

Allowable variability: A preliminary investigation of word recognition in Navajo

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Abstract

Because speakers do not produce uninflected or 'base' forms, and listeners do not hear them, the shape of the word lexicon in languages with highly productive word formation processes directly addresses the conflict between morphological theories which assume the primacy of word formation processes (Anderson 1992, Bybee and Moder 1983,) and theories of word recognition such as the Cohort theory (Caramaza, Laudana and Romani 1988, Marslen-Wilson 1978) which assume words are stored. How does a relationship between inflected forms, or between inflected forms and their more abstract base, get established? One (common) assumption is that less fluent speakers have less complete grammars and their mistakes reflect their less complete or 'imperfect' knowledge of structure. Since the productive morphology indicates a more complex word processing device and presumably a more complex word lexicon, these errors may reasonably reflect the principles that underlie the organization of the lexical system. In this study, designed to test the feasibility of this strategy, we produced a list of 100 Navajo forms, half of which were 'correct' Navajo words and half were 'incorrect', containing mistakes that less fluent Navajo speakers actually made. The Navajo verbs were categorized into 5 groups, reflecting five types of commonly occurring errors. We found that all speakers accommodated 'errors', with differences in the kinds of errors more and less fluent speakers tolerated. The results bear on the issue of the role context, fluency and morphological structure in the recognition of morphologically complex words.

1. Introduction.

The question of the nature of lexical presentation and word processing in morphologically complex languages is one that needs addressing in any theoretical framework. Because speakers do not produce uninflected or 'base' forms, and listeners do not hear them, the shape of the word lexicon in languages with highly productive word formation processes directly addresses the conflict between morphological theories which assume the primacy of word formation processes (Bybee 1995, Anderson 1992, Bybee and Moder 1983) and theories of word recognition such as the Cohort theory (Caramaza, Laudana and Romani 1988, McClelland and Elman 1986, Marslen-Wilson 1978) which assume words are stored. How does a relationship between inflected forms, or between inflected forms and their more abstract base, get established?

Our working assumption is that less fluent speakers have less complete grammars and their mistakes reflect their less complete or 'imperfect' knowledge of structure. Since the productive morphology indicates a more complex word processing device and presumably a more complex lexicon, these errors may reasonably reflect the principles that underlie the organization of the lexical system. In effect, the mistakes of less fluent speakers may be seen to indicate where listeners/learners break apart and assemble words. Any systematic differences between less and fully fluent speakers may be seen to have relevance to the structure of the word and by extension to the structure of the lexicon and the processes that build inflectional paradigms.

In this study, we produced a list of 100 Navajo forms, half of which were 'correct' Navajo words and half were 'incorrect', containing mistakes that less fluent (not non-fluent) Navajo speakers actually made. The data were drawn from the experience of teaching Navajo language classes by one of the co-authors. The Navajo verb forms were categorized into 5 groups, reflecting five types of commonly occurring errors. None of the speakers, even fully fluent speakers, scored 100% on these tests. We found that all speakers accommodated 'errors'. However, there were interesting differences in the kinds of errors more and less fluent speakers tolerated. We take this to indicate that fluent speakers deem acceptable, or are willing to accommodate, particular kinds of variability in word processing, storage and retrieval. The results of this feasibility study bear on the

issue of the role context, fluency and morphological structure in the recognition of morphologically complex words.

The second, concomitant, aim of this study is to provide instructional tools for Navajo educators. It is hoped that tests like these will allow more objective measures of a student's fluency and learning, thus facilitating classroom instruction of the Navajo language. We also hope that this study is a basis for work on developmental aphasia.

2. Navajo verbal forms.

The following is a short section on the structure of the Navajo verb form. The Navajo verb is a fully inflected form that stands as a complete proposition. Pronominal marking is obligatory in Navajo, and it has been argued that the NP's in Navajo are adjuncts to the verb (Willie 1991, Willie & Jelinek 1995, Jelinek 1989). Every verb in Athabaskan has at least two morphs: the portmanteau mode/subject morph, and the verb stem. It has been argued that these two morphs are the base of two distinct syntactic constituents, an auxiliary or 'infl' (I) and 'verb' (V) constituent (McDonough 1990, 2000). The inflectional constituent (I), called the 'conjunct' domain, holds the morphemes marking mode (tense) and subject, and the verb constituent (V), holds the verb stem. Athabaskan verbs are minimally bisyllabic, one morpheme from each of these two constituents is necessary to form a word. Each of these constituents may also include prefixes. The (I) domain has an additional set of object and 3rd person agreement markers on its left edge. There is a third domain in the word, of proclitic-like morphemes that sit at the left edge of the (I) constituent, called the 'disjunct' domain (D). The boundary between these two constituents has been traditionally marked with '#' in glosses (Kari 1975). Some examples and glosses of verbal constructions are provided below. The disjunct ('D'), conjunct ('I') and verb stem ('V') domains are marked:

- (1) **yishcha** 'I cry.' (Young and Morgan 1987)
 [(y)ish] [cha]
 [∅imp/1s] [cry:imp]
 I V

- (2) **honʎl•d** ‘I/he came.’ (Young and Morgan 1987)
 [ho + nʎ] [l•d]
 [3s + nper/1/3/s] [‘appeared, came’:perf]
 I V
- (3) **hasč-bʎʎs** ‘I drove it up.’
 ha # [sč] [- bʎʎs]
 ‘up’ # [sperf/1s] [cl - ‘move hooplike object’: perf]
 D I V

In (1) is the minimal verb, with the two obligatory morphs, the mode/subject portmanteau /ish/ (ø-imperfective/1st person singular) and the imperfect form of the verb stem -cha ‘cry’. These two constituents must agree in their aspectual specification (here imperfective) (Hardy 1969). The form in (2) contains two conjunct morphs, and the verb stem, (3) has morphemes from all three domains. The boundaries between the ‘disjunct’ and ‘conjunct’ constituents, and between the ‘conjunct’ and verb constituents are areas of phonological activity.

3. The study.

For this study we produced a list of approximately 50 Navajo forms, which were divided into five groups of around 10 pairs each (see figure 3 for distribution). Each of these forms was matched with an ‘incorrect’ Navajo form, resulting in 100 verbal forms. The ‘incorrect’ forms reflect mistakes that less fluent Navajo speakers actually make. These errors were collected over several years by the co-author from her experience teaching Navajo language classes.

The word list was not easy to put together. Because of the complexity and productivity of the language’s morphology, it is difficult to invent ‘wug’ forms in Navajo, that is forms that are not able to be associated to meaning. There are two primary reasons for this difficulty. Firstly, since a word is a proposition in Navajo, containing many inflectional morphemes essential to building a proposition, the notion ‘new’ word is not particularly relevant.¹

¹ This type of system is a challenge to learnability theories which assume vocabulary development based on word acquisition. It is unclear what it means to have a vocabulary where most words are both poly-morphemic and associated to propositions. The ecology of this language, for instance the uneven and highly constrained distribution of phonemes, seems to inhibit dependence on notions like vocabulary size to explain the emergence of phonological regularities, as has been offered for English type systems (see Hay et. al 2000, Caramaza et. al. 1988).

The second reason is that segmental contrasts are strongly neutralized outside the stem morpheme, resulting in great deal of homophony among the large inflectional group of morphemes.² Stem onset is the single place in the word where the full set of contrasts are found. This reduces the sound variability that is likely to be found if the phonemic inventory were distributed across the word. The problem lies at the heart of the issue. The impetus for this project came from questions the Navajo co-author had about the nature of the ‘errors’ less fluent speakers were making. The nature of the errors is characterized by mismatches between phonological, semantic and syntactic phenomena within the form. It is the mismatches that indicated the disfluencies, rather than an identifiable lack of competence in an autonomous linguistic component, such as phonological or syntactic. We feel that attention to the autonomous-less-ness of morphological productivity is an important aspect of this kind of testing.

The forms we collected were categorized into 5 groups, reflecting what we considered five types of commonly occurring errors, ranked in order of ‘allowable variation’ by a native speaker. The groups are: 1) agreement errors between the two obligatory parts of the verb, 2) aspect mismatches, 3) valence anomalies, 4) postpositional agreement errors and 5) ‘disjunct’ prefix errors (see the appendix for a more detailed discussion of the list). The errors are all morpho-semantic (valence mismatches) or -syntactic (argument agreement errors), and they are often realized as small phonological changes at a specific locus in the word. There is a difference in the physical location of the error in the word between group 1 and group 5. Group 1 involves errors whose locus is in a mismatch between the two obligatory morphs in the verb. Group 5 contains morpheme arrangements that listeners may be more willing to accommodate, or less willing to mark as ungrammatical. Group 5 errors are on the left edge of the word and involve ‘disjunct’ morphemes.

Unlike classic ‘wugs’, there are no examples that can be identified as purely phonologically new forms in the list. In the process of building the wordlist and running the subjects, we discerned that a listener’s linguistic competence is best graded in what s/he deem to be allowable variability (thus the use of scare quotes around ‘good’ and ‘bad’). Thus, the groups were ranked from least to most acceptable variation; the errors in group one were most likely to be

²See Young and Morgan 1987:30ff for a list of the morphemes available to the verb. See also McDonough (1999) for a discussion of the effect of this grouping on functional morphemes on the phonological typology of Navajo.

deemed unacceptable by a fluent native speaker, group 5 the most likely to be accommodated. We will discuss the implications of this below.

3.1 Method.

The list of ‘bad’ and ‘good’ forms were recorded being spoken by two fluent native Navajo speakers, a male and a female, using a Marantz PDM222 with a head mounted mic. The speakers practiced the forms on the list before the recording session to avoid stumbling over the pronunciation of the ‘bad’ forms, which were hard for speakers to produce.

The recorded forms were digitalized using SoundEdit on a MacG3. The forms were randomized and presented as auditory stimuli in a response time experiment using Cedris Superlab software on a portable Mac. Ten listeners of various levels of fluency were recruited as participants in the study. The participants sat in front of the computer in an office in the American Indian Studies Department at the University of Arizona. Participants wore headphones. They were presented with a button box with colored coded buttons. Participants were instructed in Navajo. Two related forms were presented to them, they were instructed to chose which one was more correct. The next set of forms were presented only after a response was given. The test ran about 15 minutes per session. The response times and judgments for each item and subject were collected and analyzed.

3.2. Results

We coded correct responses as responses that chose the ‘good’ form over the ‘bad’ form in the pair. Incorrect responses were those that chose the ‘bad’ form. The chart in figure 1 shows the percentage scores of the ten participants in the study. Note that no one scored 100%, although some of the participants were fluent Navajo speakers. For most subjects, the correct / incorrect response reflected a better than chance score. However, some listeners did considerably better than others as the graph in figure 1 shows.

Response times (RT’s) were recorded for each trial. The response times were very varied, from immediate responses to several that took as long as 2 or 3 seconds. The raw RT’s are not good measures of the listener’s judgments, since the participants were not asked to respond quickly and were given as much time

as they liked for each trial. However they do serve to indicate a trend in the data. In figure 2 is a graph of the response times for the wrong and right answers for each of the 5 groups. First, the response times between correct and incorrect judgements were not significantly different. However, there was a difference in the standard errors for the two groups. The standard errors for the response times were consistently smaller for correct judgements than for incorrect ones. Participants were more consistent in their response time when their grammaticality judgements were accurate. It is not clear to the authors what these differences in the standard errors between the two groups indicate, other than a discernable and consistent trend in the data. It may be simply that the correct forms were easier to process than the incorrect ones.

Fisher's PLSD for RT

Effect: type

Significance Level: 5 %

	Mean Diff.	Crit. Diff	P-Value	
1, 2	-600.2242	313.5054	.0002	S
1, 3	-372.3242	337.5713	.0307	S
1, 4	-372.9354	337.5713	.0304	S
1, 5	-851.9509	328.1568	<.0001	S
2, 3	227.9000	331.1813	.1770	
2, 4	227.2889	331.1813	.1782	
2, 5	-251.7267	321.5798	.1247	
3, 4	-.6111	354.0477	.9973	
3, 5	-479.6267	345.0831	.0065	S
4, 5	-479.0156	345.0831	.0066	S

Table 1. Scores for the between group response times

Second, although response times of the correct vs. incorrect forms varied with the parameters of speaker and group type, there was no significant interaction between group type and response time and grammaticality. Based on the data, for none of the 5 groups was it easier (or more difficult) to tell the good from the bad forms.

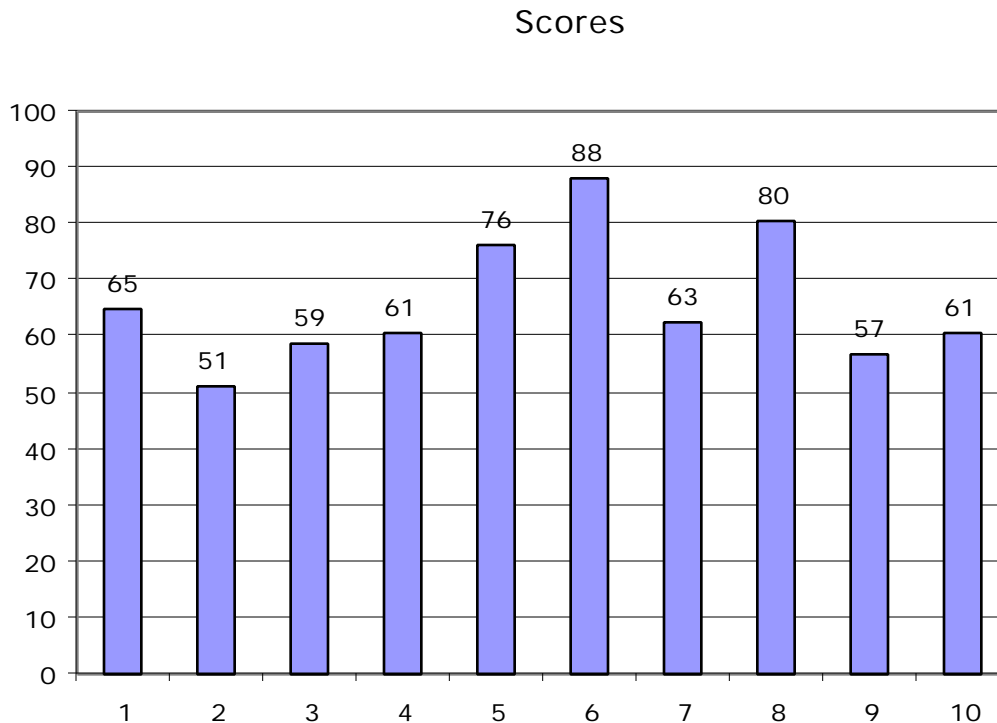


Figure 1. Percentage scores of the ten subjects.

Third, there was a between the groups effect. Groups 1 and 5 were significantly different from each other in their response times ($p > .0001$). At 5%, group 1 was significantly different from all the other groups. Group 5 was significantly different from all groups but group 2. The response times for group 5 were the highest and for group 1 the lowest.

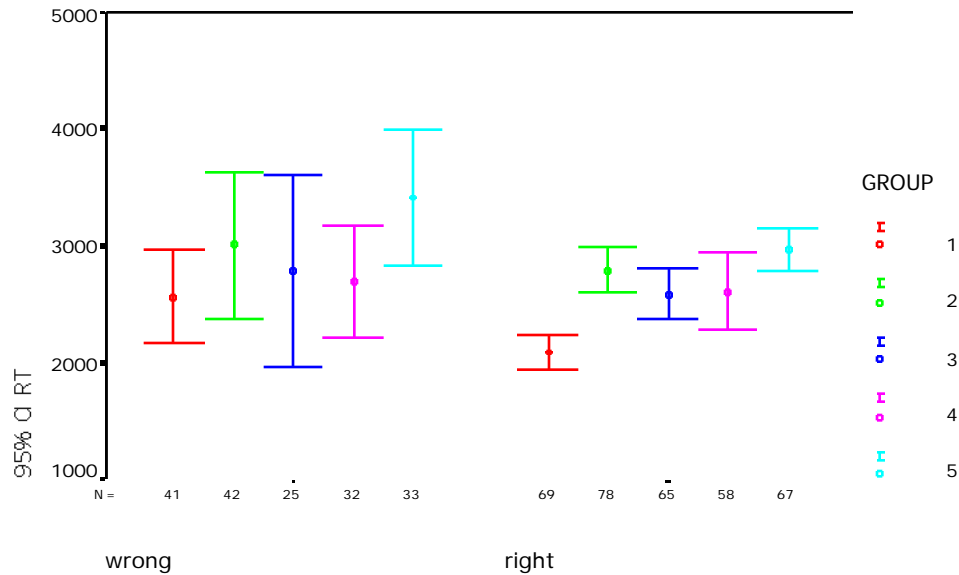


Figure 2. The response times by group for the correct and incorrect responses. Bars indicate standard error.

4. Discussion.

There are several points of interest in this study. First, this was a feasibility study, done to test the design and suitability of this sort of task on Navajo speakers. There are very few studies of morphological processing in languages of this complexity. This fact is compounded by the relative lack of complete description of the language structure, although Navajo is one of the best described of any indigenous language. We believe that the results of this study indicate that the design is practicable.

One issue that arises is the nature of the differences between the good and bad forms. Often these involve very small phonological changes in the word. The difference for instance between the pair 2.6 (wrong <hadah ch'čldloozh> versus correct <hadah ch'ččldloozh> 'I went over the edge and down on all fours') is vowel length. This is not however a phonological error. The vowel length difference in this pair indicates a fluent speaker's awareness of the phonological behavior of particular class of prefixal morphemes, here the disjunct <ch'ŋ>

‘horizontally outward’, and it’s interaction with the aspectual marking of the inner constituents. The short vowel is found in the imperfective form of the verb, <ch’čldl°sh>. The verb stem in the form in 2.6 is the perfective form using the perfective form of the stem <-dloozh>. Young and Morgan (1987:274d) describe it this way: the disjunct prefix <ch’č> sometimes takes the <yi> perfective form of the verb. When it does, the disjunct prefix <ch’č> takes the phonological form <ch’čč>. Only when it takes the imperfective does it take the phonological form <ch’č>. (Young and Morgan 1987:274dff give paradigms of these and related verb forms.) A gloss follows (<hadah> ‘downward from a height’, <ch’č> ‘outward over an edge, <l-dl°sh> ‘move on all fours’)³:

hadah ch’ččldloozh	*ch’čldloozh
hadah ch’č # [[yč] [l-dloozh]] _{y-perf}	
‘down..’ ‘out..’ # [yperf/1s] [cl- ‘move on fours’ perf]	

While a phonological description of this vowel length phenomenon is possible, a phonological explanation is not. The vowel length alternation, like most phonological changes in the word, is highly conditioned by morpho-syntactic and semantic phenomena. It is clear that a speaker is not learning phonotactics when s/he learns this kind of sensitivity to form. The authors believe that the errors that participants made are best characterized as ‘analogic misanalysis’, i.e. mismatches to word internal paradigms (Schreuder and Baayen). One way to think of this is that less fluent speakers may have less robust paradigms.

Another issue concerns the difference between the 5 groups. For instance, the first group contains the most identifiable errors, and thus the least acceptable to a native speaker. We assumed that fluent speakers would be considerably less inclined to accommodate alternate constructions in these kinds of morpheme arrangements. The opposite is true for group 5. This concerns the difference in the locus as well as type of errors that are exemplified by these groups.

³ Note that this form is evidence for what we are calling the weakness of the left edge of the word. Young and Morgan 1987 report both <hadah> and <ch’č> as disjunct prefixes from ‘position Ib’. This puts them inside the verbal complex. Young and Morgan 1987 also note that <hadah> may be used independently. The final coda consonant in <hadah> is evidence of this independence. This is not an isolated phenomenon. Many disjunct prefixes of a certain class (postpositional indirect objects for instance (Young and Morgan 1987:44)) exhibit this independence. Navajo speakers are very clear about when a morpheme belongs inside the complex and when it does not. What determines this independence is an unexplored question.

There is evidence that the left edge and the right edges of the word do not have boundaries of a similar strength, with the right edge being a strongly marked edge, and the left a weakly marked edge. McDonough (1999, 2000, 2000b) has shown that the stem, which is the rightmost morpheme in the word, has properties of prominence often associated to the phonological notion ‘stress’. The consonants and vowels in stems are considerably longer than any others in the word. This is the single place where the full set of consonantal and vocalic contrasts occur, and pitch range is expanded in this morpheme. These properties have the effect of producing a very distinct auditory profile at the right edge of the word, in particular in the final syllable, the stem. We expect that fluent Navajo listeners reflect the difference between these two word edges in their accommodations to alternate morpheme arrangements at the left edge.

Also, the minimal verb in Navajo consists of two obligatory parts, a verb stem and an adjacent mode/subject morpheme. (For a list of the paradigms of these mode/subject morphemes see Young and Morgan 1987:200ff.) Group 1 contains errors in agreement between these two morphemes. We expect that fluent speakers would recognize these errors, and thus be quicker to react to them and be less tolerant of variation among them. The RT measures may reflect this difference.

Since the participants were not controlled for their level of fluency, it is difficult to draw conclusions from the data. We intend to pursue an evaluation of the listener’s fluency by independent means—such as an evaluation of the subject’s use of Navajo—and to match it against the results of this experiment. If there is a correlation between the score on the test and the speaker’s fluency, this study may provide a viable method for testing the fluency. A fluency test of this sort is potentially a valuable community resource. It would, for instance, provide an objective means for evaluating students who enter a Navajo language class, or it may provide a test for disfluencies in developmental aphasia, or it may help evaluate learning disabilities. We feel that this method shows promise. Further work on this project will have as a component the development of this type of fluency test. We hope to develop this as a standard fluency test for Navajo speakers entering Navajo language classes.

5. Conclusion.

The results bear on the issue of the role context, fluency and morphological structure in the recognition of morphologically complex words. Participants differed in their scoring on the test. Not even fluent speaker scored 100%; we take this to be a result of their accommodation of certain kinds of forms. Participant 6 for instance, the subject with the highest score, made no errors on group 1. This is the group whose errors we believe are the most difficult for fluent speakers to accommodate. Participant 2, the subject with the lowest score, made several errors in group 1. While on the whole participants did not do better on one group than another, the response time patterns showed significant difference between the groups. The correct forms were identified with more RT consistency than the incorrect forms. We believe this test is worth developing. We plan a revision of the word list, for a baseline study using fully fluent speakers.

Acknowledgements: The work was supported by a grant from the University of Arizona. Our thanks to Eloise Jelinek, Merrill Garrett, Tom Bever, Joel Lachter, Dick Demers, Audrey Holland, none of whom are responsible for the contents. Our thanks also to the audience at the SSILA session of the LSA, January 2000.

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Appendix to ‘A feasibility study of Navajo word recognition’: Word list

The co-authors decided on five classes of errors: (1) Pure agreement, (2) aspect matching, (3) valence anomalies, (4) postposition issues, (5) morphological competency. The first column contains errors ‘bad’, the second the ‘good’ forms. The categories are discussed after the list.

(1)	pure agreement		
	bad	good	
1.1	sikaah stem:imp	sikʃ	‘container of x sits’ (perf)
1.2	yishdee’ stem:perf	yishdʃʃh	‘wipe’ (imp)
1.3	yishzʃʃs pre:imp	yʃʃzʃʃs	‘dribble little things’ (perf)
1.4	sʃ-hʃʃʃ pre:0/d stem: future	sʃ-hʃ diyeeshyʃʃʃ	I killed him’ (perf →) i’ll kill him (fut)
1.5	bʃnʃshkʃʃ pre:pers/imp stem:perf	bʃnʃkʃʃh stem :imp per:imp	‘you tracking him down’ (imp) itracked him down (perf)
1.6	ahʃsiskad stem:per pre:wrong classifier	ahʃzkad	‘he clapped his hands’ (sperf →)
1.7	deeszʃʃh stem: impf	deeszʃʃʃ	‘I will tan/scrape it’ (fut)
1.8	yʃnʃʃaah stem:imp pref:perf	yʃnʃʃʃ	‘you brought something round’ perf
1.9	anʃʃʃʃ stem:fut pre: perf	adʃnʃeshʃʃʃ	‘I will steal’ (fut)
1.10	yishtʃʃʃ stem:fut pre:imp	deeshtʃʃʃ	‘I will wipe it’

1.11	ch'čćnisht'ee- stem fut pref; perf	ch'čćnisht'e'	'I let him back out' perfective
1.12	k'ćnihizin	k'ćniidzin	'we want friendship'

Type (1) are simple mismatches between the tense/aspect of the prefix and the stem. For example <si> is the 1st person singular form of the s-perfective and the stem is the perfective form <kaad>.

- (1) *sikaad
 [si]_{perf} [kaad]_{imp}
 sperf/1s 'kaad'imperf

Since the aspect of the person number conjugation (perf) must match the aspect of the stem (perf), this constitutes an agreement mismatch between the aspect of the person number morpheme and the aspect of the stem. The form <sikf>, the stem is in its perfective form <kf>. All of the examples in this section are of this type. This is the most straightforward of the types.

(2) Aspect mismatches

	bad'	'good'	
2.1	si-jid pre:wrong per (s)	nʃjid	'I back-carried him' n-perf:
2.2	nč-'a' stem:perf ni+sperf	dč-'a'	'I send him off' di+sperf
2.3	diniy; pre: d +nperf	niniy; needs ni+nperf	'I am tired'
2.4	kintahji' ninč-bʃʃz needs <nʃ>	kintahji' ninʃ-bʃʃz	'I drove it as far as town' perf
2.5	d; ; di'yishbaa- 0imper	d; ; di'nishbaa- nimperf	'I'm closing it' requires n-imperf it's the prefix that requires it.
2.6	hadah ch'čldloozh	hadah ch'ččldloozh	translation YM278
2.7	k'ʃhinistsee-	k'ʃhideesti-	'I chopped it in half'
2.8	ch'ʃnaash; ; h the <na> means down	ch'ʃn; sh; ; h the <na> is iterative	'I walk out again'
2.9	nikinis'eez pref needs a <di>	nikidinis'eez	'I have my feet on the ground'
2.10	bik'idiinist'a'	bik'inaast'a'	'it flew over him'
2.11	bi-shich'•' yʃnʃ; ; zh needs <di>	bi-shich'•' dʃnʃ; ; zh	'you have started to come visit' perf both fine without shich'•'
2.12	bi-nani' ; ; zh pre:imperf stem perf	bi-yʃnʃ; ; zh	'you came with him'

Type (2), 'aspect matching', is similar to type (1) in that the mismatch is between two components in the verb, but there is an additional level of complexity since the mismatch has an important semantic component. It is not an mismatch in

aspect agreement between the two components. Navajo is a ‘verb classification’ language; the verb roots exhibit a rich set of semantic specifications that interact with aspect. The examples in this group are mismatches between the inherent ‘type’ of the verb and the aspect of the prefix complex. Since Navajo can draw much finer aspectual distinctions than English, because these distinctions are morphological and not periphrastic, it is difficult to describe these mismatches with reference to English. However, these mismatches are somewhat similar to distinctions found between verb pairs like finish/ stop and the adverbial phrases that can be used with them.

(2) *he finished for an hour vs. he stopped for an hour

with the caveat that there is a great deal more range for this type of construction in Navajo than in English. An example from Navajo follows:

(3) **si-jid** **ni-jid** ‘I back-carried him’

The <si> is the s-perfective. The perfective verb stem <jid> ‘back carry’ requires a n-perfective infl stem <ni>. <ni> indicates the end of action (atelic). For the differences between these two perfectives see Young and Morgan 1980, 1987, Young and Morgan & Midgette 1992. These examples constitute a set of forms that indicate a speaker’s access to complex knowledge about the semantic mapping between morphological structure and meaning. In these examples, we are simply trying to establish a classification of some of more common mismatches that speakers were found to make.

(4) Postposition			
4.1	y^hn^h i i zh	bi-y^hn^h i i zh	'you came with him' perf stem is dual
4.2	naash'aash	bi-naash'aash	'I am walking with him' stem is dual, imp
4.3	shik^h 2 args, needs 3	shaa yin^hk^h	'he gave it to me' perf me pp
4.4	ninahi-niih	nah^h-niih	'you bought it' this one's too hard see YM528
4.5	yee nahashne' 1st person takes <bi>	baa nahashne'	'I talk about him' imperf
4.6	shich'•' d^hcsdzil	bich'a' d^hcsdzil	'I put my strength to it' perf
4.7	haashkai	bi-haashkai	'I came up with them' kai = pl
4.8	da haashkai	bi-haashkai	'I came up with him'
4.9	bi-daahashyⁱ		
4.10	bi-yishke' ke' is dual	yiike'	'we (2) were left behind' perf YM:795 transitional
4.11	yijj^hcc'	biih yijj^hcc'	'we 3 ran into it'

Type 4 are postposition errors. In these forms a listener's proficiency with the use of the postpositions is tested. In some there is no postposition where one is needed. This occurs when the verbal argument is di-transitive and needs three arguments, one of them realized in the postposition. Thus this is a kind of valence error. We have also included one example (4.10) where the form contains a postposition and does not need one.

In (4.3) the verb stem is di-transitive, it needs three arguments, with the 'to me' in a postposition. There are several examples of this kind.

(7) *shik ^h	shaa yin ^h k ^h
[sh -I] [k ^h]	shaa [yin ^h] [k ^h]
[1 st Do 3 ^r Su] [k ^h]	me-with [3 rd Do -] [k ^h]

'he gave it to me'

The form in (4.10) is the opposite of the others (4.1, 4.2, 4.2, 4.7, 4.11). It has the postpositional <bi> and doesn't need it:

- | | | |
|-----|--|---|
| (8) | *bi-yishke'
bi- [ish] [ke']
[1 st Su] _{imp} [ke'] _{imp} | yiike'
[ii] [ke']
[2ndDual]_{imp} [k'e]_{imp}
'we (2) were left behind' |
|-----|--|---|

The forms in (4.7) and (4.8) are related to each other by the error in the postpositional argument. The verb stem <kai> needs a plural object. The form in (4.7) has a singular object, (4.8) has the wrong postposition.

- | | | |
|-----|---|---|
| (9) | *haashkai
*da haashkai | bi-haashkai
bi- [ha # [ish]imp [kai]imp
him-with ['up' [1st Su]imp [kai]
'I came up with him' |
|-----|---|---|

In (4.6) the postposition contains the wrong argument <shi> 1st person instead of <bi> 3rd person agreement.

- | | | |
|------|--|---|
| (10) | *shich'•' dčsdzil
me 'up to' [dčsh]perf [dzil]perf | bich'a' dčsdzil
it-'up, to' [dčsh]perf [dzil]perf
'I put my strength to it' |
|------|--|---|

(5)	Disjunct prefix		
5.1	da nihi-h^ozh <da> in wrong place, nihi- is pp	nihi-dah^ozh	‘we are happy’
5.2	da bi-hooghan <da> as above	bi-dahooghan	‘they live with them’
5.3	honaagaii	naahoogaii	‘the whole area became white again’
5.4	daan_ii cha	n_ii daacha	‘they are crying again’
5.5	n_ii nihi-h^ozh misplaced <n _i i>	nihi-n_ii h^ozh	‘we’re happy again’ ‘you (2) are ...’ either
5.6	na’_i dahashniih misplaced <’ _i da>	’_i danashniih	‘I’m buying it for myself’
5.7	nih^oneez <ni> goes with neez in non- nueter	h^oneez	‘it (area) is long’
5.8	shich’•’ ’_id_ideeshx_{CC}- double makring on IO	’_id_ich’•’ deeshx_{CC}-	‘I will take it to myself’ (big load)
5.9	yin_ii gish <n _i i> in wrong place	n_ii neigish	‘he’s cutting it again’ impf
5.10	n_ii han_id_i h <ha>	han_ii n_id_i h	‘he’s coming up again’ impf

Type 5. Disjunct displacements. In these examples, the disjunct prefixes appear in the wrong position with respect to the postpositions. We think of these as disjunct displacements. In the pair below <nihi-> is the 2nd dual marker ‘with us’, <da> is the distributive marker. The morpheme <da> is a disjunct morpheme, as such, its place is at the right edge of the word, as it is placed in the starred form below.

(11) *da nihi-h^ozh nihi-dah^ozh ‘we’re happy’

However, in this starred form, the <da> is placed outside the 2nd dual marker, the postpositional <nihi> ‘with us’. This dual marker is not part of the agreement complex within (I) constituent of the verb where it is forced by the presence of the disjunct <da>. The gloss, of course, is not an accurate representation of the syntactic structure, which is more accurately glossed as ‘it is peaceful, among us’. The form is a neuter imperfective construction (Young and Morgan 1987:356).

- (12) **nihi-dah^ozh**
 nihi- [da # [h^o] [zh]]
 ‘with us’ distr # [3rd area] [be peaceful]

The incorrect forms misplaces the <nihi> inside the conjunct domain:

- (13) ***danihi-h^ozh**
 [da # [(nihi-) h^o] [zh]]
 *distr # [(‘with us’) 3rd area] [be peaceful]

All the forms in this group contain errors of this sort.

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