The Clan of Zagi: Numeric Calculus or Genealogical Primer? A Structural Analysis of the Kristiansen Cuneiform Corpus

Inrik Ükskü la

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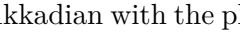
1 Introduction

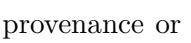
The corpus of texts written in the so-called Kristiansen glyph system has long posed a challenge to interpretation. The glyphs are clearly structured into recurring composite signs, and early analyses already recognised regularities in their internal composition and combinatorial behaviour. Subsequent work has explored two main directions. On the one hand, some studies have argued that the system primarily encodes a formal, possibly dozenal, arithmetic in which complex signs function as numerals and operators in a small calculus. On the other hand, more phonologically oriented approaches have sought to identify consonantal and vocalic patterns suggestive of a segmental writing system. The available material has been sparse, and many conclusions have necessarily remained tentative.

Against this background, the group of clay tablets examined in this article is of particular importance. These tablets bear recognisably sketched Kristiansen glyphs incised into the clay. Crucially, the signs are not typical wedge-shaped cuneiform; rather, they retain a more pictographic, linear appearance, closer in visual character to early archaic cuneiform or proto-cuneiform sign forms than to the canonical wedge impressions of later periods. The result is a hybrid material and graphic situation: Kristiansen glyphs, with their own internal structure, deployed in a medium and general layout associated with cuneiform tablets but without adopting the full wedge-based ductus.

The tablets are headed in Akkadian with the phrase  , conventionally read as *imri Zagi-ak*, "the clan of Zagi / Zagi's family", which explicitly frames the material in terms of a kin-group centred on an individual named Zagi. This combination of an external, linguistically intelligible heading with an internally coherent Kristiansen-text corpus provides an unusually rich context in which to revisit questions about the nature and uses of the system. The heading offers an anchor in a familiar onomastic and kinship vocabulary, while the internal Kristiansen text exhibits a high degree of formal regularity.

Within the Kristiansen text proper, several structural features stand out. Across four documents the tablets are dominated by two recurrent composite signs that func-

tion as pivots, organising sentences into definitional and equational templates. A small set of complex tokens behaves as a tightly constrained paradigm, combining with a distinguished UNIT sign in frames that differ only by the choice of one of four markers. Another composite, conventionally glossed AND_PLUS, appears as a restricted linker between a coefficient-like token and a small set of operator-like forms. The vocabulary as a whole is limited and heavily templated, and many sentences occur in near-reversal pairs that differ only in the ordering of components around the pivots. Taken together, these features point to a learned formalism with strong internal regularities.

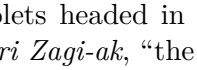
The central question addressed in this article is how to reconcile the formal and social dimensions of the Zagi corpus. One possibility, developed here as Hypothesis A, is that the tablets are primarily a didactic introduction to a small numeric or proto-algebraic calculus, broadly continuous with earlier "dozenal" readings of other Kristiansen inscriptions, and that the heading  / *imri Zagi-ak* functions primarily as a marker of provenance or school affiliation. A second possibility, Hypothesis B, is that the tablets are a genealogical primer, explicitly concerned with the internal structure of the clan of Zagi, and that the formal apparatus serves to encode ordered child positions and branch relations within that clan. A third, hybrid view holds that these options are not mutually exclusive: the same formal numeric apparatus may be used to model and reason about kinship structure in a socially anchored context.

The aims of the present study are threefold. First, we provide a detailed description of the formal properties of the Zagi tablets, including their sentence templates, pivot signs, restricted paradigms, and near-reversal patterns. Second, we develop and articulate the two main interpretive hypotheses—numeric calculus and genealogical primer—showing how each maps the same distributional facts to a coherent semantic model. Third, we evaluate these hypotheses comparatively, taking into account not only the internal structure of the Zagi corpus but also its relationship to other Kristiansen texts and to the external evidence supplied by the heading.

The remainder of the article is organised as follows. Section 2 describes the corpus, encoding conventions, and methodological approach. Section 3 sets out the global structural properties of the tablets. Sections 4–6 develop the numeric and genealogical hypotheses in detail. Section 7 compares the two models along several dimensions, and Section 8 discusses the possibility of a hybrid interpretation that integrates formal and social perspectives. Section 9 concludes with a summary of the main findings and an outline of directions for future research.

2 Corpus, Encoding, and Methods

2.1 The Zagi Tablets and Their Transcription

The corpus analysed in this study consists of the Kristiansen-text portion of a small group of clay tablets headed in Akkadian with the phrase  , conventionally read as *imri Zagi-ak*, "the clan of Zagi / Zagi's family". The tablets carry recognisably sketched Kristiansen glyphs incised into the clay. Although they share the medium

and general layout of cuneiform tablets, the signs themselves retain a more pictographic, linear appearance, closer to early archaic or proto-cuneiform sign forms than to canonical wedge impressions.

For the purposes of this article, the analysis is based on a machine-readable transcription of the Kristiansen text. In this working transcription, the text is segmented into 104 sentences, each associated with a unique identifier of the form `F#_##` (for example, `F1_01`, `F3_75`, `F4_100`). The sentences are grouped into four internal "documents" corresponding to coherent blocks of text on the tablets:

- Document 1: 27 sentences,
- Document 2: 16 sentences,
- Document 3: 39 sentences,
- Document 4: 22 sentences.

The 104 sentences together contain 552 token instances, representing 46 distinct token-types (composite signs), with an average sentence length of approximately 5.3 tokens. These figures reflect the highly formulaic character of the corpus: a small inventory of signs is combined in a limited number of recurrent patterns.

The present study does not address issues of sign identification on the physical tablets themselves, nor the palaeography of the sketched glyphs beyond the general observations made in Section 1. It takes as its starting point the existing transliteration into Kristiansen codes and focuses on the internal structure and distributional behaviour of those codes in the corpus.

2.2 Tokenisation and Coding Conventions

In the working transcription, each distinct composite sign is represented by a code of the general form

`Cxx-Myy-Szz-...`

for example, `C01-M03-S01-C02` or `B03-T02-B05-L01`. These codes reflect an established convention in Kristiansen studies for decomposing and classifying glyphs; however, in this article they are treated as *atomic* units. No attempt is made to segment the signs further into phonological or semantic subcomponents, and all analysis proceeds at the level of whole-token sequences.

Sentence tokenisation follows the boundaries defined in the existing dataset. Each sentence is stored as an ordered list of token codes, corresponding to a line or clause-like unit on the tablets. In addition to the token sequence and identifier, each sentence record includes:

- a document index (1–4), linking it to one of the four internal groupings;
- where applicable, a reference to a partner sentence and a label for the type of pairing (for example, `near_reversal_2_diff`).

The latter information is used to identify and analyse near-reversal pairs, that is, pairs of sentences that share the same multiset of tokens but differ in order or in a small number of positions. These pre-annotated pairings provide an independent signal of structural symmetry in the corpus and are complemented by automated checks.

Throughout the article, token codes are given in `typewriter` font when cited in full. For certain high-frequency items that play a central structural role, conventional descriptive labels are used for expository convenience: for example, UNIT for `C01-M03-S01-C02`, DEF_PIVOT for `C03-M03-T02`, EQ_PIVOT for `C03-M03-L01`, and AND_PLUS for `A02-L01`. These labels are intended as neutral shorthand and do not in themselves presuppose a particular semantic interpretation.

2.3 Quantitative and Structural Methods

The analysis combines simple quantitative measures with more targeted structural diagnostics.

First, basic corpus statistics were compiled from the sentence-level tokenisation: counts of sentences, tokens, and token-types; sentence-length distributions; and token frequencies overall and by document. These measures provide a baseline characterisation of the corpus as lexically restricted and structurally repetitive.

Second, bigram and trigram frequency tables were constructed over the token sequences. High-frequency bigrams and trigrams were inspected to identify strongly associated token pairs and clusters, especially those that recur across different sentence positions and documents. Particular attention was paid to tokens that occur in a wide range of contexts but with stable local patterns, as these are good candidates for structural "pivots".

Third, on the basis of these collocational profiles, candidate pivot tokens and sentence templates were extracted. The file of pivot templates used in this study enumerates frames of the form

$$X \texttt{ C03-M03-L01 } Y, \quad X \texttt{ C03-M03-L01 } Y \texttt{ C06-S01 } Z,$$

and analogous patterns for `C03-M03-T02` and `C06-S01`, together with the distribution of observed fillers in the X, Y, and Z positions. This provides a compact representation of the main structural skeletons of the corpus and allows the role of individual tokens within those skeletons to be assessed.

Fourth, the pre-annotated near-reversal pairs were examined in combination with frequency and template data. For each pair, the degree of token overlap and the nature of the differences in order or composition were recorded. This helps to distinguish truly symmetric transformations (where the same multiset of tokens is rearranged around a pivot) from pairs that involve slight variation in the choice of operator or argument tokens.

Finally, the Kristiansen token sequences were compared with an external dictionary that proposes tentative semantic values for a subset of complex signs, notably those corresponding to small numerals, a base unit, and several operator-like items. These

dictionary assignments are not assumed to be correct a priori; rather, they are treated as hypotheses to be tested against the distributional evidence of the Zagi corpus. Sections 4–7 present the results of this testing in the form of competing, but structurally grounded, interpretations of the system.

3 Global Structure of the Zagi Corpus

3.1 Basic Corpus Statistics

The Zagi corpus, as defined in Section 2, consists of 104 sentences distributed over four documents (27, 16, 39, and 22 sentences respectively). In total, these sentences contain 552 token instances representing 46 distinct token-types. The average sentence length is therefore slightly above five tokens, with a relatively narrow spread: most sentences are short, and longer sequences are rare.

The type–token ratio is correspondingly low. A small group of high-frequency tokens accounts for the majority of occurrences, while the long tail of rare tokens is very modest. Among the most frequent items are the two pivot signs `C03-M03-L01` and `C03-M03-T02`, the connector `C06-S01`, the token identified as UNIT (`C01-M03-S01-C02`), and a handful of operator-like composites that recur across documents. By contrast, many token-types occur only in one or two sentences.

These statistics characterise the corpus as lexically restricted and structurally repetitive. Rather than exploiting a large and varied vocabulary, the tablets repeatedly combine a limited inventory of signs in a small number of recurrent patterns. This profile is consistent with texts that are highly formulaic or didactic in nature.

3.2 Pivot Signs and Sentence Templates

Within this restricted vocabulary, certain tokens occupy clearly privileged structural positions. Most notably, `C03-M03-L01` and `C03-M03-T02` act as pivots around which sentence templates are organised.

The sign `C03-M03-L01`, referred to here as EQ_PIVOT, appears in the majority of sentences and typically occupies a central position between two expressions. A very common frame is

$$X \texttt{ C03-M03-L01 } Y,$$

where X and Y are composite tokens or short sequences of tokens. A related and slightly more complex template is

$$X \texttt{ C03-M03-L01 } Y \texttt{ C06-S01 } Z,$$

in which `C06-S01` follows `C03-M03-L01` and links an operator-like token Y to a further expression Z. In both cases, `C03-M03-L01` serves as a structural spine, separating a left-hand and a right-hand component and anchoring the overall sentence pattern.

The sign `C03-M03-T02`, referred to here as DEF_PIVOT, is less frequent overall but appears in a highly diagnostic environment. It occurs most characteristically in templates

of the form

$$X \texttt{ C03-M03-T02 } N \texttt{ C01-M03-S01-C02},$$

where N is one of the four markers conventionally glossed ONE, TWO, THREE, FOUR, and C01-M03-S01-C02 is the token labelled UNIT. Here C03-M03-T02 stands between a left-hand composite X and the sequence N+UNIT, and the overall template behaves as a definitional frame.

The connector C06-S01 also plays a notable structural role. It frequently follows C03-M03-L01 in the equational template just mentioned and less often appears in other medial positions. Its distribution suggests that it functions as a secondary structural hinge, mediating between an operator-like element and an ensuing expression.

Taken together, these observations motivate a view of the corpus in which sentences instantiate a small number of schematic frames, chiefly:

$$X \text{ EQ\_PIVOT } Y, \quad X \text{ EQ\_PIVOT } Y \texttt{ C06-S01 } Z, \quad X \text{ DEF\_PIVOT } N \text{ UNIT}.$$

Much of the variation in the corpus is then attributable to different choices of X, Y, Z, and N within these skeletons.

3.3 Near-Reversal Pairs and Symmetry

A further salient feature of the Zagi corpus is the presence of numerous *near-reversal* pairs: pairs of sentences that share (almost) the same set of tokens but differ in their order or in the grouping of components around the pivots. In many instances, both members of a pair contain EQ_PIVOT (and often C06-S01), with the roles of the surrounding expressions exchanged or rearranged.

For example, there are pairs in which a composite token A appears to the left of EQ_PIVOT in one sentence and to the right in another, with a corresponding exchange of position for a second composite B. In other cases, an operator-like token and its apparent argument are grouped differently around the sequence EQ_PIVOT + C06-S01. In both types of case, the two sentences are close enough in form that they can naturally be seen as different presentations of a single underlying relationship.

From a structural perspective, these near-reversal pairs indicate that the system not only asserts relations between expressions but also thematises the symmetry or transformability of those relations. The corpus does not merely state that a particular X is related to Y; it also records the converse or a structurally permuted variant. This pattern is compatible with both of the interpretive hypotheses pursued in later sections: it can be read as illustrating identities and alternative factorizations in a formal calculus, or as encoding redundant kinship formulas (for example, parent/child and child/parent statements) in a genealogical register.

3.4 Tablet-Level Profiles

Although the same basic inventory of tokens and templates is deployed across all four documents, there are clear differences in emphasis and composition between them.

Documents 1 and 2 are dominated by equational frames built around EQ_PIVOT and C06-S01, with a relatively wide variety of composite tokens filling the X, Y, and Z slots. In these documents, the numerals ONE–FOUR and the UNIT token are absent or marginal. The overall impression is of a set of identities or correspondences among composite expressions, expressed in a stable but numerically unmarked register.

Documents 3 and 4, by contrast, make intensive use of DEF_PIVOT, the UNIT token, and the paradigm ONE–FOUR. The definitional template

$$X \text{ DEF\_PIVOT } N \text{ UNIT}$$

is characteristic of Document 3 for $N \in \{\text{TWO}, \text{THREE}\}$ and is extended in Document 4 to $N = \text{FOUR}$. In both documents, these definitional sentences are complemented by equational sentences of the form

$$\text{UNIT } N \text{ EQ\_PIVOT } Y,$$

which relate the N-fold UNIT quantity to further composite expressions. Documents 3 and 4 thus add an explicit small-number layer to the equational machinery already present in Documents 1 and 2.

The distribution of templates and token-types across the four documents therefore suggests a progression. The first two documents focus on establishing and varying patterns of equivalence among composite expressions. The latter two introduce and systematise a four-term paradigm that combines with UNIT and the pivots in strictly regulated ways. Any interpretation of the Zagi corpus must account for both these aspects: the shared formal backbone that runs through all four documents, and the concentration of explicit small-number material in the latter part of the corpus.

4 Numerals, UNIT, and AND_PLUS in the Zagi Corpus

This section describes the empirical behaviour of three tightly interconnected components of the Zagi corpus: the small numerals, the token labelled UNIT, and the operator-like token AND_PLUS. The discussion is descriptive and distributional; interpretive consequences for the numeric and genealogical readings are developed in Sections 5 and 6.

4.1 Inventory of Small Numerals and Related Tokens

The external dictionary used in this study assigns the following tentative values to a subset of composite signs that also occur in the Zagi material:

- C01-S03-C03-T03 → ONE,
- C02-M02-H01-M01-T01 → TWO,
- B01-M02-L02-A03-H02 → THREE,
- C05-M03-S02-C06-T02 → FOUR,

- A02-L01 → AND_PLUS.

The first four items form a paradigmatic series of small numerals, and AND_PLUS is treated in the dictionary as a compositional operator. Within the Zagi corpus, all four numerals are attested, but with a restricted and structured distribution.

Numerals are confined to the latter part of the corpus. They are absent from the purely equational material of the first two documents and appear only once UNIT and the two pivot signs (DEF_PIVOT and EQ_PIVOT) are already established. In the current dataset, ONE, TWO, and THREE cluster in the third document, where they combine with UNIT in several definitional and equational sentences, while the numeral FOUR is restricted to the fourth document, where it participates in patterns closely parallel to those of the smaller numerals.

The token AND_PLUS (A02-L01) is present in the earlier documents and continues to occur in the third, but is notably absent from the fourth document. Its behaviour therefore contrasts with that of FOUR: AND_PLUS is characteristic of the pre-FOUR material, whereas FOUR appears only in the final stage of the corpus.

4.2 The UNIT Token and Its Environments

The token C01-M03-S01-C02 plays a structurally central role in the latter part of the corpus. It is referred to here as UNIT for convenience. Two aspects of its distribution are particularly salient.

First, UNIT is confined to the numerically marked documents. It does not appear in the equational material that dominates the first two documents, and becomes frequent only once the small numerals are introduced. This late emergence suggests that UNIT belongs to a specialised subsystem that builds on the more general equational machinery already in place.

Second, whenever UNIT appears, it does so in highly constrained local environments. Almost all instances occur in one of two pivot-centred frames:

- A *definitional frame* of the form

  $$X \texttt{ C03-M03-T02 } N \texttt{ C01-M03-S01-C02},$$

  where X is a composite token, C03-M03-T02 is DEF_PIVOT, N is one of the small numerals, and C01-M03-S01-C02 is UNIT. In the corpus this pattern is instantiated with $N =$ TWO and $N =$ THREE in the third document, and with $N =$ FOUR in the fourth document, where a single sentence matches this shape with FOUR in the numeral slot.

- An *equational frame* of the form

  $$\texttt{C01-M03-S01-C02 } N \texttt{ C03-M03-L01 } Y,$$

  where N is again one of the small numerals, C03-M03-L01 is EQ_PIVOT, and Y is a composite token or short sequence. In the corpus this frame appears with $N =$

ONE, TWO, and THREE in the third document, and in a small, tightly structured series in the fourth document in which each of ONE, TWO, THREE, and FOUR occurs once in the N slot with a distinct Y.

There are no clear counterexamples to these patterns. UNIT does not occur in positions that would suggest a more general adjectival or nominal modifier and is never separated from the numeral by intervening tokens within these frames. Its behaviour is therefore closely tied both to the small-number series and to the two pivot signs.

4.3 AND_PLUS as a Restricted Compositional Linker

The token `A02-L01` (AND_PLUS) occupies a structurally distinct role. It occurs predominantly in the first three documents and is absent from the fourth. Across the corpus, its collocational behaviour is highly restricted.

In the first document, AND_PLUS appears in trigrams of the general form

$$X \texttt{ A02-L01 } O,$$

where X belongs to a small set of composite tokens and O is one of a few operator-like forms (for example, `C05-C02-T02-M03-T03`). These trigrams do not involve UNIT or the small numerals and do not occur within the definitional or equational frames described above.

In the second and third documents, AND_PLUS continues to behave as a linker between specific composites and operator-like tokens. A particularly characteristic configuration is

$$\texttt{C02-S01-M03-S01 A02-L01 } O,$$

with O drawn from a very small set, notably `C05-C02-T02-M03-T03` and `C06-S01-C02-S01-C01-T02`. Even where UNIT and numerals are present elsewhere in the same document, AND_PLUS does not directly combine with them. Instead, it remains confined to a narrow set of non-numeric composites and appears to mark a kind of compositional or coordinative relation between them.

The absence of AND_PLUS from the fourth document, which otherwise elaborates the small-number subsystem by adding FOUR and constructing a complete series of UNIT + numeral equations, is therefore non-trivial. Whatever semantic value AND_PLUS may have, it belongs to the general equational and compositional repertoire of the Zagi texts rather than to the specific subsystem in which UNIT and ONE–FOUR interact.

4.4 Interim Summary

Three distributional observations follow from this survey.

First, the numerals ONE–FOUR form a structurally coherent series. ONE, TWO, and THREE are already integrated into the definitional and equational machinery of the third document; the fourth document then extends this system to FOUR, both by introducing a definitional sentence with FOUR and UNIT and by constructing a short equational series in which UNIT combines with each numeral in parallel frames.

Second, UNIT is functionally inseparable from this small-number series. It is confined to the numerically marked documents, and within those documents it appears almost exclusively in the two pivot-centred frames that bind it to the numerals. Any interpretation of the Zagi corpus must therefore account for UNIT and ONE–FOUR together.

Third, AND_PLUS occupies a distinct and more restricted role. It occurs only in the pre-FOUR part of the corpus and only in carefully delimited trigrams linking specific composites and operator-like tokens. It does not interact directly with the numerals or with UNIT. In subsequent sections, this contrast between the small-number/UNIT subsystem and the broader compositional repertoire marked by AND_PLUS will be central to the numeric and genealogical interpretations.

5 Hypothesis A: Numeric / Proto-Algebraic Calculus

In this section we treat the Zagi tablets as instances of a formal numeric system, extending the "dozenal primer" interpretation previously developed for other Kristiansen inscriptions. The goal is not to exclude alternative readings, but to show that a compact and internally consistent numeric model can account for the main structural properties of the corpus.

5.1 Restating the Numeric Model

The numeric hypothesis assumes that a subset of complex Kristiansen tokens functions as numerals and operators within a small formal calculus. On the basis of prior work and the accompanying dictionary, the following items are relevant for the present corpus:

- `C01-S03-C03-T03` → ONE
- `C02-M02-H01-M01-T01` → TWO
- `B01-M02-L02-A03-H02` → THREE
- `C05-M03-S02-C06-T02` → FOUR
- `A02-L01` → AND_PLUS

Higher numerals and the lexical items corresponding to *dozen* and *gross* are part of the broader Kristiansen lexicon but do not occur in the Zagi tablets. The explicitly attested cardinals here are therefore ONE–FOUR, plus the operator-like AND_PLUS.

A further complex sign, `C01-M03-S01-C02`, plays a distinguished role in the corpus. It occurs predominantly in the immediate neighbourhood of the numerals ONE–FOUR and in fixed relation to particular pivot signs. We refer to this sign as UNIT, reflecting its behaviour as a base quantity.

Two additional signs function as structurally central pivots:

- `C03-M03-L01` → EQ_PIVOT

- C03-M03-T02 → DEF_PIVOT

EQ_PIVOT occupies a central position in a large majority of sentences and organises equational templates of the form "X is equal to Y". DEF_PIVOT appears more rarely and is closely associated with sequences involving a numeral (ONE–FOUR) followed by UNIT, in a position that is naturally interpreted as definitional.

Finally, the sign C06-S01 recurs immediately adjacent to operator-like clumps and to EQ_PIVOT, and behaves as a secondary connector between an operator and a result clause.

Under Hypothesis A, these elements are interpreted as follows:

- UNIT: a base quantity ("one unit"),
- ONE–FOUR: cardinals indicating 1–4 instances of UNIT,
- DEF_PIVOT: a definitional operator ("is defined as"),
- EQ_PIVOT: an equational operator ("is equal to", "corresponds to"),
- AND_PLUS: an additive or compositional linker,
- C06-S01: a clause-level connector mediating operator application.

The question is whether this constellation of roles is compatible with the observed sentence templates and distributional regularities in the Zagi corpus.

5.2 Numeric Explanation of the Core Templates

The Zagi tablets can be described in terms of a small number of highly recurrent frames. Under Hypothesis A, these frames instantiate simple algebraic schemata.

5.2.1 Equational Templates with EQ_PIVOT

The most frequent frame has the form

$$X \text{ EQ\_PIVOT } Y$$

where X and Y are drawn from a limited set of complex tokens. A slightly extended form is

$$X \text{ EQ\_PIVOT } Y \text{ C06-S01 } Z,$$

in which the cluster Y C06-S01 Z behaves as a right-hand-side expression. In many such cases Y is filled by a recurrent operator-like token (a composite that rarely appears in purely argument positions), whereas Z is filled by tokens that also appear as stand-alone arguments elsewhere.

Within the numeric model, these frames correspond to equational statements and operator applications:

- `X C03-M03-L01 Y` → "$X = Y$",
- `X C03-M03-L01 Y C06-S01 Z` → "X is equal to the result of applying operator Y to Z".

This reading is consistent with the general character of Documents 1 and 2, in which such formulas appear without overt numerals but exhibit a stable internal structure.

5.2.2 Definitional Templates with DEF_PIVOT, Numerals, and UNIT

The numerals ONE–FOUR appear in strongly constrained environments in Documents 3 and 4. The most characteristic patterns involve DEF_PIVOT and UNIT. For TWO, THREE, and FOUR, we observe frames of the type

$$X \text{ DEF\_PIVOT } N \text{ UNIT},$$

with $N \in \{\text{TWO}, \text{THREE}, \text{FOUR}\}$, and X drawn from a small, recurrent set of complex tokens. For ONE, a closely associated pattern with EQ_PIVOT is attested:

$$\text{UNIT ONE EQ\_PIVOT } Y.$$

Within a numeric system, these can be read straightforwardly as:

- `X C03-M03-T02 TWO C01-M03-S01-C02` → "X is defined as 2 units",
- `X C03-M03-T02 THREE C01-M03-S01-C02` → "X is defined as 3 units",
- `X C03-M03-T02 FOUR C01-M03-S01-C02` → "X is defined as 4 units",
- `C01-M03-S01-C02 ONE C03-M03-L01 Y` → "1 unit is equal to Y".

The behaviour of UNIT is crucial here. It rarely appears outside these sequences and is almost always immediately preceded by a numeral and a pivot. Its distribution is therefore consistent with a dedicated base-quantity lexeme, rather than with an ordinary content word.

An additional regularity is that, for each $N \in \{\text{TWO}, \text{THREE}, \text{FOUR}\}$, the corpus contains both:

1. definitional sentences of the form `X C03-M03-T02 N C01-M03-S01-C02`, and
2. equational sentences of the form `C01-M03-S01-C02 N C03-M03-L01 Y`.

Taken together, such pairs express:

1. that a particular expression X is by definition an N-fold multiple of the base unit, and
2. that N units correspond, via EQ_PIVOT, to some other expression Y.

This two-step pattern—definition in terms of units, followed by an equation relating those units to another form—is precisely what one expects in a primer designed to teach the use of small numerals within a formal system.

5.2.3 Extension to FOUR and Series Structure

The inclusion of FOUR in the same templates reinforces the numeric interpretation. In Document 4, FOUR occurs both in definitional frames with DEF_PIVOT and UNIT, and in equational frames where C01-M03-S01-C02 FOUR C03-M03-L01 Y.

The result is a coherent series:

- for ONE: C01-M03-S01-C02 ONE C03-M03-L01 Y_1,
- for TWO: X_2 C03-M03-T02 TWO C01-M03-S01-C02 and C01-M03-S01-C02 TWO C03-M03-L01 Y_2,
- for THREE: X_3 C03-M03-T02 THREE C01-M03-S01-C02 and C01-M03-S01-C02 THREE C03-M03-L01 Y_3,
- for FOUR: X_4 C03-M03-T02 FOUR C01-M03-S01-C02 and C01-M03-S01-C02 FOUR C03-M03-L01 Y_4,

where the X_N and Y_N are drawn from the same small inventory of composite tokens already active in Documents 1–2. The fact that all four numerals participate in structurally parallel patterns strongly suggests that they are being used as members of a numeric paradigm, rather than as independent lexical items with idiosyncratic behaviour.

5.2.4 AND_PLUS and Composite Quantities

The operator AND_PLUS appears almost exclusively in trigrams linking a particular complex token to one of two operator-like forms. A typical pattern is

$$X \text{ AND\_PLUS } O,$$

where X is a recurrent coefficient-like expression and O is a composite sign that also appears in other operator slots, including right-hand positions in EQ_PIVOT templates. In numeric terms, this is naturally interpreted as a compositional structure "X and-plus O", analogous to adding a lower-order component to a higher-order operation (for example, combining a raw count with a "dozen-like" multiplier).

While the lexical *dozen* sign from the broader dictionary is absent from the Zagi corpus, the distribution of AND_PLUS with particular operator-like composites is consistent with the use of additive constructions over structured quantities.

5.3 The Tablets as Didactic Numeric Material

Under Hypothesis A, several global properties of the Zagi corpus fall into place if the tablets are understood as didactic material for a small numeric calculus.

First, the vocabulary is both limited and highly structured. A small number of tokens accounts for most of the running text, and many of these tokens occupy sharply circumscribed roles (UNIT near numerals and pivots, numerals near UNIT and pivots, AND_PLUS between a specific coefficient and a specific operator). This is characteristic

of controlled teaching texts, where learners are exposed systematically to a restricted set of forms and constructions.

Second, the division of labour between documents aligns well with a staged curriculum:

- Documents 1 and 2 present equational formulas built around EQ_PIVOT and `C06-S01` without overt numerals, familiarising the reader with identities and the behaviour of certain composite signs as operators and arguments.
- Document 3 introduces explicit numerals ONE–THREE and UNIT, and uses DEF_PIVOT to define particular expressions as 2 and 3 units, while using EQ_PIVOT to relate 1–3 units to other expressions.
- Document 4 extends this pattern to FOUR, completing a small but coherent 1–4 series and linking that series back into the network of composites already active in the earlier documents.

Third, the presence of near-reversal pairs, where two sentences share the same multiset of tokens but differ in order around the central pivots, is naturally explained if the tablets are intended to illustrate the symmetry and transformability of formal expressions (for example, the bidirectionality of equality, or alternative but equivalent ways of grouping operators and arguments).

Finally, the explicit small-number series ONE–FOUR, all tightly bound to UNIT and the two pivots, is precisely what one would expect in the early stages of a numeric primer. The corpus does not aim to cover a full number line or a full dozenal system; instead, it appears to instantiate a pattern ("N units are defined and equated in the following ways") for the first few values of N, using a fixed inventory of composite forms.

On this reading, the heading *imri Zagi-ak* is most plausibly taken as a label of provenance or school affiliation, i.e. "[property of] the clan of Zagi" rather than as a direct description of subject matter. The content of the tablets would then be a structured introduction to a formal numeric calculus used within that clan or scribal lineage. In Section 6, an alternative hypothesis is considered in which the same structures are interpreted genealogically, with ONE–FOUR encoding child positions and UNIT representing clan membership rather than an abstract quantity.

6 Hypothesis B: Genealogical Primer for the Clan of Zagi

In this section the Zagi tablets are interpreted as a *genealogical primer* for the clan named in the heading *imri Zagi-ak* ("the clan of Zagi"). On this view, the formal devices identified in Hypothesis A do not primarily encode abstract quantities, but rather encode ordered *kinship positions* and their occupants within a small, structured family model. The aim is to determine whether the same distributional facts and templates that support a numeric reading can also be reconciled with a didactic kinship interpretation.

6.1 Restating the Genealogical Model

Under Hypothesis B the key elements of the system are reinterpreted as follows:

- UNIT (`C01-M03-S01-C02`) denotes a generic member of the clan of Zagi, that is, an abstract *Zagi-descendant* rather than a specific individual.
- ONE, TWO, THREE, FOUR correspond to ordered *child positions* in the Zagi lineage: "first child", "second child", "third child", "fourth child".
- DEF_PIVOT (`C03-M03-T02`) expresses the assignment of a role or position, glossable as "occupies the N-th child role" or "is in the N-th position".
- EQ_PIVOT (`C03-M03-L01`) expresses identity between a role and a concrete bearer, glossable as "is (the person) Y".
- AND_PLUS (`A02-L01`) links clan branches or segments, combining line labels into composite genealogical entities.
- `C06-S01` functions as a connector between relational expressions, coordinating multi-step kinship relations.

The heading *imri Zagi-ak* then naturally reads as indicating that the tablets concern the internal structure of a specific kin-group. The central question is whether the observed patterns — in particular the layered definitional–equational structure and the disciplined behaviour of ONE–FOUR — can be coherently read in terms of role positions and person-identifications in such a clan.

6.2 Genealogical Explanations of the Core Templates

6.2.1 Definitional and Equational Layers as Role vs Identity

The corpus is dominated by two closely related templates involving DEF_PIVOT and EQ_PIVOT.

First, for TWO, THREE, and FOUR, there are numerous sentences of the form

$$X \text{ DEF\_PIVOT } N \text{ UNIT},$$

with $N \in \{\text{TWO}, \text{THREE}, \text{FOUR}\}$ and X selected from a small set of composite tokens. In a genealogical model, such sentences can be read as assigning a named *branch* or *sub-lineage* X to the N-th child position among the Zagi-descendants:

> "Branch X occupies the N-th child position in the clan."

Here UNIT does not denote a numeric unit but the type "member of the clan of Zagi": the phrase "N UNIT" expresses the N-th instantiation of that member-type.

Second, for all $N \in \{\text{ONE}, \text{TWO}, \text{THREE}, \text{FOUR}\}$, there are sentences in which

$$\text{UNIT } N \text{ EQ\_PIVOT } Y,$$

with Y a composite token behaving like a personal or branch name. These can be read as identifying the concrete bearer of the N-th child role:

> "The N-th Zagi-child is Y."

Taken together, definitional and equational sentences come in complementary pairs:

1. X DEF_PIVOT N UNIT (assignment of a child-role to a branch label X),
2. UNIT N EQ_PIVOT Y (identification of the N-th child with a particular entity Y).

The layered structure that appears as "definition versus equality" in the numeric reading thus has a natural genealogical counterpart: *role-assignment* (which branch or sub-lineage has the N-th position) versus *identity* (which specific composite token is said to be the N-th child).

6.2.2 Numerals ONE–FOUR as Ordered Child Positions

Within this model, the disciplined behaviour of ONE–FOUR is expected. The numerals never function as free modifiers of arbitrary expressions; they appear only:

- adjacent to UNIT in definitional frames with DEF_PIVOT, and
- adjacent to UNIT in equational frames with EQ_PIVOT.

This distribution is exactly what one would predict if the text is concerned with a *finite sibling set*, where:

- each child position (first, second, third, fourth) is associated with a line or branch within the clan, and
- each child position is redundantly identified with a named composite token.

For example, sentences of the schematic form

$$X \text{ DEF\_PIVOT TWO UNIT}$$

and

$$\text{UNIT TWO EQ\_PIVOT } Y$$

can be read together as:

> "Branch X has the second-child role among Zagi descendants; the second child of the Zagi clan is Y."

Analogous pairs exist for THREE and FOUR, and a closely related pattern associates ONE with the first Zagi child. The presence of a complete series of roles ONE–FOUR, all expressed in parallel forms, supports the view that the numerals are being used to encode *ordinal positions* in a fixed genealogical schema.

6.2.3 AND_PLUS and Branch Composition

The operator AND_PLUS can also be given a genealogical reading. As noted earlier, it appears predominantly in trigrams of the form

$$X \text{ AND\_PLUS } O,$$

where X is a recurrent composite token and O is one of a small set of operator-like forms that also occur adjacent to the pivots. In a numeric calculus this suggests additive combination of quantities. In a genealogical context it can be read as a compositional link between two *segments of the clan*:

> "Branch X together-with line O" or "the X and O segments of the clan considered as a unit."

Such combinations would be natural in a primer that wishes to illustrate not only individual child positions, but also how different lines or sub-lines of the clan can be grouped or related. The heavy restriction of AND_PLUS to a few specific X and O tokens then reflects the limited repertoire of branches that are considered relevant in this didactic context.

6.3 The Tablets as Kinship Pedagogy

When read genealogically, the four documents can be understood as a structured introduction to the internal organisation of the clan of Zagi, rather than as a general-purpose kinship register.

First, the overall *formulaic* character of the corpus is compatible with pedagogical intent. The vocabulary is restricted, and many tokens recur in fixed roles. Instead of a broad catalogue of individuals and relations, the tablets focus on a small, tightly controlled family model with exactly four child positions. This is more readily interpreted as a *didactic abstraction* of a clan structure than as an exhaustive record of membership.

Second, the division of material across documents admits a plausible pedagogical sequencing:

- Documents 1 and 2 introduce the core relational machinery centred on EQ_PIVOT and `C06-S01`, using a small set of composite tokens to illustrate symmetric correspondences and equivalences between expressions. At this stage, the focus is on patterns such as "X corresponds to Y" and the fact that certain relations can be reversed or transformed without loss.

- Document 3 introduces explicit child positions ONE–THREE and the abstract clan-member category UNIT. Using DEF_PIVOT and EQ_PIVOT, it assigns roles to branches and identifies the first three Zagi children with specific composites, thereby grounding the abstract relational patterns in a concrete kinship model.

- Document 4 extends this system to FOUR, completing the sibling set and further integrating the four child positions into the network of composites already employed in Documents 1 and 2.

Third, the numerous near-reversal pairs in the corpus are readily interpretable as *redundant kinship formulae*. Pairs of sentences that share the same multiset of tokens but differ in order around EQ_PIVOT and `C06-S01` can be seen as encoding symmetric statements such as:

> "X stands in relation R to Y; Y stands in relation R to X."

In genealogical terms, these might correspond to parallel formulations of parent–child, sibling, or branch equivalences: "X is the parent of Y; Y is the child of X", or, more abstractly, "branch A corresponds to branch B; branch B corresponds to branch A". A primer for scribes or clan members could reasonably expend effort on such redundancy in order to enforce a clear understanding of the symmetry and mutual entailment of kinship relations.

Finally, the presence of the heading *imri Zagi-ak* provides an explicit *social anchor* for this interpretation. The text is framed, not as an anonymous exercise, but as something belonging to or concerning a named clan. Within Hypothesis B, it is therefore natural to view the tablets as teaching or codifying the internal structure of that clan: who the primary child positions are, how they are related to particular branches or segments, and how equivalences between segments are to be understood and expressed in a formalised register.

In summary, the genealogical hypothesis offers a coherent re-interpretation of the same templates and distributions that support the numeric reading. Instead of formal quantities and operations, the system encodes child positions and branch relations within the clan of Zagi, using the same layered definitional–equational structure. The extent to which this model is preferable to, or compatible with, the numeric calculus interpretation depends on cross-corpus evidence and on how strongly one weighs the external heading against the internal formal regularities. These issues are addressed in Section 7.

7 Comparative Evaluation of the Two Hypotheses

The preceding sections have outlined two coherent, structurally informed interpretations of the Zagi tablets. Hypothesis A treats the corpus as a didactic introduction to a small numeric or proto-algebraic calculus. Hypothesis B treats it as a genealogical primer that encodes ordered child positions and branch relations within the clan referenced in the heading *imri Zagi-ak*. Both readings make use of the same formal observations: the existence of two pivots, the restricted distribution of ONE–FOUR in the vicinity of UNIT, the role of AND_PLUS, and the prevalence of near-reversal pairs. This section compares the two hypotheses along four dimensions: formal fit to the corpus, lexical expectations, cross-corpus consistency, and the interpretation of the heading.

7.1 Formal Fit to the Zagi Corpus

At the level of internal structure, both hypotheses provide plausible mappings from form to function.

Under Hypothesis A, the templates centred on DEF_PIVOT and EQ_PIVOT instantiate the familiar distinction between definitions and equations:

- X DEF_PIVOT N UNIT $\rightarrow$ "X is defined as N units",
- UNIT N EQ_PIVOT Y $\rightarrow$ "N units are equal to Y".

The series for $N \in \{\text{ONE}, \text{TWO}, \text{THREE}, \text{FOUR}\}$ then yields a small but systematic numeric paradigm. The role of AND_PLUS as a linker between a fixed coefficient-like token and operator-like composites is naturally read as an additive or compositional operation. Near-reversal pairs are interpreted as identity transformations or illustrations of symmetry in a formal calculus.

Under Hypothesis B, the same templates encode the distinction between role-assignment and identity within a finite sibling set:

- X DEF_PIVOT N UNIT $\rightarrow$ "branch X occupies the N-th child position",
- UNIT N EQ_PIVOT Y $\rightarrow$ "the N-th child is Y".

Here UNIT denotes the type "member of the clan of Zagi", and ONE–FOUR are understood as ordinal child positions rather than numeric quantities. AND_PLUS combines branch labels into composite clan segments. Near-reversals become redundant symmetric kinship statements (e.g. "X is related to Y; Y is related to X").

From a purely formal standpoint, both mappings are internally consistent. The same distributional facts support either (i) a very small numeric domain (1–4 units) or (ii) a small ordered set of child roles (first–fourth). In particular, the strongly constrained behaviour of ONE–FOUR and UNIT is compatible with both numeric quantities and kinship positions.

7.2 Lexical Expectations and Vocabulary Profile

A more discriminating comparison concerns lexical expectations. The Zagi corpus exhibits a strikingly small and repetitive vocabulary. Only a few dozen complex tokens appear, and many are tightly confined to specific syntactic slots (as pivots, numerals, UNIT, or operator-like composites).

The numeric hypothesis is well aligned with this profile. A didactic numeric text can be expected to employ:

- a limited inventory of operators and base expressions,
- a handful of small numerals,
- and a controlled set of templates that combine these elements.

The absence of tokens that clearly behave as free lexical items (with broad positional and combinatory freedom) is not problematic; on the contrary, it reinforces the impression of a specialised formal register.

The genealogical hypothesis, in contrast, might prima facie be expected to generate a richer and more varied lexicon of personal names and kin terms. A comprehensive clan register would typically involve many distinct names, descriptive titles, and relational markers. The Zagi corpus does not display such diversity. Instead, the same few composite tokens recur as both X and Y in the core templates.

This does not invalidate the genealogical reading, but it constrains it. The text cannot be a wide-ranging register of clan members and relations. It must instead be a highly abstracted and stylised representation of the clan, featuring a small number of privileged child positions and branches. On this view, the vocabulary profile becomes compatible with Hypothesis B only if the tablets are understood as a schematic pedagogical model rather than as a detailed genealogical record.

7.3 Cross-Corpus Consistency

A third axis of comparison involves cross-corpus behaviour. The dictionary used here is not derived from the Zagi tablets alone; it reflects earlier work on other Kristiansen inscriptions, most notably the "dozenal primer" type text written on a scapula. In those settings, the same complex tokens that appear in the Zagi corpus have been argued to function as numerals and operators in a numeric system.

The numeric hypothesis therefore enjoys an advantage of *continuity*: it can interpret the Zagi material using the same semantic assignments that have been proposed elsewhere. ONE–FOUR, AND_PLUS, and several composite operator-like tokens behave in the Zagi tablets in ways that are parallel to their behaviour in the scapula text, especially in terms of adjacency to pivots and participation in repeated frames.

The genealogical hypothesis, by contrast, requires a partial refunctioning of these tokens in the Zagi context. Forms that elsewhere appear to operate as small numerals must here be treated as child-position markers, and operator-like composites must be read as branch labels or clan segments rather than as numeric operations. This is not impossible, especially if the Kristiansen system is allowed to be polyfunctional, but it introduces additional complexity: the same sign sequences would then carry different semantic loads in different corpora.

At present, the limited size of the Zagi corpus makes it difficult to test cross-corpus consistency in a fully quantitative way. Nevertheless, the systematic alignment of ONE–FOUR and AND_PLUS with previously proposed numeric behaviour is a non-trivial point in favour of Hypothesis A. Hypothesis B can accommodate this by positing a genealogical specialisation of a generally numeric system, but this requires an additional layer of explanation.

7.4 The Role of the Heading *imri Zagi-ak*

The heading *imri Zagi-ak* (*"the clan of Zagi"*) is a key external datum. It explicitly introduces the notion of a clan or kin-group and names Zagi as the eponymous ancestor or focal person. Any interpretation of the tablets must account for this heading.

Hypothesis B takes the heading at near face value: the tablets are about the internal structure of the clan of Zagi. The definitional and equational templates, the child-position series ONE–FOUR, and the combinations effected by AND_PLUS are all interpreted as elaborations of this clan structure. On this view, the heading is not merely a colophon but a precise thematic label for the content.

Hypothesis A instead treats the heading primarily as a marker of provenance or ownership: the tablets belong to, or were produced by, a scribal school or household associated with the clan of Zagi. The content is then understood as a numeric primer used within this group, without necessarily encoding the clan's structure. This is a common pattern in many written traditions, where instructional texts are labelled by their owner, patron, or institutional affiliation rather than by topic.

Both readings are plausible. The balance between them depends on how strongly one privileges the external label over internal structure. Given the highly formal and abstract character of the Zagi corpus, the numeric hypothesis makes economical use of the internal evidence while relegating the heading to a social or institutional function. The genealogical hypothesis fully exploits the heading but must work harder to explain why a genuinely kinship-focused text would be so austere in its lexicon and so heavily templated.

7.5 Interim Assessment

In sum, the two hypotheses are comparably successful at mapping the internal formal structure of the Zagi tablets to coherent semantic domains. Hypothesis A offers a more straightforward alignment with cross-corpus numeric behaviour and with the restricted vocabulary profile. Hypothesis B gains support from the explicit clan heading and from the naturalness of treating ONE–FOUR as ordered positions in a finite sibling set.

At this stage, the available evidence does not allow for a categorical rejection of either model. The data are consistent with at least three possibilities:

1. a primarily numeric calculus text produced by the clan of Zagi (Hypothesis A in its pure form),

2. a genealogical primer expressed in a formalised register that resembles a numeric calculus (Hypothesis B in its pure form),

3. a hybrid, in which a numeric system is explicitly used to encode and reason about clan structure.

The last of these suggests that the opposition between "numeric" and "genealogical" may be partly artificial. Section 8 considers the implications of such a hybrid view and discusses how the Zagi corpus might illuminate a broader spectrum of uses for the

Kristiansen system, ranging from abstract calculation to socially embedded modelling of kinship.

8 Discussion: Towards a Hybrid Understanding

The comparative assessment in Section 7 suggests that the Zagi corpus is compatible with at least two coherent readings: a primarily numeric calculus (Hypothesis A) and a genealogical primer focused on the clan of Zagi (Hypothesis B). Both hypotheses are grounded in the same formal properties of the text and differ chiefly in the semantic domain to which those properties are mapped. This section argues that the opposition between these readings may be partly misleading and that a hybrid understanding—in which a formal numeric system is deployed to encode and reason about clan structure—offers a promising way forward.

8.1 Formal Calculus Embedded in a Social Context

The internal structure of the Zagi tablets strongly supports the existence of a formal calculus. Independent of any particular semantic assignment, the following features stand out:

- the presence of two distinct pivots (DEF_PIVOT and EQ_PIVOT) with sharply differentiated distributional roles;
- the existence of a small, clearly delimited paradigm of markers (ONE–FOUR) that systematically combine with UNIT and the pivots;
- the use of AND_PLUS as a highly constrained compositional linker between a coefficient-like token and operator-like composites;
- the prevalence of near-reversal pairs that differ only in the ordering of expressions around the pivots.

These properties point to a system in which a limited set of symbolic resources is manipulated according to stable patterns, in order to generate a family of related expressions. Such a system may be numeric in content, genealogical, or something else entirely, but in all cases it presupposes a *formal* layer: tokens must be recognisable as belonging to specific paradigms, relations must be capable of being inverted or recombined, and certain templates must be privileged.

The heading *imri Zagi-ak* adds an explicit social dimension to this picture. It situates the tablets within, or in relation to, a named clan. Even if the content of the tablets were primarily numeric, they would still be embedded in a particular social context: a clan, household, or school that makes use of the Kristiansen system for its own purposes. Conversely, if the content is primarily genealogical, then the choice to express it in such a formal and highly constrained register implies the existence of a sophisticated symbolic practice within that same social milieu.

A hybrid perspective therefore starts from the premise that the Zagi corpus reflects a formal calculus that is *socially situated*. The question is not whether the tablets are *about* numbers or *about* the clan, but rather how the clan of Zagi uses a formalised notation—possibly designed for numeric calculation—to model and transmit aspects of its own structure.

8.2 Does a Clan Primer Need to be Non-Numeric?

The genealogical hypothesis in its pure form treats ONE–FOUR as ordinal child positions rather than as numeric quantities. However, ordinal positions and cardinal numbers are closely related concepts. A system that employs numerals to refer to "first child", "second child", and so on is already numeric, in the sense that it relies on an ordered sequence of countable positions.

On this view, a genealogical primer does not need to be non-numeric; it can instead be an instance of *numeric reasoning applied to kinship*. The definitional and equational templates would then be understood as expressing facts such as:

- that a particular branch or line occupies the N-th child slot among Zagi descendants,
- that the N-th child slot is filled by a specific individual or sub-branch, and
- that composite segments of the clan can be represented as combinations of such numbered positions or branches.

This is particularly attractive in light of the series structure observed for ONE–FOUR. Rather than forcing a choice between "numeric" and "genealogical", it is possible to view the Zagi tablets as a medium in which numerical tools—units, small numerals, definitional and equational operators, and compositional linkers—are deployed to establish and explore the internal organisation of a kin-group.

Under such a hybrid interpretation, the following synthesis emerges:

- UNIT denotes an abstract instance of clan membership.
- ONE–FOUR denote both cardinal quantities of such instances and the ordinal positions associated with them in a sibling set.
- DEF_PIVOT carries the sense of "is defined as" or "occupies the role of" N units or N-th child.
- EQ_PIVOT expresses an identity or correspondence between the abstractly defined role and a specific composite expression, which may encode an individual, branch, or segment of the clan.
- AND_PLUS mediates combinations of branches in a way that mirrors additive combination of quantities.

The same formal apparatus that supports Hypothesis A thereby becomes a vehicle for implementing Hypothesis B: the clan of Zagi is being described in a language that is intrinsically quantitative and relational, even when the immediate subject matter is kinship rather than arithmetic. The Zagi tablets would thus exemplify a broader pattern in which numeric and genealogical thinking are intertwined rather than opposed.

8.3 Limitations and Open Questions

Adopting a hybrid perspective does not remove the need for further evidence; it merely reframes the interpretive problem. Several limitations of the current analysis should be emphasised.

First, the Zagi corpus is small and highly formulaic. The restricted vocabulary and heavy templating are consistent with didactic material, but they also limit the range of syntactic and semantic configurations that can be observed. Without additional texts of different genres—for example, narratives, contracts, or less constrained lists—it remains difficult to confirm whether the formal patterns seen here are specific to instructional contexts or characteristic of the Kristiansen system more generally.

Second, the mapping from formal patterns to semantics remains underdetermined by the Zagi data alone. Both the numeric and genealogical models, and their hybridisation, rely on inferential steps that draw on analogies with other writing traditions (for example, the use of numerals in kinship enumeration) and on prior proposals about the scapula and related inscriptions. A decisive test would require either:

- independent evidence about the values of specific tokens (for instance, from bilingual texts or from direct archaeological context), or
- a larger corpus in which the same tokens participate in a wider variety of frames, making their semantic roles more transparent.

Third, the relationship between the Zagi tablets and other Kristiansen texts is not yet fully characterised. The dictionary used in this study reflects earlier work on the scapula, but the degree of semantic stability across corpora is an open question. If certain complex signs can shift between numeric and genealogical meanings, or combine them, then a more nuanced account of semantic flexibility and polyfunctionality will be required.

Finally, the status of the heading *imri Zagi-ak* itself invites further investigation. Whether this phrase functions as a series title, a colophon, a topical heading, or some combination thereof has direct implications for the weight that should be placed on the genealogical reading. Comparative study of similar headings in other corpora, if available, would be particularly valuable.

Despite these limitations, the Zagi corpus already provides a rare glimpse into the intersection of formal symbolic practice and social identity in the Kristiansen tradition. The coexistence of a small, well-behaved numeric paradigm and an explicit clan label strongly suggests that any adequate interpretation must accommodate both dimensions.

Subsequent work will need to refine the hybrid model outlined here and to test it against an expanded body of evidence.

9 Conclusion

The Zagi tablets constitute a compact but remarkably rich corpus within the Kristiansen tradition. Their heading, *imri Zagi-ak* ("the clan of Zagi"), anchors them explicitly in a kin-based social context, while their internal structure exhibits the hallmarks of a formal calculus. Any satisfactory interpretation must do justice to both dimensions.

On the formal side, several robust features emerge. The tablets are dominated by two pivots, DEF_PIVOT and EQ_PIVOT, which organise a layered system of definitional and equational templates. A small paradigm of markers, ONE–FOUR, combines in a strictly regulated fashion with UNIT, producing series of sentences in which the same schematic frames are instantiated with different values of N. The operator AND_PLUS appears in a highly constrained set of trigrams linking a particular coefficient-like token to operator-like composites. The vocabulary is limited and heavily templated, and near-reversal pairs proliferate around the pivots. Taken together, these features strongly indicate a learned formalism rather than free-running prose.

Hypothesis A, the numeric or proto-algebraic reading, interprets these structures as the core of a small numeric calculus: UNIT as a base quantity, ONE–FOUR as cardinals 1–4, DEF_PIVOT as a definitional operator, EQ_PIVOT as an equational operator, and AND_PLUS as an additive linker. On this view, the tablets form a didactic progression from abstract identities (Documents 1–2) to explicit unit-based definitions and equations for 1–4 units (Documents 3–4). This hypothesis aligns well with the restricted vocabulary, with the internal series structure of the numerals, and with earlier proposals about the numeric behaviour of the same complex signs in the scapula and related inscriptions.

Hypothesis B, the genealogical reading, takes the heading at direct face value and treats the tablets as a schematic primer for the clan of Zagi. In this model, UNIT denotes an abstract clan member, ONE–FOUR encode ordered child positions, DEF_PIVOT assigns roles ("occupies the N-th child position"), and EQ_PIVOT identifies these roles with specific branches or individuals. AND_PLUS combines branches into composite clan segments. The same templates that support a numeric interpretation can thus be read as expressing carefully redundant kinship facts of the type "branch X is the second child; the second child is Y". In order to remain compatible with the austere vocabulary and high degree of templating, this hypothesis construes the tablets not as a full clan register, but as a stylised and didactic family model.

The analysis in this article suggests that the opposition between these hypotheses is, at least in part, artificial. The Zagi corpus can be plausibly understood as a formal system in which numeric tools are used to encode and reason about clan structure. Under such a hybrid interpretation, the numeric apparatus of units, small numerals, definitional and equational operators, and compositional linkers is applied to a social domain delineated by the heading *imri Zagi-ak*. The clan of Zagi is not merely the owner or patron of an abstract calculus, nor is it described in purely narrative genealogical

terms; rather, it is *modelled* in a symbolic language that is intrinsically quantitative and relational.

At the same time, the available evidence remains limited. The Zagi tablets are small, highly formulaic, and belong to a single genre. They do not, on their own, allow for a definitive resolution between the pure numeric, pure genealogical, and hybrid readings. Progress will depend on several types of further work: the identification and analysis of additional Kristiansen corpora (ideally including texts of other genres and with different headings), more detailed cross-corpus comparison of the behaviour of shared complex tokens, and, if possible, independent constraints on sign values from archaeological or bilingual contexts.

Nonetheless, the Zagi corpus already plays a crucial role in the study of the Kristiansen system. It provides the clearest internal evidence for a structured paradigm of small numerals operating in conjunction with a base unit, and it does so in a text that explicitly names a clan. This combination of formal regularity and social anchoring makes the Zagi tablets a key locus for understanding how abstract symbolic practices and concrete kin-groups interact in this tradition. Whether one emphasises their numeric, genealogical, or hybrid character, they demonstrate that the Kristiansen glyphs supported not only representation, but also disciplined reasoning within socially meaningful domains.