# Chapter 1

## Exploring script adoption

The main focus of this chapter will be the development of the Linear B syllabographic repertoire from a Linear A template,[1] a process that has attracted much discussion over the years. Despite the doubts of many scholars, extensive study of the repertoires used in each writing tradition shows that it is valid to apply the values of Linear B signs to Linear A, as will be discussed below. The idea that there might have been an extensive restructuring of the Linear A syllabary in the creation of Linear B, as suggested by a range of scholars over the years (even Ventris and Chadwick wondered whether there had been a 'wholescale reshuffling process'[2]), is not only unnecessarily cautious, but also out of step with the evidence we have.[3] The number of shared sign shapes in Linear A and B, the evidence for shared values in individual cases and the implications of statistical distributions will all play a role in confirming that the syllabographic repertoire of Linear A was borrowed with its values intact in the creation of Linear B. This will then allow us to look more closely at the process of adoption and to try to understand how it took place and in what context.

It is important to point out from the beginning that this chapter focuses only on the syllabographic, and not the logographic, repertoire. While the demonstrable overlap between the Linear A and B syllabaries is very considerable (something like a 72% match on the signs about which we can be certain,[4] or higher if we focus on the core syllabary), it is also striking that Linear B does not appear to inherit most of its logographic repertoire from Linear A. It has been suggested that as many as 80% of the logographic signs of Linear A were abandoned in the creation of Linear B, with a series of signs for wool and textiles representing one of the most notable exceptions (pointing also towards continuity in this technological sphere).[5] Meanwhile, Linear B appears to have created a large set of new logographic signs covering numerous

[1] It would be premature to try to discuss the relationship between Cretan Hieroglyphic and Linear A, since it is not at all clear that the latter developed directly from the former and we lack significant amounts of evidence for the important periods when these scripts emerged. The Cypriot scripts will provide some interesting comparanda but will not be discussed in detail as script adoptions here (see Steele 2018, chapters 1 and 2, for further thoughts on these issues).

[2] Ventris and Chadwick 1973, 39.

[3] *E.g.* Olivier 1975.

[4] Steele and Meißner 2017, 95–96.

[5] Nosch 2016; Nosch and Weilhartner forthcoming.

industries and commodity types: in part these changes may be administrative, though some may be more language driven (*e.g.* where a logographic sign was originally used with reference to a Minoan word that may not have continued to be used in Greek[6]). Although the state of preservation of Linear A makes it difficult to know how accurate our assessments of the percentage of adopted or created signs are, a greater problem is the way in which logography works in each system; Chapter 2: Exploring Logography, will consider these issues in much more detail. For the purposes of the present chapter, logographic writing will largely be set aside in order to concentrate on the syllabographic repertoire, which also allows us to draw comparisons with the ways in which sets of phonographic signs have been borrowed and adapted in other writing systems.

While the adoption or development of ancient writing systems are never helpfully described by their users, the modern world can offer some useful parallels. There are numerous documented cases of unwritten languages acquiring a written form by developing an orthography in a pre-existing writing system,[7] whether devised by the speaker community themselves or, as is more often the case, by linguists or missionaries working with the community to give their language written representation.[8] Sometimes these will be minority or endangered languages, but sometimes they will be widely spoken languages with high vitality that are minoritised by popular or state preference for other languages that therefore become regionally (or supra-regionally) dominant from a social or political perspective. The adaptation of any writing system to a new language will present problems because each language has its own phonological repertoire, which may or may not be well represented by the writing system being adapted to its use. Typically the new system will be referred to as an orthography of the old system, rather than a new system in its own right, which brings us to some interesting questions surrounding the shared use of a core set of signs by more than one language – Salgarella, for instance, has argued strongly that Linear B used the same script as Linear A,[9] *i.e.* its core set of syllabographic signs and their values, while other elements of the wider system (such as the metrical signs or the way logograms are used) could differ much more substantially. Is Linear B simply an orthography of Linear A used to write Greek rather than Minoan language then, and if so, how and why was it devised? These are questions we will return to.

The development of orthographies for unwritten languages (sometimes referred to as graphisation) in the modern world very often takes the Roman alphabet

[6] There are, however, some examples that do point towards continuing use of Minoan terminology in some form, such as the MA+RU compound sign for 'wool' used in both scripts.

[7] See recently Gnanadesikan 2021.

[8] On the issues of writing development for previously unwritten languages, see recently Shah and Brenzinger 2021 and the papers in Jones and Mooney 2017. In the case of missionaries, developing an orthography has usually been seen as a step towards making it possible for the community to read the Christian Bible in their own language.

[9] *E.g.* Salgarella 2020, 374, where she proposes using the term the Aegean Linear Script for both Linear A and Linear B.

as a starting point, especially when the orthography is devised by linguists or missionaries – though some languages may have orthographies developed in other majority systems, such as Devanagari or Arabic, depending largely on the wider cultural context. There are even some languages whose written forms differ depending on the cultural setting, such as Afar in eastern Africa, which is written in Ge'ez in Ethiopia, in the Roman alphabet in Eritrea and in the Arabic alphabet in Djibouti, despite being seen broadly as a single language. We might compare the use of the Cyrillic or Roman alphabets for closely related languages in the Balkans, or indeed the different orthographies associated with closely related Scandinavian languages. For some communities, these choices are affected by an element of identity, for instance showing that a local language is 'real' by giving it the same sort of appearance as nearby majority languages, such as English, Spanish, Hindi or Arabic. But for others the writing system of a nearby majority language may carry associations of cultural hegemony, colonialism or hostility, making it favourable to choose a different existing system or even to develop a completely new system. Several newly invented writing systems in Africa have followed such a path, for instance, and in North America the Cherokee and Cree syllabaries are good examples of systems that are, wholly or partly, deliberately visually distinctive. Mixed visual and structural inspirations are also possible: consider the combination of wedge-shaped signs with the structure of the linear alphabet to produce alphabetic cuneiform in ancient Ugarit,[10] or the combination of sign shapes inspired by local traditions of ceremonial scarring with the structure of the Roman alphabet in the creation of the Naasioi Otomaung script in Bougainville,[11] to give just two examples.

Shah and Brenzinger have drawn up a list of six possible factors that may affect the process of developing a writing system or orthography for a previously unwritten language, based on observations of modern systems but with applicability too for pre-modern systems:[12]

1. Governmental, administrative and legal policies, obligations and restrictions, which must be considered when working on community-driven (bottom-up or grassroots) projects. For example, in Ghana all writing systems have to use the national orthographical conventions.
2. Cultural or religious traditions, including ease of access to earlier written materials, such as pre-Conquest Central American manuscripts, visual appearance (*i.e.* symbolic meaning of individual graphemes), the values attached to a script or typeface (*e.g.* the close relationship between Arabic script and Islam).
3. Linguistic factors, including sound-grapheme or meaning-grapheme correspondence (according to the script type), or how to decide where word breaks come.

[10] Boyes 2021, 68–78.
[11] Kelly 2021.
[12] Shah and Brenzinger 2021, 230. For a similar discussion of factors important in orthography development, see Cahill and Karan 2008.

4. Educational and social factors, including literacy issues and ease of learning, access to the learning of additional language.
5. Sociolinguistic aspects, including language ideologies, attitudes, how to choose the 'standard' variety and its applicability to other varieties of the language in question.
6. The need for and importance of written language documentation for the community.

These factors are, or should be, also of interest when looking back towards script creation in the ancient world, boiling down to the following main concerns:

1. Political or administrative control over writing and/or the purposes for which it is used.
2. The cultural context of writing, its visibility and any cultural values attached to it.
3. The relationship between a language's features and features of the writing system (especially sign values, but also extending to orthographic features).
4. Education, literacy and the means by which the writing system is disseminated.
5. Sociolinguistic factors related to the choice of language variety to be written.
6. The perceived need for writing.

In discussions of Linear A and B, it is particularly point 3 that has attracted the most interest, since the alleged 'suitability' of a given set of writing features to a language raises questions not only about the choices made in the adaptation of Linear B, but also about the underlying structure of the Minoan language written in Linear A – which remains undeciphered in as much as we cannot identify its linguistic affiliations, nor interpret the majority of sequences written in it.[13] Suitability is in any case a very subjective property of a writing system, since a high degree of phonemic representation is only one aspect of potential significance, while the degree to which it is practical and functional in given contexts of use could be perceived as more important to users.[14] It is also important to consider the degree to which a writing tradition has become standardised, as it can be anachronistic to project ideas of standardised spelling back onto traditions of the ancient world: for Linear B, we can reconstruct a situation where training seems to have concentrated on ways of spelling phonological sequences rather than standard spelling for certain words or even morphological features, for example.[15] Phonemic underrepresentation and overrepresentation are in fact very common in writing systems across the world, and do not tend to be the sole factor responsible for the success or otherwise of a writing tradition, even though they are often perceived as having some effect on the system's usability by its own language's speakers. This means that it is important to

[13] On these problems, see Stephens and Justeson 1978.
[14] See Consani 2016 on Linear B.
[15] Judson 2022.

look beyond purely linguistic concerns to understand the choices made during and following the adoption of a writing system for a new language.

Focusing specifically on the development of what we call Linear B from Linear A, there will of course be several aspects we cannot reconstruct easily: we do not even know what words these early writers may have used for their writing system(s), nor do we have any direct accounts relating to their attitudes towards writing. But there is much more we can do to understand issues such as sociolinguistic, cultural and educational factors, and from there we may be able to draw some important observations about the cultural and social contexts of writing. It is also important to bear in mind what Blommaert has referred to as 'economies of literacy', that is the different kinds of usage and status that writing can acquire in different social situations; when transposing one kind of writing to a different situation, fundamental inequalities will arise that affect the performance and the reception of the writing.[16] This raises some particularly important questions not only about the differences between Minoan and Mycenaean attitudes to writing and literacy (which will be an important topic for Chapter 3: Exploring Vitality), but also what happened at the crucial juncture when the Greek language first came to be written in a sphere that was or had been dominated by Minoan language and, presumably, Minoan cultural attitudes.

We will begin by considering what we know about the relationship between Linear A and B, in order to establish the basis on which we can draw further conclusions about the nature of the transition from one to the other, followed by an excursus on the importance of such findings for our knowledge of Minoan language.

## How do we know that Linear B adopted Linear A syllabographic sign values with little change?

In order to make progress with understanding the development of Linear B from Linear A, it is first important to establish why we think that many of the syllabographic sign values were carried over from one to the other, at least approximately. Rather than revisiting the doubts expressed by a number of scholars, as mentioned at the beginning of this chapter, we can make the best progress by focusing on the positive evidence for continuation of sign values. The following comments largely follow an earlier article I published in conjunction with Torsten Meißner that treats the main reasons for assuming we can project Linear B values backwards onto Linear A,[17] namely:

1) Around 64 out of 89 Linear B syllabographic signs have very strong formal correspondences with Linear A signs, going beyond the bounds of chance similarity,

[16] Blommaert 2004.

[17] Steele and Meißner 2017. The original article can be consulted for further detail on each point.

giving a 72% shared identity, which is comparable also with well-established script adoptions (such as the Latin alphabet from the Greek alphabet). If we concentrate on the core syllabary, by which I mean the main set of V (vowel-only) or CV (consonant-vowel) signs excluding ones that provide optional spelling alternatives in Linear B, then this percentage rises to 86% (51 out of 59).

A note of caution is necessary on the concept of the 'core syllabary'. In Linear B we are justified in thinking in terms of 'core' signs and 'extra' signs because we can show that the extra signs provide alternative options for spelling words, sometimes motivated by a desire to convey a more specific sound sequence (*e.g.* $a_2$ in favour of *a* to show the presence of the otherwise unwritten aspirate /h/) or perhaps to save space by expressing a consonant cluster in a single sign where it might otherwise be spelt out (*e.g. nwa* for *nu-wa* in words such as *pe-ru-si-nwa*, using four signs rather than five).[18] The Linear B sign grid is laid out in Table 1.1, divided into sections for the core syllabary, the extra signs and the still-undeciphered signs: while the still-undeciphered signs are a category only relevant to a modern viewpoint (owing to our inability to reconstruct their values), the concepts of obligatory 'core' signs and optional 'extra' signs must certainly have had relevance for the writers of Linear B documents, as we can tell from their orthographic choices. But in Linear A we do not have any evidence to point towards a similar situation, and in fact it is often assumed that some of the Linear B extra signs were motivated by the existence of Linear A signs that were phonologically odd-looking in a Greek-language setting (such as labialised consonants that might be reinterpreted as consonant clusters, perhaps). This may even have prompted the creation of new signs along the same lines, for example Linear B *dwo* (which has no Linear A precedent), created from two *wo* signs facing each other and so accomplishing a Greek pun (*dwo* being the word for the number 'two'), developed on the template of pre-existing signs inherited from Linear A that contain a consonant + *w*, such as *nwa*.[19] When isolating the core syllabary, in essence we are viewing the situation from the Mycenaean Greek side; however, there is value in looking at it this way, because in assessing the adoption of the Minoan Linear A script by Greek speakers, Greek is inevitably the target language and the one that will have dictated which signs were adopted and with what values.

2) Linear B shares a number of syllabographic sign shapes and values with the Cypriot syllabic script used during the 1st millennium BCE to write the Cypriot dialect of Greek, a point already clear to the early decipherers of Linear B and the scholars who preceded them: this is one factor that allowed Michael Ventris to place certain sign values on his grid as his attempt to identify the language of Linear B progressed.

[18] On these broad issues, see Judson 2017b, 2020a, 2022.
[19] See Meißner and Steele 2017, 109–111.

*Table 1.1. The Linear B syllabary, separated into its core set of syllabographic signs, the 'extra' signs (those that offer options for orthographic variants) and the untransliterated signs (those still considered by most to be undeciphered). Signs drawn by Rupert Thompson. Only one variant of any sign is given here.*

*Linear B Core Syllabary*

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *a* |  | **08* | *e* |  | **38* | *i* |  | **28* | *o* |  | **61* | *u* |  | **10* |
| *da* |  | **01* | *de* |  | **45* | *di* |  | **07* | *do* |  | **14* | *du* |  | **51* |
| *ja* |  | **57* | *je* |  | **46* | | | | *jo* |  | **36* | *ju* |  | **65* |
| *ka* |  | **77* | *ke* |  | **44* | *ki* |  | **67* | *ko* |  | **70* | *ku* |  | **81* |
| *ma* |  | **80* | *me* |  | **13* | *mi* |  | **73* | *mo* |  | **15* | *mu* |  | **23* |
| *na* |  | **06* | *ne* |  | **24* | *ni* |  | **30* | *no* |  | **52* | *nu* |  | **55* |
| *pa* |  | **03* | *pe* |  | **72* | *pi* |  | **39* | *po* |  | **11* | *pu* |  | **50* |
| *qa* |  | **16* | *qe* |  | **78* | *qi* |  | **21* | *qo* |  | **32* | | | |
| *ra* |  | **60* | *re* |  | **27* | *ri* |  | **53* | *ro* |  | **02* | *ru* |  | **26* |
| *sa* |  | **31* | *se* |  | **09* | *si* |  | **41* | *so* |  | **12* | *su* |  | **58* |
| *ta* |  | **59* | *te* |  | **04* | *ti* |  | **37* | *to* |  | **05* | *tu* |  | **69* |
| *wa* |  | **54* | *we* |  | **75* | *wi* |  | **40* | *wo* |  | **42* | | | |
| *za* |  | **17* | *ze* |  | **74* | | | | *zo* |  | **20* | | | |

*'Extra' signs*

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $a_2$ |  | **25* | $a_3$ |  | **43* | *au* |  | **85* | *dwe* |  | **71* | *dwo* |  | **90* |
| *nwa* |  | **48* | *pte* |  | **62* | $pu_2$ |  | **29* | $ra_2$ |  | **76* | $ra_3$ |  | **33* |
| $ro_2$ |  | **68* | $ta_2$ |  | **66* | *twe* |  | **87* | *two* |  | **91* | | | |

*Untransliterated signs*

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **18* |  | | **19* |  | | **22* |  | | **34* |  | | **47* |  | |
| **49* |  | | **56* |  | | **63* |  | | **64* |  | | **79* |  | |
| **82* |  | | **83* |  | | **86* |  | | | | | | | | |

Crucially, these sign correspondences are not direct and have to have been passed on through Linear A, since the chronology makes it impossible that the Cypriot syllabic script as used for Greek was developed directly from Linear B:[20] writing first appeared in Cyprus in the earliest phase of the Late Bronze Age, probably more than 100 years before Linear B was developed, making it an independent development directly from Linear A.[21] This makes the shapes and values of Cypriot syllabic signs more helpful in an attempt to reconstruct the values of Linear A signs, since they give confirmation via a separate route of development from that of Linear B – particularly in the case of a small number of signs whose shapes and values are very close.

The peculiar circumstances of syllabic writing in Cyprus through the Bronze and Iron Ages were such that there was a high level of palaeographic variation and change, meaning that for many of the other sign values we are left to piece together a number of palaeographic puzzles in order to try to understand the precise relationship between Linear A and Cypro-Minoan, and how that then resulted in the repertoire of Cypriot syllabic writing during the 1st millennium BCE. It is also worth noting that some of the puzzles are very difficult to resolve even in relation to the well-established correspondences: for example, why does the Cypriot syllabary distinguish between /r/ and /l/ while Linear B does not (and did Linear A and/or Cypro-Minoan have this feature?), and how is it that the *ta* sign in the Cypriot syllabary is related to the Linear B *da* sign (belonging to the d-series, which distinguishes voicing), while *ti* and *to* relate to Linear B *ti* and *to* (from the t-series, unvoiced)?[22] Nevertheless, the Cypriot syllabic values of comparable signs allow us to reconstruct a number of approximate values for Linear A signs that align with those of Linear B – at least 10 or 11 signs, and perhaps more depending on how far you are prepared to accept palaeographical arguments for further correspondences.

3) There are numerous sign sequences attested in both Linear A and Linear B, many of which stand a good chance of representing the same word (with perhaps minor variation due to *e.g.* morphological differences). The odds of a real correspondence are increased in particular where the word has three or preferably four or more shared signs, where the Linear B attestation is from Knossos (particularly in the case of personal names) and where Cretan toponyms are recorded (of which there are perhaps as many as six attested in both scripts). In the case of personal names, a trend whereby Linear A names appear to end in *-u* and corresponding Linear B names in *-o* further suggests regular morphological correspondences and cases where Minoan morphology was adapted to Greek paradigms (namely the o-stems in these

[20] On these issues and on the development of the Cypro-Greek syllabary from Cypro-Minoan, see Egetmeyer 2013; Steele 2018, chapter 2.

[21] See *inter alia* Valério 2017. The possibility that Linear B was later transferred to Cyprus and had any influence on the development of Cypriot syllabic writing as used for Greek seems very unlikely, particularly given the very different orthographic choices of each system (on which see also the next section).

[22] On these problems, see Steele 2014 and also brief discussion in the next section.

cases). Each of these shared words helps to establish or confirm shared sign values across the two scripts.

4) Where sign sequences are attested multiple times in Linear A, we sometimes see variations, particularly at the end of a word (and sometimes at the beginning): for example *su-ki-ri-ta / su-ki-ri-te-i-ja* or *ja-sa-sa-ra-me / a-sa-sa-ra-me / ja-sa-sa-ra-ma-na*. In cases like this it is possible to make assumptions about which series particular signs belong to, for example that the *ta* and *te* in *su-ki-ri-ta / su-ki-ri-te-i-ja* share the same consonant and so both belong to the t-series, or similarly that the *me* and *ma* in *ja-sa-sa-ra-me / a-sa-sa-ra-me / ja-sa-sa-ra-ma-na* share the same consonant and so both belong to the m-series.[23] This also confirms that whole consonant series of signs in Linear B functioned in the same way in Linear A, thus constituting a strong piece of evidence against the idea of random restructuring of the sets of signs and their values.

5) As shown long ago by Packard, a statistical approach to Linear A and B lends some confirmation to the assumption that sign values were carried over from one to the other.[24] His experiments clearly demonstrated that by applying the same values, the number of correspondences between the two traditions is much higher than would be found when substituting sets of random values (with Linear A closer to Knossian Linear B in terms of shared sequences than to Pylian Linear B), and, within Linear A, that relative expected frequencies were maintained across different series of signs (for instance if *da* were twice as common as *di*, then *ka* and *ma* should be twice as common as *ki* and *mi*, respectively), again indicating that what we think of as consonant series in Linear B also acted as such in Linear A.

6) We have evidence from later Greek glosses that certain Cretan words of non-Greek origin must have been transmitted to Greek. In two particular cases these can explain the values of signs used in Linear B in both logograms and syllabograms, but with syllabographic values that do not match the usual Greek words for the commodities in question: the syllabographic value of the 'fig' logogram, *ni*, does not match the Greek word for 'fig' (σῦκον) but can be explained via a gloss νικύλεον· τὸ σῦκον ἐν ταῖς Κρητικαῖς γλώσσαις ('*nikuleon: the fig in the Cretan tongue*': Hermonax cited in Athenaeus *Deipnosophistae* 76e);[25] and the compound logogram MA+RU 'wool', which does not match the Greek word for 'wool' (λῆνος) but can be explained via a gloss μάλλυκες· τρίχες in Hesychius (*mallukes: hair*; also μαλλός used for 'fleece' in Hesiod *Works and Days* 234). The fact that both the 'fig' and 'wool' logograms appear in very similar forms and usages in Linear A, along with the evidence for the adoption of these non-Greek words in Greek, gives further confirmation of shared sign values.

[23] This may put us in mind of Alice Kober's 'triplets' in the decipherment of Linear B (Kober 1945).
[24] Packard 1974.
[25] Neumann 1962.

*Table 1.2. The Linear A signs with formal correspondences in Linear B whose values we can confirm, structured on the grid for the Linear B core syllabary. Signs drawn by Ester Salgarella. Only one variant of any sign is given here.*

| *Linear A signs shared with Linear B (with evidence for shared values)* | | | |
|---|---|---|---|
| *a* *08 | | *i* *28 | |
| *da* *01 | | *di* *07 | |
| | | *ki* *67 | |
| *ma* *80 | *me* *13 | *mi* *73 | *mu* *23 |
| *na* *06 | | *ni* *30 | |
| *pa* *03 | | | *po* *11 |
| | | *ri* *53 | *ro* *02 | *ru* *26 |
| *sa* *31 | *se* *09 | *si* *41 | *su* *58 |
| *ta* *59 | *te* *04 | *ti* *37 | *to* *05 | *tu* *69 |

These observations may be collected from a number of different sources, but together they form a powerful argument for the maintenance of sign values from one script to the other. They allow us to reconstruct a grid containing 25 shared sign values from the core syllabographic repertoire that we can be certain were carried over from Linear A to Linear B based on direct evidence for correspondences (Table 1.2). While in a sense randomly selected, given that they rely on a patchwork of evidence that just happens to confirm one value or another in any given case, the distribution of the confirmed values is significant: it covers a number of consonant values and all five vowels, thus giving good overall coverage across the grid.

If we look at purely formal correspondences between Linear A and B signs of the core syllabary (*i.e.* shared shapes, with or without evidence for shared values), we will find that the majority of Linear B core signs (51 out of 59) are inherited from formally identical (or very similar) signs in Linear A: all signs containing the vowels *a*, *i* and *u*, and most of those with other vocalic values (Table 1.3). The most obvious gaps are for o-vowel signs, with 7 out of 13 o-vowel signs unattested in Linear A (*do*, *jo*, *mo*, *no*, *qo*, *so*, *wo*), along with 2 out of 13 e-vowel signs (*pe* and *we*, although a correspondence has been suggested for *we*); this is a problem we will return to shortly.

*Table 1.3. The Linear A signs with formal correspondences in Linear B, structured on the grid for the Linear B core syllabary; shared signs not in the Linear B core syllabary are given in a separate section at the bottom. Signs drawn by Ester Salgarella. Only one variant of any sign is given here.*

| *Linear A signs shared with Linear B* | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *a* |  | **08* | *e* |  | **38* | *i* |  | **28* | *o* |  | **61* | *u* |  | **10* |
| *da* |  | **01* | *de* |  | **45* | *di* |  | **07* | | | | *du* |  | **51* |
| *ja* |  | **57* | *je* |  | **46* | | | | | | | *ju* |  | **65* |
| *ka* |  | **77* | *ke* |  | **44* | *ki* |  | **67* | *ko* |  | **70* | *ku* |  | **81* |
| *ma* |  | **80* | *me* |  | **13* | *mi* |  | **73* | | | | *mu* |  | **23* |
| *na* |  | **06* | *ne* |  | **24* | *ni* |  | **30* | | | | *nu* |  | **55* |
| *pa* |  | **03* | | | | *pi* |  | **39* | *po* |  | **11* | *pu* |  | **50* |
| *qa* |  | **16* | *qe* |  | **78* | *qi* |  | **21* | | | | | | |
| *ra* |  | **60* | *re* |  | **27* | *ri* |  | **53* | *ro* |  | **02* | *ru* |  | **26* |
| *sa* |  | **31* | *se* |  | **09* | *si* |  | **41* | | | | *su* |  | **58* |
| *ta* |  | **59* | *te* |  | **04* | *ti* |  | **37* | *to* |  | **05* | *tu* |  | **69* |
| *wa* |  | **54* | | | | *wi* |  | **40* | | | | | | |
| *za* |  | **17* | *ze* |  | **74* | | | | *zo* |  | **20* | | | |
| *Other shared signs (not in the core syllabary from a Linear B perspective)* | | | | | | | | | | | | | | |
| *?* |  | **22* | $pu_2$ |  | **29* | *?* |  | **47* | *nwa* |  | **48* | *?* |  | **49* |
| *?* |  | **56* | $ta_2$ |  | **66* | $ra_2$ |  | **76* | *?* |  | **79* | *?* |  | **82* |
| *au* |  | **85* | *?* |  | **86* | *?* |  | **87* | | | | | | |

On top of the core syllabary, there also exist a number of signs with optional, more specific values as used in Linear B, usually referred to as the 'extra' signs, and of these, three have formal correspondences in Linear A (*nwa*, $ra_2$, $ta_2$), another one has a perhaps doubtful correspondence (*twe*), and eight do not have attested correspondences ($a_2$, $a_3$, *dwe*, *dwo*, *pte*, $ra_3$, $ro_2$, *two*).[26] For most of the still-undeciphered (or 'untransliterated') signs of Linear B, we are dealing with very small numbers of attestations, and only in the occasional case can we see a close correspondence with Linear A (*e.g.* the common sign *22).[27]

What conclusions can we draw from the very high number of formal correspondences between Linear A and Linear B signs, especially in the overwhelming majority of the core syllabary? While formal correspondences alone are not enough to prove shared values, the very strong evidence that we can piece together in 25 cases on the principles outlined above gives an encouraging indication that values were shared across multiple consonant series and vocalic values: these account for around half the number of core signs with formal Linear A correspondences, distributed randomly (depending on the availability of evidence) across the grid. This makes it methodologically very unsound to argue for large-scale value reassignment in the development of Linear B. While we can almost certainly assume there would have been some modification of the values of Linear A signs as the script came to be used to write a new language with a different phonological inventory,[28] it does not follow that the modifications must necessarily have involved drastic change in the underlying sign value, such as reallocation to a completely different consonant-vowel combination. A comparison with the development of the Greek alphabets is instructive: while a number of Phoenician consonantal letters were reassigned vocalic values, these were not applied at random but rather seem to have related to the position of articulation of a given sound (*e.g.* the glottal consonant *aleph* reinterpreted to represent a Greek back vowel as *alpha*, and something similar might be said of the pharyngeal consonant *ayin* reinterpreted to represent another Greek back vowel as *omicron*). To some extent this issue depends on how we envisage the development of Linear B having taken place, as a decisive initial redesign or an evolving new orthography for example, a question to which we will return later.

But what the confirmed shared values between Linear A and B do show us is that there seems to have been a significant amount of stability in the values carried over from one to the other. All five vowels are represented in this selection, as well as eight different consonants. Whatever the phonetic reality of the sign values in the Linear A tradition (on which, see the next section), they must nevertheless have been close enough for Greek speakers to borrow the majority of signs in their script in such a way that they preserved the sorts of shared features we have seen above, such as shared spellings for Cretan place names and personal names. A number of the values were

[26] See Judson 2017b.
[27] See Judson 2020b. The sign *65 is considered here to be confidently assigned the value *ju* (and so appears in Table 1.2 as part of the core syllabary).
[28] *E.g.* Bennet 2008, 15.

even stable enough in the Cypriot case to survive two separate language adaptations, first from Minoan to whatever language might have been written in Cypro-Minoan, and from there to a different but related variety of Greek at a later stage. Finally, it is not insignificant that we have evidence of Linear A consonant series (*i.e.* sets of signs with the same consonant but different vowels) being organised in the same way as in Linear B, which is clear both where we can observe patterns of morphological variation and in the statistical experiments for relative frequencies carried out by Packard. All these factors should give us some confidence in 'reading' Linear A using Linear B sign values – although how far that will take us in understanding the Minoan language is another question.

## Can we use Linear B sign values or structural features to reconstruct Minoan phonology or other linguistic features?

It is important to note at this point that I am not arguing (and I am sure no Aegean scholar would argue) that the sign values shared by Linear A and B are an exact phonetic match: even from a purely theoretical and typological perspective, we should expect two different and unrelated languages, *i.e.* Mycenaean Greek and what we label as Minoan, to have different phonological repertoires and features. So it is all the more valid to ask to what extent we can use the evidence for shared values between Linear A and Linear B to reconstruct the phonology of the Minoan language, and here it would be unwise to make any great claims. Although there have been some very confident reconstructions of Minoan phonology (and of other linguistic features, such as morphology and word order),[29] Duhoux's caution that any interpretations are 'trop hypothétiques, parce qu' invérifiables' remains salutary.[30] With just over 8,000 signs in total, spread over approximately 1,500 short inscriptions, there is simply too little scope to test any given hypothesis that relies on internal factors – unlike the 'backwards' analysis of Linear A derived from Linear B, where the deciphered state and far more extensive corpus of Linear B at least give us a good understanding of the values and usage of signs in that tradition, and so give us a solid starting point for comparison.

Ultimately, while we can reconstruct approximate values for each sign, we cannot know the phonetic reality of the sound or sounds involved in the Minoan language. We might guess that there is some approximation between the two, for instance that the place of articulation will be close if not identical – but this only takes us so far. The lack of distinction for voicing and aspiration in the Linear B consonant series looks odd from a Greek perspective, since these contrasts are phonemic in that language, but there is little to guide us in interpreting the status

[29] Davis 2014 is a good example, with extensive analysis and reconstruction of Minoan phonological features (193–245), despite his counselling some caution as to the decipherability of the script (157).
[30] Duhoux 1989, 90 ('too hypothetical because they are unverifiable').

of voicing and aspiration in Minoan (whether they existed at all, whether they were allophonic rather than phonemic, and so on). A cautionary tale is to be found in the problem of the Linear B d-series, which differs from all other stop series in the script in distinguishing voiced consonants from the unvoiced ones (so Greek /d/ is distinguished from a series representing both /t/ and /t$^{h}$/, whereas all other stop series feature no distinctions of voicing or aspiration at all). It is difficult to accept that this imbalance was inherited from Linear A (though this is not at all impossible), since there is no obvious reason why voicing should be distinguished in the dental series but not elsewhere, so instead scholars have been keen to see here some disjunct between Greek and Minoan phonology. But what sort of sound was it that Greek speakers heard as closest to their /d/, and where did it fit in the Minoan phonological repertoire? Lejeune suggested that in Minoan this was actually some sort of /l/ phoneme, thus tackling not only the problem of the unexpected Linear B d-series, but also the failure of Linear B to distinguish between /r/ and /l/ (which are separate phonemes in Greek): 'pour cette double étrangeté, une explication unique'.[31] The suggestion seems ingenious, and would also provide a neat solution to the use of a d-series sign in the contentious 'labyrinth' word (*da-pu$_2$-ri-to-jo*) attested in the Linear B tablet KN Gg(1) 702,[32] which also recalls other examples of confusion between /d/ and /l/ in words of non-Greek etymology (cf. Odysseus vs. Ulixes and related forms).

But another problem remains, namely the signs inherited from Linear A in the Cypriot scripts. Cypro-Minoan could theoretically have inherited two separate series of signs for /r/ and /l/ from Linear A, which could explain why the Cypriot Syllabic script used later for Greek had separate series for these phonemes, unlike Linear B (which had just one series for both), while also not having a separate d-series. But why is it that in the Cypriot Syllabary the sign for /ta/, /t$^{h}$a/ and /da/ is derived from the sign shape that in Linear B would become *da* (= /da/), while the signs for /ti/, /t$^{h}$i/ and /di/ and for /to/, /t$^{h}$o/ and /do/ are derived from sign shapes that would belong to the Linear B t-series (*ti* for /ti/ and /t$^{h}$i/ but not /di/, *to* for /to/ and /t$^{h}$o/ but not /do/)?[33] A further problem acknowledged by Lejeune is the fact that the Cypriot Syllabic sign *lo* (representing only /lo/, not /ro/) would be derived from a sign he had just argued to represent an /r/ phoneme in Minoan, on the assumption that the Linear B liquid series (representing either /l/ or /r/) came from a Linear A series representing only /r/. These Cypriot outcomes are very difficult to reconcile with

[31] M. Lejeune 1958, 327 ('for this double abnormality, a single explanation').
[32] On which see Judson 2017a.
[33] Valério 2016, 292–293, cites a parallel from the use of logosyllabic cuneiform to write Hurrian in the Mitanni Letter, where both voiced and unvoiced consonant signs were used to write single Hurrian consonants (which did not feature phonemic voicing); however, these may be ad hoc spellings rather than part of a standardised orthography, and the situation is different in that the original language features voicing while the target language does not (the opposite of the situation here, where Minoan may not have featured phonemic voicing but Greek most certainly did).

the evidence provided by Linear A and B alone, but equally they cannot be ignored, especially given the usefulness of certain shapes and values in the Cypriot Syllabary for confirming the values of Linear A and B signs.[34] So should we accept a partial or modified version of Lejeune's proposal or abandon it altogether? In the spirit of acknowledging the difficulties of reconstructing Minoan phonology, it is better to leave this question hanging.

Another problem surrounds the Linear B *dwo* sign, traditionally understood as a Linear B innovation based on a 'pun' that brings two *wo* signs together in a single sign (2 × *wo* = *dwo*, Greek for 'two'), and the apparent existence of labialised consonants in Minoan. Brent Davis has argued in favour of a set of signs for labialised consonants in Linear A based on the attestation of some signs that seem to have such a derivation in Linear B:[35] he argues that a language's speakers are unlikely to create signs for highly marked sounds, such as labialised consonants, without first developing signs that distinguish the (in Greek) phonemically distinct but less marked features, such as voicing and aspiration – so Linear B really ought to have separate signs for /b/, /$p^h$/, /g/, /$k^h$/, etc, before creating signs for highly marked labialised consonants that don't exist in Greek, such as /$d^w$/ or /$t^w$/. He therefore suggests that Linear B *dwo* is not a new invention but an inheritance from Linear A that was instead split in half to create the *wo* sign. But this argument falls down on several points. Firstly, the Linear B *dwo* sign doesn't have a clear antecedent in Linear A as Davis claims (Linear A sign 118 is not a good match palaeographically), nor does it represent a labialised consonant but rather a cluster of two consonants /dw/.[36] Minoan may indeed have featured labialised consonants, as suggested by Linear B's inherited labiovelar q-series (which *was* useful for a small set of labialised Greek phonemes in this period) and the inherited *nwa* sign (only discovered in Linear A in the 1990s although it was already attested in Cretan Hieroglyphic before that). But it nevertheless seems most plausible based on available evidence that Linear B did invent at least one new sign for a /d/ + /w/ combination, namely *dwo*, which can be interpreted as a creation inspired by the reanalysis of the *nwa* sign from a presumed Minoan value /$n^w$a/ or similar, as the sequence of Greek phonemes /nwa/.[37] This is also reinforced by the fact that other signs involving labial clusters in Linear B (*dwe*, *twe*, *two*) do not have confirmed Linear A antecedents. We may indeed wonder whether Linear B might have made use of more labialised consonant signs (reinterpreting them as consonant clusters) if more had existed in Linear A.

What is curious is that Mycenaean Greek didn't really need a sign for the sequence /nwa/, which was perfectly well represented by sets of two signs (usually *nu-wa*) and could always be spelt in that way – *i.e.* the use of *nwa* remained optional. This flies in the face of claims about typological universals in the development of writing systems, such

[34] See Steele 2014 for further discussion of the problem.
[35] Davis 2014, 195.
[36] See Judson 2017b, 117–118.
[37] Meißner and Steele 2017, 109–111.

as that of Stephens and Justeson that 'innovations that produce overrepresentations of highly marked sounds, while ignoring underrepresentations of less marked sounds, are almost nonexistent in the writing systems of the world'.[38] Such claims tend to be both unhelpful and poorly substantiated, and many writing systems contain similar oddities that contravene the supposedly idealistic principle of having both minimal and maximal representation of the underlying language's phonemes (*i.e.* enough signs for all phonemes, with no unnecessary signs or overlap). A closer look at newly developed writing systems in the modern day also shows numerous choices that we might see as linguistically unjustified but that nevertheless have compelling and traceable motivations. Sometimes they will be motivated by a desire to make a system or orthography appear different to another dominant (perhaps colonial) script, as in the case of deliberate distancing from Spanish spelling in modern orthographies designed for Mayan languages in central America: in Ch'orti', to take one example, the conjunction pronounced [i] has come to be written *yi* or *yi'* to distance it from the spelling of the Spanish conjunction *y* (also pronounced [i]), where speakers or writers 'are making overt political statements through their conscious and determined orthographic choices'.[39] What looks to a linguist like a phonological oddity may be better explained by non-linguistic or sociolinguistic factors.

The final phonological problem I will mention is that of the vowel structure of the Minoan language. As has already been observed, 7 out of 13 Linear B o-vowel signs lack any established formal correspondence in Linear A (*do*, *jo*, *mo*, *no*, *qo*, *so*, *wo*), and the same can be said of 2 out of 13 e-vowel signs (*pe*, *we*), focusing solely on the core syllabary. At the same time, it is clear from looking at Linear A that signs containing the vowels *-a*, *-i* and *-u* are far more frequent than those containing the vowels *-e* and *-o*. These factors have long been assumed to suggest that the Minoan language had only three vowels, and that Greek speakers, who had a five-vowel system, were then forced to reallocate sign values and create new signs in order to represent their extra two vowels.[40] The relevant frequencies of Linear A signs with a/i/u vowels compared with e/o vowels seems to confirm this picture in showing that the e/o vowels are far less frequent.[41] However, this is where arguments in favour of a three-vowel system in Linear A meet a significant problem, because if it is claimed that Linear A did not represent e/o vowels, then such statistical evidence could not be used in support (since we would be forced to accept that the e/o-vowel signs did not represent e/o after all). As we have already seen, there is also comparative evidence to suggest that the Linear A e/o-vowel signs with continuations in Linear B really did represent something close enough to the Greek phonemes to be used in similar spellings (*e.g. to*

[38] Stephens and Justeson 1978, 279.
[39] Hull 2017, 152–153.
[40] *E.g.* Palaima and Sikkenga 1999, 603–604. See also the discussion in Duhoux 1989, although he suggests that Minoan could have had more rather than fewer vowels than Mycenaean Greek depending how we interpret the evidence (p. 72).
[41] Davis 2014, 240–242; Meißner and Steele 2017, 105.

in the place names *pa-i-to* and *se-to-i-ja*) and in some cases to appear also with the same values in the Cypriot syllabic system (*lo*, *po*, *se*, *to*). On this basis, there can be no doubt that Linear A did represent e/o vowels, and that it seems to have done so systematically – though this does not have to mean that these vowels were as common in Minoan language as the a/i/u vowels. Indeed, the statistical evidence suggests that the e/o vowels were far more rare, which could in turn explain why some Linear B o-vowel signs in particular still lack Linear A correspondences: they may simply not have been found yet.[42] Indeed, a close look at Linear A palaeography does reveal some signs that could theoretically be close to the shapes of the Linear B signs in question: *do* and *jo* look close to signs attested only once each in Linear A (A 364 on ZA 15 and A 349 on KH 11 respectively, although with some perhaps problematic palaeographic features in the latter case); *no* and *so* perhaps also correspond with one-off attestations (A362 on ZA 10 and A 363 on ZA 14 respectively); and *wo* could arguably be seen in a sign with slightly better attestation though with varying shapes (A 306), leaving only *mo*, *no* and *qo* without any obvious parallels at all.[43] Here we again seem to be dealing with a case of being able to say more about the Linear A writing system than about the phonological features or structure that may have underpinned it.

Another assumption commonly made about the Minoan language is that it may have suited the structure of its writing system somewhat better than Greek suits that of Linear B, and in particular that the motivation for a system of open syllable signs (*i.e.* vowel-only or consonant-vowel but never ending in a consonant) could lie in the language's syllabification. This would make Minoan a predominantly open syllable language, with languages such as Japanese (with its developed open syllable kana systems of writing) and Polynesian providing the sort of parallel many scholars have cited.[44] However, there are several problems with this proposition. One is that we do not know whether Linear A was originally developed to write the language we label as Minoan (*i.e.* the language found in a corpus composed predominantly of administrative documents, along with some other types, from sites across Crete across the MM–LM periods). Was Cretan Hieroglyphic (perceived to have some differences in

[42] See further Meißner and Steele 2017, 102–108. Meanwhile outliers such as the relevant frequency of *ro* in Linear A, in comparison with any other o-vowel sign, could be related to the frequent attestation of accounting words (*po-to-*)*ku-ro* 'total' and *ki-ro* 'deficit' in administrative records, words which were not necessarily of Minoan etymology (argued particularly in the case of *ku-ro* as a possible Semitic loanword).

[43] Discussed in Salgarella 2020, 291–297 (where she also suggests a relationship between *qo* and the derivation of the saffron logogram in Linear B, which thus perhaps has an unattested antecedent, and the issue that some forms of the *i* sign in Linear A look somewhat closer to the shape of Linear B *no*). See also Melena 2014, 84–88, on some of the proposed identifications, as well as the suggestion that Linear B *mo* could derive from a sign attested only logographically in Linear A, such as A 302, 'olive oil', or A 303, some type of grain.

[44] On similar views of the Minoan languages, see *inter alia* Chadwick 1959, 274; Sharypkin 2008, 740; Ventris and Chadwick 1973, 69. Although it is not very relevant to our discussion, it is perhaps worth bearing in mind that some scholars have seen certain writing systems of similar types as representing moras rather than syllables: for discussion, see Gnanadesikan 2012.

its repertoire as well as its palaeography) developed first, growing out of the earliest seal inscriptions, and did it represent a different language? Another possible problem is the fact that the Aegean syllabaries are not the only open syllable writing systems of the Bronze Age Mediterranean, since Anatolian hieroglyphs also have a very similar structure (vowel-only and consonant-vowel signs). Although the timescale of the origin of Anatolian hieroglyphs is open to question,[45] there is no evidence that they were developed for any language other than that for which they were used: an Anatolian language usually classed as Luwian, which is Indo-European, like Greek, and shares similar problems of the presence of consonant clusters and final consonants (*i.e.* it is not a language with a preponderance of open syllables).

But perhaps the greatest obstacle to the idea that the Minoan language had a predominantly open-syllabic structure is that Linear A writing appears to preserve direct evidence of consonant clusters. The evidence is to some extent open to question, in that it depends on orthographic principles that are not straightforward to reconstruct for an undeciphered language, particularly one using an open-syllabic system and that therefore required a spelling strategy for any consonant cluster: you can write either one consonant too few or one vowel too many.[46] We know that many consonant clusters in the closely related Linear B system were graphically suppressed in what is usually known as 'partial spelling' (for example *pe-ma* for *sperma* 'grain', where the clusters /sp/ and /rm/ are not written in full and only one element is written). Orthographic principles in the writing systems related to Linear A are, however, somewhat mixed. In Linear B, 'partial spelling' co-exists with 'plene spelling', where certain clusters were spelt out (*e.g.* the initial /kn/ of *ko-no-so* 'Knossos'), and although these choices are governed by rules on which kinds of clusters are spelt out only partially and which are spelt out fully, we do also see a certain amount of variation in the spelling of some words.[47] If we compare Cypriot syllabic writing as used for Greek, we find that consonant clusters were more often spelt out in plene, such that the name Stasikupros would be written *sa-ta-si-ku-po-ro-se* for instance.[48] Here the syllabification of the word determined the way in which dummy vowels (*e.g.* the *a* of the *sa* and the *o* of the *po* in *sa-ta-si-ku-po-ro-se*) were chosen: when the

[45] Waal (2012) has argued for a high date for the creation of Anatolian hieroglyphs, pushing it back into the earlier 2nd or even the 3rd millennium BCE. Hawkins (1986) argued for a common origin of Anatolian and Cretan hieroglyphic writing, although this theory has not met with widespread acceptance; evidence for contact or similarities between writing traditions in the Aegean and Anatolia (see Waal 2021) is not sufficient to demonstrate a link between the writing systems, which share very few possible formal correspondences. A lower date for the creation of Anatolian hieroglyphs is also widely preferred because structural and linguistic features point towards its having been created under the influence of Hittite cuneiform writing (see Payne 2015, 66–70; Yakubovich 2022). On relationships between writing systems in Bronze Age Anatolia, see recently Rieken and Yakubovich 2023.

[46] In Egetmeyer's words: 'Ils imposent de noter ou une consonne en moins ou une voyelle en trop' (Egetmeyer 2010, 220).

[47] See Meißner 2008; Melena 2014, 91–123; Judson 2019, 2022.

[48] See Egetmeyer 2010, 220–235.

cluster was heterosyllabic (*i.e.* straddled the border between two different syllables), the vowel from the previous syllable was typically chosen, and when the cluster was tautosyllabic (*i.e.* both consonants belonged to the beginning of the same syllable), the vowel from the following syllable was typically chosen. The difference between Linear B and Cypriot syllabic spelling rules shows us that we cannot make assumptions about those of Linear A, since there are multiple possibilities.

Consani has gathered data on possible consonant clusters in Linear A by isolating all sequences that involve two adjacent syllabographic signs composed of different consonants with the same vowel.[49] Theoretically, this could point towards the existence of consonant clusters, though a word of caution is necessary because two adjacent signs displaying this pattern could always point towards two adjacent separate syllables that just happen to contain the same vowel (cf. in Linear B *a-ta-na at$^{h}$āna* 'Athena' for instance, with three syllables using the same vowel). A positive indication may be given by the case of *(j)a-di-ki-te-te* (also *a-di-ki-tu*), which appears on libation bowls and could refer to Mount Dikte or a deity associated with that site, thus suggesting the *i* of *ki* acts as a dummy vowel here in the spelling of a consonant cluster. This word also appears in Linear B in the phrase *di-ka-ta-jo di-we* ('to Diktaian Zeus', KN Fp 1), where the different syllabification (*-di-ka-* rather than *-di-ki-*) could suggest tautosyllabic treatment made possible by the existence of *kt-* clusters at syllable onset in Greek. Obviously the toponym Dikte may not belong to the same language as written in Linear A, but the apparent stability of the name over time, whatever its linguistic origin, makes it a helpful case for comparing the way in which Linear A and B dealt with consonant clusters – and if we can detect a spelling strategy for dealing with a consonant cluster in Linear A here, it strengthens the proposal that other consonant clusters (some presumably arising from Minoan language words) were treated the same way. Other Linear A sequences are more difficult to contextualise because their meaning remains obscure, but it stands to reason that among 160 possible examples, a good number may reflect underlying consonant clusters, as Consani suggests. For our present purposes, the most important point is that if consonant clusters were being written regularly in Linear A, that rather implies that at least some of the words written could be from the Minoan language, and further suggests that the open-syllabic nature of the script was not designed to accommodate a purely open-syllabic language structure in Minoan.

It is worth mentioning that in Consani's view the evidence he has assembled strongly points towards an extensive use of plene spelling in Linear A, and that he sees a direct continuation of this in the Cypriot scripts through the 2nd and especially the 1st millennium BCE, whereas he sees the considerable degree of partial spelling in Linear B as a significant departure from the spelling rules of Linear A.[50] On the one hand, some apparent spelling strategies do seem to bear out this theory. On the other,

[49] Consani 2021.
[50] Consani 2021, 26–28.

the word *pa-i-to*, which, as we have seen, is attested in both Linear A and B, seems to suggest partial spelling of an *-st-* cluster, provided that we assume the same place name is referred to in both systems. Consani sees this as doubtful,[51] but the data collected contain only nine possible examples of clusters involving the sibilant with a following stop (*i.e.* signs with the consonant *t*, *p*, *k*; *d* are discounted since there is a possibility they do not represent a stop in Minoan): only *a-tu-ri-si-ti* (which as Consani admits could represent *atursiti* rather than *aturisti*); *se-sa-pa*$_2$; *si-pi-ki*; *a-su-pu-wa*; *qe-su-pu*; *a-si-ki-ra*; *ja-ki-si-ki-nu* (*jakiskinu*, *jaksikinu* or indeed *jakskinu*?); *si-ki-ne*; *si-ki-ra*. Any one or more of these examples *could* represent a consonant cluster involving the sibilant plus a stop, but it is impossible to say how many did and how many did not. On the other hand, if partial spelling were used for such clusters in Linear A, it would leave no trace at all since the sibilant would not be written, and the only way of telling would be if we were sure of the meaning of a word; similarly, we would not know that there is an unwritten *s* at the beginning of *pe-ma sperma* 'grain' in Linear B if we did not know what it stood for. That being the case, I am inclined to be cautious about the assumed non-existence of partial spelling in Linear A.

## How should we understand the nature of the transition from Linear A to Linear B?

The previous sections have focused on questions surrounding the ways in which we understand Linear A and Linear B to be related to each other, and the degree to which we can use details of that relationship to understand features of language encoding. However, that discussion is somewhat abstracted from any hypothesis concerning the way in which writing was passed on, or perhaps more appropriately how a writing system used for a Minoan language came to be adopted and adapted for the Greek language. Was the writing of Greek in Linear B the result of design (*e.g.* users making a set of initial decisions as to how to represent Greek in this syllabic writing system, including the application of sound values and orthographic rules)[52] or the result of an organic process of changing practice (effectively the outcome of ongoing attempts to write Greek in Linear A)?[53] The argument that Linear A and B share the same script might be taken to imply the latter scenario,[54] and this could also be a better fit for the wider changes in social practices and in politico-economic organisation taking place around the same time. Furthermore, it is demonstrable that the earliest known phase of Linear B (attested primarily in the Room of the Chariot Tablets at Knossos) is closer to Linear A both palaeographically and on some points of usage than it is to

[51] He cites the ending in -o as reminiscent of the Greek o-stem declension, which ought not to exist in Minoan: Consani 2021, 17.
[52] See especially Heubeck 1982 for this perspective.
[53] Cf. Tomas 2017a, 59.
[54] *E.g.* Salgarella 2020, 369: 'one and the very same script', with a 'soft' adaptation from one to the other.

the later Linear B.[55] At the same time, however, it is evident that Linear B already had well-established orthographic rules by this point, suggesting some sort of training was in place;[56] training in the writing system (which is surely necessary to account for the very high level of similarity in script use, orthography and many other aspects of writing across the Mycenaean world) also suggests awareness of the script repertoire and direct consciousness of its application to the Greek language. The administrative context of Mycenaean writing, inherited directly from Minoan writing practices, might also be argued to give the perfect setting for a conscious and deliberate design of Linear B orthography, since it was in the hands of presumably a small number of users and 'stakeholders'. With two competing views of the way in which Linear B arose out of Linear A, how do we decide which one fits the evidence better?

Theoretical approaches to the development of Greek alphabetic writing make a useful comparison. The Greek alphabets that are first attested in the 8th century BCE (alongside the closely related Phrygian alphabet now thought to be first attested in the 9th century BCE) featured the use of dedicated signs for vowel phonemes that had not existed in the Semitic consonantal alphabet from which they were derived, as already mentioned above. But how and when were they added? There are three main competing theories:

1. An original adapter or group of adapters took the Semitic consonantal alphabet, disregarded signs that were not useful for representing Greek phonology (*e.g. aleph* and *ayin*), and gave them new vocalic values (based on the position of their consonantal values) that suited Greek better.
2. Greek speakers heard some signs of Semitic alphabet as vowels, or as close in position to vowels, in their own phonemic repertoire.
3. A pre-existing practice of using consonant signs to also represent (long) vowels in some Semitic writing traditions (particularly Aramaic), a usage known by the term *matres lectionis*, was picked up and expanded by Greek speakers when adopting the alphabet.

It is hardly surprising that the Greek language (and indeed other Indo-European languages with similar phonological repertoires) needed to be able to write vowels separately: how else could words such as οὐ, ἥ or indeed Αἰαία be written, and how could frequently encountered initial vowels be specified, without dedicated vowel letters? The vowel letters are particularly significant because these are the only invention shared by all the regional alphabets: the first attested Greek alphabetic inscriptions do not belong to a single tradition but rather are spread across the Greek-speaking world in areas where regional alphabets had already or would go

[55] The continuation of sign variants across Linear A to early Linear B is especially telling, as it implies continued practice and perhaps even continuing personnel: Salgarella 2019.
[56] On the early Linear B of the Room of the Chariot Tablets, see Driessen 2000, and on its relationship with Linear A, see especially Salgarella 2019, 2020.

on to develop distinctive features,[57] meaning that we never see evidence of a single ancestor alphabet that later went on to diversify into the attested 'branches'. We may indeed question whether there ever was a single ancestor alphabet, or *Uralphabet* as the idea has often been labelled,[58] and a closer look at the vowel letters reveals some significant differences (such as the distribution of straight and crooked *iota*) that point towards at least two early traditions rather than a single, homogeneous one.[59] This makes some of the more extreme interpretations of monogenesis of a Greek alphabet look somewhat fanciful: for example, Powell imagines a Phoenician and a Greek speaker sitting down together, with the Phoenician speaker writing each sign and speaking its name and value aloud as they go, and the Greek speaker quickly making some changes to sign shape and value to accommodate their own language, before spreading the new invention on to others.[60] Indeed, the very idea of pinning down a date and location for the creation of the Greek alphabet, which has dominated the scholarly agenda for many years without any signs of broad agreement, arguably needs to be abandoned. As more recent research has shown, far more progress can be made by trying to understand the diversity of early attested Greek alphabetic writing.[61]

The case of the Greek alphabets shows quite clearly that theoretical models can impede our understanding as much as they can further it, particularly the very popular view that a single original Greek *Uralphabet* (for which we have no direct evidence) was created at a moment in time before undergoing a diversification process. While we do not have to postulate numerous independent borrowings in order to explain the pattern of regional alphabets, at the same time we can more plausibly account for what we do see (*i.e.* diversity) than what we don't (*i.e.* homogeneity). Indeed, the diversity of attested Greek alphabetic writing in the Archaic period makes the situation in Mycenaean Greece, where numerous regional centres over a similarly wide area employed strikingly homogeneous sets of writing practices, look rather odd; we are left to try to explain it either by positing an unusually homogeneous linguistic situation across such a wide area (which seems unlikely) or by looking towards the contexts of use of writing, where it may be that a particularly prestigious dialect came to be associated with effective administrative control, against a background where whatever diversity existed was not of great sociolinguistic significance for those involved. Nevertheless, it is perhaps understandable that this situation has again led many scholars to look for a place and moment of creation of Linear B, after which it would have been transmitted wholesale around the rest of the Mycenaean

[57] On which see Steele 2019a.
[58] See *e.g.* Wachter 1989, 2021.
[59] Elvira Astoreca 2021, 85–86.
[60] Powell 1991, 25–27, 42ff. Cf. also Wachter's scenario of an evening party (1989, 36–37).
[61] *E.g.* Elvira Astoreca 2021, 136–138, on the regional alphabets as independent writing systems or Luraghi 2010, 2021 on the importance of localised perceptions of ethnic divisions as alphabetic writing diversified (though he assumes an early stage of homogeneity).

Greek–speaking world. But we are in danger of overlooking some degree of complexity in the process of adaptation by thinking of it as a single event.

Salgarella has pointed out that the adaptation of Linear A to write Greek must have involved multiple levels ('palaeographical, structural, phonological, logographical, metrological', etc), and that at the palaeographical level we see not the borrowing of single standardised sign forms but the continuation of multiple variants of many of the signs.[62] This is an important point strongly borne out by the palaeographical evidence, and already shows that it was not a single set of sign forms that was initially borrowed to write Greek but rather a set of fluid practices (which almost certainly must have involved Linear A writers continuing administrative work as the language of administration switched to Greek). Consani, meanwhile, has seen the structural elements as the more important ones, not only the correspondence between phonemes and graphemes but also the orthographic principles by which they were applied to the languages.[63] The syllabographic repertoire must, however, be considered separately from the logographic repertoire, which clearly underwent some quite drastic changes in not only the range of signs themselves but also the basic operating principles of logography. It will be argued in the next chapter (Chapter 2: Exploring Logography) that logographic signs underwent a change of status, from a situation in Linear A where they played a role within broader syntactical structures, to one in Linear B where they were entirely removed from syntax and given separate slots within the document format. Further, Tomas pointed out that the development of the script system is a separate matter from the development of the administrative system, which seems to have different origins.[64]

Usage must be figured into the equation from several perspectives, for instance continuities and discontinuities in document types and sealing practices.[65] Linear A clay tablets are of the small, page-shaped type (*i.e.* oriented in portrait format), and while the basic shape of tablet was continued in Linear B writing, the size of page-shaped tablets generally increased, and seems to have depended largely on the amount of information being recorded; they also seem to have served different purposes, with no indication that information from other document types was redacted onto page-shaped tablets in Linear A, a phenomenon well attested in Linear B.[66] Meanwhile palmleaf-shaped tablets are a new invention under the Linear B writing tradition. Out of the range of sealing types employed under Linear A administration, only one has a strong continuation under Linear B (the two-hole hanging nodule) while most others are abandoned completely (other than a small number of noduli and some flat-based nodules, confined to the Room of the Chariot Tablets at Knossos). Even the apparent continuities here are not straightforward, as differences in their

[62] Salgarella 2019 (quotation from p. 61) and 2020 in more detail.
[63] Consani 2022.
[64] Tomas 2017a, 60. Similarly Bennet 2005, 270.
[65] See Tomas 2003, 2008, 2011, 2012, 2017b.
[66] See *e.g.* Schoep 2001.

material properties and features of their usage have led to different terminology being used for the Linear B sealing types.[67] Tomas has suggested that some of the document types prevalent under Linear B administration do not stem from the latest attested phases of Linear A but rather from earlier attested practices, in particular from some that are, as far as we know, unique to Cretan Hieroglyphic accounting.[68] The obvious chronological problem with this theory (which she fully acknowledges) might be assuaged if we consider that the surviving archaeological record may not have preserved ongoing practices at some Cretan sites and that at Knossos we do not have surviving contexts from the period immediately before the development of Linear B administration. This gap in evidence makes it far harder to argue for particular details of administrative change, because we are forced to extrapolate from the much more varied usage of Linear A attested across other sites in the LM IB period, and from there to guess at exactly what the emergent Linear B practices in the Room of the Chariot Tablets might have been working from and building on.[69]

The implication that a writing system can develop independently from the contexts of its use needs to be interrogated in more detail. While the nature of the evidence we have seen does seem to point to a disjunct between graphic and administrative changes, it becomes difficult to construct a plausible historical situation around such a hypothesis. Would the same people who first took Linear A and used or adapted it to write Greek have taken their inspiration for what they were writing on from a completely different direction? It is perhaps helpful to think in terms of different rates or types of change, since a full picture of what Linear B writing looks like only emerges at quite some time after the initial period of adaptation. To a considerable extent our reconstructions will inevitably rely on speculation, but one particular deposit may help us to bridge the gap: the Room of the Chariot Tablets at Knossos. It has been seen as a special case, whose apparent chronological isolation as the earliest surviving Linear B archive may be able to help us reconstruct a step between Linear A and the Linear B of later destruction horizons.[70] From a graphic and linguistic perspective, it looks as though it may preserve early developments that were later abandoned at Knossos but continued at mainland sites. For instance, the $a_2$ sign is used to represent an initial aspirate only in the Room of the Chariot Tablets at Knossos, whereas outside of this room it appears only in the textile term *pa-we-*$a_2$ in the North Entrance Passage (also argued to be earlier than the main destruction at Knossos although not as early as the Room of the Chariot Tablets) and in the word for a deity, probably Hermes, *e-ma-*$a_2$ (and *e-ma-*$a_2$*-o*); on the mainland its use is more prevalent, although still optional. This could suggest that the $a_2$ sign was used in early Linear B

[67] See Hallager 2005, 252–258.
[68] Tomas 2012, 2017a.
[69] On the evidence for what was emerging in the LM II period and how it related to later material, see recently Driessen and Mouthuy 2022; Whitelaw 2022.
[70] See Driessen 2000. Also widely used in Salgarella 2020 as a basis for interpreting palaeographic and systemic changes, and in the phylogenetic palaeographic analyses of Firth and Skelton 2016.

at Knossos and that over time its usage was abandoned, perhaps because of psilosis in the local dialect (remaining only in the occasional conservative spelling), as argued by Nosch, in turn implying that its usage was transmitted to the mainland at an early stage.[71] A linguistic example could be the usage of the case form *-pi* (linked with later Greek -φι, particularly prevalent in Homer), which seems to have been used with dative-locative force with toponyms, whereas in the rest of the Knossian archives it had a primarily instrumental function. On the mainland, the dative-locative *-pi* with toponyms is well attested.[72] This could suggest an innovative usage again transmitted to the mainland (or shared with the mainland) at an early stage, whereas at Knossos its usage was restricted over time.

In document type, too, the Room of the Chariot Tablets presents some features that set it apart not only from later Linear B, but also from Linear A. Here we see the first attested palmleaf tablets, but there are also a number of tablets whose shape, size and typology do not quite fit the pattern established in later archives, sitting somewhere between the palmleaf and the page-shaped tablet in both shape and function. Palmleaf-type documents could be cut into smaller segments in order to re-arrange information (known as simili joins[73]), which might recall cutting practices attested in Linear A and perhaps the use of long dividing lines in Cretan Hieroglyphic documents.[74] This area also attests the last known uses of flat-based nodules, the same type as are known to have sealed parchment documents in the Linear A tradition, although their typology is not an exact match.[75] Perhaps these oddities point towards a period in which there was a lack of standardisation and a high degree of experimentation.[76] But another way of looking at the evidence might be to see an administrative system that operated according to changing rules over time, and that may have involved changing personnel and perhaps a changing sociolinguistic situation too. It may be that the usage of the syllabographic repertoire was established at an early stage and needed little refinement, while other aspects of administrative practice went through phases of successive changes or improvements, as they may have been perceived by their users. The logographic repertoire of the Room of the Chariot Tablets looks in-keeping with later Linear B usage, except in a few minor details of sign shapes, suggesting that the reanalysis of logography had already taken place (see further Chapter 2: Exploring Logography); but some differences in the way measurement signs were used, including the almost exclusive use of Q and a dotted variant of M, could point towards some aspects of administrative practice being abandoned at this stage or updated later on.

[71] See Nosch 2022. Note that Linear A does not preserve any correspondence for the $a_2$ sign, and this sign could have been an invention of Linear B.
[72] On the *-pi* case form, see Thompson 1998.
[73] Driessen 1987. See also Tomas 2013.
[74] See Schoep 2002, 77–78; Tomas 2003, 223.
[75] Hallager 2005, 252.
[76] See Salgarella 2020, 187–190.

This rather complicates the question of what was transmitted to the mainland and when, since it does not look as though what we see in the Room of the Chariot Tablets was transmitted wholesale. In particular there are some features of document typology that do not seem to have featured in mainland usage. This may make it difficult to argue for early features present in the Room of the Chariot Tablets having been transmitted elsewhere but then being abandoned at Knossos while growing in popularity elsewhere. There could be various ways around this problem, however, such as placing the transmission slightly later than the Room of the Chariot Tablets or, indeed, abandoning the idea of a single transmission event. It could after all be that there was constant contact between Knossos and the mainland centres, and that practices were sometimes 'updated' through shared networks of communication and perhaps even movement of personnel from one place to another. The lack of early archival deposits from the mainland is another problem for trying to reconstruct the timeline on which, and the ways in which, Linear B writing was adopted across numerous mainland sites: most of the mainland archives date to the later part or the end of LH IIIB (towards the end of the 13th century BCE, probably post-dating the main archive at Knossos by at least 100 years and the initial development of Linear B by perhaps some 200 years), with very few finds in between (for instance the archives at Ayios Vasileios, mid-LH IIIB and so mid-13th century BCE,[77] a small group of tablets from Pylos, apparently LH IIIA 2[78] and another from the Petsas House at Mycenae from a reasonably secure LH IIIA 2 context[79]).

Looking at the broader context of the administrative changes that occur in the Linear A to Linear B interface, the large-scale changes in the socio-economic landscape must be of considerable importance. Significantly, there was a move away from multiple smaller regional administrative complexes across Crete to a more centralised, island-wide system operating out of Knossos (from a poly-palatial to a mono-palatial society in Driessen's words[80]), which seems to have developed its control over other parts of the island over time.[81] This change looks from our perspective as though it must have taken place at the same time as there was a language shift in administration from Minoan to Greek. Old-fashioned views of the aggressive arrival of Greek-speaking invaders in Crete have, however, begun to give way to a more nuanced understanding of internal social changes that may have given rise to the adoption of the Greek language, particularly in the context of elites trying to reframe and reinforce their power base with reference to mainland practices.[82] This has implications for our understanding of the phonological or phonographic aspects of adaptation too,

[77] See Aravantinos and Vasilogamvrou 2012; Vasilogamvrou, Kardamaki and Karadimas 2022.
[78] See Melena 2000–01, 366–368; Skelton 2010; Vitale, Stocker and Davis 2022.
[79] See Shelton 2002–03.
[80] Driessen 2000, 220.
[81] See Bennet 1985, 1990, 2011, 148–151; Driessen 2001.
[82] See *e.g.* Preston 1999; Driessen and Langohr 2007, 181–187; Bennet 2008, 20; Galanakis, Tsitsa and Günkel-Maschek 2017; Galanakis 2022.

since we may be looking not at one language group borrowing writing from another language group, and thus operating across a language barrier, but rather at a situation in which people literate in a pre-existing writing system were acquiring expertise in the new language while also thinking about how to write it down – or at least this might have been the case for some individuals involved in these processes.[83] There was a sociolinguistically motivated choice here of the language variety to be used in writing, whereby, we can assume, some prestige was attached to the Mycenaean dialect of Greek, such that making a decisive switch to its use at least in the practice of bureaucracy (and who knows how widely outside of this sphere?) made sense as a strategy employed in elite behaviour and control of resources.

The perceived need for writing, as it appears from looking towards the Linear B evidence, must have been largely administrative, and so it makes sense also to think of the adoption of writing for Greek as taking place within an administrative milieu. However, given the existence of a small number of very late non-administrative Linear A inscriptions (of which at least one could easily be interpreted as Linear B in terms of sign shapes),[84] it might be that the move towards restricting writing to bureaucratic uses happened only gradually. It makes sense, for instance, that Linear A could have continued to be used in ritual practice for a short period while what we now call Linear B was emerging in administrative practice, before religious literacy began to disappear (see further Chapter 3: Exploring Vitality). Largely this must have depended on a number of ongoing changes in elite behaviour, social attitudes, economic control and religious practice whose overlap is very difficult to judge from the archaeological record, especially since they must have taken place within a relatively short period of time.

So where does this leave the question of the transition from Linear A to Linear B? Crucially we do not have to see the development of Greek writing in Linear B as one single process of change, but rather we can see it as a whole changing set of resources and practices – and likewise we do not have to give one single answer to the question of whether Linear B was a result of intelligent redesign or a slowly evolving entity. Theoretically one aspect could have changed suddenly, while others took longer to effect, and some may have been a result of deliberate design (such as how the writing system would be taught to new users), while others may have been an effect of changing attitudes (such as the, from our perspective sudden-looking, move away from socially visible writing in religious spaces). Whatever caused the rise in prestige of the Greek language, and the desire to use it in written administration, it makes sense that the existing Linear A tradition should have been borrowed and

[83] Cf. Driessen's musing on a language switch from Minoan to Greek taking place over one generation to another (2000, 161–164).

[84] The Poros figurine (LM IIIA1) is undoubtedly Linear A from a palaeographical perspective according to its editors (Dimopoulou, Olivier and Réthémiotakis 1993, 512), but an inscription in the Kephala tomb at Knossos (LM II) reading only *a-pi* could plausibly be Linear B as much as Linear A (and, as suggested by Bennet, could even be read in Greek as 'Go away!', a fitting text for a tomb perhaps: Bennet 2008, 20).

adapted to its use. Indeed, this has been observed to be a cross-linguistically common process, termed by Gnanadesikan as the 'native script effect', whereby a pre-existing writing system already in relatively local use will offer certain benefits (particularly to those already using it) for adaptation to a previously unwritten language.[85] There was a deliberate motivation behind the creation of what we call Linear B: in the words of Houston and Rojas, 'secondary scripts come into existence because people decide they need them, not vaguely, diffusely, neurally, or by pressing linguistic impulse, but because they fulfill a function'[86] – making it highly important that we look beyond the fine details of linguistic structure in order to take contextual factors into account.

Against this background, and following Salgarella in her assessment of the Linear A to B transition from palaeographic and structural perspectives,[87] seeing the early stages of Linear B as a developing Linear A orthography for writing Greek fits in well. Linear A did not die, though the writing of Minoan language in it did.[88] The degree of overlap in the syllabographic repertoire (and evidence for stability of values) strongly suggests that the majority of Linear A signs were perceived to be useful for representing the Greek language, and so were adopted with their original values intact, give or take small matters of phonological precision that are inevitable when applying the writing system of one language to the phonological repertoire of another. When we look at the core syllabary, we are viewing the situation from a Mycenaean Greek perspective, and focusing on the set of signs that formed the basis for the original orthography; the development of extra signs offering options for orthographic variation may have developed over time from a mixture of redeployed Linear A signs and newly invented ones.[89] As we will see in the next chapter, the developments in the logographic repertoire may have taken place alongside or subsequent to the initial orthographic development in the syllabographic signs, but they certainly involved a more radical degree of change.

[85] Gnanadesikan 2021.
[86] Houston and Rojas 2022, 266.
[87] Salgarella 2020.
[88] Following also Bennet 2008.
[89] See Judson 2017b.