The writing culture of ancient Dadān: A description and quantitative analysis of linguistic variation
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Chapter 7 - A quantitative approach to variation

7.1 Introduction

Dadanitic contains many points of variation. Inscriptions may differ in how they were executed, their purpose, the location where they were left, and even the grammatical forms they contain (see Chapter 1 - Introduction). This chapter contains a quantitative study of the major points of variation within the inscriptions, concerning grammatical and stylistic features. The investigation will focus on the co-occurrence of two variables within the same inscription, to see if there are any variables that co-occur more, or less, often than expected. The underlying assumption is that if two variables co-occur significantly more often than would be expected purely by chance, that some relationship exists between the two. Two variants may consistently co-occur together, for example, because an inscription was produced in a certain period of time, when other variants were not in use, or because a specific topic goes together with certain expressions and grammatical forms. Two variables can also co-occur significantly fewer times than expected, which may indicate, for example, that one form replaced another, or was deemed inappropriate in certain types of inscriptions. A statistical analysis of the variation in the inscriptions will offer evidence for the kind of relationships that may exist between forms, and reveal concrete patterns of distribution of variation. This will help move the discussion of linguistic variation in the Dadanitic corpus beyond impressionistic observations about single varying features offered so far, such as by Sima (1999, 117) and Farès-Drappeau (2005, 65–66).

7.1.1 Methodology - Statistics

The significance of an association will be determined using the chi-square test (Pearson 1900). This test is designed to test whether there is a relationship between two categorical variables. For the chi-square test the expected values of each category are calculated based on the assumption that there was no relationship between the two categories that are compared. This assumption is called the null-hypothesis. The expected frequencies can be calculated using a contingency table, showing the attested frequencies per category. The example in Table 52 contains fictitious numbers and categories to clarify the basic principles.

Table 52 Contingency table comparing the co-occurrence of the variables gender and hat wearing

	Boy	Girl	Total
Hat	40	10	50
No hat	20	30	50
Total	60	40	100

Table 52 shows a group of 60 boys and 40 girls, of which 40 boys and 10 girls wear a hat, and 20 boys and 30 girls do not wear a hat. These numbers reflect the observed, or attested, frequencies. The expected frequencies can be calculated by multiplying each row total by their associated column total per cell and dividing it by the grand total.

Equation 1 Showing the formula to calculate expected frequencies in contingency table. (E_{ij} = expected frequency for ith row and jth column; T_j = total of the ith row; T_j = total of the jth column; N = grand total)

$$E_{ij} = \frac{T_i \times T_j}{N}$$

Following this equation the expected number of boys wearing hats, if there was no correlation between gender and hat wearing habits, would be:

(50*60)/100 = 30

The round numbers in the table help to visualize how the distribution of the expected frequency is calculated. If 50% of the whole population is wearing a hat and 50% is not, and we have 60 boys, we would expect to find that half the number of these boys (30) is wearing hats, all else being equal. So we are multiplying the number of hat wearers by the number of boys and dividing it by the grand total to get a proportion relative to the whole population. In doing this we find that more boys than expected are wearing hats in this case. Continuing this process for each cell in the table would give the expected results as shown in Table 53.

Table 53 Contingency table showing the expected frequencies of co-occurrence of gender and hat wearing

	Boys	Girls	Total
Hat	30	20	50
No hat	30	20	50
Total	60	40	100

The expected frequencies are then compared to the attested frequencies. Since we are looking at the difference between the expected and attested frequencies, an attestation of 1 or even 0 of a certain variable can still give a significant result, as long as the expected result is far enough removed from the attested numbers. If the difference between the expected and attested frequencies exceeds a certain threshold, dependent on the degrees of freedom[270] of the underlying contingency table, the result is found to be significant. A significant result, therefore, indicates that the null hypothesis is likely not true and the two variables are probably not independent from each other.

This can be summarized in the following formula:

Equation 2 Formula underlying the chi-square test

$$\chi_c^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

In this formula the subscript c stands for the degrees of freedom; the observed values (O) are the attested frequencies; E represents the expected frequencies (under the null hypothesis). Subtracting the

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[270] Degrees of freedom (df) are calculated by multiplying the number of rows of the table minus one by the number of columns minus one: $df = (r - 1)(c - 1)$.

observed values from the expected values gives us the difference or deviation of the attested numbers from our model in which we assume the two variables are independent. The difference between the observed and expected values are squared to ensure that positive and negative outcomes will not cancel each other out and leave us with an outcome of zero. Dividing this deviation from the model by the expected value gives us a ratio of just how much it deviated, which standardizes the result so it can be compared to the deviation of the other cells. The sigma sign indicates that the outcomes of this calculation for each data point need to be added up, which means that the outcome of the formula will indicate whether the relationship between the two categories in general is significant or not. It does not indicate which individual correlations are significant. In the case of gender and hats it will indicate whether gender can predict something about someone's hat wearing preferences, and not specifically whether boys are more likely to wear hats than girls. In simple 2x2 tables, like the one in the example, this may often be gleaned by looking at the expected and attested frequencies, but when the tables get bigger the relationships are not always obvious straight away (see below § 7.1.1.2 Standardized residuals for how this will be dealt with). If one were to do the calculations by hand there are tables in which the critical values per degrees of freedom of your contingency table are given. When the corresponding chi-square value from your calculations is bigger than the indicated cut-off value in the table, this indicates a significant relation between the variables compared. More commonly, and in what follows, the results are described by a *p* value.[271] If this value is below .05, the correlation is found to be significant. This value indicates that there is a 5% or smaller chance that there is no relationship between the two variables given the attested frequencies, or, in other words, a 5% or smaller chance that the null hypothesis is true.[272]

7.1.1.1 Correcting for smaller sample sizes

The chi-square test becomes less reliable when the expected frequencies are low (Dunning 1993). This is corrected for by using Fisher's exact test (Fisher 1922).[273] Fisher's exact test is typically used when one or more cells of the contingency table contain an expected value of less than five.[274] Almost all sets of variables compared here contain such low expected frequencies. For each comparison a table containing the results of the chi-square test will be given. These tables contain a footnote mentioning whether there were any cells with a lower expected frequency than five. If this is the case the *p* value of Fisher's exact test will be reported, otherwise the *p* value of the chi-square test will be given.

With each *p* value, the effect size will be reported using Cramér's V. This indicates the strength of association between the variables. Significant results with a very small effect size may not be very reliable, while non-significant results with a very high effect size indicate that there is a good chance that if more data were available they could turn out to be significant. Cramér's V gives an output between 0 and 1, with a result of 0 meaning that there is no association and a result of 1 meaning there is a perfect association between the groups compared. I will report values between 0-.3 as low effect size, .3-.75 as medium effect size and values higher than .75 as high or strong effect size.

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[271] The *p* value, or calculated probability, indicates in decimals the percentage of probability that the null hypothesis is true. The null hypothesis being that there is no relationship between the two variables compared.

[272] An excellent introduction to the chi-square test can be found in Field (2013, 721–23).

[273] Another commonly used alternative for the chi-square test in corpus linguistics is the log-likelihood test (McEnery and Hardie 2012, 51).

[274] The general principles behind Fisher's exact test are briefly discussed in Field (2013, 723–24).

7.1.1.2 Standardized residuals

The outcome of Fisher's exact test only says something about the general relationship between two variables. It does not indicate which of the categories of each variable caused a possible effect. Especially when a variable has more than two categories (as for example the categories genre and agreement, see § 7.1.2.2.2 Genre), it is not always clear from the expected and attested values which category caused the effect. The effect of individual categories will be assessed by looking at the standardized residuals of the contingency table. These essentially indicate the difference between the expected frequencies and the attested frequencies, for each possible combination of variables. So, to go back to our example from Table 53, instead of giving a general indication for the association between hat-wearing and gender, the standardized residuals will give you an indication of the association between boys and hats, boys and no hats, girls and hats, and girls and no hats. This outcome is then standardized by dividing them by an estimate of their standard deviation, so it becomes independent of the absolute number of occurrences and can be compared across different datasets. A number above 1.96 (or below -1.96) indicates a 5% or smaller chance that the two subcategories are not related.[275] A positive value indicates that two categories co-occur more often than expected if they had no relationship, while a negative value indicates that two categories co-occur less than expected if they had no relationship.

7.1.2 The data and methodology

The variables selected for comparison are grammatical variants, and stylistic variants that may say something about the register of the inscription: script style and genre. The previous chapters focused on describing the language of the Dadanitic writing tradition and the attested variation from the norm. In this chapter the consistently varying grammatical forms were taken as grammatical variables. They are the type of causative form (ʾ- or *h*-causative), the form of the I-*w* causative, the spelling of the geminate causative, the spelling of √RḌY, the spelling of *ẓ* and agreement type (see below § 7.1.2.1 Grammatical variants).

In Chapter 1 - Introduction the location of the inscription was also mentioned as a component to its interpretation. It was shown, however, that the location of an inscription is closely linked to the genre of the inscription. Therefore, adding location as a separate category would not have added much information, as it largely overlaps with genre and script style.

When comparing two variables they should co-occur in the same inscription, so when comparing causative type and √RḌY forms, the set may be smaller than the total set of attested causative forms, for example. So while there are 239 inscriptions containing a causative verb, and 256 with a form of the root √RḌY, there are only 198 in which both occur together and can be used to test any hypothesis about their co-occurrence. On top of that, any uncertain attestations were left out, to avoid skewing the results. For example, inscriptions lacking a clear photograph, or only having a copy available in the OCIANA database were excluded from the script type analysis. Also damaged inscriptions or inscriptions with unclear interpretation were left out. An example of this is JSLih 076.[276]

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[275] The standardized residuals give us a *z* score, based on a standard normal distribution. In a standard normal distribution with a mean of 0 and a standard deviation of 1, a score of 1.96 cuts off the top 2.5% of the curve. Since normal distributions are symmetrical -1.96 would cut off the bottom 2.5% of the bell curve, thus adding up to the same 5% general cut off point for significance. See Field (2013, 28–34 and 743–44) for a more elaborate explanation of *z* scores and the use of standardized residuals respectively.

[276] In the following paragraphs the make-up of each set of variables will be discussed in more detail.

JSLih 076   *ʾmtḥmd/bnt// ʿṣm/h-mt ʿt*
                   ' *ʾmtḥmd* daughter of *ʿṣm* protected/the protector'

First of all, it is unclear whether the final word of the inscription is a verb or a noun preceded by a definite article. Secondly, based on the content of the inscription, a personal name followed by a title or a single verb, it looks like a graffito. On the other hand, the inscription is executed in relief, which seems to contradict this interpretation. In summary, both the form of the verb and the genre of this inscription are uncertain, making any further hypothesis based on it too uncertain to include it in the analysis. This limits the dataset, but should not make observations about patterns in correlations invalid. As statistics is generally used to make predictions about a general population based on a sample, having a limited sample is therefore part of the expected process. As discussed above (§ 7.1.1 Methodology - Statistics), both the use of Fisher's exact test and the incorporation of Cramér's V in the discussion of the data, function as a control for the relatively small sample sizes. On top of this the contingency table, containing the attested and expected frequencies is supplied for every correlation that is discussed. This way it will always be clear what the actual distribution looks like.

7.1.2.1 Grammatical variants

7.1.2.1.1 Morphological variants

7.1.2.1.1.1 ʾ/h-causative
Dadanitic contains two forms of causative verbs, a *ʾ*-causative and a formally archaic *h*-causative (e.g. Sima 1999, 93; Farès-Drappeau 2005, 68–69) (see § 5.3.2 Causative). The *ʾ*-causative is the most commonly attested form of the two in Dadanitic (249 attestations as opposed to 17 *h*-causatives[277]).

Previous assertions that the variation in letter shapes in the corpus implied a diachronic dimension to the corpus (e.g. Caskel 1954, 21–34; Winnett and Reed 1970, 119; but cf. Macdonald 2015, 17–18) and the development of the causative forms in other Semitic languages, made it obvious to suggest that diachronic change is responsible for the variation in causative forms attested in Dadanitic (Sima 1999, 117). However, there are two inscriptions in which both causative forms co-occur (U 079 bis; AH 197). For comparison: there are 30 inscriptions in which two causative forms of the same type occur.[278] This shows that at least for some time during the production of the inscriptions, both forms were known at the oasis. Therefore we cannot rule out that the usage of one or the other was a choice made by the author instead of simply representing different stages in the language.

U 079 bis   *w----t/bld ʾ-//----l/hẓll/**h-ẓ//ll**//b-bṯ//r/b ʿd/n{ḥ}l-h w //dṯ ʾ-h/b- ḏ ʿmn //l-ḏġbt f rḍ-//hm //w ʾṯb-hm*
                 '… he performed the *ẓll* ceremony at *bṯr* on behalf of his palm trees and his crops of the season of the later rains at *ḏ ʿmn* for *ḏġbt* so may he favor them and reward them'

AH 197   *ḥggw/h-nq/w **hġnyw**/b-bt-hm/l- ----//tn/l- ḫrg/w-ʾẓlw/b-h-mṣd/ẓll/h-[nq]//l-ḏġbt*
                 'they performed the pilgrimage and dedicated (lit. made increase wealth?) at their temple for….. *tn* for *ḫrg* and they performed the *ẓll* of the [nq] for *ḏġbt*'

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[277] Based on the data in the OCIANA database February 2016.
[278] AH 072; AH 080; Nasif 1988: 99, pl. CLVIII; U 044; U 092; AH 065; AH 070; AH 071; AH 101; AH 141; U 020; U 021; U 024; U 025; U 059; U 070; U 075; U 093; U 108; AH 006; AH 109; AH 138; AH 239; Al-ʿUḏayb 009; JSLih 077; U 032; U 038; U 040; U 115; Al-Ḫuraybah 12.

Note that in U 079 bis the author starts with singular suffix pronouns and ends the inscription with plural suffix pronouns, which may suggest that he modeled the dedicatory part of the inscription (containing the *h*-causative) on a different example than the blessing formula (containing the ʾ-causative). In AH 197 it is interesting to note that the more common verb *ẓll* is written in the most common ʾ-causative form, while the so far unique verb *hġny* is written in the *h*-form. This might suggest that while the written conventions dictated the ʾ*ẓll* form, the spoken language of the author maintained a more archaic form of the causative.

Table 54 Attested forms of the causatives

Sigla of attested inscriptions	ʾ-stem	*h*-stem	Total
JSLih 054	ʾ*fq* (1)		1
U 005; U 037; U 035; U 026; U 004; U 031; AH 087.1; AH 015; Private collection 1	ʾ*fy* (9)		9
JSLih 177	ʾ*gy* (1)		1
U 038; U 049; AH 135; AH 157; AH 202; AH 201; AH 243; Nasif 1988: 99, pl. CLVII; JaL 155 d; U 115; U 071; U 043; U 040; U 032; U 095; U 088; U 082; AH 065; AH 109; AH 113; AH 138; AH 140; U 055.1; Al-ʿUḏayb 001; Al-ʿUḏayb 009; Al-ʿUḏayb 011; Al-ʿUḏayb 041; Al-ʿUḏayb 075; Al-ʿUḏayb 113; Al-ʿUḏayb 138; U 126; AH 006; AH 079; Al-ʿUḏayb 129; Al-ʿUḏayb 008	ʾ*gw* (35)		35
AH 221	ʾ*ġnm* (1)		1
AH 197		*hġny* (1)	1
JSLih 064	ʾ*ḥrm* (1)		1
AH 204	ʾ*rqw* (1)		1
JSLih 077	ʾ*rṭṭ*/ʾ*rḥṭ* (1)		1
JSLih 008; Müller, D.H. 1889: 68, no. 16	ʾ*ṣdq* (2)		2
Al-ḫuraybah 12		*hṯb* (1)	1
JSLih 075	ʾ*ṯ*ʿ (1)		1
JSLih 077; U 038; U 079bis; JaL 004; U 115; U 059; U 047; U 044; U 040; U 036; U 021; U 092; U 084; U 075; AH 006; AH 065; AH 070; AH 072; AH 080; AH 084; AH 099; AH 101; AH 125; AH 138; AH 141; AH 084.1; Al-ʿUḏayb 009; Al-ʿUḏayb 032; Al-ʿUḏayb 132; Al-ʿUḏayb 129; Al-ʿUḏayb 008	ʾ*ṯb* (31)		31

ʾdq: AH 222; JSLih 061; JSlih 063; Al-Saʿīd 1419/1999: 4-2, no. 1, side 1-2; AH 087; Private collection 2; Al-ḫuraybah 09 hdq JSLih 062; Al-Saʿī 1419/1999: 4-24, no. 1, side 1-2	ʾdq (7)	hdq (2)	9
AH 288; JSLih 049; al-Ḫuraybah 13; al-Ḫuraybah 14		hwdq (4)	4
Al-Ḫuraybah 12		hwḍʾ (1)	1
AH 239; AH 217; AH 226; AH 222; Al-Saʿīd 1420/1999: 3–14, no. 1	ʾqd (5)		5
ẓll e.g. AH 057; AH 163; AH 142; U 058. hẓll AH 023; AH 021; AH 038; AH 225; AH 011; U 079bis; AH 026	ẓll (116)	hẓll (8)	124
e.g. AH 064; U 125; U 016; AH 197; U 028	ẓl (41)		41
Total	233	17	270

7.1.2.1.1.2 I-w causative

The *h*-causative of I-*w* verbs is attested in two different forms: with the root-initial *w* represented, and without it. Note that there are no attestations of ʾ-causatives of I-*w* roots with the initial *w* represented (see § 4.5 Diphthongs).

Table 55 Attested forms of I-*w* causatives

	ʾ-causative	*h*-causative	Total
Without *w*	ʾdq (7)	hdq (2)	9
	ʾfy (9)		9
	ʾqd (5)		4
With *w*		hwdq (4)	4
		hwḍʾ (1)	1
Total	21	7	28

7.1.2.1.1.3 Geminate causative

There is only one geminate root attested as a causative verb: the very common *ẓll*. Besides variation in the type of causative, with a ʾ- or *h*- prefix, there is also variation in the representation of the geminate root consonant, which can be written just once or twice (see § 5.3.2.3.5 C2 = C3).

Table 56 Attested forms of the geminate causative

	’-causative	*h*-causative	Total
Without geminate	*ʾẓl* (41)		41
	ʾṭl (4)		4
With geminate	*ʾẓll* (106)	*hẓll* (10)	116
	ʾṭll (10)		10
Total	142	8	171

7.1.2.1.2 Phonological/orthographic variants

7.1.2.1.2.1 Spelling of RḌY

The verb *rḍy* 'he favored' is only attested with an enclitic pronominal pronoun. In this form, it is attested with the spelling *rḍy* and *rḍ*. Given the attestation of both the feminine forms *rḍyt* and *rḍt*, it seems that the difference in spelling represents a chronological development in the corpus. If this is correct, then the *rḍy* forms reflect an older form with the triphthong still intact, while the *rḍ* forms represent a more progressive spelling from after the collapse of word final triphthongs (for a complete discussion see 4.3.2.1 Verbs).

Table 57 Attested spellings of √RḌY

	Masculine	Feminine	Total
Defective spelling	*rḍ* (123)	*rḍt* (2)	125
Plene spelling	*rḍy* (29)	*rḍyt* (1)	30
Total	152	3	155

7.1.2.1.2.2 *ẓ/ṭ spelling*

There are some attestations of etymological *ẓ represented with *ṭ*. The OCIANA database identifies two examples of this spelling in the highly frequent root √ẒLL (AH 009.1 and U 048). Upon closer inspection of the photographs I would propose there are 26 such spellings of √ẒLL in the corpus (see Chapter 2 - Script and manners of inscribing for a complete overview). Beside these examples, this spelling is also commonly found in inscriptions mentioning the guarding of Dadān *√NẒR and in personal names (Kootstra 2018b). As discussed in Chapter 4 - Orthography and Phonology, it is not entirely clear whether the use of *ṭ* for *ẓ reflects a change in the spoken language at the oasis, or a borrowing from Aramaic in the *nṭr* inscriptions. The use of *ṭll* for *ẓll*, however, is not likely due to a borrowing. The verb seems to be unique to Dadān, and the more archaic *ẓll* spelling is clearly the norm, indicating that *ṭll* is the substrate form. The data from the personal names cannot be directly

compared to that of the verbs found in the inscriptions,[279] and will therefore not be part of the statistical analysis.

7.1.2.1.3 Syntactic variants

7.1.2.1.3.1 Agreement

It is possible to distinguish three types of dual agreement in Dadanitic: full dual agreement with a dual subject agreeing with a dual verb and dual suffixed pronouns; partial dual agreement with a dual subject, a plural verb and dual pronouns; and neutralization of dual concord in which case we see two dedicants being mentioned, with a plural verb and plural pronouns (see § 5.1.3 Dual and 5.1.4 3MPL).[280] The category of neutralization of the dual is by far the most common. There are 14 inscriptions with neutralization,[281] seven examples of partial dual agreement[282] and only one example of full dual agreement (AH 199). There is one example which suggests that the dual may have survived on nouns while it was already lost on verbs and pronouns (U 001).[283] This distribution of the dual is typologically common and can be found in Arabic dialects[284] (Macdonald 2008, 217) and Biblical Hebrew (Joüon and Muraoka 2009, 514–17), for example. Since there is only evidence for this in Dadanitic in one inscription, however, it is impossible to say whether this system underlies all inscriptions which have lost the dual on verbs and pronouns.

Table 58 Agreement types

	Subject	Verb	Pronouns	No. of attestations
Full dual agreement	PN *bn* PN *w*-PN *bn* PN	*fʿl-h*	*-hmy*	1
Partial dual agreement	PN *bn* PN *w*-PN *bn* PN	*fʿl-w*	*-hmy*	7
Neutralization of dual agreement	PN *bn* PN *w*-PN *bn* PN	*fʿlw*	*-hm*	14
Total				22

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[279] See § 1.7.5.1 Evidence from personal names for a complete methodological discussion of the use of personal names for the analysis of the corpus.

[280] See Sima (1999, 117) for an overview table of inscriptions from al-ʿUḏayb with incongruences in their number agreement.

[281] U 027; U 044; AH 011; Al-ʿUḏayb 064; Al-ʿUḏayb 065; U 047; U 064; U 063; U 115; AH 081; JSLih 079; JSLih 282; U 036; Al-ʿUḏayb 075. Al-ʿUḏayb 075 is not completely certain. The beginning of the inscription is damaged casting some doubt on the number of dedicants.

[282] Nasif 1988: 99, pl. CLVIII; Müller, D.H. 1889: 63–64, no. 8; U 069; AH 209; JSLih 077; AH 215; JSLih 037. AH 215 and JSLih 037 are uncertain. They both have dual pronouns, suggesting they had partial dual agreement, but both inscriptions are damaged, making the number of the subject and verb uncertain.

[283] For a complete discussion and description of dual agreement see § 5.1.3 Dual.

[284] E.g. in Syrian Arabic, where dual nouns agree with plural predicate: *wǝṣlu l-ǝktābēn tabaʿi?* 'have my two books arrived?' (Cowell 1964, 420).

Several inscriptions seem to be different from the more common and regular types of agreement.[285] These can be divided into two subgroups: those which seem to contain a mistake and inscriptions with two different suffixed pronouns.

There are only four inscriptions that seem to contain mistakes. There are eight examples of inscriptions with 'mixed pronouns'. Even though this type of inscription is not very common, they seem to occur too often to be dismissed simply as slips of the pen and they may be explained in different ways.

Table 59 Attested anomalous agreement

Siglum	Subject	Verb	Pronoun 1	Pronoun 2
AH 120	Singular	Singular	Singular	Dual
U 075	Dual	Plural	Singular	Plural
AH 096	Singular	Singular	Singular	Plural
AH 023	Singular(?)	Singular(?)	Singular	Plural
U 079bis	Singular?	Singular	Singular	Plural
AH 089	Singular	Singular	Plural	Singular
U 073	Singular	Singular	Plural	Singular
AH 072	Singular	Singular	Plural	Singular

When trying to explain this category of 'mixed agreement' one can imagine that the scribe or the mason simply lost track of the subject towards the end of the inscription. The distance between them is likely part of the reason that the disagreement happened or was deemed acceptable, but it is not consistently the last pronoun of the inscription that disagrees with the rest of the inscription. In addition to the distance between the pronouns and the subject, the real life referents of the persons and objects mentioned in the inscription may also have played a role.

U 075   *qnh/bnt/ʾqḥwnh//w-{ḫ}tn-h/ʿbb/ʾẓllw[/]l-d̲ġ//[b][t][/]bʿd/dt̲ʾ-**h/b-hm**//d̲hb/f-rḍ-**hm**/w-ʾt̲b-//**hm***
            '*qnh* daughter of *ʾqḥwnh* and her relative through marriage *ʿbb* **performed the ẓll (pl.)** for *d̲ġ[bt]* on behalf of **his/her** crops of the season of the later rains in *hmd̲hb* so may he favor **them** and reward **them***'

AH 089   *----ns²ms¹/bn// kdn/ʾẓll//h-z̲ll/l-d̲ġbt// ʿly-/ml-**hm**/b-d̲ʿ//mn/f rḍ-**h**/w ʾḫ//rt-**h***
            '*....ns²ms¹* son of *kdn* **performed (sing.) the ẓll** ceremony for *d̲ġbt* on behalf of **their** property at *d̲ʿmn* so may he favor **him** and **his** posterity'

It is possible, for example when we consider U 075, that while the inscription was dedicated by two people, the crops the dedication it was made on behalf of only belonged to one of them, but the blessing invoked by it was meant for both of them again. A similar situation can be imagined for AH 089: while one person performed the ritual, he did it on behalf of communal crops, but he is only

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[285] For a complete overview of the verbal forms and agreement types see Chapter 5 verbal morphology.

asking for favor for himself as he was the one performing the ritual as suggested by Sima (1999, n. 21). Since we do not know what the ritual exactly entailed and what the rules for obtaining blessings from them were, this can of course be no more than a suggestion. It does, however, provide an explanation for this relatively commonly occurring 'error' in the corpus.

7.1.2.2 Register indicators

7.1.2.2.1 Script style

Script style refers to the technique used to make an inscription. The different forms that can be distinguished are discussed in Chapter 2 - Script and manners of inscribing. Here the different categories will only be listed (see Table 61). Note that the number of inscriptions listed is less than half of the total number of inscriptions. This is due to the fact that not all inscriptions have (clear) pictures available. On top of that there are some styles of inscribing that occur so infrequently that they are not very helpful as a category to analyze the general trends in the corpus, such as texts incised in pottery (TA 00888; TA 11414.1; Tall al-Kaṯīb, no. 3) and inscriptions in which only the outline of the letters are inscribed, possibly as preparation to making an inscription in relief that was abandoned halfway through the process (Müller, D.H. 1889: 69, no. 17; JSLih 057) (See Table 60).

Table 60 Inscriptions that were excluded from the script style anlysis and no. of occurrences

Category	Sigla	no. of attestations
Unsure, maybe pounded	e.g. JSTham 539; Umm Daraǧ 72; AH 311	26
Unsure, maybe chiseled	Nasif 1988: 68, pl. LXXIX; U 113; Al-ʿUḏayb 002	23
Unsure, maybe incised	Müller, D.H. 1889: 66, no. 11; Nasif 1988: 97, pl. CXLIX/a; AH 246; AH 301; Nasif 1988: 65, pl. LXXII; Nasif 1988: 69, pl. LXXXI(b); Nasif 1988: 97, pl. CXLVII	7
Unsure, maybe relief	Al-ʿUlā Museum 2	1
Both chiseled and incised	AH 337	1
Incised in pottery	TA 00888; TA 11414.1; Tall al-Kaṯīb, no. 3	3
Outline	Müller, D.H. 1889: 69, no. 17; JSLih 048; JSLih 057	3
No picture available, or too unclear to be determine script style	e.g. U 082; Nasif 1988: 98, pl. CLI; AH 255	47
Only a copy available	e.g. Bogue 058; JaL 007 b; JaL 169 k	934
Total		1045

Table 61 Distinguished script styles and no. of occurrences

Pounded	375
Chiseled	241
Incised	163
Relief	135
Iṯlib relief	9
Total	923

7.1.2.2.2 Genre

Genre refers to the content and purpose of the inscription. The different genres and compositional formulae that come with them are discussed in Chapter 3 - Genres and Compositional Formulae. A basic distinction is made between graffiti and more official inscriptions. Within the more official inscriptions the genres building, dedication, funerary, non-graffiti, *nṭr* and *ẓll* inscriptions are distinguished. Since the *ẓll* inscriptions take such a central part within the corpus it seems useful to take them as a category separate from other dedicatory texts, even though they seem to overlap in their purpose and compositional formulae. The high frequency of the *ẓll* inscriptions likely had an effect on their formularity.

Table 62 Distinguished genres and no. of occurrences

building	6
dedication	83
funerary	23
graffiti	1462
nṭr	20
non-graffiti	31
ẓll	243
Total	1867

The category non-graffiti comprises texts that are too rare as a type to form their own subgroup in a meaningful way, but seem more elaborate than average graffiti such as legal (JSLih 065; JSLih 077) and narrative texts (JSLih 072) and short texts containing a curse (AH 289) or a date (JSLih 054; Nasif 1988: 96, pl. CXLIV). The graffiti genre contains inscriptions with their own compositional formulae, inscriptions mentioning *tqṭ* 'he wrote' and *wdd* 'he loved', but which still belong to the

more general genre of graffiti. It also includes eight inscriptions that only consist of a single letter.[286] Finally, even though they can arguably be seen as graffiti, the *nṭr* inscriptions were kept apart from graffiti in general because they have several unique features, in their phonology, script style and location, setting them apart from the other types of graffiti. Including them in the genre of graffiti would therefore unduly influence the outcome of any comparison with other variables.

Table 63 Inscriptions not included in genre analysis

Category	Sigla	no. of attestations
Fragment	e.g. JaL 001; AH 335; JSLih 050	86
Genre undetermined, possibly graffiti	e.g. al-ʿUlā 1; Al-ʿUḏayb 016; Al-ʿUḏayb 050	11
Genre undetermined, possibly funerary	Umm Daraǧ 05	1
Name on object	Al-Ḫuraybah 01; Al-Ḫuraybah 15; Al-Mazroo and Nasīf 1992: 4, no. 3	3
Rockart	JaL 005	1
Total		102

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[286] JaL 008 o; JaL 014 b; JaL 023 c; JaL 085 h; JaL 156 d; JaL 124; JaL 135 a; JaL 142.

7.2 Significant co-occurrences

Table 64 Overview of the correlations between the attested variables (grey = significant results, NA = Not Attested)

	ʾ/h causative	Geminate causative	I-*w* causative	Spelling of RḌY	Agreement	ẓ/ṭ spelling	Script style	Genre
ʾ/h causative	X							
Geminate causative	*p* = .065	X						
I-*w* causative	*p* < .001	NA	X					
Spelling of RḌY	*p* < .001	*p* = .176	*p* = .002	X				
Agreement	*p* = .866	*p* = .27	NA	*p* = .237	X			
ẓ/ṭ spelling	*p* = .599	*p* = .349	NA	*p* = .412	*p* = 1	X		
Script style	*p* = .091	*p* = .406	*p* = .812	*p* = .018	*p* = .002	*p* < .001	X	
Genre	*p* < .001	NA	*p* = .259	*p* < .001	*p* = .089	*p* < .001	*p* < .001	X

7.2.1 Grammatical variants

7.2.1.1 ʾ/h-causative

The occurrence of one of the two causative types correlates significantly with two other grammatical variants: the spelling of the I-*w* causative and the spelling of RḌY. Of these features RḌY also correlates significantly with script style.

Interestingly, even though ʾ/h-causative does not correlate significantly with script style, it does with genre. There are 238 inscriptions of which both the causative type and genre could be determined; there are 216 inscriptions of which both the causative type and script style could be determined. Below, the significant correlations will be reported. In the section discussion, the results will be interpreted.

7.2.1.1.1 Co-occurrence with I-*w* causative

There are 24 inscriptions in which both evidence for either a ʾ- or *h*-causative and the spelling of I-*w* causative occur, one inscription in which both ʾ- and *h*-causative occur was taken out of the sample as not to skew the general trend. Comparing the use of causative type to the spelling of I-*w* causatives using Fisher's exact test gives a highly significant result with a strong effect size ($p < .001$; $\chi^2 = 18.24$; $df = 1$; Cramér's V = .872). This indicates that there seems to be a relationship between the use of the type of causative and the spelling of I-*w* causatives in the same inscription.

Table 65 Contingency table comparing causative type and spelling of I-w causative

Causative type * representation of I-w in C-stem Crosstabulation

			Representation of I-*w* in C-stem		
			No *w* represented	*w* represented	Total
causative formation	ʾ	Count	19	0	19
		Expected Count	15.8	3.2	19.0
		Standardized Residual	.8	-1.8	
	h	Count	1	4	5
		Expected Count	4.2	.8	5.0
		Standardized Residual	-1.6	3.5	
Total		Count	20	4	24

Looking at the standardized residuals (Table 65), only the combination of *h*-causative and *plene* spelling of the I-*w* causative verb (*hwdq*) gives a significant result (3.5), indicating that the most relevant effect found with Fisher's exact test is caused by an unexpectedly high number of *plene* spellings of the I-*w* causative verbs using the *h*-prefix.

7.2.1.1.2 Co-occurrence with *RḌY*

There are 199 inscriptions in which both evidence for a ʾ- or *h*-causative and the spelling of √RḌY occur, one inscription was excluded from the analysis to avoid obscuring the general trend, because it contained both *h*- and ʾ-causative and would have constituted a separate type of causative by itself. Comparing the use of causative type to the spelling of RḌY using Fisher's exact test gives a highly significant result with a medium effect size ($p < .001$; $\chi^2 = 39.284$; $df = 1$; Cramér's V = .445). This indicates that there seems to be a relationship between the use of the type of causative and the spelling of RḌY in the same inscription.

Looking at the standardized residuals (Table 66), only the combination of *h*-causative and *plene* spelling gives a significant result (5.9), indicating that the most relevant effect found with Fisher's exact test is caused by an unexpectedly high number of *plene* spellings of *rḍy* co-occurring with *h*-causatives.

Table 66 Contingency table comparing causative type and spelling of RḌY

Causative type * spelling of RḌY Crosstabulation

			spelling of RḌY		
			Defective	*Plene*	Total
Causative type	*h*	Count	6	6	12
		Expected Count	11.2	.8	12.0
		Standardized Residual	-1.6	5.9	
	ʾ	Count	179	7	186
		Expected Count	173.8	12.2	186.0
		Standardized Residual	.4	-1.5	
Total		Count	185	13	198

7.2.1.1.3 Co-occurrence with genre

There are 237 inscriptions of which both the causative type and the genre can be determined. Comparing the use of causative type to the genre in which the verb occurs, using Fisher's exact test, gives a significant result with a low effect size ($p = .025$; $\chi^2 = 12.273$; $df = 3$; Cramér's V = .228). This indicates that there is probably a (weak) relationship between the use of the type of causative and the genre of the inscription.

Table 67 Contingency table comparing causative type and genre of the inscription

Causative type * genre of the inscription Crosstabulation

			Genre of the inscription				
			Dedication	Funerary	Non-graffiti	*ẓll*	Total
Causative type	ʾ	Count	19	1	4	200	224
		Expected Count	22.7	.9	3.8	196.6	224.0
		Standardized Residual	-.8	.1	.1	.2	
	h	Count	5	0	0	8	13
		Expected Count	1.3	.1	.2	11.4	13.0
		Standardized Residual	3.2	-.2	-.5	-1.0	
Total		Count	24	1	4	208	237

Looking at the standardized residuals (Table 67), the combination of *h*-causative with dedicatory inscriptions gives a significant result (3.2), indicating that there are significantly more attestations of *h*-causatives in dedicatory inscriptions than expected. The relationship that probably exists between causative type and genre that is indicated by Fisher's exact text is therefore caused by a relatively high number of *h*-causatives in the dedicatory inscriptions.

7.2.1.2 Spelling of RḌY

The occurrence of one of the two types of the spelling of RḌY correlates significantly with grammatical and register variants. It correlates significantly with the spelling of the I-*w* causative, and with script style and genre.

7.2.1.2.1 Co-occurrence with I-*w* causative

There are 18 inscriptions which include evidence for both the spelling of √RḌY and that of the I-*w* causative. Comparing the spelling of RḌY with the spelling of I-*w* causatives in the same inscription, using Fisher's exact test, gives a significant result with a high effect size ($p = .002$; $\chi^2 = 13.371$; $df = 1$; Cramér's V = .862). This indicates that there is probably a relationship between the spelling of RḌY and of I-*w* causative verbs in the same inscription.

Table 68 Contingency table comparing the spelling of RḌY and I-*w* causatives

I-w causative * spelling RḌY Crosstabulation

			spelling of RḌY		
			Defective	*Plene*	Total
I-*w* causative	No I-*w* represented	Count	13	1	14
		Expected Count	10.1	3.9	14.0
		Standardized Residual	.9	-1.5	
	With I-*w* represented	Count	0	4	4
		Expected Count	2.9	1.1	4.0
		Standardized Residual	-1.7	2.7	
Total		Count	13	5	18

Looking at the standardized residuals (Table 68) only the combination of *plene* spelling of RḌY with the *plene* spelling of I-*w* causative gives a significant result (2.7). This indicates that the co-occurrence of the *plene* spelling of both forms within the same inscription is significantly higher than expected if they were in free variation.

7.2.1.2.2 Co-occurrence with script style

There are 142 inscriptions in which the spelling of √RḌY and script style could be determined. Comparing the spelling of RḌY with script style of the inscription in which it occurs, using Fisher's exact test, gives a significant result with a low effect size ($p = .018$; $\chi^2 = 8.093$; $df = 3$; Cramér's V = .239). This indicates that there is probably a relationship between the spelling of RḌY and the script style of the inscription in which it occurs.

Looking at the standardized residuals (Table 69) only the combination of the *plene* spelling of RḌY in a chiseled inscription gave a significant result (-2.2), indicating that the occurrence of *plene* spelling of RḌY is significantly lower in chiseled inscriptions than expected if they were in free variation.

7.2.1.2.3 Co-occurrence with genre

There are 251 inscriptions of which the spelling of √RḌY and genre could be determined. Comparing the spelling of RḌY with the genre of the inscription in which it occurs, using Fisher's exact test, gives a highly significant result with a moderate effect size ($p < .001$; $\chi^2 = 34.170$; $df = 4$; Cramér's V = .369). This indicates that there is probably a relationship between the spelling of RḌY and the genre of the inscription in which it occurs.

Table 69 Contingency table comparing script style and spelling of RḌY

Script style * spelling RḌY Crosstabulation

| | | | Spelling of RḌY | | |
			Defective	*Plene*	Total
Script style	Chiseled	Count	25	0	25
		Expected Count	20.2	4.8	25.0
		Standardized Residual	1.1	-2.2	
	Incised	Count	34	8	42
		Expected Count	34.0	8.0	42.0
		Standardized Residual	.0	.0	
	Pounded	Count	18	5	23
		Expected Count	18.6	4.4	23.0
		Standardized Residual	-.1	.3	
	Relief	Count	38	14	52
		Expected Count	42.1	9.9	52.0
		Standardized Residual	-.6	1.3	
Total		Count	115	27	142

Table 70 Contingency table comparing the spelling of RḌY and genre

Genre of the inscription * *plene* spelling of RḌY Crosstabulation

| | | | Spelling of RḌY | | |
			Defective	*Plene*	Total
Genre of the inscription	Building	Count	3	1	4
		Expected Count	3.6	.4	4.0
		Standardized Residual	-.3	.9	
	Dedication	Count	29	15	44
		Expected Count	39.4	4.6	44.0
		Standardized Residual	-1.7	4.9	
	Funerary	Count	1	0	1
		Expected Count	.9	.1	1.0
		Standardized Residual	.1	-.3	
	Non-graffiti	Count	3	0	3
		Expected Count	2.7	.3	3.0
		Standardized Residual	.2	-.6	
	ẓll	Count	189	10	199
		Expected Count	178.4	20.6	199.0
		Standardized Residual	.8	-2.3	
Total		Count	225	26	251

Looking at the standardized residuals (Table 70) the combination of *plene* spelling of RḌY in dedicatory inscriptions gave a significant result (4.9), indicating that the number of RḌY spellings in dedicatory inscriptions is higher than expected. The *plene* spelling of RḌY also yielded a significant

result in the *ẓll* inscriptions (-2.3) showing the opposite relationship: the number of *plene* spellings of RDY in *ẓll* inscriptions is significantly lower than expected if they had relation to each other.

The fact that *ẓll* inscriptions have the opposite relationship with *plene* spellings of RDY than other dedicatory inscriptions confirms that they are a relevant separate category and not just another type of dedicatory inscriptions.

7.2.2 Register indicators

7.2.2.1 Script style

Script style correlates significantly with several grammatical variants. It correlates significantly with RDY spelling, *ṭ/ẓ* spelling and agreement type. Script style and genre also correlate significantly.

7.2.2.1.1 Co-occurrence with *ẓ/ṭ* spelling

There are 210 inscriptions of which both script style and spelling of *ẓ could be determined. Comparing the script type of an inscription with the spelling of *ẓ with either *ẓ* or *ṭ* in the inscription, using Fisher's exact test, gives a significant result, with a moderate effect size ($p < .001$; $\chi^2 = 42.260$; $df = 4$; Cramér's V = .449). This indicates that there is probably a relationship between the spelling of *ẓ and the script style of an inscription.

Table 71 Contingency table comparing script style and spelling of *ẓ

Script style * *ẓ spelling Crosstabulation

			*ẓ spelling		
			ṭ	*ẓ*	Total
Script style	Chiseled	Count	20	40	60
		Expected Count	11.1	48.9	60.0
		Standardized Residual	2.7	-1.3	
	Incised	Count	3	45	48
		Expected Count	8.9	39.1	48.0
		Standardized Residual	-2.0	.9	
	Itlib relief	Count	5	0	5
		Expected Count	.9	4.1	5.0
		Standardized Residual	4.2	-2.0	
	Pounded	Count	10	47	57
		Expected Count	10.6	46.4	57.0
		Standardized Residual	-.2	.1	
	Relief	Count	1	39	40
		Expected Count	7.4	32.6	40.0
		Standardized Residual	-2.4	1.1	
Total		Count	39	171	210
		Expected Count	39.0	171.0	210.0

Looking at the standardized residuals (Table 71) the combination of chiseled inscriptions and the spelling of *ẓ with *ṭ* gives a significant result (2.7), indicating that there are significantly more chiseled inscriptions with *ṭ* spellings than would be expected if there was no relation between spelling

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and script style. With incised inscriptions, on the other hand, t spelling has a significant negative relationship (-2.0). This shows that there are fewer t spellings than expected in the more formal incised style of inscribing if there was no relationship between the two. The t spelling has a positive relationship with the I̲tlib relief style, as expected (4.2). The $ẓ$ spelling has a negative relationship with the I̲tlib relief style (-2). This shows that there are more inscriptions with t spelling in I̲tlib relief style than expected, but less with $ẓ$ spelling than expected if there was no relationship between the categories. Finally, the *ẓ spelled with t has a negative significant relationship with inscriptions in relief (-2.4), indicating there are significantly less inscriptions than expected in relief with t spelling for *ẓ if there was no relationship between them.

Table 72 Contingency table comparing script style and agreement type

Agreement type * script style Crosstabulation

			Script style				
			Chiseled	Incised	Pounded	Relief	Total
Agreement type	Full Plural	Count	2	10	7	20	39
		Expected Count	4.6	10.3	8.6	15.5	39.0
		Standardized Residual	-1.2	-.1	-.5	1.1	
	Full dual	Count	0	0	0	1	1
		Expected Count	.1	.3	.2	.4	1.0
		Standardized Residual	-.3	-.5	-.5	1.0	
	Neutralization	Count	4	3	5	0	12
		Expected Count	1.4	3.2	2.6	4.8	12.0
		Standardized Residual	2.2	-.1	1.4	-2.2	
	Mistake	Count	0	0	1	3	4
		Expected Count	.5	1.1	.9	1.6	4.0
		Standardized Residual	-.7	-1.0	.1	1.1	
	Mix incongruence	Count	1	2	2	0	5
		Expected Count	.6	1.3	1.1	2.0	5.0
		Standardized Residual	.5	.6	.9	-1.4	
	Mix incongruence dual	Count	1	0	0	0	1
		Expected Count	.1	.3	.2	.4	1.0
		Standardized Residual	2.6	-.5	-.5	-.6	
	Only on noun	Count	0	0	0	1	1
		Expected Count	.1	.3	.2	.4	1.0
		Standardized Residual	-.3	-.5	-.5	1.0	
	Mixed agreement	Count	0	3	0	2	5
		Expected Count	.6	1.3	1.1	2.0	5.0
		Standardized Residual	-.8	1.5	-1.1	.0	
Total		Count	8	18	15	27	68
		Expected Count	8.0	18.0	15.0	27.0	68.0

7.2.2.1.2 Co-occurrence with agreement type

There are 68 inscriptions of which both agreement type and script style could be determined. Comparing script type of an inscription with the agreement type used in it using Fisher's exact test

gives a significant result with a moderate effect size ($p = .002$; $\chi^2 = 35.197$; $df = 21$; Cramér's V = .415). This indicates that there is probably a relationship between the agreement type used in an inscription and the technique used to inscribe it.

Looking at the standardized residuals (Table 72) the overall significant result is mostly due to how inscriptions with a loss of the dual interact with script style. Chiseled inscriptions and loss of the dual give a significant result (2.2), relief and loss of the dual have the opposite relation (-2.2). This indicates that the loss of the dual seems to occur more than expected if the two factors had no relation to each other in the chiseled inscriptions, while it occurs less often than expected in inscriptions in relief (in fact it never does).

Chiseled inscriptions and mixed agreement with at least one dual form (1 attested, .1 expected) give a significant result (2.6) as well, but since this is based on just one occurrence it should not be given too much weight at this point.

Table 73 Contingency table comparing the genre and script style of inscriptions

Genre of the inscriptions * script style Crosstabulation

			Chiseled	Incised	Itlib relief	Pounded	Relief	Total
					Script style			
Genre of the inscriptions	Building	Count	0	0	0	0	6	6
		Expected Count	1.6	1.0	.1	2.5	.8	6.0
		Standardized Residual	-1.3	-1.0	-.3	-1.6	6.1	
	Dedication	Count	4	24	0	8	41	77
		Expected Count	21.1	13.2	.8	32.3	9.6	77.0
		Standardized Residual	-3.7	3.0	-.9	-4.3	10.1	
	Funerary	Count	3	8	0	0	3	14
		Expected Count	3.8	2.4	.1	5.9	1.8	14.0
		Standardized Residual	-.4	3.6	-.4	-2.4	.9	
	Graffiti	Count	157	45	4	280	4	490
		Expected Count	134.1	83.8	5.2	205.7	61.3	490.0
		Standardized Residual	2.0	-4.2	-.5	5.2	-7.3	
	Non-graffiti	Count	3	15	0	2	5	25
		Expected Count	6.8	4.3	.3	10.5	3.1	25.0
		Standardized Residual	-1.5	5.2	-.5	-2.6	1.1	
	nṯr	Count	10	0	5	2	0	17
		Expected Count	4.7	2.9	.2	7.1	2.1	17.0
		Standardized Residual	2.5	-1.7	11.3	-1.9	-1.5	
	z̠ll	Count	55	53	0	64	47	219
		Expected Count	59.9	37.4	2.3	91.9	27.4	219.0
		Standardized Residual	-.6	2.5	-1.5	-2.9	3.8	
Total		Count	232	145	9	356	106	848
		Expected Count	232.0	145.0	9.0	356.0	106.0	848.0

7.2.2.1.3 Co-occurrence with genre

There are 848 inscriptions of which both script style and genre could be determined. Comparing the combination of script style and genre within inscriptions using Fisher's exact test gives a highly significant result with a moderate size ($p < .001$; $\chi^2 = 521.566$; $df = 24$; Cramér's V $= .392$). This indicates that there is probably a relationship between the genre of an inscription and the technique used to inscribe it.Looking at the standardized residuals (Table 73) each genre correlates significantly with at least one script style. Given the long list of significant combinations, they will be summarized in the table below.

Table 74 Overview of the significant standardized residuals of genre and script style

Genre	Script style	standardized residuals	Attested no. of inscriptions	Expected no. of inscriptions
Building	Relief	6	6	.8
Dedication	Chiseled	-3.7	4	21
	Incised	2.9	24	13.3
	Pounded	-4.3	8	32.2
	Relief	10.1	41	9.7
Funerary	Incised	3.6	8	2.4
	Pounded	-2.4	0	5.9
Graffiti	Chiseled	2	155	132.3
	Incised	-4.2	45	83.3
	Pounded	5.2	276	202.3
	Relief	-7.3	4	60.9
Non-graffiti	Incised	5.2	15	4.3
	Pounded	-2.6	2	10.5
nṭr	Chiseled	2.5	10	4.6
	Iṯlib relief	11.3	5	.2
ẓll	Incised	2.5	53	37.7
	Pounded	-2.9	64	91.6
	Relief	3.7	47	27.6

The strong interaction between genre and script style and the direction in which they correlate (see Table 73 and Table 74) clearly show that the more official inscriptions (building inscriptions, dedicatory inscriptions, funerary inscriptions, non-graffiti, and ẓll inscriptions) tend to be executed in more technically demanding writing techniques (incised and relief) than would be expected if there was no relation between script style and genre, while graffiti tend to be inscribed more often than expected in the less demanding script styles (chiseled and pounded). This supports the idea that script style can be used as a measure of the formality of the text.

7.2.2.2 Genre

Genre correlates significantly with the variants mentioned above (script style, ʾ/h causative, and spelling of RḌY) but also with ẓ/ṭ spelling.

7.2.2.2.1 Co-occurrence with ẓ/ṭ spelling

There are 225 inscriptions in which genre and the spelling of *ẓ can be determined. Comparing these categories, using Fisher's exact test, gives a highly significant result with a moderate effect size ($p <$ .001; $\chi^2 = 79.518$; $df = 2$; Cramér's V = .594), indicating that there is probably a relationship between the genre of the inscription and the spelling of *ẓ.

Table 75 Contingency table comparing the genre of the inscription and the spelling of *ẓ

genre * *ẓ spelling Crosstabulation

			*ẓ spelling ṭ	*ẓ spelling ẓ	Total
Genre	Dedication	Count	0	1	1
		Expected Count	.2	.8	1.0
		Standardized Residual	-.4	.2	
	nṭr	Count	19	1	20
		Expected Count	3.9	16.1	20.0
		Standardized Residual	7.6	-3.8	
	ẓll	Count	25	179	204
		Expected Count	39.9	164.1	204.0
		Standardized Residual	-2.4	1.2	
Total		Count	44	181	225
		Expected Count	44.0	181.0	225.0

Looking at the standardized residuals (Table 75) both nṭr inscriptions and ẓll inscriptions have a significant relationship with the spelling of *ẓ. The nṭr inscriptions have a significant positive relationship with the ṭ spelling (7.4) and a negative relationship with ẓ spelling (-3.8). This shows that there are more inscriptions than expected with ṭ spelling and less than expected with ẓ spelling in the nṭr genre if the two had no relationship to each other. There is a significant negative relationship between the ṭ spelling and the ẓll genre (-2.4), showing there are less ẓll inscriptions with ṭ spelling than expected if the two had no relation to each other.

7.2.3 Important non-significant co-occurrences

There are several relationships between variables that are non-significant, but still contribute to the overall picture of how the different variables interact with each other. First of all, there is the interaction between genre and the two grammatical variables it does not interact with, which do have significant relations with other variables: I-*w* causative and agreement. Secondly, it is worth exploring the relationship of the geminate causative to the other variables, since this is the only variable that does not interact significantly with any other one. Below, the results of the correlation between geminate causatives and causative type and script style will be given. Even though these correlations are not necessarily the ones closest to a significant result (see Table 64), they do show a pattern in their distribution.

7.2.3.1 Genre

7.2.3.1.1 Co-occurrence with I-*w* causative

There are 24 inscriptions which contain evidence for the spelling of I-*w* causative and of which the genre can be determined. Comparing the co-occurrence of genre and spelling of the I-*w* causative does not give a significant result, and only shows a moderate effect size ($p = .259$; $\chi^2 = 2.88$; $df = 1$; Cramér's V = .347).

Looking at the standardized residuals (Table 76) the *plene* spelling of I-*w* causatives and the *ẓll* inscriptions have the strongest negative relationship. This indicates that there are fewer I-*w* causatives with *plene* spelling in *ẓll* inscriptions than expected, but not as few as to reach significance. Given the moderate effect size and the small data set, the size of the sample could explain the absence of a significant result.

Table 76 Contingency table comparing genre and the spelling of I-*w* causative

Genre of the inscription * form of I-*w* causative Crosstabulation

| | | | Form of I-*w* causative | | |
			Defective	*plene*	Total
Genre of the inscription	Dedication	Count	11	4	15
		Expected Count	12.5	2.5	15.0
		Standardized Residual	-.4	.9	
	ẓll	Count	9	0	9
		Expected Count	7.5	1.5	9.0
		Standardized Residual	.5	-1.2	
Total		Count	20	4	24
		Expected Count	20.0	4.0	24.0

7.2.3.1.2 Co-occurrence with agreement

There are 70 inscriptions of which both the genre and agreement type can be determined. Even though there is no significant correlation, the outcome of Fisher's exact test does approach significance, with a moderate effect size ($p = .089$; $\chi^2 = 29.869$; $df = 21$; Cramér's V = .377). Especially non-graffiti and partial dual agreement have a positive relationship (Table 77) (standardized residual = 2.8).

7.2.3.2 Geminate causative

The geminate causative is the only linguistic variable that does not correlate significantly with any of the other variables in the corpus. There is some relationship between I-*w* causative and causative type and with script style.

Table 77 Contingency table comparing agreement type and genre

Agreement type * genre of the inscription Crosstabulation

			Dedication	Graffiti	Non-graffiti	*ẓll*	Total
			Genre of the inscription				
Agreement type	Full plural	Count	16	2	3	18	39
		Expected Count	10.0	1.7	3.9	23.4	39.0
		Standardized Residual	1.9	.3	-.5	-1.1	
	Full dual	Count	0	0	0	1	1
		Expected Count	.3	.0	.1	.6	1.0
		Standardized Residual	-.5	-.2	-.3	.5	
	Neutralization	Count	1	1	1	10	13
		Expected Count	3.3	.6	1.3	7.8	13.0
		Standardized Residual	-1.3	.6	-.3	.8	
	Mistake	Count	0	0	0	4	4
		Expected Count	1.0	.2	.4	2.4	4.0
		Standardized Residual	-1.0	-.4	-.6	1.0	
	Mix incongruence	Count	0	0	0	6	6
		Expected Count	1.5	.3	.6	3.6	6.0
		Standardized Residual	-1.2	-.5	-.8	1.3	
	Mix incongruence dual	Count	0	0	0	1	1
		Expected Count	.3	.0	.1	.6	1.0
		Standardized Residual	-.5	-.2	-.3	.5	
	Only on noun	Count	0	0	1	0	1
		Expected Count	.3	.0	.1	.6	1.0
		Standardized Residual	-.5	-.2	2.8	-.8	
	Mixed agreement	Count	1	0	2	2	5
		Expected Count	1.3	.2	.5	3.0	5.0
		Standardized Residual	-.3	-.5	2.1	-.6	
Total		Count	18	3	7	42	70
		Expected Count	18.0	3.0	7.0	42.0	70.0

7.2.3.2.1 Co-occurrence with causative type

There are 171 inscriptions in which the causative type and spelling of the geminate causative could be determined. Fisher's exact test gives a marginally significant result, but with a low effect size ($p = .065$; $\chi^2 = 3.793$; $df = 1$; Cramér's V = .149). Looking at the standardized residuals (Table 78), the defective spelling of the geminate causative and the *h*-causative have the strongest relationship, albeit not a significant one. The relationship between them is negative (-1.6). This indicates that there are fewer attestations of *hẓl* forms than expected, while there are slightly more *plene* spellings with the *h*-causative (*hẓll*) than expected. The opposite relationships were found between the ʾ-causative and spelling of the geminate causative, but the strength of association between them is even lower.

Table 78 Contingency table comparing causative type and spelling of geminate causative

Causative type * geminate spelling in causative verb Crosstabulation

			Geminate spelling in causative verb		
			Defective	*Plene*	Total
Causative type	ʾ	Count	45	116	161
		Expected Count	42.4	118.6	161.0
		Standardized Residual	.4	-.2	
	h	Count	0	10	10
		Expected Count	2.6	7.4	10.0
		Standardized Residual	-1.6	1.0	
Total		Count	45	126	171

7.2.3.2.2 Co-occurrence with script style

There are 157 inscriptions with a geminate causative of which the script style could be determined. Their relationship is not significant with a low effect size ($p = .406$; $\chi^2 = 2.956$; $df = 2$; Cramér's V = .137). Looking at the standardized residuals (Table 79) relief and the spelling of the geminate causative with one *l* has the strongest relationship (1.3). This indicates that there are more defective spellings of the geminate causative than expected in inscriptions executed in relief, but not to a significant degree.

7.2.3.2.3 Co-occurrence with RḌY

There are 152 inscriptions in which both a causative form of the geminate root and the verb RḌY occur. There is no significant correlation between the two with a low effect size ($p = .176$; $\chi^2 = 1.94$; $df = 1$; Cramér's V = .113). Looking at the standardized residuals (Table 80), the strongest relationship exists between the plene spelling of RḌY and the defective spelling of the geminate causative (1.2), but not to a significant degree. This means that there are slightly more inscriptions with both *plene* spelled RḌY and defectively spelled geminate causative than expected.

7.2.3.2.4 Co-occurrence with agreement

There are 32 inscriptions in which both plural agreement type and the spelling of geminate causatives could be determined. They do not correlate significantly, but there is a medium effect size ($p = .27$; $\chi^2 = 6.163$; $df = 5$; Cramér's V = .439). Looking at the standardized residuals (Table 81), the strongest relationship exists between the category of mistake in agreement and the spelling of the geminate causative. There is a positive relationship between mistake and defective spelling (1.3) and a negative

relationship between mistake and *plene* spelling (-1.1), but not to a significant degree. This indicates that there are more inscriptions than expected with a mistake in agreement with only one *l* of ẒLL represented; while there are slightly fewer inscriptions with mistaken number agreement with both *l*'s represented.

Table 79 contingency table comparing the spelling of geminate causatives and script style

Script style * spelling of geminate root Crosstabulation

			Spelling of geminate root		Total
			Defective	*Plene*	
Script style	Chiseled	Count	8	30	38
		Expected Count	9.9	28.1	38.0
		Standardized Residual	-.6	.4	
	Incised	Count	10	31	41
		Expected Count	10.7	30.3	41.0
		Standardized Residual	-.2	.1	
	Pounded	Count	10	33	43
		Expected Count	11.2	31.8	43.0
		Standardized Residual	-.4	.2	
	Relief	Count	13	22	35
		Expected Count	9.1	25.9	35.0
		Standardized Residual	1.3	-.8	
Total		Count	41	116	157
		Expected Count	41.0	116.0	157.0

Table 80 Contingency table comparing the spelling of geminate causatives and RḌY

Spelling of geminate causative * spelling of RḌY Crosstabulation

			Spelling of RḌY		Total
			Defective	*Plene*	
Spelling of geminate roots	Defective	Count	36	3	39
		Expected Count	37.5	1.5	39.0
		Standardized Residual	-.2	1.2	
	Plene	Count	110	3	113
		Expected Count	108.5	4.5	113.0
		Standardized Residual	.1	-.7	
Total		Count	146	6	152
		Expected Count	146.0	6.0	152.0

Table 81 Contingency table comparing spelling of geminate causatives with agreement type

Agreement type * spelling of geminate causative Crosstabulation

| | | | Spelling of geminate causative | | |
			Defective	*Plene*	Total
Agreement type	Full plural	Count	6	6	12
		Expected Count	4.9	7.1	12.0
		Standardized Residual	.5	-.4	
	Full dual	Count	0	1	1
		Expected Count	.4	.6	1.0
		Standardized Residual	-.6	.5	
	Neutralization	Count	3	5	8
		Expected Count	3.3	4.8	8.0
		Standardized Residual	-.1	.1	
	Mistake	Count	2	0	2
		Expected Count	.8	1.2	2.0
		Standardized Residual	1.3	-1.1	
	Mix incongruence	Count	1	6	7
		Expected Count	2.8	4.2	7.0
		Standardized Residual	-1.1	.9	
	Mixed	Count	1	1	2
		Expected Count	.8	1.2	2.0
		Standardized Residual	.2	-.2	
Total		Count	13	19	32
		Expected Count	13.0	19.0	32.0

7.3 Discussion
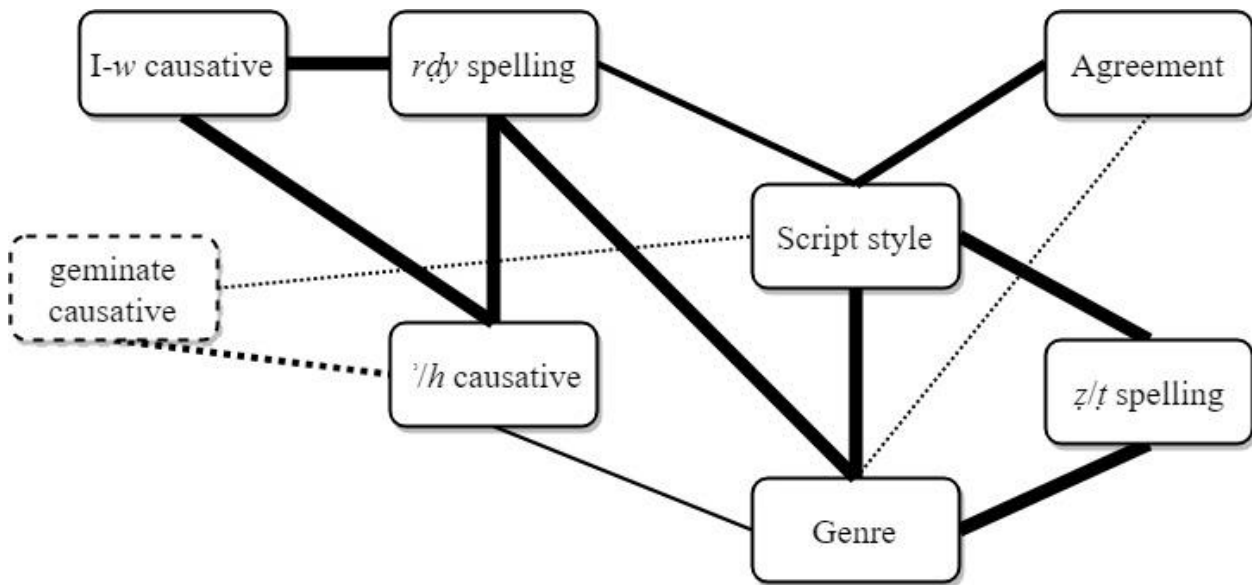
Figure 18 Overview of correlations between variables. Significant relations are indicated by a line, the thicker the line the higher the significance (see table 64 for exact numbers). Dashed lines represent non-significant relationships, the thicker the line the closer to significance.

7.3.1 Genre

The overview in Figure 18 shows that genre has a significant relationship with almost all other variables that interact significantly with at least one other variable, except for the spelling of I-*w* causatives and agreement.[287] In light of the high formularity of the inscriptions, it is unsurprising that the content and topic of an inscription go together with specific linguistic conventions or, in case of the graffiti, a distinctive departure from them. The correlation between genre and linguistic variables shows that general dedicatory inscriptions tend to contain more archaic linguistic forms (*h*-causative and *plene* spelling of *rḏy*), while the *ẓll* inscriptions, which are a particular kind of dedicatory inscription, tend to contain the linguistically more progressive, defective spellings of √RḎY. There also seems to be a preference for not using the more archaic *h*-causative in *ẓll* inscriptions, but this relationship is not significant (see Table 67). A more elaborate discussion of the *ẓll* inscriptions follows below in § 7.3.4 The *ẓll* inscriptions.

Considering the spelling of **ẓ* we see that there is a significant positive relationship between the more innovative *ṭ* spelling and graffiti, while there is a negative relationship between *ṭ* spelling of **ẓ* and *ẓll* inscriptions. Not only is there a significant correlation between genre and the spelling of **ẓ*, the correlation also has a moderate effect size, showing a convincing relationship between the two variables. This clearly shows that *ṭ* spelling fell outside the norm of writing, and was not generally used or accepted in the writing of formulaic inscriptions. The fact that we see this most clearly reflected in the *ẓll* inscriptions, is not only due to their formularity and central place within the writing tradition, but also to the fact that they all contain the relatively rare phoneme **ẓ*.

Even though one might expect genre to have an effect on all other variables, based on the strong link between content and form in the inscriptions, not all linguistic variables have a significant correlation

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[287] Note that the set of I-*w* causatives is particularly small (24 inscriptions), and that they all occur in, *ẓll* (9) and dedicatory (15) inscriptions.

with genre: it does not seem to influence the writing of the I-*w* causative and the choice of agreement type. In the case of the variable I-*w* causative this might be due to the particularly small data set (24 inscriptions), which has the effect that finding a single new inscription with such a verbal form could drastically change the outcome of the comparison. The moderate effect size of this correlation (see § 7.2.3.1.1 Co-occurrence with I-w causative) does not provide clear support for a possible increase in significance when the dataset is expanded.

Note that even though there is no significant relationship between agreement type and genre, the outcome does approach significance (see § 7.2.3.1.2 Co-occurrence with agreement). Especially non-graffiti and partial dual agreement have a positive relationship. The moderate effect size does not give strong support that significance will increase when the dataset is expanded. Given the lack of a very strong correlation, it may be posited, that even though the use of dual agreement, or lack thereof, was not strongly associated with a particular genre, using it was still considered to be prestigious. This would be in line with the correlations found between script style and agreement type, where we find a negative relationship between inscriptions in relief and the loss of the dual category but the positive relationship between chiseled inscriptions and the loss of the dual. The medium effect size makes this correlation pretty robust (§7.2.2.1.2 Co-occurrence with agreement type). Alternatively, the relationship between script style and agreement could indicate a historical development of a preference for specific script styles, with a higher number of inscriptions in relief being produced before the dual was lost, while the different genres in use remained more stable over time. For this last hypothesis it is problematic, however, that agreement does not correlate significantly with any of the other linguistic variables.

Script style and genre, on the other hand, are particularly intricately intertwined, with many individual combinations of script style and genre being significantly related to each other. Despite the relatively large dataset, the effect size is only moderate. The pattern in which they relate to each other confirms the hypothesis that graffiti are more likely to be produced using less technically demanding writing styles such as pounding, while the more formal inscriptions are more likely to be incised or executed in relief (see § 7.2.2.1.3 Co-occurrence with genre). Since genre seems to have a different relationship to different variables, it cannot be taken as a general explanation for all the variables it interacts with. Considering the significant relationships apart from genre is therefore useful.

As can be seen from the diagram in Figure 19, the overlap between variables seems to form two separate clusters if genre is taken out of the equation. One group of grammatical features clusters together and partly with script style (and genre) on the left, colored red (ʾ/h-causative, form of the I-w causative and the spelling of RḌY), and the other side of the diagram contains two grammatical features that correlate significantly with script style (and genre) but not with each other or the other grammatical variables (agreement and ṭ/ẓ spelling of *ẓ). I would propose that the relationship between the variables in the red cluster on the left (cluster I) is mainly due to diachronic change, while agreement and the spelling of *ẓ (cluster II) seem to be primarily prestige and register driven.
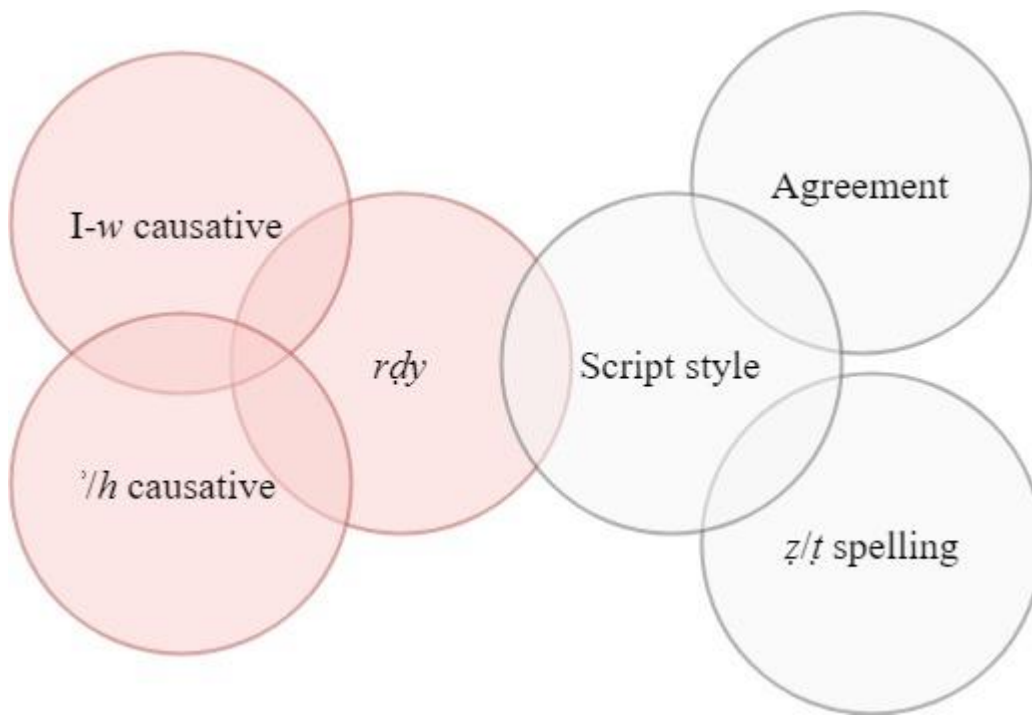
Figure 19 Overlap of variables with significant results excluding genre. The degree of overlap does not represent the degree of significance.

7.3.2 Cluster I: ʾ/*h*-causative, I-*w* causative, RḌY

Not only do the causative type, the spelling of the I-*w* causative and RḌY all correlate significantly with each other, they all correlate with each other in the same way. Especially the correlations between causative type and I-*w* causative and between I-*w* causative and the spelling of RḌY are robust, given the strong effect size of both these correlations besides their significant relationship (§ 7.2.1.1.1 Co-occurrence with I-w causative, 7.2.1.1.2 Co-occurrence with *RḌY*, 7.2.1.2.1 Co-occurrence with I-w causative).

Table 82 Overview of correlations between the variables in cluster I

Variable I	Variable II	Standardized residual
h-causative	Plene spelling of *rḍy*	5.9
h-causative	Plene spelling of I-*w* causative	3.5
Plene spelling of *rḍy*	Plene spelling of I-*w* causative	2.7

Independently from its correlation with other variables in the corpus, it is clear that the *plene* spelling of final weak verbs in non-word final position is more archaic than the defective spelling, and that the sound change underlying this change in spelling occurred in the period attested in the inscriptions. This follows from the variation in spelling of the final glide (see § 4.2 *Matres lectionis*).

Based on comparative evidence, a similar claim can be made for the difference between ʾ- and *h*-causative forms, where the *h*-causatives represent a more archaic form than the ʾ-causatives.[288] However, the existence of an inscription containing both forms also clearly shows that there was a period in which both forms were available to the authors of the Dadanitic inscriptions. This indicates that we cannot conclude that all inscriptions containing *h*-causatives must have been produced before those containing ʾ-causatives (see § 5.3.2 Causative).

Looking at the variant spellings for I-*w* causative forms, it is not immediately clear if one form is more archaic than the other and if this is the case, which one should be considered archaic. Given the lack of evidence for the *plene* spelling of word internal diphthongs in other forms, the variation might be best explained as the loss of the CD-stem (see § 4.5 Diphthongs). If this analysis is correct, the 'defective spelling' is the more developed form. Interpreting this variation as a historical development seems to be supported by the significant relationship between *plene* spelling of I-*w* causatives and the more archaic features of the other two variables it correlates with. Based on the complete lack of ʾ-causatives with the first *w* represented (see Table 55), it can even be proposed that the CD-stem had lost its productivity by the time the ʾ-causative developed. Since this is based on the absence of evidence this can be no more than a suggestion of course.[289]

7.3.2.1 Cluster I and genre

If the features in this cluster indeed represent a historical development in the language of the inscriptions, then the relationship between the spelling of RḌY and genre and script style and the relationship between causative type and genre could support a historical development in use of genre and script style as well (see also § 7.3.1 Genre). It is also possible that linguistic change simply entered the higher register genres and script styles at a slower pace due to conventions or a certain prestige connected to more archaic language use. The more archaic linguistic forms may also have had a certain prestige which made them more appropriate for more formal inscriptions and their use was open to choice to a certain degree. It is clear, however, that the more progressive forms eventually became completely acceptable for higher register inscriptions as well. Looking at the absolute number of occurrences of each feature, it is clear that the more progressive linguistic forms eventually became the norm in all layers of the corpus.

7.3.2.2 Cluster I and geminate causative

The geminate causative is the only variable that does not correlate significantly with any other variable in the corpus. This is partly due to its restricted use. The only attested verb in the causative form of a geminate root is √ẒLL. Since it is only found in *ẓll* inscriptions, it cannot be compared to the variable genre, and since there are no I-*w* geminate roots, a comparison to that category is also impossible.

The spelling of the geminate causative does have a marginally significant correlation with causative type, albeit with a low effect size (§ 7.2.3.2.1 Co-occurrence with causative type). It is interesting to note, however, that the association between the different categories seems to corroborate the hypothesis that the *plene* spelling of the geminate roots in the causative stem is the more archaic form. The archaic nature of the *h*-causative is established more firmly and it correlates positively with the

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[288] Compare, for example, Aramaic in which *h* > ʾ in the causative prefix in the attested material (Gzella 2015, 34).
[289] Note however, that there are two inscriptions that are not in the OCIANA database, that contain ʾ*wdq* forms. These are found in text 2 and text 3 in the catalogue of "The Echo of Caravans" exhibition at the Sharjah Museum (UAE). I would like to thank Jérôme Norris for bringing these inscriptions to my attention.

plene spelling of the geminate causative, while it correlates negatively with the defective spelling. The ʾ-causative, on the other hand, correlates positively with the defective spelling of the geminate causative, and negatively with the *plene* spelling. So even though the association is not statistically very strong, the pattern that emerges is consistent.

The spelling of the geminate causative and the third variable of cluster I, the spelling of RḌY, is not significant, with a low effect size. The categories pattern together in the opposite direction of what would be expected, if there was a historical relationship between them: there is a positive relationship between the defective spelling of RḌY and the *plene* spelling of the geminate causative and a negative one between the defective spelling of RḌY and the defective spelling of the geminate causative. The more archaic *plene* spelling of RḌY patterns in the opposite direction with the different spellings of the geminate causative. Given the non-significant correlation and low effect size, however, this may very well be due to chance.

Given the lack of a significant relationship, not too much weight should be given to the patterning of the different categories of the spelling of RḌY and the geminate causatives. The lack of both a consistent pattern and significant correlations does show that even if there is some historical relationship between causative type and the spelling of the geminate causative, it is not the same one as that between the three variables of cluster I. Given the low effect size, even the marginally significant relationship between causative type and the spelling of geminate causatives cannot be taken as proof for a historical development in the spelling of the geminate causatives. Therefore it seems that the different spellings of the geminate causative (metathesized and *plene*) either continued to exist in free variation, or that they represent different morphological forms (a C-stem and a CD-stem) which possibly continued to be productive in this particular context due to its high formularity and centrality to the writing tradition.

7.3.3 Cluster II: *z̧/ṭ* spelling, script style, agreement and genre
As discussed above (§ 7.3.1 Genre), agreement and the spelling of *z̧ significantly correlate with genre. The spelling of *z̧ also correlates significantly with script style. The fact that they do not correlate significantly with any of the variables in cluster I suggests that they are not part of a similar historical development.

7.3.3.1 z̧/ṭ spelling
In relation to the significance of genre as an explanatory factor for variation, it has already been discussed that the spelling of *ṭ* for *z̧ seems to have fallen outside of the written norm of the Dadanitic language (§ 7.3.1 Genre). It is therefore probably best understood as influence from the spoken language of the inscriber. It is unclear whether this means that *z̧* and *ṭ* had merged in the language of the oasis itself, or that the authors of the inscriptions using *ṭ* for *z̧ spoke an entirely different language (Kootstra 2018b, 210).

7.3.3.2 Agreement
Agreement only correlates significantly with script style, mostly due to a significantly lower number of inscriptions with neutralization executed in relief than expected, and a significantly higher number of inscriptions with neutralization that were chiseled into the rock (see §7.2.2.1 Script style). This seems to suggest that the linguistically most progressive forms, which neutralized dual agreement completely, were preferred in more simply produced inscriptions, while neutralization was avoided in the more elaborate inscriptions. This is supported by the attestation of two inscriptions in which the

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author seemed unsure about the usage of the dual.[290] This suggests that people continued to (attempt to) use the dual forms even though it was not, or no longer, part of their day-to-day speech. The low number of occurrences of dual forms clearly shows that despite any prestige the dual may have had during the production of the inscriptions, it was not part of the standard written register of the inscriptions, probably indicating that it was already falling out of use by the time this register developed.

7.3.3.2.1 Agreement and non-significant correlations

Taking into consideration the distribution of ʾ- and *h*-causatives in inscriptions across the different agreement types, we see that the most archaic type of the causative (*h*-form) only occurs in an inscription with the most progressive treatment of the dual (neutralization, AH 011) and mixed pronouns (U 079 bis),[291] while the most archaic form of dual agreement (full dual agreement) only occurs in an inscription with an ʾ-causative (AH 199).

Note that there are only three instances of *h*-causatives in this dataset. As discussed above there seems to be a general historical trend in the development of the *h*-causatives to ʾ-causative, but it is impossible to say in absolute terms that any inscription containing *h*-causative forms is older than one containing ʾ-causative forms (§ 7.3.2 Cluster I: ʾ/h-causative, I-w causative,). Therefore, the few examples of *h*-causatives in inscriptions for which the agreement type can be determined do not show definitively that the development of the agreement types does not have any historical component. It does show, however, that it probably did not develop in parallel with the linguistic variables in cluster I.[292]

7.3.4 The *ẓll* inscriptions

Within cluster I the *ẓll* inscriptions deserve special attention. Both in content and structure *ẓll* inscriptions and more general dedicatory inscriptions are similar: something is performed or given to a deity, and the inscription ends with a petition to the deity. Given their similarities, they would also be expected to belong to the same or a similar genre as they are both clearly not graffiti, but formulaic and official in character. Their similar degree of formality is reflected in the way both genres of inscription interact with script style (Table 84).

Even though the *ẓll* inscriptions are more evenly distributed across the different script types and dedicatory inscriptions have a much stronger positive relationship to relief than *ẓll* ones, they always correlate in the same direction to specific script styles. A similar overlap can be found in the relationship between *ẓll* and dedicatory inscriptions and the spelling of *ẓ.

Once again, the relationships are not identical, but they do all correlate in the same direction. This seems to confirm that both genres have a similar kind of official character warranting the use of more elaborate techniques for their execution, while they both have a negative relationship with the non-standard spelling of *ẓ.

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[290] In one inscription two dedicants agree with a dual verb but plural resumptive pronouns are used (U 019), the other inscription is completely in the singular except for the resumptive pronoun in the blessing formula in the dual (AH 120).

[291] And once with the neutral full plural agreement (JSLih 049).

[292] The distribution of agreement type across geminate causative types is fairly similar for each type of geminate causative. Note that the one example of full dual agreement occurs in the more archaic plene spelled geminate causative (a ʾ-causative verb).

Table 83 Relationship between script style and *ẓll* or dedicatory inscriptions in standardized residuals

Script style	Relationship to *ẓll*	Relationship to dedicatory
Pounded	-2.9	-4.3
Chiseled	-.6	-3.7
Iṯlib relief	-1.5	-.9
Incised	2.5	2.9
Relief	3.7	10.1

Table 84 Relationship between spelling of *ẓ and *ẓll* or dedicatory inscriptions in standardized residuals

*ẓ spelling	Relationship to *ẓll*	Relationship to dedicatory
ẓ	1.2	.2
ṭ	-2.4	-.4

If we compare their relationship to the linguistic variables in cluster I, however (spelling of RḌY, causative type, spelling of I-*w* causative and agreement type), they always have the opposite relationship to them.

Table 85 Relationship between spelling of RḌY and *ẓll* or dedicatory inscriptions in standardized residuals

Spelling of RḌY	Relationship to *ẓll*	Relationship to dedicatory
Plene	-2.3	4.9
Defective	.8	-1.7

Table 86 Relationship between causative type and *ẓll* or dedicatory inscriptions in standardized residuals

Causative type	Relationship to *ẓll*	Relationship to dedicatory
h-causative	-1	3.2
ʾ-causative	.2	-.8

Considering that these three variables also cluster together and seem to share a historical dimension (see § 7.3.2 Cluster I: ʾ/h-causative, I-w causative,), the general dedicatory inscriptions seem to occur more frequently with the more archaic forms, while the *ẓll* inscriptions seem to occur more frequently together with the more progressive forms.

Table 87 Relationship between I-*w* causative and *ẓll* or dedicatory inscriptions in standardized residuals

I-w causative	Relationship to *ẓll*	Relationship to dedicatory
Defective	.5	-.4
Plene	-1.2	.9

This may suggest that the general dedicatory inscriptions are older, or belong to a different register than the *ẓll* inscriptions which favors a more linguistically archaic style. However, since both types of inscriptions were composed using similar formulae (see Chapter 3 - Genres and Compositional Formulae) and they have a similar relationship to script style, assuming that they belong to different linguistic and stylistic registers is problematic. It does need to be kept in mind, however, that the *ẓll* inscriptions are by far the most attested genre of inscriptions (243), after graffiti (1443) and followed by dedicatory inscriptions (83) (see 7.1.2.2.2 Genre). It is tempting to think the *ẓll* inscriptions may have had a special linguistic register associated with them, based on the special place within the corpus. Looking at the distribution of the linguistic variables, however, it seems instead that the dedicatory inscriptions triggered the preference for more archaic linguistic forms. So despite the fact that the *ẓll* inscriptions are clearly dedicated to the main deity of the oasis, *ḏġbt*, and they had a religious character, they do not seem to have been closely associated with a special archaic linguistic register. This may say something about the nature of the *ẓll* ritual. If we imagine a performative aspect to the *ẓll* inscriptions, a spoken part to the ritual may have contributed to its language developing more closely along with the spoken register, which may explain the occasional use of even more progressive *ṭ* spellings for *ẓ in the *ẓll* inscriptions. However, even spoken ritual language is often archaic and not a direct reflection of the spoken language in the society in which it is used. Another possibility might be that even though the *ẓll* inscriptions follow the general formulae of the dedicatory inscriptions, their function was not purely religious. The association between the *ẓll* ritual and crops and what seem to have been names of agricultural plots, may suggest that apart from their ritual association, the *ẓll* inscriptions also had a legal function, related to taxes or property rights. Such a legal function may have influenced the language used in them to be closer to the language of documentary texts, which tend to be linguistically more progressive (see chapter 1, scribal school and variation). Based on the currently available material it is difficult to say whether the nature or the age of the rituals caused the difference in language preference between the *ẓll* and dedicatory inscriptions. It is clear, however, that the dedicatory inscriptions seem to be the genre with a special archaic linguistic register associated with them.

7.3.4.1 Agreement and the *ẓll* inscriptions

Agreement and genre do not correlate in a significant way with only a moderate effect size, but the pattern of co-occurrence of these factors is still interesting. The relationship between genre and full plural agreement does not say anything about the language used for the inscriptions, as there is no linguistic variation in expressing plural agreement. The positive relationship between dedicatory inscriptions and full plural agreement therefore only means that there are more attestations of dedicatory inscriptions made by more than two people than expected if there was no relationship between these two factors, but not as many as to give a significant result. So their correlation might still be due to chance.

While agreement type and genre do not have a significant relationship ($p = .89$), the ẓll and other dedicatory inscriptions do pattern with agreement type in similar directions as with the other linguistic variables. Especially interesting is the relationship between the most progressive neutralization and the genre of the inscription: it has a negative relationship with general dedicatory inscriptions but a slightly positive relationship with ẓll inscriptions, again showing a preference for more progressive linguistic forms in the ẓll inscriptions and a dis-preference for them in dedicatory inscriptions.

Table 88 Relationship between agreement type and ẓll or dedicatory inscriptions in standardized residuals

Agreement type	Relationship to ẓll	Relationship to dedicatory
Full plural agreement	-1.1	1.9
Full dual agreement	.5	-.5
Partial dual agreement	.6	-.3
Only on noun	.8	-.5
Mix dual	.5	-.5
Mix	1.3	-1.2
Mistake	1	-1
Loss of the dual	.8	-1.3

7.4 Conclusions

Looking at the absolute number of occurrences, the forms that are most common in the writing tradition in fact seem to be the more linguistically progressive forms. The more archaic forms are usually the less frequent form.[293] However, at the same time they correlate significantly with the more formal script styles and genres. Especially the use of the dual (part of the variable agreement), which only correlates significantly with script style, seems to be driven by the register of the inscription. However, the *plene* spelling of RḌY, which seems to have a historical component, also correlates significantly with script style and genre.

Additional support for the high prestige of some of the more archaic features can be seen in the inscriptions in which the authors seem to have been confused about their usage. For example in the inscription in which both an *h*-causative and a ʾ-causative occur (Al-Saʿīd 1419/1999: 4–24, no. 1, side 1-2); the inscription in which two dedicants agree with a dual verb but plural resumptive pronouns are used (U 019); the inscription which is completely in the singular except for the resumptive pronoun in the blessing formula in the dual (AH 120); and the occasional use of *ṭ* spellings for *ẓ (e.g. AH 009.1). This suggests that the authors of the inscriptions were trying to use forms that they were (no longer) familiar with in their day-to-day speech.

On the other hand, the fact that the more archaic forms were not adopted as the written norm, shows that even though register had some effect on their usage, the archaic forms did not have the kind of

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[293] The spelling of *ẓ is the only exception.

prestige that would make them the goal variety of the entire written register. Instead, they seem to have existed in parallel to the more progressive linguistic variables and their use was possibly more of an artistic choice. The physical presence of other (possibly older) inscriptions with archaic linguistic forms in the landscape may have inspired the authors of some of the inscriptions to (attempt to) copy their archaic language.

Given the fact that the archaic forms were clearly not the linguistic norm of the inscriptions, and therefore register alone cannot explain or predict their usage, it may be suggested that script style and genre are not merely indicators of register, but also underwent a historical development themselves. In the case of script style this would mean that technically less demanding manners of inscribing became more acceptable for more formal inscriptions as well (as we can see in the wide variety of styles the *ẓll* inscriptions were executed in). Within genre, the *ẓll* inscriptions contain less archaic linguistic forms than the general dedicatory inscriptions. This clearly shows that they form two separate genres, despite their overlap in formulaic usage and register, based on the script styles used to produce the inscriptions. The use of a special archaic linguistic register used in the dedicatory inscriptions could mean that they are simply older than the *ẓll* inscriptions. If we consider the register of the inscriptions to be leading, however, it might suggest the *ẓll* inscriptions did not have a purely religious function, which meant that the archaic linguistic register associated with religious texts was less appropriate for them.