does he/she create the practice? It is easy to draw the creation of practice, where the fibula is Prototype-P, regardless of its decoration or variant (Figure: 5.30; Gell 1998, 32). Whichever the case, the added agency the index now possessed, as an extension of the patron, is clear, and it is exerted over the community, Recipient^{4}.

It would not be too much to suggest observers admired the Lerna fibula as they admired Odysseus himself. Indeed, we are told so: 'and all admired it' (Lattimore 1975, *Odyssey* 19.229). The emotion of admiration is closely intertwined with feelings of inferiority, envy, and jealousy (Figure: 5.31). I can document the prerequisites of admiration borrowing components common to psychological studies (Castelfranchi and Miceli 2009, 224-6). I substitute observers for 'A', Odysseus for 'B', and fibula for 'p'. The sum of 'p' of course stands for a whole host of adornments, bodily extensions and personal skills. Thus, the components for admiration:

1. The observers believe they do not have the fibula.

Figure 5.31: Emotions of admiration, emulation, inferiority, envy, and jealousy, and their components. Note, there is a mistake in this diagram: the uppermost line should read ‘A believes A doesn’t have *p*’ (Castelfranchi and Miceli 2009, 225, Fig. 1).

2. The observers believe Odysseus has the fibula.

3. The observers believe they are inferior to Odysseus with respect to the fibula.

5. The observers believe the fibula is valuable in some respect.

9. The observers want the fibula to exist.

10. The observers believe Odysseus is valuable (because of the fibula).

I need only substitute two components, 9 and 10, with 4 and 6 to allow the feeling of inferiority:

4. The observers want the fibula.

6. The observers want (not (observers inferior to Odysseus with respect to the fibula)).

Inferiority is similar to the feeling of 'benign envy' as opposed to 'malicious envy' (Castelfranchi and Miceli 2009, 226), for the latter would entail additional components:

11. The observers believe Odysseus is the cause of their inferiority.

12. The observers want Odysseus not to have the fibula.

It seems that the audience would feel admiration for Odysseus more than inferiority, as they are told to feel so by the orator, for Odysseus is a hero, touched by the gods (cf. West 1988, xviii-xix). Similarly, they admire the fibula, and they may want it, or they may want to be close enough to see the beguiling decoration of the hound strangling the fawn as it tries to escape. They may feel alienated for not having it. Moreover, the emotion evoked of strength strangling inferiority, that the observer is obliged to share in, helps to submit them to the wearer's power. It is easy to appreciate the hound as Odysseus and themselves as the struggling fawn should they come face-to-face with the hero (Gell 1998, 31), as much as seeing Telemachus as fawn to Penelope's suitors. The fibula need not be decorated to achieve such efficacy; other pins in Homer are praised for their shining quality (see list on page 10). It is not difficult to see how, with the emotions of admiration and inferiority already in place, Gell's technology of captivation is easily powerful, especially so in this cultural context. Captivation by artistic agency is where technical superiority, and the steps forming the process of its origination, cannot be mentally understood by the observer (patient). The origination of the index, for Gell, 'defeats explanation', and renders the observer trapped between two worlds: the world where the observer observes and the world where the artefact was created, as if by magic (Gell 1988; 1998, 68-72; Garrow and Gosden 2012).

Such social cognition is well-known, where awe diminishes the self and encourages collective engagement, a key legitimising practice (Bai *et al.* 2017, 186). Odysseus' fibula is imaginary, the Lerna fibula could be similarly so, becoming equally imaginary once buried, as could a virtuosic but plain object. Indeed, the affirmation of individuals-with-fibulae, and other objects such as the Immortal Shield (Ebbinghaus 2014, 154), by Homer (Fitzgerald 1998, *Iliad* XVIII, 478-617), is a striking confirmation of how important such an object could be to an individual playing status games in Ancient Greece towards the end of the 8th century (cf. Whitley 2015, 301).

5.3.2.2 Location of display: Croesus' sanctuary dedications

My second general point is the location that the fibula takes compared to other items of worn metalwork. A belt is low, as are rings, whilst earrings can be disguised by hair, and they are off-centre. The fibula by contrast is usually worn in the most prominent position, at upper chest (see Brøns 2014, above 1.1 on page 13), and though a diadem is also important, it is a less frequent find. The large size of fibulae in relation to other jewellery emphasises their importance during the period. The richness of variety, in contrast to other classes of jewellery, further establishes this point. The fibula was an essential part of everyday dress; they would be handled and worn each day, hence their very personal nature. Why dedicate them to a god? I may remind the reader of my other research question, why do fibulae gain power, evidenced by their variety, now, in the 8th century?

In a sanctuary dedication, I expect the fibula to have been put on display amongst other dedications in the god's possession within the temenos, and left there perhaps for generations; or if redeposited, kept or buried nearby (Alroth 1988; Burkert 1985; Whitley 2001, 136). This is how votives are positioned in a Classical sanctuary, but not necessarily one of the 10th to the 7th century. Indeed, the architecture of early sanctuaries, traditionally seen as a development from 'ruler's dwelling to temple', is decidedly sparse (Mazarakis Ainian 2016; Whitley 2001, 133-40). But it is also not straight-forward. Early 'cult' sites exhibit evidence of feasting, with remains of animals and drinking equipment, but not necessarily divine patronage (van den Eijnde 2018, 75-80); they can hardly be called 'sanctuaries' until the 8th century. Even then, the key feature of a sanctuary, the altar, may not have been accompanied by any structure, though scholars expect votives to remain in the immediate vicinity; probably close to the altar (Alroth 1988, 203; Klebinder-Gauß 2007, 23, Fig. 1). Perhaps the most I can say of votives of earlier date (8th and 7th century), is that they are found in fills of the 6th and 5th century. An example is the Argive Heraion, the old terrace is said to date to the second half of the 8th century, yet no architecture is found upon it (Strøm 1988, 178; Wright 1980). If some of the fibulae date to the 8th century they may have been displayed here, around the same time fibulae were dedicated at the Hera temple to the west, for they are later found all over the sanctuary (Strøm 1995, 38, Note 240). There are just two sanctuaries that provide definitive dating to Period 3 (800-600 BC). Kalapodi has a mid-8th century context (Felsch 1983, 124-6; Klebinder-Gauß 2015, 193-4), whilst the fibulae unearthed in the Austrian excavations at Ephesus have an early 7th century context (Klebinder-Gauß 2007, 21; see above on page 2.4.2.4).

The most obvious evidence of votive offering are objects inscribed, for example 'Apollo, I am thine' or 'I am of the Anakes: Eudemus offered me' (Rouse 1902, 322-34). Just two

The image originally presented here cannot be made freely available via ORA because of copyright.

(a) FU1.—.–, #9428 (Cahn 1950, 190, Fig. 2). **(b)** FU1.—.–, #9427 (Source: Author).

Figure 5.32: Lion Brooches from the Sanctuary of Apollo Tyritas (a) and the Argive Heraion (b). Not to scale.

fibulae in my catalogue are inscribed (#9428 and #9434), and only two others are known to me. They are from Italy: the Praenestina fibula, with the earliest known Latin inscription, probably a fake (Gordon 1975), and the Valenzano fibula (Gervasio 1921, 87, Pl. XII, No. 7). Our fibulae are the probable 6th century Lion Brooches associated with Apollo. The first was found at the Sanctuary of Apollo Tyritas and its inscription reads *ΑΠΟΛΟΝΣ ΕΜ* ('I belong to Apollo'; Figure: 5.32) and the second is fragmentary, *ΙΑΙΓ*, it is probably from the Sanctuary of Artemis Orthia (Blinkenberg 1926, 280-1; Cahn 1950, 190). Of straight-pins, Jacobsthal (1956, 31, 96, Figs. 84 and 314) notes an inscribed pin from the Argive Heraion and another from Paphos. But an inscription is not necessary to make a votive; the agency-relations remain the same (Rouse 1902, 322). High profile dedications are known to us in later texts, such as Herodotus, writing in the 5th century. Croesus, King of Lydia, is said to have dedicated famous amounts of gold amongst other items, including his wife's necklaces and belts, to Apollo at Delphi, but not necessarily in person (Waterfield 1998, *Herodotus* I.50-3). Other dedications were made at Thebes, Ephesus, and Miletus (ibid. I.92). Votives were thought to bring Croesus favour, as payment for oracles and military alliances, albeit it did not turn out well in the end.

It is likely a fact of chronology that fibulae are not mentioned in Herodotus but are in Homer. Whilst it is probable that a definitive version of Homer was not written down until the late-6th and 5th century for performance at the Panathenaea in Athens, earlier versions were performed at the Panionia festival in the later-8th and 7th century (Nagy 2010, 22;

2015, 62). Whilst the performance is an act of creation, the archaising elements in Homer strongly suggest that key elements of the poetry (the things) were formed over several centuries, during the time of fibula use (Nagy 2010, 311-4; 2015, 64; cf. Hood 1995, 26; Lemos 2002, 217-8). Without delving into that controversy, I can at least contend the fact that Herodotus does not note the dedication of fibulae in the 5th century to be consistent with the archaeological record, for there were next to none, indeed very few from as early as the 6th century, until their reintroduction in Roman times.

Returning to the question of Phrygian's dedicating objects in Greece, archaeologically speaking, there are many examples of fibulae turning up in Aegean sanctuaries from Anatolia presumably in the 7th century, more so than any other region (e.g. the Balkans, Cyprus or Italy), and some appear to be imitated (Strøm 1998, 46-8; Vassileva 2014, 224). What I would like to know about these early offerings at sanctuaries is whether they were displayed for a similar time as at a burial, during dedication and sacrifice, or were in fact visible for generations, and visible to whom? Of course, whilst this is impossible to tell on present evidence, I can list the agency relations involved for the different abduction scenarios (cf. Garrow and Gosden 2012, 45-6).

In Croesus' case there are many agents involved in the dedication of, in our case, his wife's jewellery to Apollo at Delphi (Figure: 5.33 on the next page). The god can also be placed as agent in front of Croesus, instructing him to make a dedication. Croesus believes the index will act, as his extension, upon the god (idol) and observers (other leaders) to bring him good fortune and military strength. Dedicating being the right thing to do, observers must have felt Croesus a benevolent king.

If the index remained on display after the event, the agency relations may be simplified, in that the observers may not know of his wife or the way it arrived, and they may also become confused over the prototype. For example, local imitations might augment the prototype's agency, they believing it local rather than rare and exotic (Gunter 2009, 86). Indeed, whilst the agency of the prototype and artist are still latent in the index, the most

Recipient^{4}-A >>>
God
Demands

[[[[[[Recipient^{1}-A] > Recipient^{2}-A] > Recipient^{3}-A] > Prototype-A] > Artist-A] > Index-A]
Croesus/King | wife | gift-bearers | PF-G | smith | belt/fibula
Seeking favour | transferred property | spectacle | appropriate | virtuosic | enchanting

>>> Recipient^{4}-P > Recipient^{5}-P
God | Observers
Satisfaction | Captivation
abduction
symbolism
aesthetics

Figure 5.33: Dedication of Croesus' wife's jewellery to Apollo at Delphi (Source: Author).

[[Recipient$^{1/6}$-A] > Index-A] >>> Recipient^{5}-P
Croesus/Lacedaemonians | votive | observers
(King/Usurpers) | biography | captivation
abduction
symbolism
aesthetics

Figure 5.34: Simplification of Croesus' extended agency over Recipient^{5}-P, and the attempt to usurp this agency by the Lacedaemonians (Source: Author).

important agents may be shown (Figure: 5.34). In fact, observers may believe the King himself brought the object into being and made the dedication personally.

We also learn from Herodotus that one of Croesus' dedications was later over-written with the name of a false dedicator, the Lacedaemonians. This attempt to usurp the agency of the index for a new patron is commonplace. The practice of defiling and dedicating enemy's weapons, armour, and possessions, their 'extended skins', is very famous in Greece and Assyria. This is clear archaeologically (Ebbinghaus 2014, 152-3, 161; Whitley 2006, 233) and in texts. Assyrian soldiers took bones from royal graves, timber beams from palaces, and tens of thousands of other treasures to destroy or take hostage at their capital (e.g. Gunter 2009, 168-70; Livingstone 1989, 44-7, No. 17). The Aeginetans stole the Athenian statues, and the failed rescue attempt led the sole survivor to be murdered with

[[[Prototype-A] > Artist-A] > Index-A] >>> Prototype/Recipient$^{1/7}$-P
votive/enemy defiler votive/volt votive/enemy
(image of enemy) re-appropriate captured physical/psychological harm
abduction
symbolism
aesthetics

Figure 5.35: Agency involved in dedicating the enemy's objects: volt sorcery (Source: Author).

the straight-pins of the Athenian wives' (Waterfield 1998, *Herodotus* V. 83-7). The act of burying objects in the ground, at burials or foundation rituals, has a similar effect of defiling the agency that was present before. This is known as volt sorcery, where damage to the prototype is damage to the individual (Gell 1998, 103) or collective (Figure: 5.35).

It is important to note that dedications become the god's worldly indexes, gods being powerful as a sum of their representation by men, such as praise in poetry and piety in worship (Gell 1998, 114). This transfer of ownership, and power of the index when passed to the god's control, will increase its efficacy in future abduction events. Not knowing how the object was used between dedication and deposition is a challenge for the understanding of the value of fibulae in systems, as I shall show.

5.3.2.3 Cultural responses to abduction

Awe and admiration are good techniques for legitimising hierarchy, it makes people feel small but not diminished in status, rank, or self-esteem (Bai et al. 2017, 201). The magnitude of the affect, or efficacy of the index, is culturally dependent, as argued above. I think a good case has already been made to show that Ancient Greeks, in particular, would have been especially subject to it, as explained by E. R. Dodds (1959) in *The Greeks and the Irrational*. 'Homeric man's highest good is... public esteem... and strongest moral force... public opinion' (Dodds 1959, 17-8): their greatest fear, for Dodds, in a similar vein to Treherne (1995), was shame (see Crozier 2014, 271). Shame, rather than guilt, was a particularly Greek thing. Hence Treherne's thesis of the beautiful death and obsessive

[[Prototype-A]	>	Artist-A]	>>>	Index-P	>>>	Recipient[5]-P
god's power		creates object imbued with atē	abduction symbolism aesthetics	fibula piece of god's presence	abduction symbolism aesthetics	observers idolatry

Figure 5.36: Power of god as prototype; power of abduction via cultural thought (Source: Author).

desire to protect one's possessions from transgression, such as loss in battle. Moreover, more than subject to shame, the Greeks were irrational, like Dodds himself, and many of us today (Finkelberg 2012, 108; Thaler and Sunstein 2008). Homeric Greeks believed *atē*, an external blindness, and *menos*, energy, were breathed into humans by the gods; indeed, anything vague, such as out-of-body aggression or spontaneous thought, was attributed to daemonic or godly power, or if known, a particular god's agency (Dodds 1959, 11, 14). In this way, the unknown, the technically unexplainable qualities of objects, result of the god's own agency, and become a carrier of the god's presence, as if an idol (Gell 1998, 40, 97-8). Here the god, and piety, become the prototype, and provides, in our case the fibula, with superior abductive power (Figure: 5.36). The fibula then channels multiple levels of agency and abduction simultaneously: biographical association, captivation, and the touch of the gods.

My third point, then, concerns the different groups of people who would encounter the fibula. I have shown that multiple levels of abduction may take place simultaneously, and they may have different levels of affect on different individuals. For certain groups the importance would be the presence/absence of the fibula, for others the profile-group, and close observers the specific variant and decoration. The recipient[5]-P is made up of multiple individuals subject to abduction in different ways, as their minds interact with the index.

If culture affects efficacy, abduction not being universal, it becomes obvious why things can lose efficacy over time and lose value. Moreover, by understanding them, and interacting with them, they become overpowered and weak. From feeling small in awe, in understanding the beholder feels large. This must tie in to fashion, and the question of why fibulae make such a spectacular profusion in the 8th century to all but disappear by the late-6th century (cf. Snodgrass 1990, 289). This must also be an explanation for the divergence in quantity and variety of dedications regionally.

5.3.2.4 Explaining variety

My fourth point returns to my primary research question, why do fibulae need to have so much variety? Is it because objects become weak as they are understood? Or to the contrary, might objects incur stronger emotional attachments over time? My list of factors causing variety (Section 5.1.3 on page 230) does not account for why fibulae needed to have more variety whilst other artefact-classes had less variety. This variety is carefully produced. Indeed, producing a technically efficient fibula, such as an E5 or F1 profile-variant, strong and sturdy, would produce minor variation patterns noted in my list: including time, population, tools and materials, copy-error, number of workshops, exchange, practical uses, and inventions. There is only one joint-factor remaining that accounts for the high level of internal variation in the data: fashion and artistic innovation. As an aside, I contend this is where Feldman's (2014, 27, 31) thesis for networked production of ivories (as opposed to workshop control) goes awry, and the paradox that follows, that elephant tusk procurement was likely closely controlled, becomes less paradoxical. In our case, I hope I have, in part, answered why fibulae needed variety, and explained it, by reasoning that style, and its captivation, is equal to power. Style, then, is not inherent to man, but inherent to man's goals (*sensu* Mark 2: 27-8 New International Edition).

This is not out of step with Darwinian evolution (as opposed to Neo-Darwinism) in so much as adaptive selection is coupled with sexual selection. For Darwin, the primary cause of evolution was not only natural selection (an evolution of fitness) but sexual selection (an evolution of beauty); the desire for beauty in animals was key to reproductive success (Prum 2017, 22-55). It is obvious how jewellery can likewise be employed in the pursuit of beauty and success in social negotiation.

On one side of the coin, there is style at multiple levels. Variant style affected the intimate observers, confounded by technical intricacy, nuance, and decoration. Variant-level style is formed at the craftsman's hand, produced during the production of imperfect copies and experimentation of new fibulae. Group style affected the consumer; the latest fashion could be discerned or social group differentiated. Group-level styles are fibula prototypes, collections of variants that form entities easily observed by consumers. Finally, super-group style was more culturally salient for the distant observer. Super-group style is like a slice of culture; different super-groups were obviously distinct, and held regional associations. The general idea of a person-with-fibula would be abducted at this stage. The details (including virtuosity, narrative, or aesthetics) need not matter for abduction; they affect not the presence of abduction, rather its efficacy. On the other side of the coin, there is context. The historical circumstances, or system configuration if you will, had to be right to allow fibula style cultural saliency at a given time. The huge rise in quantity suggests the fibula was selected in 8th and 7th century cult practices, whilst the constant high diversity reflects the artefact-classes' cultural role. It may be difficult to evaluate the relative strength of this variety at the different levels, yet it will become clear where their importance lies in several subsystems: in death, daily-life, and status institutions.

5.3.3 Agency, systems, and extended mind

Telling us to admire Odysseus's fibula is to condition listeners to respect individuals with beautiful, magical things, whilst proposing the listener to be inferior, rightly subjected to the elite. Homer is not suggesting we should be envious or jealous in respect of the fibula, and condemns related practices of greed and deceitfulness to non-locals, such as the Phoenicians (Winter 1995, 249). We think that Homer is right and good, but there is much societal structuration taking place here. Emotional responses are very important. In particular, it is now clear that emotion plays a significant role in decision making (Fig-

Figure 5.37: The role of current emotions in decision making (Lerner et al. 2015, 815, Fig. 2).

ure: 5.37; Lerner et al. 2015, 801). The evaluation of how to act, and the expectation of an outcome are decisively affected by current emotions and cultural conditioning. An individual (or dividual) used to feeling inferior to person-with-fibula will find it an uphill struggle if he/she wishes to break this normalised hierarchy. In any case, one object is not enough, he/she needs the diadem, fibula, earrings, robe, weapons, and so on, in addition to exceptional personal qualities. Indeed, without these he/she may well feel helpless (Castelfranchi and Miceli 2009, 226).

If the power of style is cultural, the variety (richness) and quantity (count) of fibulae are evidence of historical importance. Both count and richness increase steadily until a jump four centuries after their introduction. Variety tells us of elites trying to maintain their status and the number of elites involved in status games, and the locus of this shifts in emphasis from tombs to sanctuaries. This is consistent with big-men society rather than a society of heritable status (Duplouy 2015, 62; Whitley 1991; 2015). Fibulae became part of an institutional mindset, where diverse and larger, more elaborate, brooches were legitimised as a useful tool in power relationships and maintaining system continuity before the polis and other more complex systems of legitimacy, convention, and dynastic strategies took hold (Duplouy 2015, 78; Hall 2014, 126-53). The high variety is consistent with the power ascribed to fibulae and other objects in oral poetry, and something akin to 'fibulamania', parallel to the idea of 'Renaissance' (Coldstream 1983, 18; Morris 1988, 750), must have occurred in the 8th and 7th century, but only in certain areas as my distributions show (Figure: 3.6 on page 118): for it was culturally constructed.

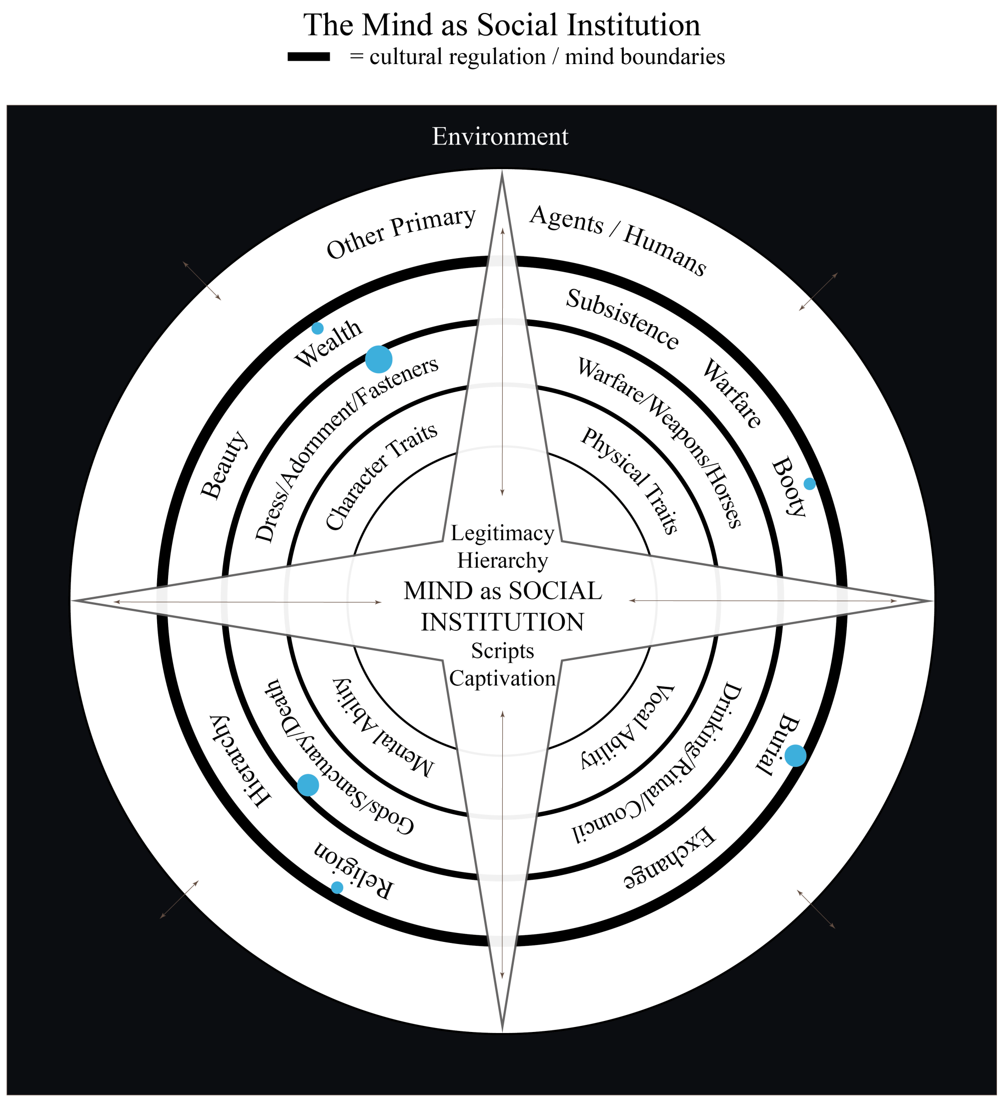
We do well to remember that such a renaissance reflects cultural phenomena, and may not necessarily coincide with a revolutionary increase in wealth or population. For the decline in fibulae coincides precisely with increased wealth and status competition in the 6th and 5th century, including a significant rise in sanctuary dedications overall (Whitley 2001, 311-3). I might suggest in historical terms that status is shifting to the community from the individual level; not too hard to achieve, for there was no stratified social order in place in the Early Iron Age (Hall 2014, 134). The decline in fibula richness and count is consistent with the rise of the polis, institutions, and monumental sanctuaries, suggesting status investment moved to other areas of material culture. The use of fibulae did not entirely cease in the Archaic and Classical, however, where a small number of exquisite and technically exceptional gold and silver examples are found in graves and sanctuaries. Does richness of style reduce in favour of rare, hard to acquire, technical captivation? And yet, in these later times a patron could dedicate a realistic bronze statue of his own image, with name attached, an inevitable precursor for the introduction of consumption restrictions in later times (Dodds 1959, 137).

Now that I have put forth an explanation for fibula variation, there is left to account for their value and the question of culture. I can assure myself that their exchange value addressed in Chapter 4 is not important. Rather, the value lies in the part it plays in the system, the practice of daily life, and special events; but these different contexts of use lie only in certain subsystems. Indeed, I have shown how individuals work within systems and how the system works in the human mind, as extended, distributed minds. In short, I could define the sum of distributed cognition as a culture. In Clarke's general model c (Figure: 5.2 on page 221), it is apparent that R (the Regulator) is the most important factor in system change, ${}^{S}t_2$. So, I could say that the regulator is culture, and the methods I have described operate (amongst other methods) within it. The regulator operates on several levels simultaneously. It is in individual minds as well as material culture and their collectives. It then follows that we have a fairly good idea of where fibulae operated in the system, and thus in various regions across Greece and Anatolia. I can make a hypothetical model to place their use (Figure: 5.38).

Here I have gone beyond the basic idea of extended personhood, 'skins' in the literal sense, such as bronze-laden warriors (Ebbinghaus 2014, 154), into distributed minds and culture. My model shows the skin of an extended mind as it lives and dies within itself, and within the cultural system. Each tier is an insulator, or regulator, that acts to socially condition the mind in its operations. Interaction within each sphere requires running the right scripts, thus being passive to their requirements that are yet set within one's own mind. The use of fibulae, as one tool, is shown to have a limited presence, but a powerful one in adornment, grave goods, and dedications (in some regions), whilst it has a minor role in booty and wealth storage (except, perhaps, in Gordion's cellars). I can also see the other factors and skills that enable individual success in the status games they encountered.

Summary

The purpose of this section, whilst seemingly theoretical, shows a best fit model hypothesising where and how fibulae were used in daily interaction. The theories are actually rather straightforward, indeed obvious, and I would not wish any linguistic dressing to cloud their utility (cf. Bintliff 2015). In my model, the extended mind takes centre stage as a unit of culture and a regulator of culture: for minds, things, and culture are intermingled. To summarise, in Clarke's general model the crucial component for system change (or continuity) is the regulator, R (Figure: 5.2 on page 221). At the micro-scale, the mind is regulator; at the macro, a collection of minds, whether wittingly or not. If culture and institutions



<u>Affordances/Constraints:</u>
Inner: human traits and abilities.
Middle: extensions, material, family, and class.
Outer: institutions, manners, and etiquette.
Ranking: outer layers are more important for success in social negotiation.

● = The role of fibulae

Figure 5.38: Minds as social institutions (Source: Author).

are within the mind, rather than out there to interact with, it becomes clear that the most important factor for explaining culture at any given point is not quite 'man's extrasomatic means of adaptation' (Binford 1965, 205), or as evolutionary progress, but perhaps surprisingly, as emotion and feelings. For it is emotion, though culturally conditioned, that plays the pivotal role in decision-making: the formation of goals and motivations. This is perhaps where the fault-line between processualism and post-processualism lay.

To address material culture head-on I follow Sørensen (2014, 252-4) who argues that culture is emotional: it is people seeing differences, and seeing qualities in themselves alongside a sense of the self; an emotional construct. This has strong implications for the types of archaeological artefact that are better or worse at exploring cultural systems. For Sørensen they are above all dress, and second, food. Dress and adornment because these are things that visually distinguish one from another in the every day; not people's pots or graves, or house types. That is to say it is not styles of pottery but use of pottery, in terms of food consumption, that is more important (Sørensen 2014, 256). Naturally, language, practices, and beliefs are also critical factors in culture, but they are more difficult to discern archaeologically. Hence, archaeological evidence of jewellery, textiles, and bodily adornment are much more important units of measurement than the study of pottery or tools.

This is not to say that I have answered any question of culture in the Early Iron Age, but rather I aim to restore dress, jewellery, and other identity-laden artefacts, where the mind has distributed agency and identity, at the forefront when looking at culture. What is needed in archaeology is not more refined chronology of (pot) styles but a new look at how typologies may be created with multiple levels, and a shift in emphasis to artefact-classes that have a cultural-emotive residue. Fibulae, then, I argue, are one of the most important artefacts of the Early Iron Age Aegean, and with this new layered typology, they are ready for further analysis. A next step would be to posit a map of dress-culture based on the distribution of fibula super-groups (cf. Gleba 2017, 1206). This is not to say these super-groups are necessarily synonymous with an ethnic or other, cultural identity, but that the users they stand in for would have noticed an emotive difference in fibula and dress style.

Chapter 6

Summary & Conclusion

6.1 Summary

Chapter 1

My first chapter introduced the influx of fibulae into the Aegean in the late-13th/12th century as a similar technology to pins; their likely origin was the Alpine foothills. As a technology, they never replaced pins. I introduced the evidence for their use in the literary and visual record, and, though vital, I argued it was limited in quantity for chronological reasons. For example, black and red figure vase painting came after fibulae had fallen from popularity. The main thrust of Chapter 1 concerned typology, style, and historiography. The key work this thesis aimed to supersede was Blinkenberg's (1926) *Fibules Grecques et Orientales*, published almost 100 years ago, as well as to combine several *Prähistorische Bronzefunde* classifications (Caner; Kilian; Sapouna-Sakellarakis) into one typological scheme. I looked back to Thomsen and Montelius to the roots of archaeological typology, noting classifications were ultimately evolutionary or logical in nature. At the outset, I argued not only a new typology was needed but a new kind of typology, one that was multi-level and multi-scalar. Different levels of differentiation are important for analysing different kinds of problem, namely production, consumption, and identity. Style, and the way objects were classified, was of course fundamental to this issue. Style has meaning to those that created and observed it, and though my typology built heavily on Clarke's (1978) work, I rejected his premise of building types on arbitrary attribute values. Like Klejn (1982), I argued that typology must be built from the top down, using key variables that the craftsmen of the past would also have recognised; in the case of fibulae the profile, cross-section, and catch-plate. I ended by pointing out that typological issues had been largely sidestepped by modern theoretical trends, at their peril, for almost all archaeological work has foundations in the comparison of one thing from another.

Chapter 2

Chapter 2 contained the nuts and bolts of the thesis. To create this typology new definitions needed to be created without the baggage of indefinite terms such as 'type' and 'artefact'. Existing definitions for the parts of fibulae themselves were also insufficient. I argued that the subdivision procedure should be based on gestalts, subdividing to roughly equivalent levels of behavioural complexity. The division is not arbitrary but aimed at the recognition of polythetic prototypes, held in the minds of the craftsmen who made them. The prototype was the recognisable sum of a fibula, and further variation proceeded in reference to available prototypes, rather than something completely new and abstract.

I made the important decision that every code should be unique and thus mutually exclusive. Whilst my typology was hierarchical, crucially I argued that the levels should not be hierarchically fixed. Rather, they should be analysed separately and never together. This allowed my typology to be flexible to answer multiple kinds of questions rather than fixed and mono-level, as is the case in traditional fibula typologies. I also introduced the methodology of phylogenetic trees in archaeology as a useful structural map for the analysis of artefacts, but concluded they were so hypothetical that their use was ultimately misleading.

The results provided a typology fit for its purpose. Any typology must have a chronological element, although I argued that chronology was not a driving factor for the creation of my typology. I wanted to find types of equivalent value so that I could assess links between sites and the diversity of site assemblages. The concept of diversity does not necessarily require chronological contiguity. Since the vast majority of fibulae were found in sanctuary contexts without good chronological sequencing I assigned only very broad phases to each fibula profile-group: Period 1 (1200-1000 BC), Period 2 (1000-800 BC), Period 3 (800-600 BC), and Period 4 (600-400 BC). The bulk of the chapter contained the typological essay of the variant-categories and the 1,202 variants described in Plates: 1-129 (Volume 2). The 10,282 fibulae were recorded in Appendix G (Volume 3).

Chapter 3

The assemblage of data was quantified in Chapter 3. Each fibula had been assigned a confidence code between 1 and 27 to indicate which level of information was available due to the damaged nature of the surviving record (Table: 3.1 on page 107). This is a significant advantage over traditional typologies that tend to force broken data into types by guesswork. 7,389 (72%) of the data had an identifiable profile-variant; 9,519 (93%) were identifiable at profile-group. Only 3,381 (33%) of catch-plates were identifiable at variant level as opposed to 5,281 (51%) at group. Cross-sections were often hard to judge as a result of publication quality and took a lesser role in the thesis as a whole.

The key result of the nominal data was to show how uneven the distribution of fibulae was (Figure: 3.3 on page 113; Plate 135). Of 223 sites recording the presence of fibulae, 50% had less than two fibulae. 63% of the data (some 6,273 fibulae) came from only 6 sites. There was not only a varied use of fibulae in deposition practices, but also dress and regional use. I showed that in Periods 1 and 2 most fibulae were dedicated at cemeteries, however, this situation dramatically shifted to sanctuaries in Period 3 (Figure: 3.6 on page 118). Further points addressed in Chapter 3 included the material type and manufacture of fibulae, as well as size and repair. Fibula repair was consistent at both sanctuary and cemetery deposits indicating a use-life before dedication. Fibulae of the Aegean Mainland were about 50% larger, on average, than those found in Asia Minor.

Chapter 4

Network analyses in archaeology aim to uncover interaction between sites (nodes) and the relationships between them (edges) based on artefact similarity. The nature of similarity is thus of critical importance. Chapter 4 presented a critique of network analyses measuring artefact similarity, for a degree of similarity does not necessarily equate to interaction. My analysis started with the usual problems, the incomplete nature of the record, deposition practices, and cultural drift. I then highlighted those more complex, including the possibility of similar artefacts being second- or third-generation copies of an earlier import, directionality of exchange, and the biography it acquired whilst getting there.

Notwithstanding these general problems, my analysis took the assumption that creating directional networks, where the edges contained only those instances of variant similarity where the source of the production was identifiable, would be beneficial. I argued that manufacture could be ascertained not by the traditional counting of types by location alone, but by the number of contiguous profile-variants at a site, as shown in a radial tree diagram (Plate: 152). Assemblages containing all, or nearly all, of the variants within a group were determined to be the source of manufacture. For it is the variants, the minor mistakes and innovations, that suggest the location of production. A site having a large number of fibulae but less than 50% of the variants, say 3 or 4, such as Pherai, could be seen to be importing objects from Philia even though a casual reading of the group data would suggest Pherai to be a joint manufacturer of the profile-group.

I applied a manufacture test to 26 sites, and hypothesised the number of fibulae produced locally in each case. I then estimated the actual number of unique profile-variant exports by site. I argued that fibulae were not a commodity for exchange, but rather subject to direct import.

Chapter 5

I had argued throughout the thesis the importance of variation in the data. Noting the presence of variation is one thing, but what did it actually mean, and if it was not random, what was it for? In Chapter 5, I advanced diversity analyses popular in the 1980's to site assemblages and typological group variation. When I listed the possible factors of diversity I found they were much more complex than the typical explanations, such as time, population size, and copy-error. In fact, I listed 16 factors including manufacture liberalisation, innovation, tradition, and fashion. The three measures I adopted to examine the data were the variety ratio, richness, and evenness. The archaeological statistics programme Past 3 was used to assess these for 28 sites.

The results were consistent with the manufacture test of Chapter 4. Sites with high evenness and a low variety ratio were considered to be sites importing fibulae, whilst a low evenness and high ratio indicated a manufacture site. Moreover, the diachronic regional study was startling. In Period 3 counts and richness increased astonishingly, but not everywhere (Figure: 5.15 on page 252).

The third part of Section 5.2 looked at artefact-type diversity. This investigated the diversity of the category-groups themselves. It became immediately apparent that some profile-groups were popular in antiquity and widely spread (Plate 153). Yet, they were individually rather than mould made. Others were closely controlled and had consistency in manufacture.

The final part of Chapter 5 tackled the value of a fibula using a case study from Lerna. The Lerna fibula was found in a child burial, of perhaps 18 months, inhumed in a pithos. The burial was dated to Late-Geometric I/II, and also contained two bronze rings, a hoop, and two probable iron pins. The fibula had been repaired in antiquity, suggesting it had an extended biography prior to its dedication in burial.

I introduced Gell's (1998) thesis *Art and Agency,* and argued that abduction was not the only factor acting during abduction events. Both aesthetics and symbolism played their role. 'Gellograms' were adapted into 'Maxograms'. I argued that stylistic diversity is used to implement human agency. Its creation satisfies cultural demands, and is not a simple factor of time, population, size or copy-error. Evolutionary explanations for fibula variation were rejected. I argued that fibulae had a role in several subsystems that make up the interactions between extended minds. Fibulae were just one object of the distributed mind found in several areas, namely, dress and adornment, burial, sanctuaries, wealth, booty, and religion (see Figure: 5.38 on page 295).

6.2 Conclusion

There are four key areas that this thesis makes a contribution: typological theory, historical explanation, provenance, and diversity.

6.2.1 Typological theory

The value of any archaeological study rests on the strength and relevance of its typology. Almost all archaeological work involves the comparison of one thing from another, using intuition (e.g. gestalts) or measurements (e.g. Correspondence Analysis), to distinguish variation at different levels of detail. This thesis made the case for the centrality of typology, the seriation of relations between things, to archaeological theory. Looking again at

Figure 6.1: Typology as foundation to archaeological theory (adapted from Hodder 2012, 7, Fig. 1).

Hodder's (2012, 7) understanding of processual and post-processual approaches, I place typology as their foundation, not as a secondary question left for a typologist (Figure: 6.1).

My fundamental and yet simple contention is that a typology should be multi-layered and flexible for it to be successful. A typology that is fixed and mono-level is problematic; if it is nested hierarchically it is subject to further flaws. There is no question that traditional typologies appear unhelpful for middle range or deep theory (Snodgrass 1985), for they can answer only the questions they were designed for, often chronology and little else. A layered typology is different. Its *modus operandi* is to separate different levels of difference so that each level of information is relevant to investigate different kinds and orders of question. This is of fundamental importance. In my case, variants, akin to Clarke's (1978, 158-60) 'attribute complexes', were meaningful for issues of production and provenance but not for questions of chronology or consumption. Groups of variants, equivalent to artefact-type prototypes, were meaningful for chronology and consumption but not as helpful, indeed sometimes misleading, in terms of production and provenance. It is thus obvious how relying on traditional typologies such as Coldstream's (1968) *Greek Geometric Pottery* or Caner's (1983) *Fibeln in Anatolien I*, does not allow other questions to be answered. Indeed, I argued that neither variant- nor group-level data were meaningful for questions of identity: an analyst investigating what fibulae may tell us in this area would need to look at super-group-level similarity. Super-groups have an equivalence to a local-regional style or 'style zone' (Binford 1965, 208).

This kind of typology is therefore hierarchical, but crucially it is not hierarchically fixed. A fixed hierarchy combines information from all levels together. In the case of network analyses, I discussed how nodes were linked by a weight of joins that included dependent variables: having one attribute present meant another was automatically, enabling join weight to reach a predefined threshold, clearly erroneously (Östborn and Gerding 2015). Combining information that is neither mutually exclusive nor like-for-like is problematic. Here I approached some of the problems encountered with Clarke's (1978) work on types. In Clarke's (1978, 206) schematisation of system complexity, culture is placed at the top of a nested hierarchy: attribute, artefact, type, and assemblage; each the foundation of the next. The attribute, then, is the building block for any subsequent analysis.

Klejn (1982, 252-57) critiqued Clarke's model, arguing that his concepts should not be listed in one column but side by side. Artefacts and complexes were not the same kind of phenomena as attributes, types, and culture. If I understand correctly, the former are *emic*, real entities, whilst the latter are *etic*, abstract designations defined by the typologist (cf. Sørensen 2015a, 87). My reading, is that Clarke's contention that attribute level data is fundamental to all the others, is questionable. The trouble with attribute level data is that it is precisely the area where the analyst can most easily be misled: measuring attributes that may have been neither meaningful nor observable to the manufacturer or consumer of the artefact. Measuring the length or weight may have no meaning in relation to variant, group, or super-group variety. Hence, I contended each level of typology to be interdependent. In fact, multiple typologies could be made at different degrees of similarity without relating to each other, and still have validity for answering questions at different levels of systems complexity.

Furthermore, I argued that typologies in general are more suited to gestalts than an arbitrary construction as Clarke and others envisaged (Adams and Adams 1991; Martin 2015; Read 2007). The producer or consumer must have been able to understand and observe the degrees of similarity in order to be investigating information meaningful to them. The make-up of an artefact-type was therefore the three variant-categories relevant to the manufacture of fibulae: the profile, cross-section, and catch-plate categories; each subdivided into super-groups, groups, and variants. Each level contained data of roughly equivalent value for its level. My first research question, how typology affected research into production and consumption of fibulae, was thus answered.

The results provided a typology fit to measure 10,282 fibulae found in the Aegean and Anatolia, comprised of 1,202 variants, 259 groups, and 53 super-groups. This new typology replaces outdated information, namely Blinkenberg's (1926) *Fibules Grecques et Orientales.* A replacement was long overdue, for erroneous types, such as '*épirotes*', still mislead scholars today, such as Orfanou's (2015) interpretation of fibula composition at Pherai (see Section 4.2.3.2 on page 176). This work also aims to supersede the *Prähistorische Bronzefunde* regional typologies of Caner (1983), Kilian (1975), and Sapouna-Sakellarakis (1978), by combining the information into one scheme, as well as incorporating finds from new publications and areas previously unrecorded. That is not to say that *Prähistorische Bronzefunde* catalogues are no longer a useful repository of information and comparison, but that only now have scholars a working typology for Aegean and Anatolian fibulae as a whole.

In the typology's construction, I attempted a phylogenetic analysis of the stylistic evolution of fibulae. I found evolutionary principles useful for schematisation, and yet ultimately unsuccessful. Phylogenetic trees are useful for identifying hypotheses rather than explanations (O'Brien et al. 2016). Furthermore, the explanations afforded by Evolutionary Archaeologists are prone to mislead for they emphasise too few factors of variation (Crema et al. 2014, 289; Porčić 2015, 1072; Sørensen 2015b, 744-5; Steele et al. 2010, 1349). In Chapter 5, I argued that a much larger number of factors existed and concluded that those most important were not strictly evolutionary. To the contrary, I posited that the cultural phenomena of fashion and a desire for individualising dress ornaments during a particular cultural and chronological context was the greatest cause of fibula variation.

This understanding enabled me to consider the role of fibulae for archaeological chronology. Historically, fibulae have featured significantly in European and also Anatolian chronology, as opposed to the Aegean, and yet my findings from the Aegean area suggest that fibulae may not be as helpful as previously thought (cf. Baxter and Cool 2016; Pare 2008; Sams 2011). Seriation of artefact style is tenuous in general, not only because artefacts go in and out of fashion, increasing and decreasing in stylistic complexity in no linear fashion, but because the rate of innovation is not dependent on time but culture. Artefact chronologies are based on dead-reckoning, where a given number of styles are assigned to a given period of time (Coldstream 2003; Toffolo *et al.* 2013, 1). The trouble is that all the variation can be made in a short amount of time if desired. The enormous increase in fibula variety in the 8th and 7th century, a 22 times increase in sanctuary richness and 4 times increase in cemetery richness from the 10th and 9th century, followed by a dramatic decline nearing total disappearance in the 6th and 5th century, showed that fashion determines the rate of innovation; not standard evolutionary factors, such as time, manpower, or cultural drift.

If fibulae cannot be used with confidence for chronology, to what extent can ceramics? Perhaps ceramic variety may be accounted less for style than for function, and yet increased stylistic diversity of ceramics is reported at the same time as fibulae (Coldstream 1968; 1983). Ceramic chronologies do not take into account that variation could result for social reasons rather than a notable advancement of time (cf. Vaessen 2014). Unfortunately, this is a problem that shall persist, since radiocarbon dating is not yet able to confirm or change this picture (e.g. Toffolo et al. 2013, 8).

6.2.2 Historical summary

The second area of progress has been in quantifying, if only very broadly, the regional deposition of fibulae over time. This had not been done at an inter-regional scale before, and provides new data for interpretation. There were three critical results. The first is that the vast majority of fibulae were found at surprisingly few sites, where the largest six assemblages (2.7% of all sites) possessed some 63% of all examples (N=9,916), an average of 1,045 examples each. By contrast, some 74% of sites (N=223) had fewer than 10 examples present. The most important result of Chapter 3 was that fibula use was not universal. Prior to the 8th century fibulae were relatively rare in all regions, and almost none were found in Anatolia. Dedications in Period 1 (1200-1000 BC) and Period 2 (1000-800 BC) favoured cemeteries rather than sanctuaries, and whilst the quantity of fibula dedication in cemeteries rose in the 8th and 7th century, the rate of dedication in sanctuaries radically outstripped it at a rate of over five to one (the sanctuary count rose 25.5 times from 225 to 5,739, whilst the cemetery count rose 4.5 times from 274 to 1,234). This transformation was, however, uneven. The sanctuaries at Pherai, Lindos and Ialysos have a much larger count though not necessarily richness than elsewhere (see Section 5.2.1.1 on page 234). At the same time, fibula use in Crete and the Aegean Islands was marginalised; indeed, richness and count actually declined from Period 2 to Period 3 (800-600 BC) in the Aegean Islands. In the Peloponnese, fibula dedication was almost non-existent in cemeteries for all Periods and yet not for pins (Kilian-Dirlmeier 1984). As identified in Chapter 5, the rise in dedications and variety in the 8th and 7th century was the result of demand, and this is confirmed exceptionally by the massive decline in deposition from the 6th and 5th century. In Period 4 (600-400 BC) fibula use is rare, in direct contrast to metal dedications and other votives, especially terracottas, during the Archaic period (Mili 2015, 33; Whitley 2001, 311-3).

The history of fibula use, then, was not due to technology, function, wealth, or population, but culture and fashion. Whilst the reasons for dedication varied, this does not detract from the general picture. Why are fibulae absent if pins are not? Indeed, neither were fundamental to dress for buttons, sticks, and string could also be used, and, moreover, certain styles of dress did not need to be fastened, such as the Ionic Chiton which became popular by the 6th century (Elderkin 1928; Lorimer 1950, 354). In short, dress styles must have visibly varied across regions over time, and thus the analysis of fibula use has an indirect relation to identity, if identity is synonymous with the identification of difference (Brøns 2012; Gleba 2017; Sørensen 2014, 254).

The second result is the fact that fibulae were physically larger in the Mainland Aegean than in Anatolia and the Asia Minor Coast, not only due to larger catch-plate styles in the former, but surely a desire to have larger more significant objects. A reasonable size for a functional dress fastener is 20-120 mm (the average is 54mm), any larger suggests other factors were involved. The largest sizes were reserved for the most popular fibula groups, such as profile-groups BE and BEδ. BEδ is precisely the group consistent with Odysseus' double-bowed fibula decorated with a hound strangling a fawn that the audience is told to so admire (see Section 5.3.2). These profile-groups have an exceptionally high count of site and region find-spot (Plates: 138-41).

My third point concerned the techniques of manufacture. My typology showed that most objects were made individually using the lost-wax method. In short, each fibula was designed and copied, rather than being made from a two-piece mould that allowed the creation of identical copies; repeat examples of the same variant. Hence the high diversity in variants, but also the high diversity in size: indeed, pairs of fibulae in graves are not usually identical. Identifying fibulae made with two-piece moulds is fairly easy on this basis. Even though the technology for efficient two-piece moulds existed in the 8th century, they were not commonly used outside of Central Anatolia (See Section 3.1.8 on page 123). The fact that so few moulds have been found, and the variant richness diverges from them, attests this.

6.2.3 Networks and provenance

The results of Chapter 4 highlighted some key problems with network analyses in general. Firstly, artefacts that look the same may not actually be *similar enough* in style (groups), or in manufacture (variants), to actually have any direct relationship (Section 4.2.2 on page 161, points 1 and 2). Convergent adaptation is where artefacts evolve in a similar manner, or where an object did indeed travel but was then copied. Second- and third-generation artefacts may not possess any evidence for interaction, only the original object that was transferred. Moreover, the transferred object may not have travelled directly from point of origin, and may have taken a circular route, attaining a history of ownership, perhaps even becoming an antique before reaching its destination. Thus the edges in the network may not even be of similar chronology. Furthermore, where fibulae look identical in profile, they may have had a totally different style of catch-plate, and yet the latter evidence is often missing; the catch-plate prone to breakage before being uncovered by the archaeologist.

My second objection arose at the level of meaning (Section 4.2.2 on page 161, points 3-6). If the analyst looked at similarity in profile-variants to determine a link in manufacture provenance, working upwards that data may be useful for group and super-group-level questions. However, the analyst cannot then also include the group- and super-group-level data (which is more abundant) and work downwards. Moreover, if links at the variant-level are problematic, those at higher levels are even harder to detect in a network analysis. On the other hand, the analyst may look at style zones or general prototypes: and yet, these are much harder to understand, the variables that lead to their creation are neither universal nor straightforward.

The results of Chapter 4's manufacture test were supported by the results of the diversity analyses in Chapter 5. Assemblages were compared for their richness, evenness, and ratio. Sites with a high ratio but a low evenness were suggested to be the source of manufacture, having many examples of few dominating types, whilst those with a low ratio and high evenness, showing few examples of a large number of different profile-variants and profile-groups, to be consistent with importation (See Section 5.2).

The directional network thus strengthened, the edges (or links) between the nodes (or sites) showed something of the origins of the original artefacts. This brought to light important differences in the data. I had already identified the key Greek sanctuaries as importing their fibulae, having a large number of diverse fibulae from different profile and catch-plate-groups. Whilst larger sites, including Pherai and Lindos, quite obviously manufacture sites not only for their diversity results but possessing contiguous profile-variants, were actually exporting their fibulae in different ways. Indeed, it is not correct to discuss the movement of fibulae in terms of exchange or exportation at all. Even though the richness was high, the quantity was very small.

This was particularly the case at Pherai, evidence that the people of Pherai were allowed to dedicate their fibulae abroad, that merchants were able to take a few to sell or offer, or that visitors were able to collect them to dedicate at home. It seems unlikely that itinerant craftsmen were the cause of the distribution. The most compelling hypothesis is visitors, by that I mean looters, mercenaries, and emissaries (cf. Niemeier 2016), picking up a novelty to dedicate at home. Being so regionally distinctive, fibulae must have signified local dress cultures: ripe for transgressing and dedicating, much the same way as foreign helmets or statues (Ebbinghaus 2014; Waterfield 1998, *Herodotus* V. 83). The quantities were too small as well as highly diverse to indicate an export trade of fibulae crafted in Thessaly.

Fibulae manufactured on Rhodes were very rarely exported outside the island, and when they are they are especially restricted to the Asia Minor Coast, notably at Emporio, Ephesus, and Izmir. Yet, Rhodian fibulae are abundant (27.7% of all fibulae) and some groups were mass produced in high number. Simultaneously, they show a lower proportion of repairs than usual, suggesting an emphasis on converted offerings: votives made to be dedicated locally (Snodgrass 1990). Almost all of the other major sanctuary sites imported their fibulae; they were not produced in local workshops.

Profile-groups from Central Anatolia, namely Gordion, travelled widely throughout the Aegean, if few in number, but Aegean types did not, if ever, travel back towards Gordion itself. On the subject of wider links, there were in fact very few between the Aegean and

Cyprus, and few towards the Balkans and Italy. Where there are similarities they involve few types and are narrow in distribution. The fibula assemblage at Olympia is an example.

On the subject of cemeteries, the evidence is similarly varied. Gaps in the time between burials, and local sumptuary customs, make it hard to understand whether fibula variants were absent or simply not deposited. On the whole, most of the examples from Crete appear to be imported: but if imported, from where, if they were not commonly exported? On the other hand, examples from Athens, Lefkandi, and Thebes seem to be locally made, with clear traditions. Other areas, such as the Peloponnese, had none but few fibulae dedicated in burial.

6.2.4 Value and diversity

The fourth area is second in importance to typology in this thesis. They are closely dependent: the diversity analyses have a direct relationship to the number of variants defined by the classification process. The principal result of Chapter 5 was to argue that value is linked with diversity because value lies in the variation of style. Indeed, value lies at multiple levels of appreciation and levels of observation, just as different levels of style have different meanings (e.g. Schapiro 1953; Taylor 2015; Whitley 2018).

More important, fibulae were identity-laden artefacts powerful in the regulatory system of minds as social institutions. I argued that the regulator in Clarke's (1978, 134, Fig. 23) general model was culture, made up of minds at the micro-scale and a collection of minds at the macro. I argued that culture and institutions are found within minds, not outside as independent entities to interact with. Thus, an explanation of culture does not lie with 'man's extrasomatic means of adaptation' (Binford 1965, 205), but rather, I contended, human emotions. Emotion is the key to forming goals and motivations, the cause of action, system regulation, and the creation of culture: driven in the Greek case, above all, by the desire for public esteem (Bai et al. 2017; Dodds 1959; Duplouy 2015; Lerner et al. 2015).

The main research question, why did fibulae need so much variation, could then be answered. It is accounted by innovation and fashion evidenced in Period 3. It must have been appropriate and well received to dedicate fibulae in sanctuaries, as well as to the dead, in certain areas. Indeed, it was an Aegean wide popularity, though not universal: they became neglected in Crete and the Aegean Islands. However, by Period 4, their value in this system became minimal, and they were quickly dropped from circulation. It is not possible to conclude that their use declined with new forms of dress (Lorimer 1950, 337-39, 348-55), because some fibulae continue, although there must be a correlation. This is a pressing question. More important though, was that the mode for self-status and extension of agency was, by the 6th century, being channelled through different artefact classes and institutions (Duplouy 2015, 78; Hall 2014, 126-53; van den Eijnde 2018, 84).

I thus not only explain the history of fibulae in the Aegean and Anatolia in my study period, but also something of the communities that used them. There were changing customs of dress and dedication, and a change from the individual to the community that need to be investigated further.

6.2.5 New directions

This thesis took a different path to recent work on typology, network analysis, and diversity. A major tendency to use arbitrary attributes for types, or a focus on decoration, was avoided (see Section 2.2 on page 44). Whilst decoration would be worthy to look at as a fourth variant category, I suggest it would not assist scholars much in terms of production, consumption, or identity. Although Beazley (1956, x) was not wholly incorrect to describe '"style" as a sacred thing, as the man himself', I regard the value of art as functional, intended to cause affect (see Section 5.3 on page 268). Perhaps this is one reason why the vast majority of Aegean and Anatolian fibulae were not decorated, and why the famous BE/BEδ fibulae so rarely have Homeric narrative decoration when they could have (Snodgrass 1998, 12-16). The majority instead exhibit merely a flower or a fish, enough to evoke the idea of a powerful object, without resorting to narrative. The decoration in any case, too small to be seen by any but the most intimate observer, would thus not have come into most abduction events. The mere presence of the fibula itself was powerful enough.

I end with three questions for future work. First, out of 10,282 fibulae, only two were inscribed: two Lion Brooches probably 6th century in date (#9428 and #9434; see above on page 5.3.2.2). Was writing considered inappropriate for fibula dedications, or did fibulae generally go out of use before inscribed votives became popular? Second, I have demonstrated that some fibulae travelled long distances, such as from Gordion to the Argive Heraion, but I have not looked at the pan-Mediterranean connections. Fibulae from the Aegean and Anatolia show similarity with those as far away as Seville, Cyrenaica, and Georgia. Which are the real exports and which show convergent adaptation? Moreover, it would be possible to analyse rates of variation between different regions and cultures. It would not be wrong to suggest Cypriot fibulae were more conservative in their variety than Aegean fibulae (Giesen 2001). The question is why? Third, and most pressing, the distribution now uncovered shows that some areas did not have many fibulae. This may well be in contrast to straight-pin use. Why did the people living there choose not to adopt them? In short, who wore what, and where?

Bibliography

Abrahams, E. B. (1908), *Greek Dress: A Study of the Costumes Worn in Ancient Greece, from Pre-Hellenic Times to the Hellenistic Age*, London: John Murray.

Ackerman, J. S. (1978), “On rereading ‘Style’,” *Social Research: An International Quarterly*, 45, 153–163.

Adams, W. Y. and Adams, E. W. (1991), *Archaeological Typology and Practical Reality: a Dialectical Approach to Artifact Classification and Sorting*, Cambridge: Cambridge University Press.

Alexander, J. (1965), “The spectacle fibulae of Southern Europe,” *American Journal of Archaeology*, 69, 7–23.

— (1973), “The study of fibulae (safety pins),” in *The Explanation of Culture Change: Models in Prehistory: Proceedings of a Meeting of the Research Seminar in Archaeology and Related Subjects Held at the University of Sheffield*, ed. Renfrew, C., London: Duckworth, pp. 185–194.

Alexander, J. and Hopkin, S. (1982), “The origins and early development of European fibulae,” *Proceedings of the Prehistoric Society*, 46, 401–416.

Almgren, B. (1995), “The development of the typological theory in connection with the Exhibition in the Museum of National Antiquities in Stockholm,” in *Oscar Montelius 150 Years: Proceedings of a Colloquium Held in the Royal Academy of Letters History and Antiquities, Stockholm, 13 May 1993*, ed. Åström, P., Stockholm: Kungl. Vitterhets, Historie och Antikvitets Akademien, pp. 23–39.

Alroth, B. (1988), “The positioning of Greek votive figurines,” in *Early Greek Cult Practice: Proceedings of the Fifth International Symposium at the Swedish Institute at*

Athens, 26-29 June, 1986, eds. Hägg, R., Marinatos, N., and Nordquist, G. C., Göteborg: Paul Åströms Förlag, pp. 195–203.

Anadolu, D. B. (2004), *Anatolia: Cradle of Castings*, Istanbul: Döktaş.

Anderson, J. and Benton, S. (1953), "Further excavations at Aetos," *The Annual of the British School at Athens*, 48, 255–361.

Andronikos, M. (1969), *Vergina*, Athens: En Athēnais.

Arrington, N. T. (2017), "Connoisseurship, vases, and Greek art and archaeology," in *The Berlin Painter and His World: Athenian Vase-Painting in the Early Fifth Century B.C.*, ed. Padgett, J. M., New Haven: Princeton University Art Museum, pp. 21–40.

Aubet, M. E. (2001), *The Phoenicians and the West: Politics, Colonies and Trade*, Cambridge: Cambridge University Press.

Bachhuber, C. and Roberts, R. G. (2009), *Forces of Transformation: the End of the Bronze Age in the Mediterranean: Proceedings of an International Symposium Held at St. John's College, University of Oxford 25-6th March 2006*, Oxford: Oxbow Books.

Bader, T. (1983), *Die Fibeln in Rumänien*, Prähistorische Bronzefunde XIV.6, München: C.H. Beck.

Bai, Y., Maruskin, L. A., Chen, S., Gordon, A. M., McNeil, G. D., Keltner, D., Stellar, J. E., and Peng, K. (2017), "Awe, the diminished self, and collective engagement: universals and cultural variations in the small self," *Journal of Personality and Social Psychology*, 113, 185–209.

Bates, W. N. (1911), "Two labors of Heracles on a Geometric fibula," *American Journal of Archaeology*, 15, 1–17.

Baumbach, J. D. (2009), "'Speak, votive, ...'. Dedicatory practice in sanctuaries of Hera," in *Le Donateur, l'offrande et la déesse: Systèmes votifs dans les sanctuaires de déesses du monde grec: Actes du 31e Colloque international organisé par l'UMR Halma-Ipel (Université Charles-de-Gaulle/Lille 3, 13-15 Décembre 2007)*, eds. Prêtre, C. and Huysecom-Haxhi, S., Liège: Centre International d'Étude de la Religion Grecque Antique, pp. 203–223.

Baxter, M. J. (2001), "Methodological issues in the study of assemblage diversity," *Amer-*

ican Antiquity, 66, 715–725.

Baxter, M. J. and Cool, H. E. M. (2016), "Reinventing the wheel? Modelling temporal uncertainty with applications to brooch distributions in Roman Britain," *Journal of Archaeological Science*, 66, 120–127.

Beazley, J. D. (1943), "The training of archaeologists: II. University training," in *Conference on the Future of Archaeology: Held at the University of London, Institute of Archaeology, August 6th to 8th, 1943*, London: Institute of Archaeology, pp. 42–46.

— (1956), *Attic Black-Figure Vase-Painters*, Oxford: Clarendon Press.

Bell, C. (2009), "Continuity and change: the divergent destinies of Late Bronze Age ports in Syria and Lebanon across the LBA/Iron Age transition," in *Forces of Transformation: the End of the Bronze Age in the Mediterranean: Proceedings of an International Symposium Held at St. John's College, University of Oxford 25-6th March 2006*, eds. Bachhuber, C. and Roberts, R. G., Oxford: Oxbow Books, pp. 30–38.

— (2016), "Phoenician trade: the first 300 years," in *Dynamics of Production in the Ancient Near East: 1300-500 BC*, ed. Moreno Garcia, J. C., Oxford: Oxbow Books, pp. 91–105.

Beltz, R. (1913), "Sechster Bericht über die Tätigkeit der von der Deutschen anthropologischen Gesellschaftgewählten Kommission für prähistorische Typenkarten," *Zeitschrift für Ethnologie*, 45, 659–900.

Bennett, M. J. (1997), *Belted Heroes and Bound Women: The Myth of the Homeric Warrior-King*, Lanham: Rowman & Littlefield.

Béquignon, Y. (1937), *Recherches archéologiques à Phères de Thessalie*, Publications de la Faculté des lettres de l'Université de Strasbourg; fasc. 78, Paris: Société d'Édition: Les Belles Lettres.

Bernal, M. (1991), *Black Athena: The Afroasiatic Roots of Classical Civilization: Vol. I: The Fabrication of Ancient Greece 1785-1985*, London: Vintage.

Bietti-Sestieri, A. M. (1973), "The metal industry of continental Italy, 13th to 11th century BC, and its connections with the Aegean," *Proceedings of the Prehistoric Society*, 39, 383–424.

Bikai, P. M. (2000), "Phoenician ceramics from the Greek sanctuary," in *Kommos: IV: The Greek Sanctuary*, eds. Shaw, J. W. and Shaw, M. C., Princeton: Princeton University Press, pp. 302–312.

Binford, L. R. (1962), "Archaeology as anthropology," *American Antiquity*, 28, 217–225.

— (1963), "'Red Ocher' caches from the Michigan area: a possible case of cultural drift," *Southwestern Journal of Anthropology*, 19, 89–108.

— (1965), "Archaeological systematics and the study of culture process," *American Antiquity*, 31, 203–210.

— (1972), "Contemporary model building: paradigms and the current state of Palaeolithic research," in *Models in Archaeology*, ed. Clarke, D. L., London: Methuen, pp. 109–166.

— (1981), "Behavioral archaeology and the 'Pompeii Premise'," *Journal of Anthropological Research*, 37, 195–208.

— (1989), "Styles of style," *Journal of Anthropological Archaeology*, 8, 51–67.

Bintliff, J. (2015), "Beyond theoretical archaeology: a manifesto for reconstructing interpretation in archaeology," in *Paradigm Found: Archaeological Theory: Present, Past and Future: Essays in Honour of Evžen Neustupný*, eds. Kristiansen, K., Šmejda, L., and Turek, J., Oxford: Oxbow Books, pp. 24–35.

Birmingham, J. (1963), "The development of the fibula in Cyprus and the Levant," *Palestine Exploration Quarterly*, 80–112.

Bischop, D. (1996), "Fibeln der archaischen bis römischen Zeit in Assos," in *Ausgrabungen in Assos 1992*, eds. Serdaroğlu, Ü. and Stupperich, R., Bonn: R. Habelt, Asia Minor Studien, Vol. 21, pp. 139–165.

Blegen, C. W. (1921), *Korakou: A Prehistoric Settlement near Corinth*, Boston: American School of Classical Studies at Athens.

— (1937), "Post-Mycenaean deposits in chamber tombs," *Archaiologike Ephemeris*, 100, 377–390.

— (1939), "Prosymna: remains of post-Mycenaean date," *American Journal of Archaeology*, 43, 410–444.

Blegen, C. W., Palmer, H., and Young, R. S. (1964), *The North Cemetery*, Corinth: Volume XIII, Princeton, N. J.: The American School of Classical Studies at Athens.

Blinkenberg, C. (1926), *Fibules grecques et orientales*, København: Andr. Fred. Høst & Søn.

Blinkenberg, C. and Kinch, K. F. (1931), *Lindos. Fouilles et recherches, 1902-1914: I. Les petits objets*, Berlin: De Gruyter.

Bliss, F. J. and Macalister, R. A. S. (1902), *Excavations in Palestine During the Years 1898-1900*, London: Palestine Exploration Fund.

Blome, P. (1980), "Eine mittelgriechische Plattenfibel in Basel," *Antike Kunst*, 23, 117–123.

Boardman, J. (1967), *Excavations in Chios, 1952-1955: Greek Emporio*, Supplementary Volume, No. 6, Oxford: The British School of Archaeology at Athens.

— (1999), *The Greeks Overseas: their Early Colonies and Trade*, London: Thames and Hudson, 4th ed. .

Boehlau, J. (1888), "Böotische vasen," *Jahrbuch des Kaiserlich Deutschen Archäologischen Instituts*, 3, 325–364.

— (1898), *Aus ionischen und italischen Nekropolen: Ausgrabungen und Untersuchungen zur Geschichte der nachmykenischen Griechischen Kunst*, Leipzig: B. G. Teubner.

Boehlau, J. and Schefold, K. (1942), *Larisa am Hermos: Die Ergebnisse der Ausgrabungen: 1902-1934*, Berlin: Walter de Gruyter & Co.

Bonev, V., Zlateva, B., and Kuleff, I. (2015), "Chemical composition of fibulae from the Iron Age in Thrace (Bulgaria)," in *Archaeometallurgy in Europe III: Proceedings of the 3rd International Conference: Deutsches Bergbau-Museum Bochum: June 29 - July 1, 2011*, eds. Hauptmann, A. and Modarressi-Tehrani, D., Bochum: Bergbau-Museum, pp. 115–124.

Brandherm, D. (2008), "Greek and Phoenician potsherds between east and west: a chronological dilemma?" in *A New Dawn for the Dark Age? Shifting Paradigms in Mediterranean Iron Age Chronology*, eds. Brandherm, D. and Trachsel, M., Oxford: Archaeopress, pp. 149–174.

Brantingham, P. J. (2007), "A unified evolutionary model of archaeological style and function based on the price equation," *American Antiquity*, 72, 395–416.

Bräuning, A. and Kilian-Dirlmeier, I. (2013), *Die eisenzeitlichen Grabhügel von Vergina: Die Ausgrabungen von Photis Petsas 1960–1961*, Mainz: Römisch-Germanischen Zentralmuseums.

Brock, J. K. (1957), *Fortetsa: Early Greek Tombs Near Knossos*, Cambridge: Cambridge University Press.

Brock, J. K. and Mackworth Young, G. (1949), "Excavations in Siphnos," *The Annual of the British School at Athens*, 44, 1–92.

Brøns, C. (2012), "Dress and identity in Iron Age Italy: fibulas as indicators of age and biological sex, and the identification of dress and garments," *BABESCH Annual Papers on Mediterranean Archaeology*, 87, 45–68.

— (2014), "Representation and realities: fibulas and pins in Greek and Near Eastern iconography," in *Greek and Roman Textiles and Dress: An Interdisciplinary Anthology*, eds. Harlow, M. and Nosch, M.-L., Oxford: Oxbow Books, pp. 60–94.

Broodbank, C. (2013), *The Making of the Middle Sea: A History of the Mediterranean from the Beginning to the Emergence of the Classical World*, London: Thames & Hudson.

Bruins, H. J., Nijboer, A. J., and van der Plicht, J. (2011), "Iron Age Mediterranean chronology: a reply," *Radiocarbon*, 53, 199–220.

Buchholz, H.-G. (1986), "Ein kyprischer Fibeltypus und seine auswärtige Verbreitung," in *Acts of the International Archaeological Symposium "Cyprus between the Orient and the Occident," Nicosia, 8-14 September 1985*, ed. Karageorghis, V., Nicosia: Department of Antiquities of Cyprus, pp. 223–245.

Buchli, V. A. (2000), "Interpreting material culture: the trouble with text," in *Interpretive Archaeology: a Reader*, ed. Thomas, J., London: Leicester University Press, pp. 363–376.

Bunimovitz, S. and Faust, A. (2001), "Chronological separation, geographical segregation, or ethnic demarcation? Ethnography and the Iron Age Low Chronology," *Bulletin of the American Schools of Oriental Research*, 1–10.

Burkert, W. (1985), *Greek Religion: Archaic and Classical*, Oxford: Basil Blackwell.

Cahn, H. A. (1950), "Die Löwen des Apollon," *Museum Helveticum*, 7, 185–199.

Caner, E. (1983), *Fibeln in Anatolien I*, Prähistorische Bronzefunde XIV.8, München: C.H. Beck.

Carapanos, C. (1878), *Dodone et ses ruines*, Paris: Hachette.

Carrasco, J., Martínez, F., Pachón, J. A., and Montero, I. (2014), "Tecnología, tipología y cronología de las fíbulas de codo antiguas del 'tipo Monachil' y sus relaciones mediterráneas," *Trabajos de Prehistoria*, 71, 97–114.

Caskey, J. L. (1956), "Excavations at Lerna, 1955," *Hesperia*, 25, 147–173.

Caskey, J. L. and Amandry, P. (1952), "Investigations at the Heraion of Argos, 1949," *Hesperia*, 21, 165–221.

Castelfranchi, C. (2014), "Minds as Social Institutions," *Phenomenology and the Cognitive Sciences*, 13, 121–143.

Castelfranchi, C. and Miceli, M. (2009), "The cognitive-motivational compound of emotional experience," *Emotion Review*, 1, 223–231.

Catling, H. W. (1964), *Cypriot Bronzework in the Mycenaean World*, Oxford: Clarendon Press.

— (1995), "Heroes returned? Subminoan burials from Crete," in *The Ages of Homer: a Tribute to Emily Townsend Vermeule*, eds. Carter, J. B. and Morris, S. P., Austin: University of Austin Press, pp. 123–136.

— (1996), "Bronze," in *Knossos North Cemetery: Early Greek Tombs: Volume II: Discussion*, eds. Coldstream, J. N. and Catling, H. W., London: British School at Athens, pp. 543–574.

Catling, H. W. and Catling, E. (1980), "Objects of Bronze, Iron and Lead," in *Lefkandi I: The Iron Age*, London: Thames and Hudson, pp. 231 – 264.

Chantre, E. (1898), *Recherches archéologiques dans l'Asie occidentale: mission en Cappadoce: 1893-1894*, Paris: E. Leroux.

Charitonides, S. (1955), "A Geometric grave at Clenia in Corinthia," *American Journal* *of Archaeology*, 59, 125–128.

Chase, W. T. (1994), “Chinese bronzes: Casting, finishing, patination, and corrosion,” in *Ancient & Historic Metals: Conservation and Scientific Research: Proceedings of a Symposium Organized by the J. Paul Getty Museum and the Getty Conservation Institute, November 1991*, Marina del Rey: Getty Conservation Institute, pp. 85–117.

Childe, V. G. (1943), “The unity of archaeology,” in *Conference on the Future of Archaeology: Held at the University of London, Institute of Archaeology, August 6th to 8th, 1943*, London: Institute of Archaeology, pp. 21–25.

— (1950), *The Dawn of European Civilization*, London: Routledge & Paul, 5th ed. .

— (1958), *The Prehistory of European Society*, Harmondsworth: Penguin Books.

Christiansen, J. (1992), *Greece in the Geometric Period: Catalogue*, Copenhagen: Ny Carlsberg Glyptotek.

Clark, A. (2008), *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*, Oxford: Oxford University Press.

Clark, A. and Chalmers, D. J. (1998), “The extended mind,” *Analysis*, 58, 7–19.

Clarke, D. L. (1973), “Archaeology: The loss of innocence,” *Antiquity*, 47, 6–18.

— (1978), *Analytical Archaeology*, London: Methuen, 2nd ed. .

— (1979), “Matrix analysis and archaeology with particular reference to British Beaker Pottery,” in *Analytical Archaeologist: Collected Papers of David L. Clarke*, ed. by his Colleagues, E., London: Academic Press, pp. 489–502.

Close-Brooks, J. (1969), “The Archaeology of Southern Etruria, 10th-8th Centuries B.C., its Antecedents and Foreign Relations, with Special Reference to the Evidence of Fibulas,” Ph.D. thesis, University of Oxford.

Coldstream, J. N. (1968), *Greek Geometric Pottery: A Survey of Ten Local Styles and their Chronology*, London: Methuen.

— (1983), “The meaning of the regional styles in the Eighth Century B.C.” in *The Greek Renaissance of the Eighth Century B.C.: Tradition and Innovation: Proceedings of the Second International Symposium at the Swedish Institute in Athens, 1-5 June,* *1981*, ed. Hägg, R., Stockholm: Paul Åströms Förlag, pp. 17–25.

— (2003), "Some Aegean reactions to the chronological debate in the Southern Levant," *Tel Aviv*, 30, 247–258.

— (2011), "Far-flung Phoenicians bearing early Greek pottery?" in *Der Orient und die Anfänge Europas: kulturelle Beziehungen von der Späten Bronzezeit bis zur Frühen Eisenzeit*, eds. Matthäus, H., Oettinger, N., and Schröder, S., Wiesbaden: Harrassowitz, pp. 177–184.

Coldstream, J. N. and Catling, H. W. (eds.) (1996), *Knossos North Cemetery: Early Greek Tombs*, Supplementary Volume No. 28, London: The British School at Athens.

Coldstream, J. N. and Mazar, A. (2003), "Greek pottery from Tel Rehov and Iron Age chronology," *Israel Exploration Journal*, 53, 29–48.

Colini, G. A. (1909), "Le antichità di Tolfa e di allumiere e il principio della età del ferro in Italia," *Bollettino di paletnologia italiana*, 35, 177–204.

Collar, A., Coward, F., Brughmans, T., and Mills, B. J. (2015), "Networks in archaeology: phenomena, abstraction, representation," *Journal of Archaeological Method and Theory*, 22, 1–32.

Conkey, M. W. (1980), "The identification of prehistoric hunter-gatherer aggregation sites: the case of Altamira," *Current Anthropology*, 21, 609–630.

Courbin, P. (1974), *Tombes géométriques d'Argos, I*, Études péloponnésiennes 7, Paris: J. Vrin.

Craddock, P. T. (2009), *Scientific Investigation of Copies, Fakes and Forgeries*, Oxford: Butterworth-Heinemann.

Craddock, P. T. and Giumlia-Mair, A. (1988), "Problems and possibilities for provenancing bronzes by chemical composition," in *Bronzeworking Centres of Western Asia c. 1000 - 539 B.C.*, ed. Curtis, J., London: Kegan Paul International, pp. 317–327.

Crema, E. R., Kerig, T., and Shennan, S. J. (2014), "Culture, space, and metapopulation: a simulation-based study for evaluating signals of blending and branching," *Journal of Archaeological Science*, 43, 289–298.

Crozier, W. R. (2014), "Differentiating shame from embarrassment," *Emotion Review*, 6,

269–276.

D'Agata, A.-L. (2006), "Cult activity on Crete in the Early Dark Age: changes, continuities and the development of a 'Greek' cult system," in *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, eds. Deger-Jalkotzy, S. and Lemos, I. S., Edinburgh: Edinburgh University Press, pp. 397–416.

— (2012), "The power of images. A figured krater from Thronos Kephala (ancient Sybrita) and the process of Polis formation in Early Iron Age Crete," *Studi miceni et egeo-anatolici*, 54, 207–247.

Daniel, G. E. (1943), *The Three Ages: An Essay on Archaeological Method*, Cambridge: Cambridge University Press.

Davidson, G. R. (1952), *The Minor Objects*, Corinth: Volume XII, Princeton, N. J.: The American School of Classical Studies at Athens.

Dawkins, R. M. (1929), *The Sanctuary of Artemis Orthia at Sparta: Excavated and Described by Members of the British school at Athens, 1906- 1910*, London: Society for the Promotion of Hellenic Studies.

Dawkins, R. M., Droop, J. P., Woodward, A. M., Giles, P., Wace, M. S., and Thompson, M. S. (1909), "Laconia: I. Excavations at Sparta, 1909," *The Annual of the British School at Athens*, 15, 1–157.

Dawkins, R. M., Wace, A. J. B., Droop, J. P., Dickins, G., Tillyard, H. J. W., Woodward, A. M., and Niebuhr Tod, M. (1907), "Laconia: I. Excavations at Sparta, 1907," *The Annual of the British School at Athens*, 13, 1–218.

Day, L. P., Coulson, W. D. E., and Gesell, G. C. (1986), "Kavousi, 1983-1984: The settlement at Vronda," *Hesperia*, 55, 355–387.

de Cou, H. F. (1905), "The bronzes of the Argive Heraeum," in *The Argive Heraeum: Vol. 2, Terra-cotta Figurines, Terra-cotta Reliefs, Vases and Vase-fragments, Bronzes, Engraved Stones, Gems and Ivories, Coins, Egyptian, or Graeco-Egyptian, Objects*, ed. Waldstein, C., Boston: Houghton Mifflin, pp. 191–340.

De Marinis, R. C. (2012), "Triumph and limitations of the corpus: the Late Bronze Age and Early Iron Age fibulae of Southern Italy," *Antiquity*, 86, 928–930.

de Ridder, A. (1894), *Catalogue des bronzes de la Société archéologique d'Athènes*, Paris: Thorin & Fils.

— (1915), *Les bronzes antiques du Louvre: Vol. 2: les instruments*, Paris: E. Leroux.

Desborough, V. R. A. (1964), *The Last Mycenaeans and their Successors: An Archaeological Survey, c. 1200 - c. 1000 B.C.*, Oxford: Clarendon Press.

— (1972), *The Greek Dark Ages*, London: Benn.

Deshayes, J. (1966), *Argos: les fouilles de la Deiras*, Études péloponnésiennes, Vol. 4., Paris: Librairie philosophique J. Vrin.

DeVries, K. (1972), "Incised fibulae from Boeotia," *Forschungen und Berichte*, 14, 111–127.

— (1974), "A grave with a figured fibula at Lerna," *Hesperia*, 43, 80–104.

— (2007), "The date of the destruction level at Gordion: imports and the local sequence," in *Anatolian Iron Ages 6: The Proceedings of the Sixth Anatolian Iron Ages Colloquium held at Eskişehir, 16-20 August 2004*, eds. Çilingiroğlu, A. and Sagona, A., Leuven: Peeters, Ancient Near Eastern Studies, Supplement 20, pp. 79–101.

di Cesnola, L. P. (1903), *A Descriptive Atlas of the Cesnola Collection of Cypriote Antiquities in the Metropolitan Museum of Art, New York: Vol. 3*, Boston: J. R. Osgood.

Doctor, R. F., Chelbi, F., Maraoui Telmini, B., Nijboer, A. J., van der Plicht, J., van Neer, W., Mansel, K., and Garsallah, S. (2008), "New radiocarbon dates from Carthage: bridging the gap between history and archaeology?" in *Beyond the Homeland: Markers in Phoenician Chronology*, ed. Sagona, C., Leuven: Peeters, pp. 379–422.

Dodds, E. R. (1959), *The Greeks and the Irrational*, Berkeley: University of California Press.

Donder, H. (1994), *Die Fibeln*, Katalog der Sammlung antiker Kleinkunst des Archäologischen Instituts der Universität Heidelberg 3.2, Mainz: von Zabern.

— (2002), "Funde aus Milet: XI. Die Metallfunde," *Archäologischer Anzeiger*, 1–8.

Dörpfeld, W. (1902), *Troja und Ilion: Ergebnisse der Ausgrabungen in den vorhistorischen und historischen Schichten von Ilion, 1870-1894*, Athens: Beck & Barth.

Dragendorff, H. (1903), *Thera: Untersuchungen, Vermessungen und Ausgrabungen in den Jahren 1895-1902: Volume 2: Theraeische Graeber*, Berlin: Georg Reimer.

Drews, R. (1993), *The End of the Bronze Age: Changes in Warfare and the Catastrophe Ca. 1200 BC*, Princeton: Princeton University Press.

Dugas, C. (1921), "Le sanctuaire d'Aléa Athéna à Tégée avant le IVe Siècle," *Bulletin de correspondance hellénique*, 45, 335–435.

Dunbabin, T. J. (ed.) (1962), *Perachora, the Sanctuaries of Hera Akraia and Limenia: Excavations of the British School of Archaeology at Athens, 1930-1933: Pottery, Ivories, Scarabs, and other Objects from the Votive Deposit of Hera Limenia*, Oxford: The Clarendon Press.

Dunnell, R. C. (1978a), "Natural selection, scale, and cultural evolution: some preliminary considerations," in *Evolutionary Archaeology: Theory and Application*, ed. O'Brien, M. J., Salt Lake City: University of Utah Press, pp. 24–29.

— (1978b), "Style and function: a fundamental dichotomy," *American Antiquity*, 43, 192–202.

— (1988), "The concept of progress in cultural evolution," in *Evolutionary Progress*, ed. Nitecki, M. H., Chicago: University of Chicago Press, pp. 169–94.

Duplouy, A. (2015), "Genealogical and dynastic behaviour in Archaic and Classical Greece: two gentilician strategies," in *'Aristocracy' in Antiquity: Redefining Greek and Roman Elites*, eds. Fisher, N. R. E. and van Wees, H., Swansea: The Classical Press of Wales, pp. 59–84.

Dusenbery, E. B. (1998), *Samothrace: The Nekropoleis: Catalogues of Objects by Categories*, Princeton, N. J.: Princeton University Press.

Ebbinghaus, S. (2014), "Men of bronze-cups of bronze: bronze in the Iron Age," in *Ancient Bronzes Through a Modern Lens: Introductory Essays on the Study of Ancient Mediterranean and Near Eastern Bronzes*, eds. Mitten, D. G. and Ebbinghaus, S., Cambridge: Harvard Art Museums, pp. 146–169.

Ekhoff, E. (1905), "Statens Historiska Museum och k. myntkabinettet," *Månadsblad*, 1–254.

Elderkin, K. M. (1928), “Buttons and their use on Greek garments,” *American Journal of Archaeology*, 32, 333–345.

Etter, W. (1999), “Community analysis,” in *Numerical Palaeobiology: Computer-Based Modelling and Analysis of Fossils and their Distributions*, ed. Harper, D. A. T., Chichester: John Wiley, pp. 285–360.

Evans, A. J. (1893), “A Mykênæn treasure from Ægina,” *The Journal of Hellenic Studies*, 13, 195–226.

Fang, J.-L. and McDonnell, G. (2011), “The colour of copper alloys,” *Historical Metallurgy*, 45, 52–61.

Fantalkin, A., Finkelstein, I., and Piasetzky, E. (2011), “Iron Age Mediterranean chronology: a rejoiner,” *Radiocarbon*, 53, 179–198.

Feldman, M. H. (2014), *Communities of Style: Portable Luxury Arts, Identity, and Collective Memory in the Iron Age Levant*, Chicago: University of Chicago Press.

Felsch, R. C. S. (1983), “Zur Chronologie und zum Stil geometrischer Bronzen aus Kalapodi,” in *The Greek Renaissance of the Eighth Century B.C.: Tradition and Innovation: Proceedings of the Second International Symposium at the Swedish Institute in Athens, 1-5 June, 1981*, ed. Hägg, R., Stockholm: Paul Åströms Förlag, pp. 123–129.

— (2007), *Kalapodi II: Ergebnisse der Ausgrabungen im Heiligtum der Artemis und des Apollon von Hyampolis in der antiken Phokis*, Mainz am Rhein: von Zabern.

Finkelberg, M. (2012), “E.R. Dodds and the irrational: ‘Agamemnon’s Apology’ revisited,” *Scripta classica Israelica*, 31, 101–108.

Finkelstein, I. (1996), “The archaeology of the United Monarchy: an alternative view,” *Levant*, 28, 177–187.

Finley, M. I. (1977), *The World of Odysseus*, London: Chatto and Windus, 2nd ed. .

Fitzgerald, R. (1998), *Homer: The Iliad*, Oxford: Oxford University Press.

Flannery, K. V. (1972), “The cultural evolution of civilizations,” *Annual Review of Ecology and Systematics*, 3, 399–426.

Ford, J. A. and Steward, J. H. (1954), “On the concept of types,” *American Anthropologist*, 56, 42–57.

Frankenstein, S. (1979), "The Phoenicians in the far west: a function of Neo-Assyrian imperialism," in *Power and Propaganda: A Symposium on Ancient Empires*, ed. Larsen, M. T., Copenhagen: Akademisk Forlag, pp. 263–294.

Furtwängler, A. (1890), "Die Bronzen und die übrigen kleineren Funde von Olympia," in *Olympia: die Ergebnisse der von dem Deutschen Reich veranstalteten ausgrabung, im auftrage des Königlich preussischen Ministers der geistlichen, unterrichts- und medicinal-Angelegenheiten: Volume IV: Die Bronzen*, eds. Curtius, E. and Adler, F., Berlin: A. Asher & Co.

— (1894), "Erwerbungen der antikensammlungen in Deutschland. Berlin. Antiquarium," *Archäologischer Anzeiger*, 115–122.

— (1906), *Aegina das Heiligtum der Aphaia*, München: K.B. Akademie der Wissenschaften in Kommission.

— (1913), *Kleine Schriften: Vol. II*, München: C.H. Beck.

Furtwängler, A. and Reichhold, C. (1904), *Griechische Vasenmalerei: Auswahl hervorragender Vasenbilder*, München: F. Bruckmann.

Furumark, A. (1941a), *The Chronology of Mycenaean Pottery*, Stockholm: Kungl. Vitterhets Historie och Antikvitets Akademien.

— (1941b), *The Mycenaean Pottery: Analysis and Classification*, Stockholm: Kungl. Vitterhets Historie och Antikvitets Akademien.

Garrow, D. and Gosden, C. (2012), *Technologies of Enchantment? Exploring Celtic Art: 400 BC to AD 100*, Oxford: Oxford University Press.

Gates, C. (1985), "Rethinking the building history of Grave Circle A at Mycenae," *American Journal of Archaeology*, 89, 263–274.

Gedl, M. (2004), *Die Fibeln in Polen*, Prähistorische Bronzefunde XIV.10, Stuttgart: Franz Steiner Verlag.

Gell, A. (1988), "Technology and magic," *Anthropology Today*, 4, 6–9.

— (1998), *Art and Agency: an Anthropological Theory*, Oxford: Oxford University Press.

Gercke, P. and Naumann, U. (1974), "Tiryns Stadt 1971/1972," *Athens Annals of Archae-*

ology, 7, 15–24.

Gergova, D. (1987), *Früh- und ältereisenzeitliche Fibeln in Bulgarien*, Prähistorische Bronzefunde XIV.7, München: Beck.

Gervasio, M. (1921), *Bronzi arcaici e ceramica geometrica nel Museo di Bari*, Documenti e monografie 16, Bari.

Gettens, R. J. (1970), "Patina: noble and vile," in *Art and Technology: A Symposium on Classical Bronzes.*, eds. Doeringer, S. F., Mitten, D. G., and Steinberg, A. R., Cambridge: The Massachusetts Institute of Technology, pp. 57–72.

Ghirshman, R. (1964), "Fibule en Iran: collection de M. Foroughi," *Iranica Antiqua*, 4, 90–107.

Giesen, K. (2001), *Zyprische Fibeln: Typologie und Chronologie*, Jonsered: Paul Åströms Förlag.

Giumlia-Mair, A. (2015), "Phoenician metalwork: composition and techniques," in *Phoenician Bronzes in Mediterranean*, ed. Jiménez Ávila, J., Madrid: Real Academia de la Historia, pp. 481–516.

Giumlia-Mair, A., Albertson, C., Boschian, G., Giachi, G., Iacomussi, P., Pallecchi, P., Rossi, G., Shugar, A. N., and Stock, S. (2010a), "Surface characterisation techniques in the study and conservation of art and archaeological artefacts: a review," *Materials Technology*, 25, 245–261.

Giumlia-Mair, A., Procelli, R. M. A., and Lo Schiavo, F. (2010b), "The metallurgy of the Sicilian Final Bronze Age/Early Iron Age necropolis of Madonna del Piano (Catania, Sicily)," *Trabajos de Prehistoria*, 67, 469–488.

Gleba, M. (2014), "Cloth worth a king's ransom: textile circulation and transmission of textile craft in the ancient Mediterranean," in *Knowledge Networks and Craft Traditions in the Ancient World: Material Crossovers*, eds. Rebay-Salisbury, K., Foxhall, L., and Brysbaert, A., London: Routledge, pp. 83–103.

— (2017), "Tracing textile cultures of Italy and Greece in the early first millennium BC," *Antiquity*, 91, 1205–1222.

Glogović, D. (2003), *Fibeln im kroatischen Küstengebiet (Istrien, Dalmatien)*, Prähistorische Bronzefunde XIV.13, Stuttgart: Franz Steiner Verlag.

Goldman, H. (1940), "The Acropolis of Halae," *Hesperia*, 9, 381–514.

Gordon, A. E. (1975), *The Inscribed Fibula Praenestina: Problems of Authenticity*, University of California Publications: Classical Studies 16, Los Angeles: University of California Press.

Gosden, C. (2005), "What do objects want?" *Journal of Archaeological Method and Theory*, 12, 193–211.

Götze, A. (1902), "Die kleingeräte aus Metall, Stein, Knochen," in *Troja und Ilion: Ergebnisse der Ausgrabungen in den vorhistorischen und historischen Schichten von Ilion, 1870-1894*, ed. Dörpfeld, W., Athens: Beck & Barth, pp. 320–423.

Grethlein, J. (2008), "Memory and material objects in the Iliad and the Odyssey," *The Journal of Hellenic Studies*, 128, 27–51.

Gunter, A. C. (2009), *Greek Art and the Orient*, Cambridge: Cambridge University Press.

— (2016), "Contemplating an empire: artistic responses to the Neo-Assyrian world," in *Assyria to Iberia: Art and Culture in the Iron Age*, eds. Aruz, J. and Seymour, M., New York: The Metropolitan Museum of Art, pp. 216–226.

Guzzo, P. G. (1972), *Le Fibule in Etruria: Dal VI al I secolo*, Firenze: Sansoni.

Hadaczek, K. (1903), "Die fibel des Odysseus, Helikes und Kalykes," *Jahreshefte des österreichischen archäologischen Institutes in Wien*, VI, 108–122.

Hägg, R. (1983), "Burial customs and social differentiation in 8th-Century Argos," in *The Greek Renaissance of the Eighth Century B.C.: Tradition and Innovation: Proceedings of the Second International Symposium at the Swedish Institute in Athens, 1-5 June, 1981*, ed. Hägg, R., Stockholm: Paul Åströms Förlag, pp. 27–31.

Hall, E. H. (1914), *Excavations in Eastern Crete, Vrokastro*, Pennsylvania: University of Pennsylvania Museum.

Hall, J. M. (2003), "'Culture' or 'cultures'? Hellenism in the late sixth century," in *The cultures within ancient Greek culture: Contact, conflict, collaboration*, eds. Dougherty, C. and Kurke, L., Cambridge: Cambridge University Press, pp. 23–34.

— (2014), *A History of the Archaic Greek World: ca. 1200-479 BCE*, Chichester: Wiley-

Blackwell, 2nd ed. .

Hallager, B. P. (2007), “Problems with LM/LH III B/C synchronisms,” in *LH III C Chronology and Synchronisms II: LH III C Middle: Proceedings of the International Workshop held at the Austrian Academy of Sciences at Vienna, October 29th and 30th, 2004*, eds. Deger-Jalkotzy, S. and Zavadil, M., Wien: Verlag der Österreichischen Akademie der Wissenschaften, pp. 189–202.

— (2010), “The elusive Late IIIC and the ill-named Subminoan,” in *Cretan Offerings: Studies in Honour of Peter Warren*, eds. Krzyszkowska, O. and Warren, P. M., London: British School at Athens, pp. 141–155.

— (2012), “Pins and buttons in Late Minoan III dresses?” in *KOSMOS: Jewellery, Adornment and Textiles in the Aegean Bronze Age: Proceedings of the 13th International Aegean Conference, University of Copenhagen, Danish National Research Foundation's Centre for Textile Research, 21-26 April 2010*, eds. Nosch, M.-L. and Laffineur, R., Leuven: Peeters, pp. 353–360.

Halstead, P. (1990), “Waste not, want not: traditional responses to crop failure in Greece,” *Rural History*, 1, 147–164.

Hampe, R. (1936), *Frühe griechische Sagenbilder in Böotien*, Athen: Deutsches Archäologisches Institut.

— (1971), *Neuerwerbungen 1957-1970*, Mainz am Rhein: von Zabern.

Hampe, R. and Simon, E. (1981), *The Birth of Greek Art: From the Mycenaean to the Archaic Period*, London: Thames and Hudson.

Handberg, S. and Gadolou, A. (2017), “Material Koinai in the Greek Early Iron Age and Archaic Period,” in *Acts of an International Conference at the Danish Institute at Athens, 30 January - 1 February 2015*, Aarhus: Aarhus University Press.

Harlow, M. and Nosch, M.-L. (eds.) (2014), *Greek and Roman Textiles and Dress: An Interdisciplinary Anthology*, Oxford: Oxbow Books.

Hayden, B. (1998), “Practical and prestige technologies: the evolution of material systems,” *Journal of Archaeological Method and Theory*, 5, 1–55.

Hayden, B. J. (2002), *Reports on the Vrokastro Area, Eastern Crete. Volume 1, Cata-*

logue of Pottery from the Bronze and Early Iron Age Settlement of Vrokastro in the Collections of the University of Pennsylvania Museum of Archaeology and Anthropology and the Archaeological Muse, University Museum Monograph, Vol. 113, Philadelphia: University of Pennsylvania Museum.

Heggarty, P., Maguire, W., and McMahon, A. (2010), "Splits or waves? Trees or webs? How divergence measures and network analysis can unravel language histories," *Philosophical transactions of the Royal Society B*, 365, 3829–3843.

Helms, M. W. (1993), *Craft and the Kingly Ideal: Art, Trade, and Power*, Austin: University of Texas Press.

— (1994), "Essay on objects: interpretations of distance made tangible," in *Implicit Understandings: Observing, Reporting, and Reflecting on the Encounters between Europeans and Other Peoples in the Early Modern Era*, ed. Schwartz, S. B., Cambridge: Cambridge University Press, pp. 355–377.

Herrmann, H.-V. (1982), "Geometrische fibeln der Tübinger Universitäts-Sammlung," in *Praestant interna: Festschrift für Ulrich Hausmann*, eds. von Freytag gen. Löringhoff, B., Mannsperger, D., and Prayon, F., Tübingen: E. Wasmuth, pp. 248–260.

Heurtley, W. A. and Robertson, M. (1948), "Excavations in Ithaca, V: The Geometric and later finds from Aetos," *The Annual of the British School at Athens*, 43, 1–124.

Higgins, R. A. (1969), "Early Greek jewellery," *The Annual of the British School at Athens*, 64, 143–153.

Hildebrand, H. (1880), "Studier i jämförande fornforskning. I. Bidrag till spännets historia," *Antikvarisk Tidskrift*, IV, 15–263.

Hodder, I. (1982), *Symbols in Action: Ethnoarchaeological Studies of Material Culture*, Cambridge: Cambridge University Press.

— (1989), "This is not an article about material culture as text," *Journal of Anthropological Archaeology*, 8, 250–69.

— (2012), "Introduction: Contemporary theoretical debate in archaeology," in *Archaeological Theory Today*, Cambridge: Polity, 2nd ed. , pp. 1–14.

Hogarth, D. G. (1899), "The Dictaean Cave," *The Annual of the British School at Athens*, 6, 94–116.

— (1901), “Excavations at Zakro, Crete,” *The Annual of the British School at Athens*, 7, 121–149.

Hogarth, D. G. (ed.) (1908), *Excavations at Ephesus: The Archaic Artemisia*, London: Printed by order of the Trustees of the British Museum.

Holden, C. J. and Shennan, S. J. (2005), “Introduction to part I: how tree-like is cultural evolution?” in *The Evolution of Cultural Diversity: A Phylogenetic Approach*, ed. Mace C. J. & Shennan, S., R. H., London: UCL Press.

Hood, S. (1995), “The Bronze Age context of Homer,” in *The Ages of Homer: a Tribute to Emily Townsend Vermeule*, eds. Carter, J. B. and Morris, S. P., Austin: University of Texas Press, pp. 25–32.

Horden, P. (2005), “Mediterranean excuses: historical writing on the Mediterranean since Braudel,” *History and Anthropology*, 16, 25–30.

Horden, P. and Purcell, N. (2000), *The Corrupting Sea: a Study of Mediterranean History*, Oxford: Blackwell.

Hoskins, J. (1998), *Biographical Objects: How Things Tell the Stories of People’s Lives*, London: Routledge.

Iliffe, J. H. (1931), “Some recent acquisitions at Toronto,” *The Journal of Hellenic Studies*, 51, 164–173.

Ingold, T. (2000), *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*, London: Routledge.

Istomin, K. V. and Dwyer, M. J. (2009), “Finding the way: a critical discussion of anthropological theories of human spatial orientation with reference to reindeer herders of Northeastern Europe and Western Siberia,” *Current Anthropology*, 50, 29–49.

Jacobsthal, P. (1956), *Greek Pins and their Connexions with Europe and Asia*, Oxford: Clarendon Press.

Jacopi, G. (1929), “Scavi nella necropoli di Jalisso: 1924-1928,” *Clara Rhodos*, 3, 1–302.

— (1933), “Esplorazione archeologica di Camiro II, Necropoli, Acropoli,” *Clara Rhodos*, 6-7.

Jantzen, U. (1972), *Ägyptische und orientalische Bronzen aus dem Heraion von Samos*, Samos, Vol. 8, Bonn: Deutsches Archäologisches Institut.

Jennings, B. (2016), "Exploring Late Bronze Age systems of bronzework production in Switzerland through Network Science," *Science and Technology of Archaeological Research*, 2, 90–112.

Jockenhövel, A. (2011), "Bronzen im Spannungsfeld zwischen praktischer Nutzung und symbolischer Bedeutung - Einführung in das Thema des Kolloquiums," in *Bronzen im Spannungsfeld zwischen praktischer Nutzung und symbolischer Bedeutung: Beiträge zum internationalen Kolloquium am 9. und 10. Oktober 2008 in Münster*, eds. Dietz, U. L. and Jockenhövel, A., Stuttgart: Franz Steiner Verlag, pp. 1–18.

— (2016), "50 Jahre 'Prähistorischen Bronzefunde' - Versuch einer ersten Bilanz (unter Mitwirkung von Ute Luise Dietz, Monika zu Erbach, Wolf Kubach und Kerstin Schierholt)," in *50 Jahre 'Prähistorischen Bronzefunde': Bilanz und Perspektiven: Beiträge zum internationalen Kolloquium vom 24. bis 26. September 2014 in Mainz*, eds. Dietz, U. L. and Jockenhövel, A., Stuttgart: Franz Steiner Verlag, pp. 1–32.

Jones, A. and MacGregor, G. (2002), "Introduction: wonderful things - colour studies in archaeology from Munsell to materiality," in *Colouring the Past: The Significance of Colour in Archaeological Research*, eds. Jones, A. and MacGregor, G., Oxford: Berg, pp. 1–21.

Karageorghis, V. (1989), "A Late Bronze Age mould from Hala Sultan Tekké," *Bulletin de correspondance hellénique*, 113, 439–446.

Karantzali, E. (2001), *The Mycenaean Cemetery at Pylona on Rhodes*, BAR International Series 988, Oxford: Archaeopress.

Kilian, K. (1975), *Fibeln in Thessalien von der mykenischen bis zur archaischen zeit*, Prähistorische Bronzefunde XIV.2, München: C.H. Beck.

Kilian-Dirlmeier, I. (1984), *Nadeln der Frühhelladischen bis Archaischen Zeit von der Peloponnes*, München: Beck.

— (1995), "A Geometric fibula from central Greece," in *Classical Art in the Nicholson Museum, Sydney*, eds. Cambitoglou, A. and Robinson, E. G. D., Mainz: von Zabern, pp. 39–48.

— (2002), *Kleinfunde aus dem Athena Itonia-Heiligtum bei Philia (Thessalien)*, Mainz: Römisch-Germanischen Zentralmuseums.

Kintigh, K. W. (1984), “Measuring archaeological diversity by comparison with simulated assemblages,” *American Antiquity*, 49, 44–54.

— (1989), “Sample size, significance and measures of diversity,” in *Quantifying Diversity in Archaeology*, eds. Leonard, R. D. and Jones, G. T., Cambridge: Cambridge University Press, pp. 25–36.

Klebinder-Gauß, G. (2007), *Bronzefunde aus dem Artemision von Ephesos*, Forschungen in Ephesos XII.3, Wien: Österreichischen Akademie der Wissenschaften.

— (2015), “Eine geometrische Plattenfibel aus Kalapodi: ein beitrag zur erforschung einer mittelgriechischen Kunstlandschaft,” in *Ein Minoer im Exil: Festschrift für Wolf-Dietrich Niemeier*, eds. Niemeier, W.-D., Panagiotopoulos, D., Kaiser, I., and Kouka, O., Bonn: Dr. Rudolf Habelt GmbH, Universitätsforschungen zur prähistorischen Archäologie 270, pp. 187–197.

Klejn, L. S. (1982), *Archaeological Typology*, BAR International Series 153, Oxford: B.A.R.

Knappett, C. (2005), *Thinking Through Material Culture: an Interdisciplinary Perspective*, Philadelphia: University of Pennsylvania Press.

Knigge, U. (2005), *Der Bau Z*, München: Hirmer Verlag.

Kohler, E. L. (1995), *The Lesser Phrygian Tumuli: Part 1: The Inhumations*, University Museum Monograph, Vol. 88, Pennsylvania: University of Pennsylvania Museum.

Konstantinidi, E. M. (2001), *Jewellery Revealed in the Burial Contexts of the Greek Bronze Age*, BAR International Series 912, Oxford: John and Erica Hedges.

Körte, G. and Körte, A. (1904), *Gordion: Ergebnisse der Ausgrabung im Jahre 1900*, Jahrbuch des kaiserlich deutschen archäologischen Instituts. Ergänzungsheft 5, Berlin: G. Reimer.

Kotsonas, A. (2016), “Politics of periodization and the archaeology of early Greece,” *American Journal of Archaeology*, 120, 239–270.

Kraiker, W. and Kübler, K. (1939), *Die Nekropolen des 12. bis 10. Jahrhunderts*, Berlin: Walter de Gruyter & Co.

Kübler, K. (1943), *Neufunde aus der Nekropole des 11. und 10. Jahrhunderts*, Berlin: Walter de Gruyter & Co.

— (1954), *Die Nekropole des 10. bis 8. Jahrhunderts*, Berlin: Walter de Gruyter & Co.

Lady Evans, M. M. (1893), *Chapters on Greek Dress*, London: Macmillan.

Lamb, W. (1929), *Greek and Roman Bronzes*, London: Methuen.

— (1931), "Antissa," *The Annual of the British School at Athens*, 32, 41–67.

Lattimore, R. (1975), *The Odyssey of Homer*, New York: HarperCollins.

Lawrence, T. E. (1992), *The Odyssey of Homer*, Ware: Wordsworth Classics.

Layton, R. (2003), "Art and agency: a reassessment," *The Journal for the Royal Anthropological Institute*, 9, 447–464.

— (2006), "Structuralism and semiotics," in *Handbook of Material Culture*, ed. Tilley, C., London: SAGE, pp. 29–42.

Leidwanger, J. (2013), "Modeling distance with time in ancient Mediterranean seafaring: a GIS application for the interpretation of maritime connectivity," *Journal of Archaeological Science*, 40, 3302–3308.

Lemos, I. S. (2002), *The Protogeometric Aegean: The archaeology of the late Eleventh and Tenth Centuries BC*, Oxford: Oxford University Press.

— (2007a), ""...ἐπεὶ πόρε μύρια ἔδνα..." (Iliad 22,472): Homeric reflections in Early Iron Age elite burials," in *Keimelion: Elitenbildung und elitärer Konsum von der mykenischen Palastzeit bis zur homerischen Epoche*, eds. Alram-Stern, E. and Nightingale, G., Vienna: Österreichische Akademie der Wissenschaften, Veröffentlichungen der Mykenischen Kommission, Vol. 27, pp. 275–284.

— (2007b), "The migrations to the west coast of Asia Minor: tradition and archaeology," in *Frühes Ionien: eine Bestandsaufnahme; Panionion-Symposion Güzelçamlı, 26. September - 1. Oktober 1999*, ed. Cobet, J., Mainz am Rhein: Von Zabern.

— (2014), "Communities in transformation: an archaeological survey from the 12th to the 9th century BC," *Pharos*, 20, 163–94.

Lerner, J. S., Li, Y., Valdesolo, P., and Kassam, K. S. (2015), “Emotion and decision making,” *Annual Review of Psychology*, 66, 799–823.

Levi, D. (1931), “Arkades: una città Cretese all’alba della civiltà ellenica,” *Annuario della R. Scuola Archeologica di Atene e delle Missioni Italiane in Oriente*, X-XII.

Linders, T. (1990), “The melting down of discarded metal offerings in Greek sanctuaries,” *Scienze dell’antichità: Storia, archeologia, antropologia*, 3-4, 281–286.

Lissauer, A. (1907), “Vierter Bericht über die Tätigkeit der von der Deutschen anthropologischen Gesellschaftgewählten Kommission für prähistorische Typenkarten,” *Zeitschrift für Ethnologie*, 39, 785–831.

Livingstone, A. (1989), *Court Poetry and Literary Miscellanea*, State Archives of Assyria, Vol. 3, Helsinki: Helsinki University Press.

Lo Schiavo, F. (2010), *Le fibule dell’Italia meridionale e della Sicilia: dall’età del bronzo recente al VI secolo A.C.*, Prähistorische Bronzefunde XIV, 14, Stuttgart: Franz Steiner.

Lorimer, H. L. (1950), *Homer and the Monuments*, London: Macmillan.

Macalister, R. A. S. (1912), *The Excavation of Gezer: 1902-1905 and 1907-1909: Vol. 3*, London: Published for the Committee of the Palestine Exploration Fund by J. Murray.

Mackenzie, D. (1913), “Excavations at Ain Shems (Beth-Shemesh),” *Palestine Exploration Fund*, 2, 1–100.

Manning, S. W. and Hulin, L. (2005), “Maritime commerce and geographies of mobility in the Late Bronze Age of the Eastern Mediterranean: problematizations,” in *The Archaeology of Mediterranean Prehistory*, eds. Blake, E. and Knapp, A. B., Oxford: Blackwell, pp. 270–302.

Marangou, E.-L. I. (1969), *Lakonische Elfenbein- und Beinschnitzereien*, Tübingen: Wasmuth.

Markoe, G. E. (2000), *Phoenicians*, Berkeley: University of California Press.

Marshall, F. H. (1911), *Catalogue of the Jewellery, Greek, Etruscan, and Roman, in the Departments of Antiquities, British Museum*, London: Printed by order of the Trustees of the British Museum.

Martin, T. F. (2015), *The Cruciform Brooch and Anglo-Saxon England*, Woodbridge: The Boydell Press.

Maryon, H. and Plenderleith, H. J. (1958), "Fine metal-work," in *A History of Technology: Volume I: From Early Times to Fall of Ancient Empires*, eds. Singer, C., Holmyard, E. J., and Hall, A. R., Oxford: Clarendon Press, pp. 623–662.

Mazar, A. (2004), "Greek and Levantine Iron Age chronology: a rejoiner," *Israel Exploration Journal*, 54, 24–36.

Mazarakis Ainian, A. (2016), "Early Greek temples," in *A Companion to Greek Architecture*, ed. Miles, M. M., Chichester: Wiley-Blackwell, pp. 15–30.

McCartney, P. H. and Glass, M. F. (1990), "Simulation models and the interpretation of archaeological diversity," *American Antiquity*, 55, 521–536.

McNeil, M. and Selwyn, L. S. (2001), "Electrochemical processes in metallic corrosion," in *Handbook of Archaeological Sciences*, eds. Brothwell, D. R. and Pollard, A. M., Chichester: Wiley, pp. 605–614.

Melas, E. M. (1989), "Etics, emics and empathy in archaeological theory," in *The Meanings of Things: Material Culture and Symbolic Expression*, ed. Hodder, I., London: Unwin Hyman, pp. 137–155.

Mili, M. (2015), *Religion and Society in Ancient Thessaly*, Oxford: Oxford University Press.

Millingen, J. V. (1813), *Peintures antiques et inédites de vases grecs, tirées de diverses collections*, Rome.

Mills, B. J. and Ferguson, T. J. (2008), "Animate objects: shell trumpets and ritual networks in the Greater Southwest," *Journal of Archaeological Method and Theory*, 15, 338–361.

Mitsopoulos-Leon, V. (1990), "Lousoi," *Jahreshefte des österreichischen archäologischen Institutes in Wien*, 60, 32–36.

Montelius, O. (1882), *Spännen från bronsåldern: och ur dem närmast utvecklade former: typologisk studie*, Stockholm: Hæggström.

— (1895), *La Civilisation primitive en Italie depuis l'introduction des métaux: Vol. 1. Italie septentrionale*, Stockholm: Imprimerie Royale.

— (1903), *Die älteren Kulturperioden in Orient und in Europa*, Stockholm: K. L. Beckmans.

— (1912), *Die vorklassiche Chronologie Italiens*, Stockholm: I. Haeggströms Boktryckeri Aktiebolag.

Moore, H. (1990), "Paul Ricoeur: action, meaning and text," in *Reading Material Culture: Structuralism, Hermeneutics and Post-Structuralism*, ed. Tilley, C., Oxford: Basil Blackwell, pp. 85–120.

Morris, I. (1988), "Tomb cult and the 'Greek renaissance': the past in the present in the 8th Century BC," *Antiquity*, 62, 750–761.

— (2000), *Archaeology as Cultural History: Words and Things in Iron Age Greece*, Oxford: Blackwell.

— (2003), "Mediterraneanization," *Mediterranean Historical Review*, 18, 30–55.

— (2006), "The collapse and regeneration of complex society in Greece, 1500-500 BC," in *After Collapse: The Regeneration of Complex Societies*, eds. Schwartz, G. M. and Nichols, J. J., Tucson: University of Arizona Press, pp. 72–84.

Morris, S. P. (1992), *Daidalos and the Origins of Greek Art*, Princeton: Princeton University Press.

Müller-Karpe, H. (1959), *Beiträge zur Chronologie der Urnenfelderzeit nördlich und südlich der Alpen*, Berlin: De Gruyter.

— (1962), "Die Metallbeigaben der früheisenzeitlichen Kerameikos-Gräber," *Jahrbuch des Deutschen Archäologischen Instituts*, 77, 59–129.

Munn, M. (1994), *The Argolid 800-600 Bc an Archaeological Survey, Together with an Index of Sites from the Neolithic to the Roman Period - Foley,A*, vol. 98, Göteborg: Paul Åströms Förlag.

Munson, J. (2015), "From metaphors to practice: operationalizing network concepts for archaeological stratigraphy," *Journal of Archaeological Method and Theory*, 22, 428–460.

Murray, A. S., Smith, A. H., and Walters, H. B. (1900), *Excavations in Cyprus: (bequest of Miss E. T. Turner to the British Museum)*, London: Printed by order of the Trustees of the British Museum.

Murray, S. C. (2018), "Lights and darks: data, labeling, and language in the history of scholarship on Early Greece," *Hesperia*, 87, 17–54.

Muscarella, O. W. (1964), "Ancient safety pins: their function and significance," *Expedition*, 6, 34–40.

— (1967a), "Fibulae represented on sculpture," *Journal of Near Eastern Studies*, 26, 82–86.

— (1967b), *Phrygian Fibulae from Gordion*, Monograph series (Colt Archaeological Institute) 4, London: Quaritch.

— (1988), *Bronze and Iron: Ancient Near Eastern Artifacts in The Metropolitan Museum of Art*, New York: The Metropolitan Museum of Art.

Myres, J. L. (1910a), "A tomb of the Early Iron Age, from Kition in Cyprus, containing bronze examples of the 'Sigynna' or Cypriote javelin," *Annals of Archaeology and Anthropology*, 3, 107–117.

— (1910b), "A type of fibula of the Early Iron Age, apparently peculiar to Cyprus," *Annals of Archaeology and Anthropology*, 3, 138–144.

— (1913), "A Cypriote fibula of the Early Iron Age, now in the Ashmolean Museum," *Annals of Archaeology and Anthropology*, 5, 129–131.

— (1914), *Handbook of the Cesnola Collection of Antiquities from Cyprus*, New York: Metropolitan Museum of Art.

Nagy, G. (2010), *Homer the Preclassic*, Berkeley: University of California Press.

— (2015), "Oral traditions, written texts, and questions of authorship," in *The Greek Epic Cycle and its Ancient Reception: A Companion*, eds. Fantuzzi, M. and Tsagalis, C., Cambridge: Cambridge University Press, Sather Classical Lectures, Vol. 67, pp. 59–77.

Neer, R. T. (2010), *The Emergence of the Classical Style in Greek Sculpture*, Chicago: University of Chicago Press.

Neils, J. (2009), "Textile dedications to female deities: the case of the peplos," in *Le Donateur, l'offrande et la déesse: Systèmes votifs dans les sanctuaires de déesses du monde grec: Actes du 31e Colloque international organisé par l'UMR Halma-Ipel (Université Charles-de-Gaulle/Lille 3, 13-15 Décembre 2007)*, eds. Prêtre, C. and Huysecom-Haxhi, S., Liège: Centre International d'Étude de la Religion Grecque Antique, pp. 135–147.

Neugebauer, K. A. (1921), *Antike Bronzestatuetten*, Berlin: Schoetz & Parrhysius.

Newton, M. W., Higham, T., and Kromer, B. (2014), "Dating the end of the Greek Bronze Age: a robust radiocarbon-based chronology from Assiros Toumba," *PLoS ONE*, 9, e106672.

Nieman, F. D. (1995), "Stylistic variation in evolutionary perspective: inferences from decorative diversity and interassemblage distance in Illinois Woodland ceramic assemblages," *American Antiquity*, 60, 7–36.

Niemeier, W.-D. (2016), "Greek sanctuaries and the Orient," in *Assyria to Iberia: Art and Culture in the Iron Age*, eds. Aruz, J. and Seymour, M., New Haven: Yale University Press, Metropolitan Museum of Art Symposia, pp. 234–250.

Nijboer, A. J. (2008), "A Phoenician family tomb, Lefkandi, Huelva and the Tenth Century BC in the Mediterranean," in *Beyond the Homeland: Markers in Phoenician Chronology*, ed. Sagona, C., Leuven: Peeters, pp. 365–377.

Nijboer, A. J. and van der Plicht, J. (2006), "An interpretation of the radiocarbon determinations of the oldest indigenous-Phoenician stratum thus far, excavated at Huelva, Tartessos (south-west Spain)," *BABESCH Annual Papers on Mediterranean Archaeology*, 81, 31–36.

Noble, J. V. (1975), "The wax of the lost wax process," *American Journal of Archaeology*, 79, 368–369.

Norton, R. (1905), "Engraved stones, gems, and ivories," in *The Argive Heraeum: Vol. 2, Terra-cotta Figurines, Terra-cotta Reliefs, Vases and Vase-fragments, Bronzes, Engraved Stones, Gems and Ivories, Coins, Egyptian, or Graeco-Egyptian, Objects*, ed. Waldstein, C., Boston: Houghton Mifflin, pp. 341–354.

Novotna, M. (2001), *Die Fibeln in der Slowakei*, Prähistorische Bronzefunde XIV.11, Stuttgart: Franz Steiner Verlag.

Nowicki, K. (2000), *Defensible Sites in Crete, c. 1200 – 800 BC: (LMIIIB/IIIC Through Early Geometric)*, Liège: Université de Liège.

O'Brien, M. J., Buchanan, B., and Eren, M. I. (2016), "Clovis colonization of Eastern North America: a phylogenetic approach," *Science and Technology of Archaeological Research*, 2, 67–89.

O'Brien, M. J. and Lyman, R. L. (2003), "Style, function transmission: an introduction," in *Style, Function, Transmission: Evolutionary Archaeological Perspectives*, eds. O'Brien, M. J. and Lyman, R. L., Salt Lake City: University of Utah Press, pp. 1–32.

— (2009), "Darwinism and historical archaeology," in *International Handbook of Historical Archaeology*, eds. Gaimster, T. M. and D, New York: Springer, pp. 227–252.

Orfanou, S. (2015), "Early Iron Age Greek Copper-based Technology: Votive Offerings from Thessaly (Unpublished PhD)," Ph.D. thesis, University College London.

Orsi, P. (1894), "La necropoli sicula del terzo periodo al Finocchito presso Noto (Siracusa)," *Bullettino di paletnologia italiana*, XX, 37–81.

— (1895), "XII. Siracusa - Gli scavi nella necropoli del Fusco a Siracusa nel giugno, novembre e dicembre del 1893," *Notizie degli scavi di antichità*, 109–192.

— (1897), "Nnove esplorazioni nella necropoli sicula del monte Finocchito presso Noto," *Bullettino di paletnologia italiana*, 23, 157–197.

— (1913), "Contributi alla storia della fibula Greca," in *Opuscula archaeologica Oscari Montelio, septuagenario, dicata d. IX m. sept. a. MCMXIII*, ed. Salin, B., Holmiae: Aedibus I. Haeggstroemii, pp. 189–203.

Osborne, R. (2009), *Greece in the Making, 1200-479 B.C.*, London: Routledge, 2nd ed. .

Osborne, R. and Tanner, J. (eds.) (2007), *Art's Agency and Art History*, Oxford: Blackwell.

Östborn, P. and Gerding, H. (2014), "Network analysis of archaeological data: a systematic approach," *Journal of Archaeological Science*, 46, 75–88.

— (2015), "The diffusion of fired bricks in Hellenistic Europe: a similarity network analysis," *Journal of Archaeological Method and Theory*, 22, 306–344.

Pabst, S. (2011), "Die großräumige Ausbreitung der Brillenfibeln am Übergang von der Bronze- zur Eisenzeit - Kommunikationswege und soziale Hintergründe," in *Bronzen im Spannungsfeld zwischen praktischer Nutzung und symbolischer Bedeutung: Beiträge zum internationalen Kolloquium am 9. und 10. Oktober 2008 in Münster*, eds. Dietz, U. L. and Jockenhövel, A., Stuttgart: Franz Steiner Verlag, pp. 199–234.

Pallottino, M. (1965), "Orientalizing style," in *Encyclopedia of World Art*, New York: McGraw-Hill, vol. X, pp. 782–796.

Papadopoulos, J. K. (2005), *The Early Iron Age Cemetery at Torone: Excavations Conducted by the Australian Archaeological Institute at Athens in Collaboration with the Athens Archaeological Society*, Los Angeles: Cotsen Institute of Archaeology at UCLA.

Pappa, E. (2013), "Postcolonial baggage at the end of the road: how to put the genie back into its bottle and where to go from there," *Archaeological Review from Cambridge*, 28, 29–50.

Pare, C. (2008), "Italian metalwork of the 11th-9th Centuries BC and the absolute chronology of the Dark Age Mediterranean," in *A New Dawn for the Dark Age? Shifting Paradigms in Mediterranean Iron Age Chronology*, eds. Brandherm, D. and Trachsel, M., Oxford: Archaeopress, pp. 77–101.

Paris, P. (1888), "Fouilles au temple d'Athéna Kranaia," *Bulletin de correspondance hellénique*, 12, 37–63.

— (1892), *Élatée: La ville, le temple d'Athéna Cranaia*, Paris: E. Thorin.

Payne, H., Dunbabin, T. J., and Blakeway, A. A. A. (1940), *Perachora, the Sanctuaries of Hera Akraia and Limenia: Excavations of the British School of Archaeology at Athens, 1930-1933: Architecture, Bronzes, Terracottas*, Oxford: The Clarendon Press.

Pedde, F. (2000), *Vorderasiatische Fibeln: von der Levante bis Iran*, Saarbrücken: Saarbrücker Druckerei und Verlag.

— (2001), “Development and extension of Near Eastern fibulae in the Iron Age,” in *Migration und Kulturtransfer: der Wandel vorder - und zentralasiatischer Kulturen im Umbruch vom 2. zum 1. vorchristlichen Jahrtausend. Akten des Internationalen Kolloquiums 23.-26. November 1999 Berlin*, eds. Eichmann, R. and Parzinger, H., Bonn: Rudolf Habelt.

Peeples, M. A. and Roberts Jr., J. M. (2013), “To binarize or not to binarize: relational data and the construction of archaeological networks,” *Journal of Archaeological Science*, 40, 3001–3010.

Pendlebury, J. D. S., Pendlebury, H. W., and Money-Coutts, M. B. (1938), “Excavations in the plain of Lasithi III. Karphi: a city of refuge of the Early Iron Age in Crete,” *The Annual of the British School at Athens*, 38, 57–148.

Perdrizet, P. (1908), *Fouilles de Delphes: Tome V: Monuments figurés: petits bronzes, terres-cuites, antiquités diverses*, Paris: Albert Fontemoing.

Perrot, G. and Chipiez, C. (1898), *Histoire de l’Art dans l’antiquité. T. 7, La Grèce de l’épopée, la Grèce archaïque (le Temple)*, Vol. 7, Paris: Hachette.

Petrie, W. M. F. (1906), *Hyksos and Israelite Cities*, British School of Archaeology in Egypt and Egyptian Research Account, London: University College.

Philipp, H. (1981), *Bronzeschmuck aus Olympia*, Olympische forschungen 13, Berlin: De Gruyter.

Plantzos, D. (2016), *Greek Art and Archaeology c. 1200-30 BC*, Atlanta: Lockwood Press.

Popham, M. R. and Lemos, I. S. (1996), *Lefkandi III, The Toumba Cemetery: The Excavations of 1981, 1984, 1986 and 1992-4: Plates*, Athens: British School of Archaeology at Athens.

Popham, M. R., Sackett, L. H., and Themelis, P. G. (1980), *Lefkandi I: The Iron Age*, London: Thames and Hudson.

Porčić, M. (2015), “Exploring the effects of assemblage accumulation on diversity and innovation rate estimates in neutral, conformist, and anti-conformist models of cultural transmission,” *Journal of Archaeological Method and Theory*, 22, 1071–1092.

Premo, L. S. (2014), “Cultural transmission and diversity in time-averaged assemblages,” *Current Anthropology*, 55, 105–114.

Prum, R. O. (2017), *The Evolution of Beauty: How Darwin's Theory of Mate Choice Shapes the Animal World- and Us*, New York: Anchor Books.

Pülz, A. M. (2009), *Goldfunde aus dem Artemision von Ephesos*, Forschungen in Ephesos XII.5, Wien: Österreichischen Akademie der Wissenschaften.

Purcell, N. (2005), "The ancient Mediterranean: the view from the customs house," in *Rethinking the Mediterranean*, ed. Harris, W. V., Oxford: Oxford University Press, pp. 200–232.

Raubitschek, I. K. (1998), *Isthmia: Excavations by the University of Chicago under the Auspices of the American School of Classical Studies at Athens: Volume VII: The Metal Objects (1952-1989)*, Princeton, N. J.: The American School of Classical Studies at Athens.

Read, D. W. (2007), *Artifact Classification: A Conceptual and Methodological Approach*, Walnut Creek: Left Coast Press.

Reichel, W. and Wilhelm, A. (1901), "Die Heiligtum der Artemis zu Lusoi," *Jahreshefte des österreichischen archäologischen Institutes in Wien*, 4, 1–89.

Reisinger, E. (1916), "Geometrische Fibeln in München," *Jahrbuch des Kaiserlich Deutschen Archäologischen Instituts*, 31, 288–305.

Renfrew, C. (2012), "Systems of value among material things: the nexus of fungibility and measure," in *The Construction of Value in the Ancient World*, eds. Papadopoulos, J. K. and Urton, G., Los Angeles: Cotsen Institute of Archaeology Press, pp. 249–260.

Revere, R. B. (1957), "'No man's coast': ports of trade in the Eastern Mediterranean," in *Trade and Markets in the Early Empires: Economies in History and Theory*, eds. Polanyi, K., Arensberg, C. M., and Pearson, H. W., Glencoe: Free Press & Falcon's Wing Press, pp. 38–63.

Richter, G. M. A. (1915), *Greek, Etruscan and Roman Bronzes*, New York: Metropolitan Museum of Art.

— (1937), "The Ganymede jewelry," *The Metropolitan Museum of Art Bulletin*, 32,

290–295.

Ridgeway, W. (1901), *The Early Age of Greece*, Vol. 1, Cambridge: Cambridge University Press.

Riegl, A. (2000), "The place of the Vapheio Cups in the history of art," in *The Vienna School Reader: Politics and Art Historical Method in the 1930s*, ed. Wood, C. S., New York: Zone, pp. 105–129.

Risberg, C. (1992), "Metal-working in Greek sanctuaries," in *Economics of Cult in the Ancient Greek world: Proceedings of the Uppsala Symposium 1990*, eds. Linders, T. and Alroth, B., Stockholm: Almquist & Wiksell International, pp. 33–40.

— (1998), "Production in a sacred place," *Topoi*, 8, 671–679.

Riva, C. (2010), "Ingenious inventions: welding ethnicities East and West," in *Material Culture and Social Identities in the Ancient World*, eds. Hales, S. and Hodos, T., Cambridge: Cambridge University Press, pp. 79–113.

Riva, C. and Vella, N. C. (2006), *Debating Orientalization: Multidisciplinary Approaches to Change in the Ancient Mediterranean*, London: Equinox.

Rivers, R., Knappett, C., and Evans, T. (2013), "What makes a site important? Centrality, gateways, and gravity," in *Network Analysis in Archaeology: New Approaches to Regional Interaction*, ed. Knappett, C., Oxford: Oxford University Press, pp. 125–150.

Rizza, G. (2008), *Priniàs: la città arcaica sulla Patela: scavi condotti negli anni 1969-2000*, Catania: Consiglio Nazionale delle Ricerche, IBAM.

Robb, J. (2015), "What do things want? Object design as a middle range theory of material culture," *Archaeological Papers of the American Anthropological Association*, 26, 166–180.

Robertson, M. (1975), *A History of Greek Art*, Cambridge: Cambridge University Press.

Robinson, D. M. (1941), *Metal and Minor Miscellaneous Finds: An Original Contribution to Greek Life: With a New up-to-Date Map of Olynthus*, Johns Hopkins University Studies in Archaeology 31; Excavations at Olynthus, Vol. 10, Baltimore: Johns Hopkins Press.

Rose, C. B. (2012), “Introduction: the Archaeology of Phrygian Gordion,” in *The Archaeology of Phrygian Gordion, Royal City of Midas*, ed. Rose, C. B., Philadelphia: University of Pennsylvania Museum, pp. 1–19.

— (2017), “Fieldwork at Phrygian Gordion, 2013–2015,” *American Journal of Archaeology*, 121, 135–178.

Rösler, E., Virchow, R., Karutz, R., Andree, R., Busse, H., Ohnefalsch-Richter, von Luschan, F., Seler, E., von den Steinen, C., Conwentz, and Bohls, J. (1899), “Sitzung vom 18. März 1899,” *Zeitschrift für Ethnologie*, 31, 241–407.

Rouse, W. H. D. (1902), *Greek Votive Offerings: An Essay in the History of Greek Religion*, Cambridge: Cambridge University Press.

Ruppenstein, F. (2007), *Die submykenische Nekropole: Neufunde und Neubewertung*, München: Hirmer.

Sackett, J. R. (1986), “Style, function and assemblage variability: a reply to Binford,” *American Antiquity*, 51, 628–634.

— (1990), “Style and ethnicity in archaeology: the case for isochrestism,” in *The Uses of Style in Archaeology*, eds. Conkey, M. W. and Hastorf, C. A., Cambridge: Cambridge University Press, pp. 32–43.

Sams, G. K. (2011), “Artifacts,” in *The New Chronology of Iron Age Gordion*, eds. Rose, C. B. and Darbyshire, G., Philadelphia: University of Pennsylvania Museum, University Museum Monograph. Gordion Special Studies, Vol. 6, pp. 59–78.

Sapouna-Sakellarakis, E. (1978), *Die Fibeln der griechischen Inseln*, Prähistorische Bronzefunde XIV.4, München: C.H. Beck.

Savella, D. (2015), *Le dibule dell’età del Bronzo dell’italia centrale: definizione dei tipi e della loro cronologia e distribuzione tra Italia, Sicilia ed Egeo*, Bonn: Verlag Dr. Rudolf Habelt GmbH.

Schapiro, M. (1953), “Style,” in *Anthropology Today*, ed. Kroeber, A. L., Chicago: University of Chicago Press, pp. 287–312.

Schiffer, M. and Skibo, J. (1997), “The explanation of artifact variability,” *American Antiquity*, 62, 27–50.

Schiffer, M. B. (1972), "Archaeological context and systemic context," *American Antiquity*, 37, 156–165.

— (1985), "Is there a 'Pompeii Premise' in Archaeology?" *Journal of Anthropological Research*, 41, 18–41.

Schillinger, K., Mesoudi, A., and Lycett, S. J. (2017), "Differences in manufacturing traditions and assemblage-level patterns: the origins of cultural differences in archaeological data," *Journal of Archaeological Method and Theory*, 24, 640–658.

Schumacher, K. (1890), *Beschreibung der Sammlung antiker Bronzen*, Karlsruhe: J. Bielefeld.

Schweitzer, B. (1922), *Herakles, Aufsätze zur griechischen Religions und Sagengeschichte*, Tübingen: Mohr.

Sellin, E. and Watzinger, C. (1913), *Jericho: die Ergebnisse der Ausgrabungen*, Wissenschaftliche Veröffentlichung der Deutschen Orient-Gesellschaft 22, Leipzig: Hinrichs.

Semerari, G. S. (2016), "Towards an archaeology of disentanglement," *Journal of Archaeological Method and Theory*, 1–37.

Shear, T. L. (1937), "The American excavations in the Athenian Agora: twelfth report," *Hesperia*, 6, 333–381.

Shear Jr., T. L. (1975), "The Athenian Agora: excavations of 1973-1974," *Hesperia*, 44, 331–374.

Shennan, S. J. (1982), "Ideology, change and the European Early Bronze Age," in *Symbolic and Structural Archaeology*, ed. Hodder, I., Cambridge: Cambridge University Press, pp. 155–161.

— (1989), "Archaeology as archaeology or as anthropology? Clarke's Analytical archaeology and Binfords' New perspectives in archaeology 21 years on," *Antiquity*, 63, 831–835.

— (1997), *Quantifying Archaeology*, Edinburgh: Edinburgh University Press, 2nd ed. .

— (2004), "Analytical archaeology," in *A Companion to Archaeology*, ed. Bintliff, J., Oxford: Blackwell, pp. 3–20.

— (2011), “Descent with modification and the archaeological record,” *Philosophical Transactions of the Royal Society of London. Series B, Biological sciences*, 366, 1070–1079.

Shennan, S. J. and Wilkinson, J. R. (2001), “Ceramic style change and neutral evolution: a case study from Neolithic Europe,” *American Antiquity*, 66, 577–593.

Sherratt, A. (1997), “V. Gordon Childe: archaeology and intellectual history,” in *Economy and Society in Prehistoric Europe: Changing Perspectives*, Edinburgh: Edinburgh University Press, pp. 38–66.

Sherratt, E. S. (1994), “Commerce, iron and ideology: metallurgical innovation in the 12th-11th century Cyprus,” in *Cyprus in the 11th Century B.C.: Proceedings of the International Symposium*, ed. Karageorghis, V., Athens: A.G. Leventis Foundation, pp. 59–106.

— (2001), “Potemkin palaces and route-based economies,” in *Economy and Politics in the Mycenaean Palace States: Proceedings of a Conference Held on 1-3 July 1999 in the Faculty of Classics, Cambridge*, eds. Voutsaki, S. and Killen, J. T., Cambridge: Cambridge Philological Society, pp. 214–254.

— (2006), “The chronology of the Philistine Monochrome pottery: an outsider’s view,” in *”I Will Speak the Riddles of Ancient Times”: Archaeological and Historical Studies in Honor of Amihai Mazar on the Occasion of his Sixtieth Birthday*, eds. Maeir, A. M. and de Miroschedji, P., Winona Lake: Eisenbrauns, pp. 361–374.

Sherratt, S. (2015), “Cyprus and the Near East: cultural contacts (1200-750 BC),” in *The Mediterranean Mirror: Cultural Contacts in the Mediterranean Sea between 1200 and 750 B.C.: International Post-Doc and Young Researcher Conference, Heidelberg, 6th-8th October 2012*, eds. Babbi, A., Bubenheimer-Erhart, F., Marín-Aguilera, B., and Mühl, S., Mainz: Römisch-Germanischen Zentralmuseums, pp. 71–83.

Shott, M. J. (2010), “Size dependence in assemblage measures: essentialism, materialism, and ‘SHE’ analysis in archaeology,” *American Antiquity*, 75, 886–906.

Simpson, E. (2012), “Royal Phrygian furniture and fine wooden artifacts from Gordion,” in *The Archaeology of Phrygian Gordion, Royal City of Midas*, Philadelphia: University of Pennsylvania Museum, University Museum Monograph, Vol. 136, pp. 149–164.

Smithson, E. L. (1961), “The Protogeometric cemetery at Nea Ionia, 1949,” *Hesperia*, 30, 147–178.

— (1968), “The tomb of a rich Athenian lady, CA. 850 B.C.” *Hesperia*, 37, 77–116.

Snodgrass, A. M. (1971), *The Dark Age of Greece: an Archaeological Survey of the Eleventh to the Eighth Centuries BC*, Edinburgh: Edinburgh University Press.

— (1976), “Klaus Kilian: Fibeln in Thessalien (Prähistorische Bronzefunde, Abteilung XIV, 2 Band). München: C. H. Beck, 1975. 233 pp., 99 pls., 5 text figs. DM. 105.” *Antiquity*, 50, 75–76.

— (1985), “The New Archaeology and the Classical archaeologist,” *American Journal of Archaeology*, 89, 31–37.

— (1990), “The economics of dedication at Greek sanctuaries,” *Scienze dell’Antichità: Storia, Archeologia, Antropologia*, 3-4, 287–294.

— (1998), *Homer and the Artists: Text and Picture in Early Greek Art*, Cambridge: Cambridge University Press.

Sørensen, M. L. S. (2014), “The archaeological culture concept: hot or cold understandings,” in *Med hjärta och hjärna: en vänbok till professor Elisabeth Arwill-Nordbladh*, eds. Alexandersson, H., Andreeff, A., and Bünz, A., Göteborg: Institutionen för Historiska Studier, Göteborgs Universitet, pp. 247–258.

— (2015a), “‘Paradigm lost’ - on the state of typology within archaeological theory,” in *Paradigm Found: Archaeological Theory: Present, Past and Future: Essays in Honour of Evžen Neustupný*, eds. Kristiansen, K., Šmejda, L., and Turek, J., Oxford: Oxbow Books, pp. 84–94.

Sørensen, T. F. (2015b), “In praise of vagueness: uncertainty, ambiguity and archaeological methodology,” *Journal of Archaeological Method and Theory*, 23, 741–763.

Steele, J., Glatz, C., and Kandler, A. (2010), “Ceramic diversity, random copying, and tests for selectivity in ceramic production,” *Journal of Archaeological Science*, 37,

1348–1358.

Strathern, M. (1988), *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia*, Berkeley: University of California Press.

Strøm, I. (1988), "The early sanctuary of the Argive Heraion and its external relations (8th.- early 6th. Cent. B.C.): the monumental architecture," *Acta Archaeologica*, 59, 173–203.

— (1995), "The early sanctuary of the Argive Heraion and its external relations (8th.- early 6th. Cent. B.C.)," *Proceedings of the Danish Institute at Athens*, 1, 37–128.

— (1998), "The early sanctuary of the Argive Heraion and its external relations (8th.- early 6th. Cent. B.C.): bronze imports and Archaic Greek bronzes," *Proceedings of the Danish Institute at Athens*, 2, 37–126.

Stronach, D. (1959), "The development of the fibula in the Near East," *Iraq*, 21, 180–206.

Sulava, N. (2011), *The Caucasian Fibulae: (Typology, Chronology, Genesis)*, Tbilisi: Georgian National Museum.

Sundwall, J. (1943), *Die älteren italischen Fibeln*, Berlin: De Gruyter.

Tartaron, T. F. (2013), *Maritime Networks in the Mycenaean World*, Cambridge: Cambridge University Press.

Taylor, T. (2015), "The demons of comparison: archaeological classification vs classificatory terminology," in *Paradigm Found: Archaeological Theory: Present, Past and Future: Essays in Honour of Evžen Neustupný*, eds. Kristiansen, K., Šmejda, L., and Turek, J., Oxford: Oxbow Books, pp. 95–105.

Thaler, R. H. and Sunstein, C. R. (2008), *Nudge: Improving Decisions about Health, Wealth, and Happiness*, New Haven: Yale University Press.

Themelis, P. G. (1983), "An 8th century goldsmith's workshop at Eretria," in *The Greek Renaissance of the Eighth Century B.C.: Tradition and Innovation: Proceedings of the Second International Symposium at the Swedish Institute in Athens, 1-5 June, 1981*, ed. Hägg, R., Stockholm: Paul Åströms Förlag, pp. 157–165.

Thompson, M. S. (1909), "The Asiatic or winged Artemis," *The Journal of Hellenic Studies*, 29, 286–307.

Toffolo, M. B., Fantalkin, A., Lemos, I. S., Felsch, R. C. S., Niemeier, W.-D., Sanders, G. D. R., Finkelstein, I., and Boaretto, E. (2013), "Towards an absolute chronology for the Aegean Iron Age: new radiocarbon dates from Lefkandi, Kalapodi and Corinth," *PLoS ONE*, 8, 1–11.

Tölle, R. (1966), "Eine archaische Gußform," *Antike und Abendland*, 12, 91–94.

Toms, J. (2006), "Pithecusan gleanings III: fibulae as keys to dating the Early Iron Age in Central Italy," in *Across Frontiers: Etruscans, Greeks, Phoenicians & Cypriots: Studies in Honour of David Ridgway and Francesca Romana Serra Ridgway*, ed. Herring, E., London: Accordia Research Institute.

Trachsel, M. (2004), *Untersuchungen zur relativen und absoluten Chronologie der Hallstattzeit*, Bonn: R. Habelt.

Treherne, P. (1995), "The warrior's beauty: the masculine body and self-identity in Bronze-Age Europe," *Journal of European Archaeology*, 3, 105–144.

Treister, M. Y. (1995), "North Syrian metalworkers in Archaic Greek settlements?" *Oxford Journal of Archaeology*, 14, 159–78.

Truhelka, Ć. (1902), "Zwei prähistorische Funde aus Gorica (Bezirk Ljubuški," *Wissenschaftliche Mittheilungen aus Bosnien und der Hercegovina*, 8, 3–47.

Tyler, T. R. (2006), "Psychological perspectives on legitimacy and legitimation," *Annual Review of Psychology*, 57, 375–400.

Tyler, T. R. and Lind, E. A. (1992), "A relational model of authority in groups," *Advances in Experimental Social Psychology*, 25, 115–191.

Undset, I. (1889), "Archäologische Aufsätze über südeuropäische Fundstücke," *Zeitschrift für Ethnologie*, 21, 205–234.

Ure, P. N. (1910), "Excavations at Rhitsóna in Boeotia (continued)," *The Journal of Hellenic Studies*, 30, 336–356.

— (1934), *Aryballoi & Figurines from Rhitsona in Boeotia*, Cambridge: Cambridge University Press.

Vaessen, R. (2014), "Craftsmanship at Athens in the 11th Century BCE: improvisation, networking and pottery making," in *Knowledge Networks and Craft Traditions in* *the Ancient World: Material Crossovers*, eds. Rebay-Salisbury, K., Foxhall, L., and Brysbaert, A., London: Routledge, pp. 127–146.

van den Eijnde, F. (2018), “Power play at the dinner table: feasting and patronage between palace and polis in Attika,” in *Feasting and Polis Institutions*, eds. van den Eijnde, F., Blok, J. H., and Strootman, R., Leiden: Brill, pp. 60–92.

van der Plicht, J., Bruins, H. J., and Nijboer, A. J. (2009), “The Iron Age around the Mediterranean: a High Chronology perspective from the Groningen radiocarbon database,” *Radiocarbon*, 51, 213–242.

van Wees, H. (2004), *Greek Warfare: Myths and Realities*, London: Duckworth.

— (2009), “The economy,” in *A Companion to Archaic Greece*, eds. Raaflaub, K. A. and van Wees, H., Chichester: Wiley-Blackwell, pp. 444–467.

VanPool, T. L. and Leonard, R. D. (2011), *Quantitative Analysis in Archaeology*, Oxford: Wiley-Blackwell.

Vasić, R. (1999), *Die Fibeln im Zentralbalkan: Vojvodina, Serbien, Kosovo und Mazedonien*, Prähistorische Bronzefunde XIV.12, Stuttgart: F. Steiner.

Vassileva, M. (2014), “Phrygian bronzes in the Greek world: globalization through cult?” in *Melammu: The Ancient World in an Age of Globalization*, ed. Geller, M. J., Berlin: GmbH, pp. 217–234.

von Eles Masi, P. (1986), *Le fibule dell’italia settentrionale*, Prähistorische Bronzefunde XIV.5, München: C.H. Beck.

von Mercklin, E. (1928), “Antiken im Hamburgischen Museum für Kunst und Gewerbe,” *Archäologischer Anzeiger*, 43, 273–497.

— (1930), *Griechische und römische Altertümer*, Hamburg: Museum für Kunst und Gewerbe.

Voutsaki, S. (1995), “Social and political processes in the Mycenaean Argolid: the evidence from the mortuary practices,” in *Politeia: Society and State in the Aegean Bronze Age*, eds. Laffineur, R. and Niemeier, W.-D., Liège: Université de Liège, pp. 55–66.

Voyatzis, M. E. (1990), *The Early Sanctuary of Athena Alea at Tegea: And Other Archaic*

Sanctuaries in Arcadia, Göteborg: Paul Åströms Förlag.

Wace, A. J. B. and Droop, J. P. (1906), "Excavations at Theotokou, Thessaly," *The Annual of the British School at Athens*, 13, 309–327.

Waldstein, C. and Chase, G. H. (1902), *The Argive Heraeum: Vol. 1, General Introduction, Geology, Architecture, Marble Statuary and Inscriptions*, Boston: Houghton, Mifflin and Co.

Walker, A. L. and Goldman, H. (1915), "Report on excavations at Halae of Locris," *American Journal of Archaeology*, 19, 418–437.

Wallace, S. A. (2010), *Ancient Crete: From Successful Collapse to Democracy's Alternatives, Twelfth to Fifth Centuries BC*, Cambridge: Cambridge University Press.

Walters, H. B. (1897), "On some antiquities of the Mycenaean Age recently acquired by the British Museum," *The Journal of Hellenic Studies*, 17, 63–77.

— (1899), *Catalogue of the Bronzes, Greek, Roman, and Etruscan, in the Department of Greek and Roman Antiquities, British Museum*, London: Printed by Order of the Trustees [of the British Museum].

Waterfield, R. (1998), *Herodotus: The Histories*, Oxford World's Classics, Oxford: Oxford University Press.

Wells, B. (1976), *Asine II: Results of the Excavations east of the Acropolis, 1970-1974: Fasc. 4: The Protogeometric Period. Pt. 1: The Tombs*, Stockholm: Paul Åströms Förlag.

Weninger, B. and Jung, R. (2009), "Absolute chronology of the end of the Aegean Bronze Age," in *LH IIIC Chronology and Synchronisms III: LH IIIC Late and the Transition to the Early Iron Age: Proceedings of the International Workshop held at the Austrian Academy of Sciences at Vienna, February 23rd and 24th, 2007*, eds. Deger-Jalkotzy, S. and Bächle, A. E., Vienna: Verlag der Österreichischen Akademie der Wissenschaften, pp. 373–416.

West, M. L. (1988), *Hesiod: Theogony and Works and Days*, Oxford World's Classics, Oxford: Oxford University Press.

Whallon, R. (1972), "A new approach to pottery typology," *American Antiquity*, 37,

13–33.

Whitley, A. J. M. (1991), "Social diversity in Dark Age Greece," *The Annual of the British School at Athens*, 86, 341–365.

— (1996), "Gender and hierarchy in early Athens: the strange case of the disappearance of the rich female grave," *Metis: revue d'anthropologie du monde grec antique*, 11, 209–232.

— (1997), "Beazley as theorist," *Antiquity*, 71, 40–47.

— (2001), *The Archaeology of Ancient Greece*, Cambridge: Cambridge University Press.

— (2002), "Objects with attitude: biographical facts and fallacies in the study of Late Bronze Age and Early Iron Age warrior graves," *Cambridge Archaeological Journal*, 12, 217–232.

— (2006), "Classical art and human agency: a tale of two objects in Fifth-Century Greece," in *Genethlion: anamnēstikos tomos gia tēn symplērōsē eikosi chronōn leitourgias tou Mouseiou Kykladikēs Technēs*, ed. Stampolidēs, N. C., Athens: Nicholas P. Goulandris Foundation, pp. 227–236.

— (2007), "Letting the stones in on the act: statues as social agents in Archaic and Classical Greece," *Kodai: Journal of Ancient History*, 13/14, 185–198.

— (2012), "Agency in Greek art," in *A Companion to Greek Art*, eds. Smith, T. J. and Plantzos, D., Oxford: Wiley-Blackwell, pp. 579–596.

— (2013a), "Homer's entangled objects: narrative, agency and personhood in and out of Iron Age texts," *Cambridge Archaeological Journal*, 23, 395–416.

— (2013b), "The Cretan Orientalizing: a comparative perspective," in *Kreta in der geometrischen und archaischen Zeit: Akten des Internationalen Kolloquiums am Deutschen Archäologischen Institut, Abteilung Athen, 27.-29. Januar 2006*, eds. Niemeier, W.-D., Pilz, O., and Kaiser, I., München: Hirmer, pp. 409–426.

— (2015), "Agonistic aristocrats? The curious case of Archaic Crete," in *'Aristocracy' in Antiquity: Redefining Greek and Roman Elites*, eds. Fisher, N. R. E. and van Wees, H., Swansea: The Classical Press of Wales, pp. 287–312.

— (2016), "Burning people, breaking things: material entanglements, the Bronze Age/Iron

Age transition and the Homeric Dividual," in *An Archaeology of Prehistoric Bodies and Embodied Identities in the Eastern Mediterranean*, eds. Sevi Triantaphyllou, M. M. and Papadatos, Y., Oxford: Oxbow Books, pp. 215–223.

— (2018), "Style and personhood: the case of the Amasis Painter," *The Cambridge Classical Journal*, 64, 178–203.

Willey, G. R. and Phillips, P. (1958), "Archaeological unit concepts," in *Method and Theory in American Archaeology*, eds. Willey, G. R. and Phillips, P., Chicago: Chicago University Press, chap. Archaeolog, pp. 11–43.

Williams II, C. K. (1970), "Corinth, 1969: forum area," *Hesperia*, 39, 1–39.

Winter, I. J. (1995), "Homer's Phoenicians: history, ethnography, or literary trope? [A perspective on early Orientalism]," in *The Ages of Homer: a Tribute to Emily Townsend Vermeule*, eds. Carter, J. B. and Morris, S. P., Austin: University of Texas Press, pp. 247–272.

— (1997), "Art in empire: the royal image and the visual dimensions of Assyrian ideology," in *Assyria 1995: Proceedings of the 10th Anniversary Symposium of the Neo-Assyrian Text Corpus Project, Helsinki, September 7-11, 1995*, eds. Parpola, S. and Whiting, R. M., Helsinki: The Neo-Assyrian Text Corpus Project, pp. 359–381.

— (1998), "The affective properties of styles: an inquiry into analytical process and the inscription of meaning in art history," in *Picturing Science, Producing Art*, eds. Jones, C. A. and Galison, P., New York: Routledge, pp. 55–77.

— (2007), "Agency marked, agency ascribed: the affective object in ancient Mesopotamia," in *Art's Agency and Art History*, eds. Osborne, R. and Tanner, J., Oxford: Blackwell Publishing.

Woolley, C. L. (1914), "Hittite burial customs," *Annals of Archaeology and Anthropology*, VI, 87–98.

— (1916), "A North Syrian cemetery of the Persian period," *Annals of Archaeology and Anthropology*, VII, 115–129.

Wright, J. (1980), "The older terrace at the Argive Heraeum and early cults in the Argolid," *American Journal of Archaeology*, 84, 241–242.

Yardeni, A. (1994), "Maritime trade and royal accountancy in an erased customs account from 475 B.C.E. on the Aḥiqar Scroll from Elephantine," *Bulletin of the American Schools of Oriental Research*, 67–78.

Yasur-Landau, A. (2003), "The absolute chronology of the Late Helladic III C period: a view from the Levant," in *LH III C Chronology and Synchronisms: Proceedings of the International Workshop held at the Austrian Academy of Sciences at Vienna, May 7th and 8th, 2001*, eds. Deger-Jalkotzy, S. and Zavadil, M., Wien: Verlag der Österreichischen Akademie der Wissenschaften, pp. 235–244.

Young, R. S. (1939), *Late Geometric Graves and a Seventh Century Well in the Agora*, Athens: American School of Classical Studies at Athens.

— (1949), "An early Geometric grave near the Athenian Agora," *Hesperia*, 18, 275–297.

Zerner, H. (1976), "Aloïs Riegl: art, value, and historicism," *Daedalus*, 105, 177–188.