Syntax 0:0, Month Year, 0–0

(See Supplementary Appendix A, available online, for XXXX)

What You See Is What You Get~Get: Surface Transparency and Ambiguity of Nominalizing Reduplication in American Sign Language

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Abstract. Nominalizing reduplication in American Sign Language (ASL) is an ambiguous process that can derive both concrete-object- and result-denoting nominals. The properties of this nominalization process, including this ambiguity, are accounted for here by appealing to the discrete and surface transparent morphology the language uses to encode components of event (Wilbur 2003, 2010) and argument (Benedicto & Brentari 2004) structure. Nominalizing reduplication is shown to be a process that nominalizes (and reduplicates) only the low portion of verbal structure responsible for encoding the event result (VP_{res}). Direct nominalization of this VP_{res} constituent yields nominals with result-denoting interpretations. Concrete object-denoting interpretations may arise when the verbal structure contains an argument classifier, evident in the handshape of the verbal predicate. In such cases, the nominal argument introduced by the classifier serves as the input to reduced-relative-clause formation, yielding a concrete-object-denoting interpretation. The interpretive ambiguity is thus reduced to ambiguity in the syntactic structure underlying the derived nominal. This approach falls in line with longstanding structural approaches to nominalization and more recent proposals regarding processes of reduplication (Inkelas & Zoll 2005).

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1. Introduction

In American Sign Language (ASL), derived nominals may be formed by reduplication. This reduplication process, termed here nominalizing reduplication (~NMLZ), is systematically ambiguous, yielding both concrete-object-denoting (1a) and result-denoting outputs (1b).[1]

(1) a. (i) [$_V$ SIT]
'sit'
(ii) [$_N$ SIT~NMLZ]
'chair'
b. (i) [$_V$ DEVELOP]
'develop'
(ii) [$_N$ DEVELOP~NMLZ]
'development'

As illustrated in figure 1, nominalizing reduplication is characterized by a short spatial trajectory (as compared to the verbal form) and increased muscular tension of the manual articulators. In this paper, I argue that the verbal structures targeted for nominalization and their interaction with the syntactic nominalizer (~NMLZ) account for these surface form properties and the interpretive ambiguity of the nominalizing reduplication process.

[Figure 1 about here.]

[1] Signs are glossed in capitalized English translations (SIT) using periods where necessary for adequate representation of the sign meaning (OPEN.DOOR). The reduplication that marks the nominalized form is glossed throughout as ~NMLZ. For reader friendliness, I use traditional glosses and translations, introducing more detailed glosses of morphological complexity and more literal translations where relevant to the discussion.

Unless cited otherwise, data is from the author's year-long fieldwork with five Deaf signers (four native, one early-exposed) of ASL. All of the consultants reported using ASL as their primary language of daily communication. Consultants ranged in age from 24 to 55 and reported some college-level education. Fieldwork sessions were conducted in the Southern California area in ASL and investigated a number of topics, one of which was nominalization.

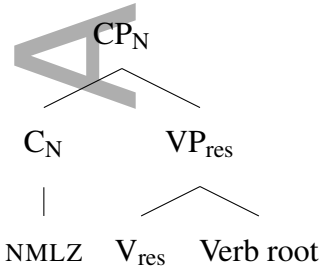
Agreement across consultants was generally high, especially regarding the inventory of nominalized forms. Some instances of individual variation did, however, emerge. For example, one signer consulted used a nominalized form LEARN~NMLZ to mean *education*, but this form was not observed from other consultants. Crucially, the variation here lies in the inventory of output forms, not in the general availability of nominalizing reduplication. On this and other topics, much work remains to be done on individual and dialectal variation in ASL and other signed languages.

I begin in section 2 by using crosslinguistic diagnostics to show that derived nominals of the type in (1b) are result nominals. ~~Therein,~~ I also provide evidence that both types of nominals are derived by the same, ambiguous nominalizing reduplication process. In section 3, I discuss event- and argument-structural components of the verbal domain, focusing on those that are relevant for nominalizing reduplication. ~~Though~~ these properties are not language- or modality-specific, their manifestation in ASL is. The movement of verbal signs through space reflects the temporal unfolding of events (Wilbur 2003, 2010), while the handshape may iconically encode an argument of the event (Benedicto & Brentari 2004). The present analysis thus shows how iconicity may be incorporated into and manipulated by the syntactic system. Such a structured approach to visual-gestural iconicity in the verbal domain is a direct extension of the idea that the interface between syntax and the interpretive systems should be as transparent as possible (Chomsky 1995). Crucially, the syntactic structures discussed are not contingent on the aforementioned iconic properties, though they are undeniably present.

~~[Figure 2 about here.]~~

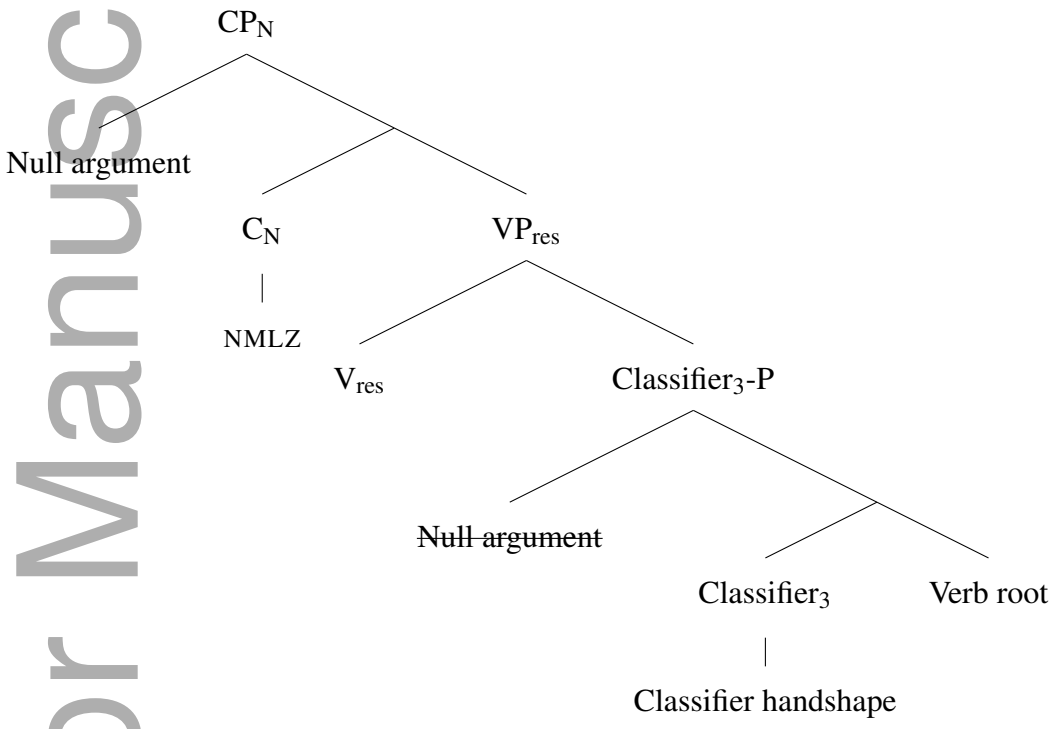
In section 4, I turn to the analysis of nominalizing reduplication. Figure 2 provides a schematic representation of the proposal, including the iconic aspects of verbal structure in ASL. As shown, nominalizing reduplication targets only the result portion of the verbal structure, "severing" VP_{res} from the verbal layer corresponding to event durativity, VP_{proc}. Nominalization of VP_{res} (2) yields a result-denoting derived nominal.

(2) **Nominalization** of VP_{res} → **result**-denoting nominal



If the VP_{res} constituent contains low argument classifier structure (evident in the handshape of the predicate), the concrete-object-denoting interpretation is available. This interpretation is the consequence of relativizing the nominal argument introduced by the classifier (Benedicto & Brentari 2004), as ~~illustrated~~ in (3).

(3) **Relativization** of classifier argument → **concrete-object**-denoting nominal



Thus, the ambiguity is reduced to whether ~~or not~~ the VP_{res} constituent serves as input to a nominalization (result-denoting) or relativization (concrete-object-denoting) structure, both of which are marked by the NMLZ nominalizer. Section 5 concludes the paper.

2. Nominalizing Reduplication: Formational Patterns and Interpretive Ambiguity

Reduplication marks a variety of morphosyntactic processes within ASL and across languages. In addition to its more iconic functions as a plurality, pluractionality (i.e., event-related plurality), or intensity marker, a common function of reduplication across languages is to mark a category alternation such as nominalization. This latter function of reduplication was first identified for

ASL by Supalla & Newport (1978), who observed that the nominal member of certain noun–verb pairs was consistently marked by short, tense, repeated movement.[2] This cluster of properties was analyzed by Supalla & Newport as the phonological specification of the reduplication process itself. A key observation of the present research, however, is that the properties of nominalizing reduplication are entirely derivable from the properties of the verbal constituent nominalized.

Supalla & Newport describe this short, tense, repeated movement as a means of distinguishing nouns from related verbs that "[express] the activity performed with or on the object named by [them]" (Supalla & Newport 1978:101–102). This is an appropriate characterization of concrete-object-denoting nominals such as SIT~NMLZ (‘chair’) in (1a), but the account leaves unaddressed the class of result-denoting nominals exemplified by DEVELOP~NMLZ (‘development’) in (1b). Subsequent research (Launer 1982, Brentari 1998) has mentioned such nonconcrete nominals as outliers in an otherwise semantically uniform class and the consistent result nominal interpretation of these outliers has gone unnoticed.[3] The productive use of nominalizing reduplication to derive result- and concrete-object-denoting nominals is the focus of the present section. The argument proceeds on two grounds. Section 2.1 provides diagnostic evidence that the nonconcrete interpretations are result nominals. Section 2.2 presents formational and interpretive evidence that the same process of nominalizing reduplication is present in both classes of derived nominals. Having supported the proposal that nominalizing reduplication is semantically ambiguous in the nominals it derives, the remainder of the paper focuses on how this semantic ambiguity can be accounted

[2] Similar, though not identical, patterns have been identified in other signed languages: see, for example, Sutton-Spence & Woll (1999) for British Sign Language, Hunger (2006) for Austrian Sign Language, Kimmelman (2009) for Russian Sign Language, and Johnston (1989, 2001) for Australian Sign Language. Moreover, formational distinctions between object (noun) and action (verb) labels have also been documented in emergent sign languages as well as child and adult homesign (Abner et al. 2015, Goldin-Meadow et al. 1994). Though it is not accurate to say that reduplication is present in all such noun–verb alternations, each of them is characterized by the use of relatively systematic modulation of the movement component of the sign to indicate syntactic category. Language-internal generalization and extension processes may then explain why movement repetition is also sometimes present in arguably underived nouns in ASL, such as the tapping movement common in name signs or the repeated movement present in certain common nouns that lack verbal counterparts (e.g. CHURCH), as noted by Brentari (1998).

[3] Klima & Bellugi (1979) and Padden & Perlmutter (1987) discuss a similar process whereby "activity" nouns (e.g., SWIMMING) are derived from verbs (e.g., SWIM) via the introduction of trilled movement, a process whose phonological analysis is also revisited by Brentari (1998). Unlike nominalizing reduplication, these activity nouns are produced with numerous repetitions and are derived almost exclusively from atelic predicates. I leave as a matter of future research the potential relationship between these two processes.

for structurally. This matter is initially addressed in section 2.3, where it is proposed that the interpretive ambiguity is correlated with the handshape and argument-structural properties of the predicate.

2.1 Evidence for Result Nominals

Nominals such as (1b) fall outside the semantic class of concrete-object-denoting nominals. Additional examples of derived nominals that fail to meet this semantic criterion are provided in (4).

(4) a. (i) [$_V$ ACCEPT]
'accept'

(ii) [$_N$ ACCEPT~NMLZ]
'acceptance'

b. (i) [$_V$ JOIN]
'join'

(ii) [$_N$ JOIN~NMLZ]
'participation'

c. (i) [$_V$ PICK-UP]
'pick up'

(ii) [$_N$ PICK-UP~NMLZ]
'acquisition'

d. (i) [$_V$ COMPARE]
'compare'

(ii) [$_N$ COMPARE~NMLZ]
'comparison' (Launer 1982)

e. (i) [$_V$ SUPPORT]
'support'

(ii) [$_N$ SUPPORT~NMLZ]
'support' (Brentari 1998)

The examples in (4) are not an exhaustive listing but do illustrate the relative productivity of nonconcrete interpretations of nominalizing reduplication. ~~Though not noted previously,~~ the semantic generalization that characterizes these nonconcrete interpretations is that they all receive result-denoting interpretations. This is evidenced by the translations of the above forms—the output,

or result, of *accepting*, for example, is *acceptance*, just as the output or result of *comparing* is *comparison*. Additional evidence for the result nominal status of these forms is provided below.

2.1.1 *Result interpretations*

In addition to ~~the above~~ interpretive intuitions, Alexiadou (2001) provides an empirical diagnostic that can be used to confirm that the referent of a given nominal is an event outcome or result: the ability to appear in a publication. Members of the proposed class of derived result nominals are felicitous in such a context:[4]

(5) a. $_i$ADOPT~NMLZ IX$_i$, IN NEWSPAPER, PRINT DISSEMINATE
'The adoption was published in the newspaper.'

b. $_i$VOTE~NMLZ IX$_i$, IN NEWSPAPER, PRINT DISSEMINATE
'The election was published in the newspaper.'

2.1.2 *Structural diagnostics*

Beyond the semantic characteristic of denoting an event outcome or result, the import of the umbrella category *result nominal* is that nominals so categorized across languages share certain structural properties. Thus, an inventory of the structural patterns exhibited by result nominals crosslinguistically can serve as diagnostic criteria for classifying a given nominalization structure as a result nominal. The diagnostic criteria used here, and elsewhere in research on nominalization structures, are those proposed by Grimshaw (1990). Table 1 lists these criteria along with the results of applying them to the proposed result nominals in ASL, as discussed in detail below.

~~[Table 1 about here.]~~

Before continuing, a general discussion of the diagnostic criteria themselves is in order. Again, the morphosyntactic properties underlying these diagnostic criteria are assumed to be the consequence of crosslinguistic structural similarity of result nominals. Reflecting on the nature of

[4] IX is an indexical pointing ~~pointing~~ sign. Subscripts indicate co-reference mediated by spatial co-location. Prosodic phrasing is marked by the comma; such nonmanual properties are not addressed in detail here.

these morphosyntactic properties, the appropriate structural generalization seems to be that result nominals exhibit little evidence of verbal structure. That is, result nominals are quite deverbal nominalized constituents, exhibiting robust nominal properties and impoverishment in the argument- and event-structural properties associated with the verbal domain. In the generative framework assumed here, this means that result nominals are formed low in the verbal structure.

Optional arguments and their interpretation (properties (ii)–(iv)). Properties (ii)–(iv) relate to the impoverished argument structure of result nominals, impoverishment that presumably is due to the formation of the result nominal prior to the introduction of the componential verbal structure that introduces the arguments of the event. With respect to property (ii), none of the proposed result nominals in ASL take obligatory arguments. For example, ~~while~~ the verbal form VOTE may take both a subject and object argument (6a), its corresponding derived nominal VOTE~NMLZ (~~‘~~election’~~)~~ does not obligatorily take either of these (6b).

(6) a. CRAIG VOTE MITT.ROMNEY FINISH HAPPEN
‘Craig already voted for Mitt Romney.’

b. VOTE~NMLZ YESTERDAY COST FORTY DOLLAR
‘The election yesterday cost forty dollars.’

Furthermore, when possessive structures are used to introduce optional argument-like elements, they are interpreted as possessors, not as verbal agents (property (iii)). ASL, like many languages, has a number of possessive strategies, one of which is the introduction of a prenominal possessor with the POSS sign (Chen Pichler & Hochgesang 2008, Abner 2013). With nominals derived via nominalizing reduplication (7), the POSS possessor exhibits an agent-like interpretive restriction: the POSS possessor of ADOPT~NMLZ (~~‘~~adoption’~~)~~ may be interpreted as referring to the person doing the adopting, not the baby being adopted. However, the POSS possessor in this structure may also receive an altogether nonargumental interpretation—the lawyer arranging the adoption—showing that the agent-like interpretation available arises merely as a “flavor” possession.

(7) POSS$_i$ ADOPT~NMLZ

≈ 'an adoption of his'

✓[*i*] = Person adopting

✓[*i*] = Lawyer arranging adoption

#[*i*] = Baby being adopted

Possessors introduced by an alternative possessive strategy in ASL, juxtaposition, are also interpreted as possessors, not agents. Interestingly, the interpretive patterns of POSS and juxtaposition with reduplicated nominals differ: the juxtaposed possessor of ADOPT~NMLZ ~~(~~'adoption'~~)~~ may be interpreted as referring to the baby being adopted, not the person doing the adopting.[5]

(8) CRAIG$_i$ ADOPT~NMLZ

≈ 'an adoption of Craig's'

#[*i*] = Person adopting

#[*i*] = Lawyer arranging adoption

✓[*i*] = Baby being adopted

~~Though~~ the patterns in (8) may seem at first blush like evidence for a verbal object interpretation of the juxtaposed possessor, here too nonargumental interpretations are also possible:

(9) IX$_i$ INFORM~NMLZ

≈ 'information of its'

✓[*i*] = Person informing

✓[*i*] = Person being informed

✓[*i*] = Thing the information is about

[5] Nominal structures containing both a POSS and juxtaposed possessor were incredibly marginal for both derived and underived nouns. Nevertheless, contrasts such as that between (7) and (8) provide additional evidence that a universal hierarchy of genitive/possessive relations is at play (Longobardi 2001).

Thus, with both POSS and juxtaposed possessors, the interpretive relation is that of possession; superficially agent- and object-like interpretations are simply varieties of the possessive relation.

Moreover, there is also evidence that no agent role is covertly present in the structure. This evidence comes from the unacceptability of agent-oriented modification (property (iv)). Agent-oriented modifiers in ASL include several signs that may be translated as 'willingly' (WILLING, WILL, GO.AHEAD) as well as a sign that means 'thoughtlessly' or 'carelessly' (WITHOUT.THOUGHT).[6] As shown ~~below~~ with GO.AHEAD, agent-oriented modifiers are unacceptable with derived nominals but acceptable with their verbal counterpart.

(10) a. IX_i GO.AHEAD INFORM_j $_j$COP, $\text{IX}_{\text{PL-ARC}}$, GANG, FED.UP
'He willingly informs/informed the police, the gang is fed up.'

b. *POSS_i GO.AHEAD INFORM~NMLZ, $\text{IX}_{k,\text{PL-ARC}}$, GANG, FED.UP
'His willing information, the gang is fed up.'

Finally, recall from the discussion above that Grimshaw's diagnostics are the consequence of reduced verbal structure in result nominals. Additional and unique evidence for this is found in the domain of verbal agreement. Many of the verbs—especially within the result-denoting class—permitting nominalizing reduplication are agreeing verbs (Padden 1988). That is, they mark certain argument-structural properties via the spatial properties of the verbal sign itself. None of the reduplicated nominals, however, may exhibit this spatial agreement, as shown by the ungrammaticality of the object agreement marking (*i) in (11).

(11) a. ADVISE~$\text{NMLZ}_{(*i)}$

b. INFORM~$\text{NMLZ}_{(*i)}$

What is especially relevant here is the ungrammaticality of spatial agreement with the nominal ADVISE~NMLZ ~~(~~'advice'~~)~~ in (11a). Because the verbal form ADVISE marks spatial agreement through palm orientation only, this example shows that the ungrammaticality of spatial agreement

[6] Benedicto & Brentari (2004) and Rathmann (2005) provide a detailed discussion of the agent orientation of such modifiers using evidence from the unergative–unaccusative distinction (Benedicto & Brentari 2004) and lexical aspect (Rathmann 2005).

with the derived nominals is a genuinely morphosyntactic constraint, not a phonological restricting arising from the shorter movement of the derived noun. ~~Though~~ the structural position of object arguments in ASL remains somewhat open, these patterns confirm that objects, like agents, are not part of the structure nominalized by nominalizing reduplication. Therefore, the nominals derived via reduplication do not contain the structure responsible for arguments: they have no obligatory arguments, argument-like constituents are interpreted as possessors, agent-oriented modifiers are unacceptable, and object agreement is not possible.

Quantificational variability (properties (v)–(vi)). Event structure, when carried over to the nominal domain, exhibits the properties of mass nouns. However, because result nominals are event-structurally impoverished, they instead behave as count nouns, which can vary in both number and definiteness (12).[7]

(12) a. a/the exam

b. the exam/exams

Here there is clear evidence that the outputs of nominalizaing reduplication display the behaviors expected of result nominals. ~~Though~~ ASL does not obligatorily mark the definiteness of a nominal (Zimmer & Patschke 1990, MacLaughlin 1997), definite and indefinite interpretations of nominals derived via reduplication can be teased apart by linguistic context. For example, VOTE~NMLZ (‘election’) is most naturally interpreted as indefinite in (13a) but definite in (13b). Thus, VOTE~NMLZ allows for variation in definiteness.

(13) a. EACH COUNTRY HAVE VOTE~NMLZ

‘There’s an election in every country.’

b. y/n

IX$_2$ FINISH HEAR ABOUT VOTE~NMLZ Q$_{WG}$

[7] Recent research reveals that the distinction is not as clear-cut as Grimshaw originally observed. Plural marking of nominalizations with argument-structural properties has been documented in both Romance (Roodenburg 2006) and Germanic (Borer 2005) languages. Nevertheless, it remains true that quantificational variability correlates with reduced verbal structure.

'Did you hear about the election?'

Variation in definiteness is further evidenced by compatibility with definite and indefinite quantifiers found in ASL, such as the definite demonstrative THAT and the indefinite quantifier SOME:

(14) THAT$_i$/SOME$_i$VOTE~NMLZ
'that/some election'

Number distinctions are also not obligatorily marked in ASL. However, marking for dual and distributive plurality are found in the language and are grammatical with derived result nominals (as well as concrete-object-denoting interpretations, as discussed by Supalla & Newport).

(15) a. VOTE~NMLZ$_{\text{PL-DU}}$
'election$_{\text{DU}}$'
b. VOTE~NMLZ$_{\text{PL-DISTR}}$
'election$_{\text{DISTR}}$'

Thus, in both definiteness in number, these nominals exhibit the quantificational variability expected of count noun-like result nominals.

Commentary on unaddressed diagnostics (properties (vii)–(xi)). There remain several unaddressed diagnostics from table 1. Beginning with the property whose omission receives the most straightforward explanation: property (xi), concerning the interpretation of ~~'by' phrases~~, is simply not a relevant diagnostic for ASL. ~~'By' phrases~~ and the passive structures they are associated with are unattested in the language (Padden 1988). Likewise, the plural requirement on *frequent* modification (property (vii)) is not straightforwardly testable given the lack of obligatory number marking in the language. Finally, predicative use of result nominals (property (viii)) was not explored in detail ~~due~~ to the difficulty of creating authentic stimuli materials for the elicitation of predicate nominals. Moreover, there is a lack of evidence regarding the structural patterns of predicate nominals in this null-copula language (~~though,~~ see Wilbur 1996 and Wilbur & Patschke 1999

for some discussion).

With respect to the remaining two properties—the prohibition against aspectual modifiers (property (ix)) and implicit argument control (property (x))—the patterns documented during the course of this research suggest that the result nominals identified here do exhibit these properties. A variety of control and aspectual environments were investigated and in none of them were the signers consulted able to produce a nominal derived via reduplication. This suggests that a ban on implicit argument control and aspectual modification is active. However, given that these too are underexplored and underdocumented areas of the ASL grammar, these results are not yet conclusive and the incompatibility may not be structurally informative about the derived nominals as such. ~~Though~~ all of Grimshaw's diagnostics could not be evaluated, those that were applicable provide clear evidence that nominals derived via reduplication in ASL exhibit the argument- and event-structural impoverishment associated with result nominals crosslinguistically.

2.2 *Formational Similarities across Interpretations*

Having supported the result nominal status of the relevant class of derived nominals, ~~the present~~ section focuses on the proposal that the same reduplication process is used to derive both result- and concrete-object-denoting nouns—that is, that nominalizing reduplication is ambiguous. Section 2.2.1 establishes that result- and concrete-object-denoting nominals share tense manner of production. Building on their documented similarity in spell-out form, section 2.2.2 shows that result-denoting and concrete-object-denoting nominals exhibit the same pattern of predictable allomorphy. Finally, in addition to general ambiguity of the nominalizing reduplication process, there are single-output forms of this process that are interpretively ambiguous (sect. 2.2.3).

2.2.1 *Tense manner of production*

A defining characteristic of nominalizing reduplication is its tense manner of production, noted by Supalla & Newport for concrete-object-denoting nominals (they term it "restrained manner"). On a par with manner of production in spoken languages (e.g., fricative, plosive), manner of production in signed languages refers to how the articulators—primarily, the hands—move in the production

of a given segment. In this case, the articulators move with an increased level of muscular tension, resulting in more 'jumpy' and faster signing.

Though a dynamic movement property, tense manner can nevertheless be inferred from the static video stills of VOTE and VOTE~NMLZ ('election') in figures 3 and 4.[8] Here, the annotation for time elapsed is especially informative. Though the reduplicated nominal involves two (versus one) instances of contact movement, it is not much longer (33 ms) than its verbal counterpart, a pattern that was generally true for all of the pairs investigated. Thus, in the time it takes the signer to produce a single movement in the verbal form VOTE, the signer produces two movement in the nominalized form VOTE~NMLZ. In order to produce more articulator gestures in the same amount of time, the hands must be moving faster. Increased velocity is an indicator of tense manner.

[Figure 3 about here.]

[Figure 4 about here.]

Point-by-point comparison of the sign productions confirms this velocity difference. As pictured in the 0-ms frame of each sign production, the productions share an initial position, the final chin contact of the verb SAY in the carrier sentence used here, IX_i SAY ___ YESTERDAY ('she/he said ___ yesterday'). At the 334-ms mark of the verbal form VOTE, the right hand is still relatively far away from the left (nondominant) hand. At the same time point in the production of the nominalized form, however, the right hand is already making its initial contact with the left hand. The ability to move farther across space in the same amount of time also requires increased velocity. Again, this is indicative of tense manner.[9]

Tense manner is not, however, part and parcel of the phonology of reduplication in ASL. As noted explicitly by Supalla & Newport and robustly documented throughout the descriptive and research literature, ASL is a language that makes robust use of reduplication for morphosyntactic purposes. Distinct processes of reduplication are, for example, used to mark number in nominals

[8] Because the stills presented here were selected by video frame, the time in milliseconds is not constant.

[9] Though elicitation conditions were not controlled enough for quantitative analysis, tense manner was apparent across the result- and concrete-object-denoting nominals elicited.

(Wilbur 1987, Steinbach 2012), as illustrated by the dual and distributive markings in (15) above, to encode argument plurality in the verbal agreement system (Padden 1988, Neidle et al. 2000, Mathur 2000, Supalla 1996, Wilbur 2010), and to mark durativity or iterativity of events (Fischer 1973). These other reduplication processes are not, however, morphophonologically characterized by tense manner, because tense manner is not a general property of reduplication. Therefore, its presence in both result- and concrete-object-denoting nominals confirms the identity of the nominalization process that derives them. The structural relevance of this indicator will be discussed further in sections 3.1 and 4.1.

2.2.2 *Allomorphy of reduplication*

In her phonological analysis of nominalizing reduplication, Brentari (1998) separated Supalla & Newport's concrete-object-denoting nominals into three classes based on the component reduplicated: movement, aperture change, and orientation change. The first class, reduplicated movement, is formed by repeating a path movement of the hands across space, potentially leading to contact with some part of the signer's body or with the other hand. SIT~NMLZ ('chair') in figure 1, with its repeated downward movement of the hand, is a member of this class. Reduplicated aperture-change nominals are formed by repetition of an opening or closing of the hand. This is illustrated for the derived nominal STAPLE.WITH.STAPLER~NMLZ ('stapler') in figure 5: a sideways C handshape is closed, opened, and then closed a second time. Finally, reduplicated-orientation-change nominals are formed by repeatedly flexing or twisting the wrist such that the direction the palm faces (orientation) changes. Repeated wrist flexion is used to produce the nominal sign STRIKE.MATCH~NMLZ ('match') in figure 6. These three classes can be thought of as forming an allomorphic paradigm for nominalizing reduplication, with membership in each class being phonologically predictable from the form of the verbal predicate.

[Figure 5 about here.]

[Figure 6 about here.]

The repeated diagonal movement of DEVELOP~NMLZ (‘development’) in figure 1 and the repeated downward movement of VOTE~NMLZ (‘election’) in figure 4 exemplify reduplicated movement within the class of result-denoting nominals. Reduplicated aperture change is evident in the repeated handshape closure of ACCEPT~NMLZ (‘acceptance’) in figure 7, while the repeated outward rotation of the wrist in ANNOUNCE~NMLZ (‘announcement’) in figure 8 is an instance of reduplicated palm-orientation change. Thus, the pattern of phonologically predictable allomorphy attested in the class of concrete-object-denoting nominals is exactly that attested in the class of result-denoting nominals. Again, this is evidence that the same morphosyntactic process is present across these derived nominal types.

[Figure 7 about here.]

[Figure 8 about here.]

2.2.3 *Single-output ambiguity*

Conclusive evidence of the ambiguity of nominalizing reduplication comes from a set of derived nominals that can receive both a concrete-object- and result-denoting interpretation. For example, MOVE.IN.AIR.BY.PLANE~NMLZ (16), a member of the original set of concrete-object-denoting nominals identified by Supalla & Newport, may actually be interpreted as either *airplane* or *flight*, the latter of which is a result-denoting interpretation.

A full video for example (16a) is available with this article online as Video 2 in the Supplementary materials.

(16) MOVE.IN.AIR.BY.PLANE~NMLZ

a. ‘airplane’ (concrete-object-denoting)

b. ‘flight’ (result-denoting)

Likewise, VOTE~NMLZ (17), discussed above as an example of a derived result-denoting nominal, can also receive the concrete-object-denoting meaning of *ballot*.

(17) VOTE~NMLZ

a. ‘ballot’ (concrete-object-denoting)

b. ‘election’ (result-denoting)

Though such patterns are influenced by “lexicalization” and frequency effects, the very existence of ambiguity of surface identical forms confirms the cognitive reality of this ambiguity for the users of the language.[10]

2.3 How the Hand Shapes the Interpretation

Derived concrete-object-denoting nominals in ASL are a subtype of ‘participant nominalizations’ (Koptjevskaja-Tamm 1993). The verbal forms that give rise to these concrete-object-denoting interpretations are systematically produced with semantically meaningful handshapes from the verbal classifier system (Supalla 1982, McDonald 1982, Schick 1987, Liddell & Johnson 1987)—for example, the C handshape of STAPLE.WITH.STAPLER and its nominalization (fig. 5) is a semantically meaningful handling classifier that represents how one would handle the stapler.[11] In ASL and other signed languages, this verbal classifier system plays a role in the argument structure of verbal predicates (see section 3.2). The potential availability of result- and concrete-object-

[10] An additional locus of variation not heretofore mentioned is the use of nominalizing reduplication to form nominals referring to individuals that typically perform the activity associated with the verb.

(i) a. ADVISE~NMLZ
‘adviser’
b. MOVE.IN.AIR.BY.PLANE~NMLZ
‘pilot’
c. MEASURE~NMLZ
‘engineer’

As discussed by Abner (2012), these forms alternate with a structure in which an overt sign PERSON follows the reduplicated noun and the availability of the “bare” option in (i) is subject to intersigner variation.

(ii) a. ADVISE~NMLZ PERSON
‘adviser’
b. MOVE.IN.AIR.BY.PLANE~NMLZ PERSON
‘pilot’
c. MEASURE~NMLZ PERSON
‘engineer’

This suggests that these interpretations arise not as an additional layer of ambiguity of nominalizing reduplication, but rather from variation in the overt presence of the PERSON sign and the licensing of NP ellipsis.

[11] A similar observation was made by Brentari (1998:332 n. 7) in her phonological analysis of nominalizing reduplication. Brentari focused on concrete-object-denoting forms and noted the frequency with which the verbal forms that undergo this process are produced with classifier handshapes. Separating concrete-object- and result-denoting interpretations allows for the operationalization of this distinction: concrete-object-denoting interpretations are only possible if the nominal is derived from a form containing verbal classifier structure.

denoting interpretations correlates with whether or not verbal classifier structure is present:[12]

(18) a. Verb, − Classifier → Unambiguous **result**-only interpretation possible

b. Verb, + Classifier → Ambiguous **result**- or **concrete-object** interpretation possible

The fact that the distinction can be operationalized in this manner provides further evidence that structural variation underlies the interpretive ambiguity of nominalizing reduplication. The nature of this variation and the structure of concrete-object- and result-denoting nominals is the focus of the remainder of ~~the paper.~~

3. The Verbal Pieces of the Puzzle

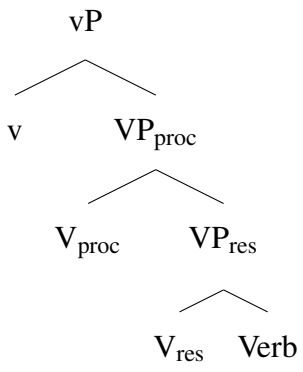
The present section outlines the structure of the low verbal domain in ASL, setting the stage for the discussion of the nominalization structures in section 4. The analysis proposed assumes a decompositional approach to verbal structure, wherein the "atomic" VP is split into its event- and argument-structural subcomponents. Such componential approaches can be viewed as having their origins in early analyses of event substructure (Vendler 1967) and the VP-internal analysis of subject arguments (Fukui & Speas 1986, Kuroda 1988, Koopman & Sportiche 1991, Larson 1988, Kratzer 1994). Under a decompositional approach, components of event and argument structure are introduced and composed piecewise. As the discussion of handshape foreshadowed, these verbal pieces in ASL (and, potentially, other languages) may be transparent and ~~isolable~~ in the surface form of the predicate. ASL therefore provides straightforward evidence for the decomposition of its verbal structures and, moreover, for the identity of the constituent nominalized by nominalizing reduplication. I begin with a discussion of event structure and then turn to argument structure and the verbal classifier system.

[12] The generalization in (18) makes clear predictions about the interpretive possibilities of novel or nonce nominalizations. Klima & Bellugi (1979:chap. 12) ~~do~~ observe novel uses of nominalizing reduplication in the lab (e.g., QUOTE.FROM~NMLZ 'derivation') and work has been done with nonce creations from classifier forms (see contributions to Emmorey 2003), ~~though~~ it has not looked specifically at nominals. I leave this as a question for future research and thank the editor for insightful feedback about the potential insight offered by interpretive patterns of nonlexicalized forms.

3.1 Event Morphosemantics in ASL

Broadly speaking, event structure refers to the syntactic and semantic encoding of how an event naturally unfolds in time. ~~Though~~ the unfolding of events is also related to properties of tense and aspect, which serve to temporally place and delimit an event, the concern here is with the event-structural components of the low verbal domain, termed alternately aktionsart (Vendler 1967), lexical aspect, inner aspect, or situation aspect (Smith 1997). Specifically, I discuss how properties such as the presence or absence of a natural event endpoint (telicity) are surface transparent in the form of the predicate in ASL. For concreteness, I ~~utilize~~ the event-structural decomposition proposed by Ramchand (2008), ~~though~~ the analysis proposed, and its empirical motivations in ASL, are compatible with alternative approaches. As schematized in (19), the lower verbal structure—that is, the portion of the verbal domain that does not yet include a subject argument—is divided into two constituents: a process component that corresponds to event dynamicity and durativity and a result component that corresponds to event resultativity and telicity.[13] Throughout the discussion, I adopt the maximally transparent terminology VP_{proc} and VP_{res} to refer to these event-structural constituents and assume that each component is introduced compositionally. The vP projection is included in the structure in (19) to situate the verbal domain discussed here but is left off the remaining examples.

(19)



In ASL, the dynamic movement properties of the predicate may provide discrete and surface transparent representation of these event-structural components. This is not a novel observation.

[13] This division and the resulting distinctions are compatible with much of the existing literature on the syntax and semantics of event structure. ~~Though further~~ decomposition may become apparent in future research, at present this two-way distinction is necessary and sufficient to capture the patterns documented here.

In her original study of aspectual reduplication in ASL, Fischer (1973) observed relations between surface form and event semantics of verbal predicates. These relations were also discussed by Supalla & Newport (1978), though they did not connect these properties to the structure of nominalizations. In recent work, Wilbur and colleagues have systematically studied the relation between surface form and event semantics and have formalized the results of these studies as the *Event Visibility Hypothesis* (Wilbur 2003, 2010):[14]

(20) Event Visibility Hypothesis (EVH)

> In the predicate system, the semantics of event structure is visible in the phonological form of the predicate sign. (Wilbur 2010:358)

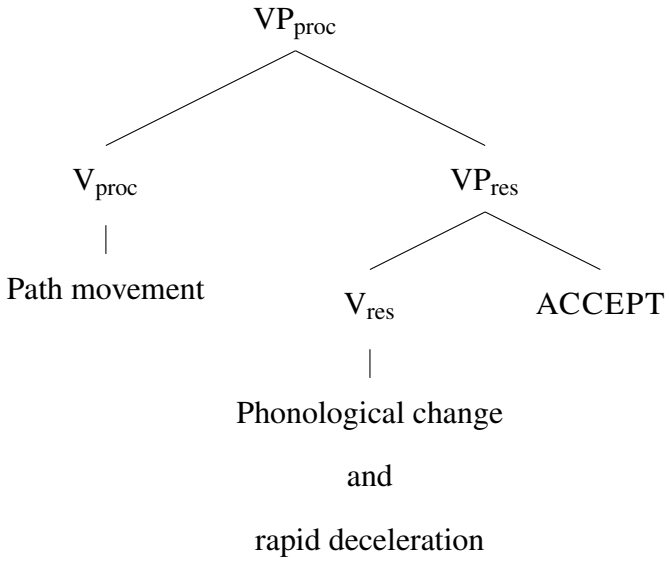
The crux of this proposal, and the longstanding observations that it builds upon, is that the temporal structure of the event denoted by a verbal predicate is represented in the manual movement of the predicate itself.

The movement sequence of dynamic, telic predicates in ASL has two meaningful parts: spatial path movement and phonological parameter change accompanied by rapid deceleration (Wilbur & Malaia 2008). The spatial path movement of the predicate encodes the process portion of the event, while rapid deceleration and phonological parameter change encode the result portion of the event. These phonological parameter changes include changes in palm orientation, handshape aperture, and movement to a (contact) point—exactly the changes that are repeated under nominalizing reduplication. Thus, just as the structure of a telic predicate is in general a verbal bundle of VP_{proc} and VP_{res}, as schematized in (19), the form of the predicate in ASL is a surface bundle of path movement along with phonological parameter change and rapid deceleration.

[14] Though little crosslinguistic research in this area has been done, evidence from Croatian Sign Language (Hrvatskom Znakovnom Jeziku, HZJ) reveals that event-structure representations are subject to variation across signed languages. In HZJ, telicity distinctions are marked in the peak velocity of the predicate, with telic predicates having a higher peak velocity than atelic predicates (Malaia, Wilbur & Milković 2013). Peak velocity also plays a role in telicity distinctions in ASL: telic predicates reach their peak velocity later in the sign than atelic predicates (Wilbur & Malaia 2008). The potential universal, then, is that signed languages use the spatiotemporal properties of sign production to represent the spatiotemporal properties of event structure, though they may vary in how they do so.

Crucially, the second part of this verbal bundle does not appear to be a surface component of stative or atelic predicates. ~~Though~~ they are not phonologically static—movement is independently required to satisfy syllabicity properties in signed languages (Brentari 1998)—stative and atelic predicates are usually produced with repeated or continuous movements that lack comparable discrete phonological changes and have consistent velocity throughout, confirming that these properties are indeed associated with telicity. Furthermore, these compositionally introduced morphophonological components may be productively manipulated. For example, ACCEPT (‘accept’) can be coerced into an atelic predicate by failing to produce full hand closure in the movement toward the signer’s chest. Likewise, a typically atelic predicate such as READ can be coerced into a telic predicate through the introduction of a rapidly decelerating downward movement to a point. This connection between the interpretive components of the event and the phonological properties of the predicate can be easily encoded in the morphosyntax of the verbal structure:[15]

(21)



As should be expected (~~though~~ it is nevertheless worth making explicit), these event-structural components are unaffected by the presence or absence of verbal classifier structure, the focus of

[15] In her discussion of these properties, Wilbur suggests that phonological parameter change may correspond to the VP_{init}/vP level, the structure associated with event agentivity. Evidence from inchoative predicates such as MELT (‘melt’) in ASL, however, reveals that these properties are introduced lower in the verbal structure. Such inchoative predicates cannot be transitivized in ASL (Wilbur 1996). Nevertheless, these predicates bear the phonological parameter changes that are indicative of event telicity (MELT is produced with a closing handshape similar to that of ACCEPT). Thus, phonological parameter change markers must be introduced at a structural level lower than that of VP_{init}/vP.

the discussion that follows.

3.2 Argument Structure and Verbal Classifiers

As discussed in section 2.3, verbal classifiers in ASL and other signed languages are handshape components of the predicate that may represent one of the event participants. For example, in the case of both (22a) and (22b) the predicates MOVE.UP and BE.LOCATED both contain a verbal classifier consisting of a sideways 3 handshape and representing the BICYCLE argument.

(22) a. BICYCLE 3+MOVE.UP
bicycle vehicle$_{w/e}$+move.up
'The bicycle went up (the mountain).'

b. BICYCLE 3+BE.LOCATED
bicycle vehicle$_{w/e}$+be.located
'A bicycle is standing (over there).' (Benedicto & Brentari 2004)

Glossed as 'vehicle$_{w/e}$', this 3 handshape is categorized as a whole entity classifier ("w/e"), adopting the handshape division and classification of Engberg-Pedersen (1993): whole entity handshapes, handling handshapes, extension-and-surface handshapes, and limb and body part handshapes. Whole entity classifiers such as the 3 handshape holistically represent entities within a given semantic class (here, vehicles).

In certain cases, the properties of the verbal classifier—namely, *how* the associated argument is represented by the classifier—vary as a function of the nature of the role played by the argument represented by the classifier. This is illustrated by the classifier alternation in (23a) and (23b) below (adapted from Benedicto & Brentari 2004:752).

(23) a. BOOK B+MOVE$_{VERT\text{-}TO\text{-}HORIZ}$
book flat-object$_{w/e}$+move$_{vert\text{-}to\text{-}horiz}$
'The (standing) book fell down on its side.'

b. ∅ BOOK C+MOVE$_{VERT\text{-}TO\text{-}HORIZ}$
book grab$_{handling}$+move$_{vert\text{-}to\text{-}horiz}$
'(S/he) took the (standing) book and laid it down on its side.'

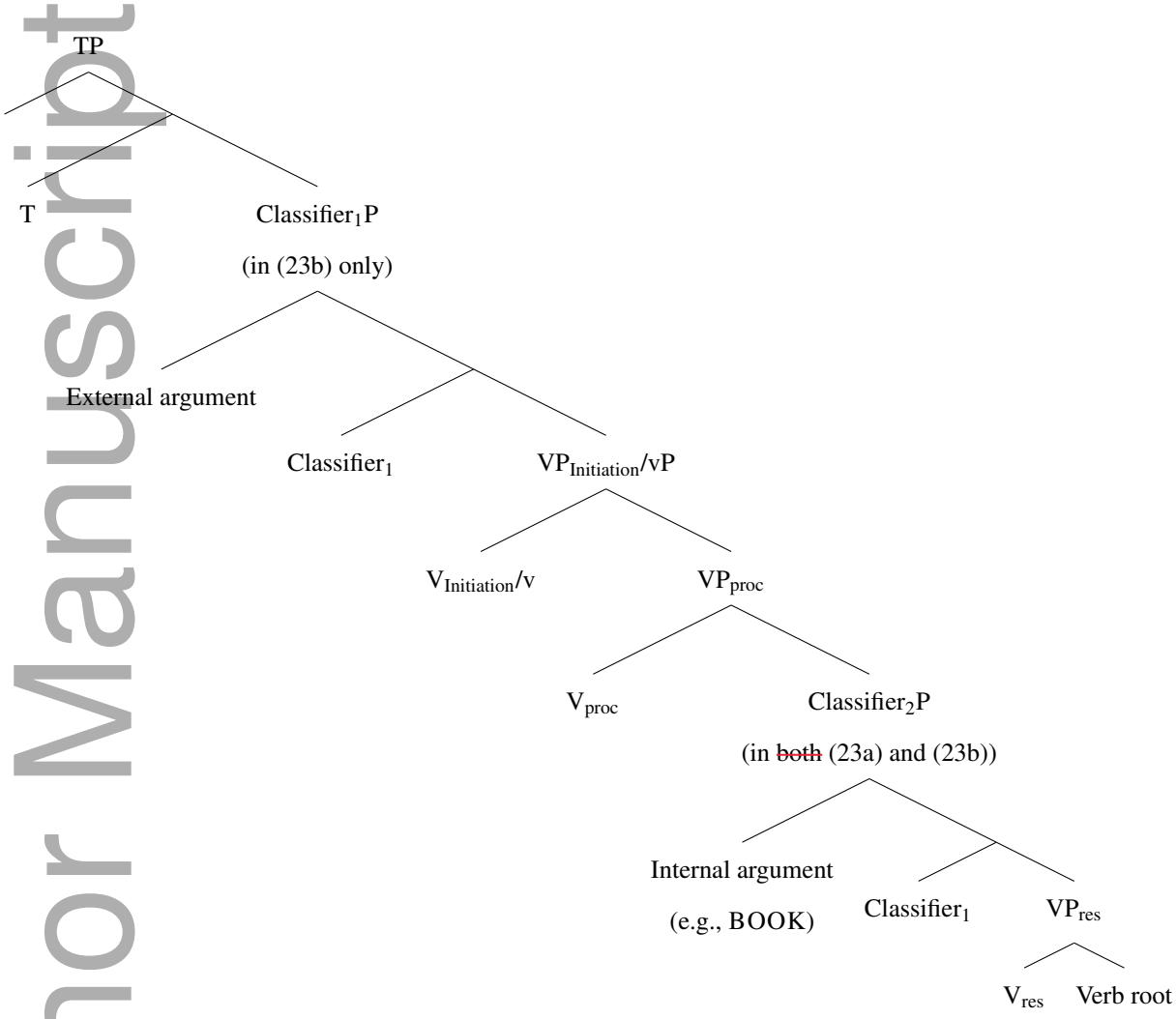
In these examples, the referent of the classifier remains the same (BOOK) but the method of representing the referent varies. In (23a), the book is represented using a whole entity classifier of the type used ~~above~~ for the bicycle, ~~though~~ in this case the whole entity representation is with a flat B handshape that corresponds, roughly, to the size and shape of a book. In (23b), however, it is a curved C handshape classifier that is incorporated into the predicate. This C handshape represents not the book entity itself but rather how a human would handle the book. As such, classifiers of this type are referred to as handling classifiers. As the translation suggests, Benedicto & Brentari found that alternation in the type of classifier used (e.g., whole entity vs. handling) correlates with an alternation in the argument-structural properties of the predicate: handling classifiers are used in an agentive transitive ~~like~~ (23b), whereas whole entity classifiers are used in unaccusative intransitive ~~like~~ those of (22a), (22b), and (23a).

To capture these patterns, Benedicto & Brentari propose that it is the classifier structure that is responsible for determining the argument role of its associated nominal (and, in some cases, introducing that nominal argument). Merged as a functional projection of the verbal domain, this classifier structure is overtly spelled out in the handshape of the verbal predicate. Under their analysis, the structure of both (23a) and (23b) contain a functional classifier projection that associates the argument BOOK with the patient role of both the transitive (23b) and unaccusative (23a) predicates. In (24), this classifier projection is labeled ~~here~~ *Classifier*$_2$*P* (f_2P for Benedicto & Brentari).[16] The distinction between these two predicates is that in (23b) a second, higher classifier projection (here, *Classifier*$_1$*P*; f_1P for Benedicto & Brentari) is present and is responsible for assigning the (null) agent role. The relative position and structural role of these functional classifier projections is schematized in (24). ~~Though~~ Benedicto & Brentari do not address the interaction of classifier structure with event structure, the association of Classifier$_1$P with an agentive argument suggests that it is merged at or above the VP$_{\text{initiation}}$/vP level, ~~while~~ the association of Classifier$_2$P with a patient or undergoer argument suggests that it is merged at or above the

[16] I have adapted Benedicto & Brentari's functional projection labels (f_1P, f_2P) to maximize transparency of the syntactic and semantic function of these projections. The term *classifier* is used to retain connection with the traditional label that these structures, and their handshape exponence, have received in the sign language literature.

VP_{res} level. A detailed investigation of these issues is outside the scope of the present project, but these are the assumptions encoded in the structural schematic in (24) (adapted from Benedicto & Brentari 2004:769).

(24)



The crucial insights of Benedicto & Brentari's analysis is that classifier projections are introduced independently and compose as part of a complex predicate, playing a integral role in determining the argument-structural properties of that predicate.

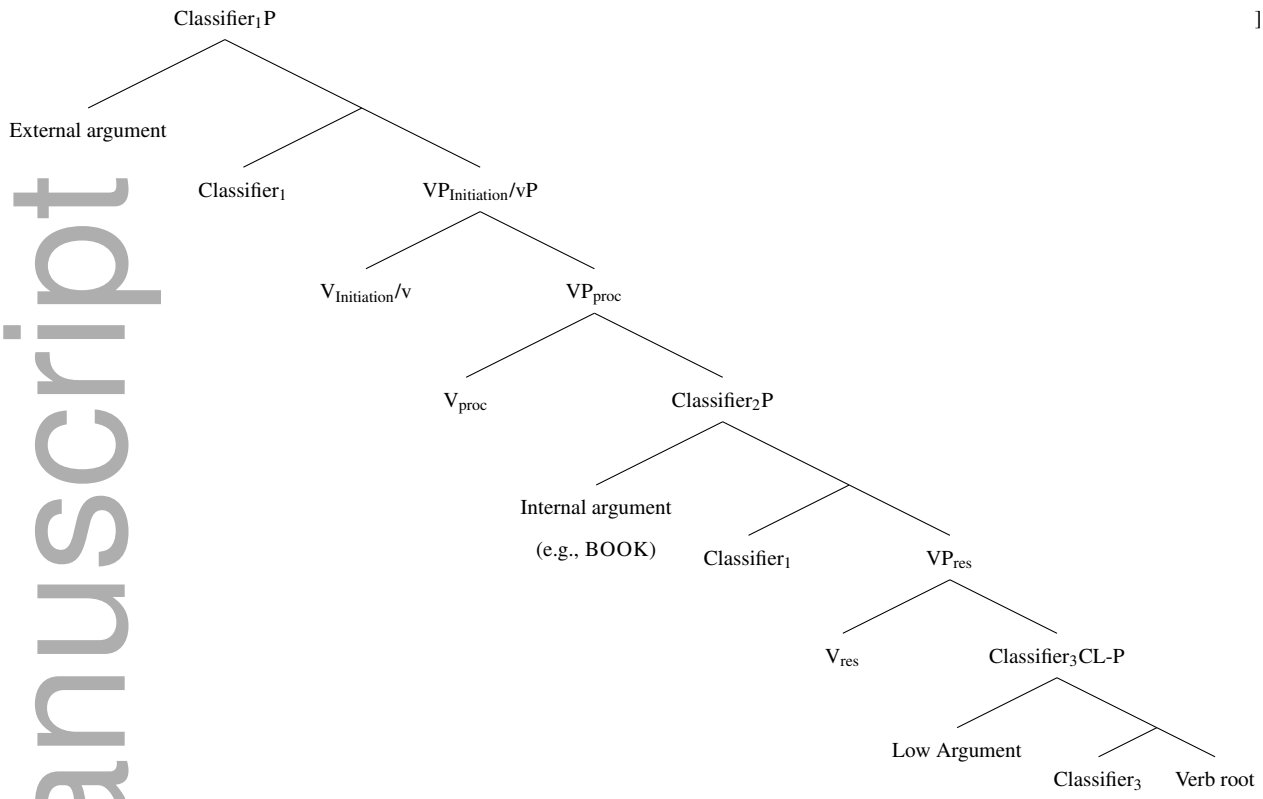
~~Though~~ verbal classifiers are largely discussed with respect to their role in complex predicates of movement and location, as in (22) and (23) ~~above~~, they are nevertheless found throughout the predicate system. As discussed in section 2.3, the presence of a verbal classifier seems to determine the availability of a concrete-object-denoting interpretation under nominalizing reduplication. The

classifiers present in the predicates that undergo nominalizing reduplication do not, however, correspond to either an internal object or external agent argument, nor do they exhibit argumental alternations of the type observed by Benedicto & Brentari. First, the nominals associated with the classifier in these predicates function as locative or instrumental arguments, ~~though~~ some "low theme" interpretations may also be possible, as with the ring argument represented by the handling classifier in PUT.ON.RING. Argumental interpretations such as these are likely associated with an even lower position in the verbal structure—that is, below the Classifier$_2$P structure proposed by Benedicto & Brentari. Second, the specific argumental role associated with the classifier in these predicates does not appear to be sensitive to classifier types. Instrumental interpretations, for example, are observed with both handling (STAPLE.WITH.STAPLER) and whole entity (MOVE.IN.AIR.BY.PLANE) classifiers. Indeed, even body and limb classifiers are arguably present, as in the case of the handshape representing an individuals legs sitting down in a chair in the predicate SIT (fig. 1).[17] Together, these arguments motivate the existence of a third classifier projection, distinct from both Classifier$_1$P and Classifier$_2$P and introduced lower in the verbal structure. In (25), this projection is labeled as Classifier$_3$-P to distinguish it from Classifier$_1$P and Classifier$_2$P; the TP-level projections have been removed from (25).[18]

[17] I thank an anonymous reviewer for helpful comments on this point.

[18] Benedicto & Brentari propose that handling classifiers arise ~~due to~~ the joint presence of both Classifier$_1$P (f_1P) and Classifier$_2$P (f_2P). Just as the detailed interaction of Classifier$_1$P and Classifier$_2$P with verbal event structure is outside the scope of the present research, so too is the interaction of these classifier structures with the lower projection, Classifier$_3$P, proposed here. The handshape variability of the Classifier$_3$P may be suggestive of minimal interaction between it and the higher classifier projections. Moreover, overt arguments present in the class of verbs that undergo nominalizing reduplication tend not to be represented in the classifier handshape, ~~suggesting~~ that they are introduced in the VP event-structure projections, not as arguments of classifier projections. Finally, there is evidence that when these predicates do represent other, higher arguments with a classifier, they do so by utilizing the nondominant hand to introduce a second classifier. For example, the predicate STAPLE.WITH.STAPLER may be produced as a two-handed predicate with the nondominant hand in a flat B handshape representing paper being stapled: STAPLE.PAPER.WITH.STAPLER. This, too, suggests minimal interaction between Classifier$_3$P and Classifier$_1$P/Classifier$_2$P.

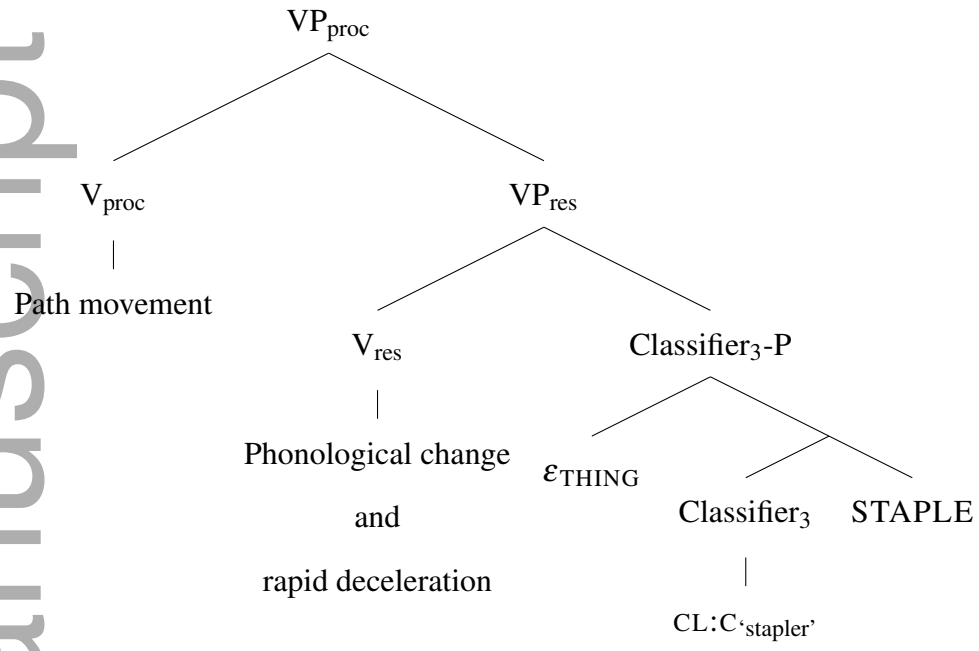
(25)



Two additional observations argue in favor of distinguishing Classifier$_3$-P as an independent component of the classifier system and of introducing Classifier$_3$-P low in the verbal domain. ~~One,~~ the complex predicate derived from the combination of the verbal root and the Classifier$_3$-P structure is much more susceptible to lexicalization and idiomatization than the classifier structures analyzed by Brentari and Benedicto. For example, in the classifier structure of VOTE (fig. 3), the dominant-hand F handshape and the nondominant-hand O handshape represent the placement of a thin object (paper ballot) into a container (voting box) (Kegl & Schley 1986). ~~Though~~ this might suggest a more appropriate gloss of PUT.BALLOT.IN.CONTAINER, this predicate can be used to describe voting activities accomplished through much different means, such as with contemporary electronic voting machines. ~~Two,~~ unlike BICYCLE and BOOK in (22) and (23), the referent associated with Classifier$_3$-P does not typically surface as an overt argument of the verbal predicate. This, too, is unsurprising given that overt arguments are licensed high in the verbal domain, ~~likely~~ above the site occupied by Classifier$_3$-P. Thus, the null status of the nominal affiliated with Classifier$_3$-P may be viewed on a par with the "incorporated" status of low nominal arguments in

other languages. For the remainder of ~~the paper,~~ I will represent this null argument using $\varepsilon_{\text{THING}}$. The structure of a predicate like STAPLE.WITH.STAPLER is then represented as in (26).[19]

(26)



3.3 Iconic Underpinnings of Event and Argument Structure Markers

The verbal domain of ASL and other signed languages is characterized by a rich system of discrete and surface transparent morphosyntactic marking. The handshape used to produce a predicate may represent an argument of the event and encode the kind of argument role (e.g., agentive) played, while the dynamic movement of the predicate may encode whether the event is telic or atelic. As noted above, these event- and argument-structural properties are likely universal in human language. What is potentially novel in ASL and other signed languages is how these properties are represented in the form of the signs. By that, I do not mean that these properties are discretely

[19] The task of the verbal classifier projection (here, Classifier$_3$-P) is threefold. First, the projection introduces into the syntactic structure the classifier handshape with which the predicate is produced (here, the CL:C handling handshape). Second, the classifier structure introduces the (null) nominal argument ($\varepsilon_{\text{THING}}$) that this handshape represents. Third, the classifier structure determines how the nominal it introduces is interpreted with respect to the event denoted by the complex predicate formed—that is, its argument role. It is the Classifier$_3$-P projection, then, that is responsible for determining the instrumental interpretation of the nominal in STAPLE.WITH.STAPLER and the locative interpretation of the chair and legs represented by the bent H handshapes in SIT. Given this, the Classifier$_3$-P projection could be viewed instead as a set of low classifier structures, each of which corresponds to the specific argumental interpretation it mediates, on a par with the set of high applicative interpretations discussed by Pylkkänen (2002). For expository purposes, Classifier$_3$-P is the uniform structural representation used here and the specific argumental role of the nominal is described in the text or in the glosses used here (e.g., WITH in STAPLE.WITH.STAPLER), ~~though~~ traditional glosses (e.g., STAPLE) often fail to represent such structural details.

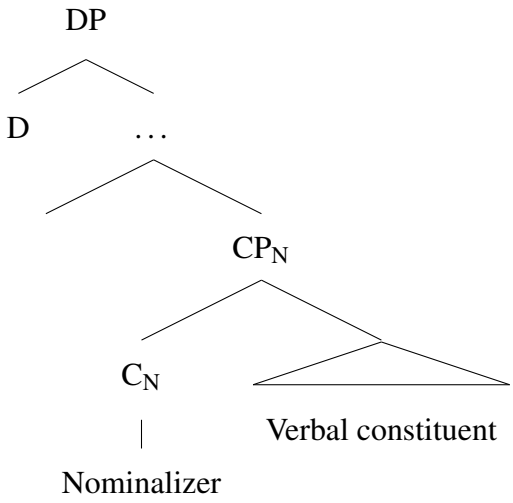
and transparently marked—such structures would be possible in a sufficiently agglutinative spoken language. The novel potential of signed languages is that the marking of these properties is not arbitrary. Rather, the discrete and surface transparent strategies that are used to mark event and argument structure in ASL and other signed languages seem to be iconically motivated. The handshapes that ~~comprise~~ the verbal classifier system are not an arbitrary inventory—they iconically represent the argument they introduce. A human being may be represented by a whole entity classifier such as an extended index finger or a fist handshape (the head). A book may be represented by a whole entity classifier such as a flat hand or a handling classifier such as a cupped hand. Likewise, the morphology that marks telicity is not arbitrary. Rather, just as a telic predicate has an endpoint, so too does the phonological form of a telic predicate in ASL, marked via rapid deceleration and phonological parameter change. Recent work by Strickland et al. (2015) shows that hearing nonsigners are sensitive to markers of telicity and atelicity in a variety of sign languages. Not only do the hearing nonsigners distinguish these signs ~~based on~~ their phonological properties, they correctly associate these phonological properties with telic and atelic meaning, providing further evidence of their iconic and nonarbitrary origins. ~~Though~~ much work remains to be done on the iconic structures of signed languages, it is clear that this iconicity is not at odds with a syntactic system that functions in a modality-independent way across sign and speech. The modality-independent nominalization processes that turn verbal constituents into nominal projections are the subject of section 4.

4. Deriving Concrete Object and Result Nominalization

Linguistic research on nominalization processes is almost as rich and varied as the processes themselves, dating back to some of the earliest work in the generative perspective (Lees 1963, Katz & Postal 1964, Chomsky 1970). In detailing the morphosyntactic structure of nominalization via reduplication, I make two assumptions in regards to the structure of nominalization processes more generally. The first is one that has been highlighted throughout much of the discussion thus far: the structural and interpretive properties of the derived nominal are determined by the properties of the

(verbal) constituent targeted for nominalization. Support for this assumption is especially clear in ASL, ~~where~~ the surface properties of the derived nominal provide discrete cues to the nominalization target. The second assumption I make here regards the structure of nominalization processes. I assume that they are operations of the morphosyntactic system. Specifically, that nominalization results from the merger of a nominalizing head with a constituent of the extended verbal domain. Here, I follow Koopman (2005) and Ntelitheos (2012) who, building on Kayne's (1994) revival of Vergnaud's (1974) promotion account of relativization, analyze nominalization as the consequence of merging a complementizer-like element that has nominal features with a constituent of the verbal domain:

(27)



I argue that the C_N nominalizer is spelled out as nominalizing reduplication in ASL and that the verbal constituent it targets is the VP_{res} layer. This alone accounts for the basic morphophonological properties of the derived nominals.

It should be noted, however, that the empirical observations made herein are ~~likely~~ compatible with other approaches. This is especially true for approaches that attempt to derive properties of nominalization from only the verbal source and the morphosyntactic nominalizer, such as those that have been pursued by Marantz (1997) and Borer (2005). I leave as a matter for future research whether there are empirical or theoretical reasons to prefer such alternative accounts over the one detailed here. Again, figure 2 provides an atheoretical schematic of the analysis.

Any account must address why nominalizing reduplication is systematically ambiguous between concrete-object- and result-denoting outputs. Excepting true cases of accidental homophony, semantic ambiguity does not arise at random. Rather, semantic ambiguity arises only when surface identity masks an underlying structural ambiguity—that is, when the same output form corresponds to a multiplicity of syntactic structures. As noted ~~above~~, the ambiguity between concrete-object- and result-denoting nominals is mediated by the presence of verbal classifier structure. What is needed, then, is an account of how this verbal classifier structure interacts with nominalizing reduplication to determine the available semantic interpretations. Here, the C_N classification of the nominalizer will provide a straightforward explanation. As a complementizer-like element, [$_{C_N}$ NMLZ] may also serve as input to relative-clause formation. When merged with a VP_{res} structure that contains a verbal classifier, the null nominal argument introduced by this classifier provides a target for relativization. If relativized, this structure yielded will be one that is referentially dependent on the classifier structure itself: a concrete-object-denoting interpretation. If relativization does not occur—as is sometimes the case when the classifier is present and always the case when no such classifier is available—then the interpretation will be that of a nominalized VP_{res}: a result-denoting nominal. Because [$_{C_N}$ NMLZ] is present in both structures and the nominal argument introduced by the classifier is null, there is no surface distinction between these interpretations. Before discussing these structures in detail, I first address the nature of the reduplication process in nominalizing reduplication and suggest that it may be better understood as morphological doubling in the sense of Inkelas & Zoll (2005).

4.1 Transparency of Nominalization Target and Reduplication as Morphological Doubling

Returning to the marking of event telicity, the phonological parameter changes observed to be correlated with event telicity are an opening or closing of the handshape (STAPLE.WITH.STAPLER), a change in the palm orientation (STRIKE.MATCH), and movement to a distinct position or location (MOVE.IN.AIR.BY.PLANE), including movement to a contact point (SIT).[20] As observed

[20]Crucially, these phonological properties are not uniquely associated with event-structural semantics. The parameters of handshape, movement, and palm orientation are part of the general phonological system of ASL (and other signed languages). The proposal here is that within the verbal domain these phonological parameters take on morpho-

earlier (sect. 2.2.2), these phonological parameter changes correspond exactly to the allomorphic classes of reduplicated nominals, suggesting that it is the result portion of the event structure that is present in the derived nominal.

The second marker of telicity within the verbal predicate system also supports the presence of the VP_{res} result component in the derived nominal: rapid deceleration. Rapid deceleration used to mark telicity in verbal predicates is manifested not only in the quick velocity change that leads to this deceleration but also in increased muscular tension of the articulators. That is, the rapid deceleration associated with event telicity has exactly those phonological properties that characterize the tense manner present in derived nominals.[21]

Moreover, in terms of event structure, it is only these surface indicators of telicity that are preserved in the derived nominal. As has been observed since Supalla & Newport ~~(~~1978~~)~~, nominals derived via nominalizing reduplication are produced with short spatial trajectories. For example, in the derived nominal ACCEPT~NMLZ (fig. 7), the sign is produced by repeated closing of the hands right in front of the signer's chest, whereas the corresponding verbal form includes this handshape-aperture change as well as an elongated spatial path movement from the middle of neutral signing space toward the signer's chest. A straightforward explanation of this observation is made possible in the present framework. Nominalizing reduplication targets only the VP_{res} constituent and, in targeting only this constituent, its output does not contain the elongated path movements associated with VP_{proc}. All nominals derived via nominalizing reduplication exhibit all and only the morphophonological properties associated with the VP_{res}. Again, ASL provides surface transparent evidence of the underlying syntactic structure.

~~Like~~ reduplicative processes more generally, nominalizing reduplication in ASL has traditionally been defined phonologically: the derived nominals are produced with short, tense repeated movements, and the shortness of the movement is likely attributable to a partial (vs. total) redu-

logical status. A familiar parallel is the case of English /s/, which functions as a meaningless phonetic unit within the phonological system but takes on morphological status as a marker of nominal plurality or verbal agreement.

[21] The presence of the telicity marking on the constituent nominalized also argues against the analysis originally proposed by Supalla & Newport (1978), wherein both the nominal and the verbal forms are derived from a shared, categorically underspecified form. If the shared underlying form is categorically underspecified, it is unclear why it would surface with a clearly verbal marker, such as ~~telicity~~ marking.

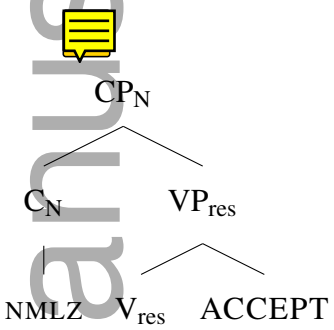
plication process. Thus, traditional description and existing analysis based on this description attribute the properties of the derived nominal to the phonological specification of the reduplication process itself. In the analysis developed here, these properties instead follow straightforwardly from the properties of the verbal structure targeted for nominalization: nominalizing reduplication is short and restrained ~~due~~ to its targeting of the VP_{res} constituent.

There is also an explanation for the duplicative property of nominalizing reduplication and this explanation can be found in the morphological doubling theory of reduplication proposed by Inkelas & Zoll (2005). Inkelas & Zoll (see also Inkelas 2008) argue that linguistic analysis must maintain two separate categories of reduplicative processes: phonological duplication and morphological doubling. Phonological duplication is the creation of a copy of a phonologically defined unit to satisfy some phonological need, such as the filling of a phonologically mandated slot. Morphological doubling, on the other hand, is the doubling of a morphologically and semantically defined unit to serve a morphological purpose. One such morphological purpose is a change of category, such as that that occurs under nominalization. Given this, I propose that nominalizing reduplication may operate via morphological doubling: the morphosyntactic structure targeted for nominalization (VP_{res}, $\pm$ classifier structure) is simply doubled in the spell-out. With such an analysis in place, it may be possible to describe nominalizing reduplication without appeal to any additional phonological properties. Nominalizing reduplication has tense manner because it is created from the VP_{res} structure. Nominalizing reduplication is short because it is created from the VP_{res} structure, without VP_{path}. Nominalizing reduplication is reduplication because the nominalizer is spelled out as morphological doubling. Any account along these lines has the potential to achieve far greater explanatory adequacy and parsimony than one that appeals to brute force phonological specification (though brute force phonological specification certainly remains possible). In the sections that follow, I ~~will further detail the~~ structures of nominalizing reduplication in ASL and how both concrete-object- and result-denoting interpretations arise.

4.2 Result-Denoting Nominals: VP_{res} Nominalization

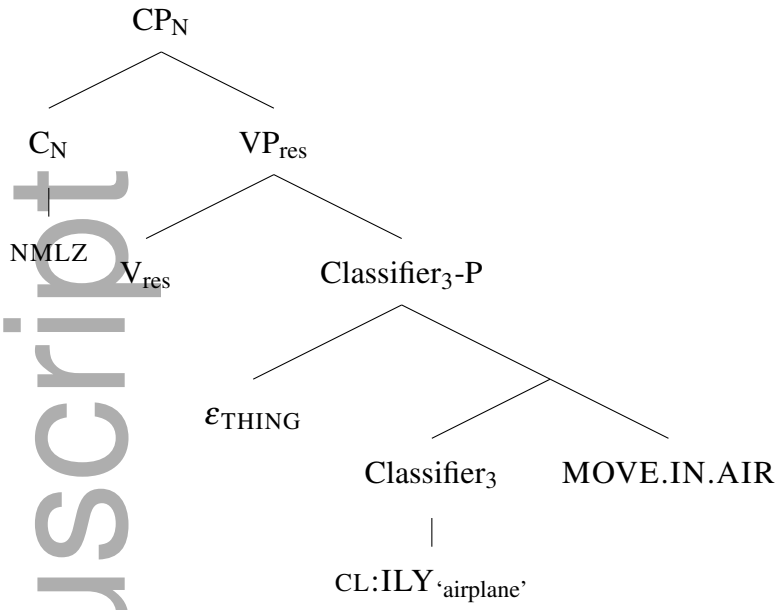
As just discussed, nominalizing reduplication in ASL is the consequence of merging a nominalizing C_N head (NMLZ) with the VP_{res} portion of the structure. Under the morphological doubling approach to reduplication, this will trigger repeated spell-out of the surface form of the VP_{res} target. In the case of ACCEPT~NMLZ in figure 7, for example, this means repetition of the restrained handshape closure (aperture change) that is the morphophonological spellout of the VP_{res} structure of the associated verbal form. The output will be a result-denoting nominal:

(28) ACCEPT~NMLZ (‘acceptance’, ‘a/the result of accepting’)



If the VP_{res} structure merged with [C_N NMLZ] contains a verbal classifier, the result-denoting structure is also available. In this case, the morphologically doubled (reduplicated) structure will contain, in addition to the markers of event telicity, a verbal classifier (represented here using a conventional gloss ILY for the classifier handshape in which the pinky finger, index finger, and thumb are extended from a fist handshape). The output remains a result-denoting nominal:

(29) MOVE.IN.AIR.BY.PLANE~NMLZ (‘flight’, ‘a/the result of moving in air by $thing_{airplane}$’)



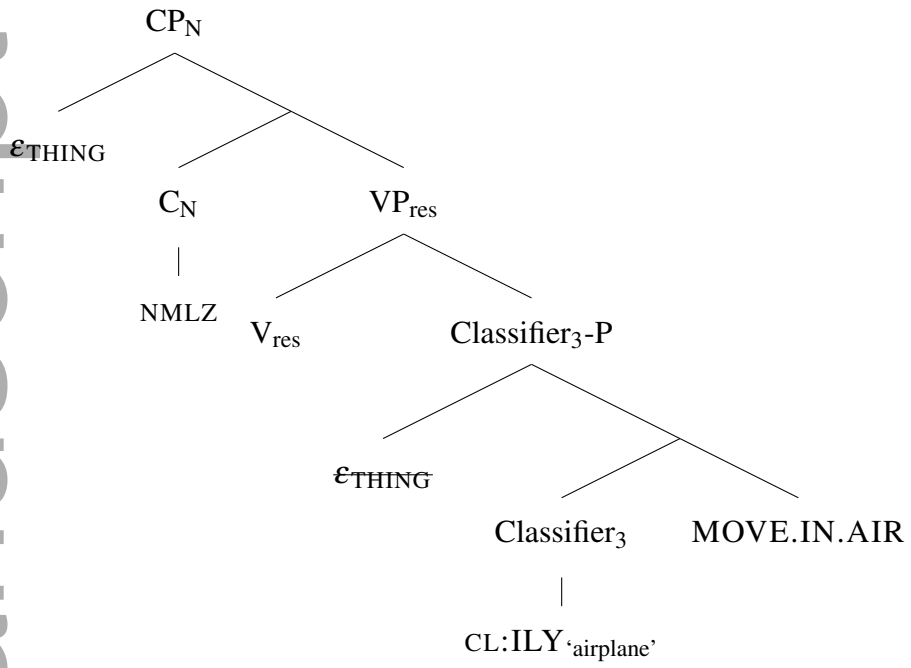
4.3 Concrete-Object-Denoting Nominals: Argument Relativization

The structure in (29) ~~illustrates~~ how a result-denoting nominal can be derived from a VP$_{res}$ constituent containing verbal classifier structure. ~~This, however, is~~ not the only interpretation available for nominals derived from such structures. Concrete-object-denoting interpretations are also available for verbal forms that contain classifier structure. The present analysis adopts an approach to nominalization in which the nominalizer functions as a C$_N$ head. Such approaches receive support from the clause-like properties sometimes exhibited even by underived nominals (Koopman 2005, Hiraiwa 2005), the crosslinguistically common strategy of using nominalization to introduce propositional arguments, and relativization structures in human language. The analysis of the ~NMLZ nominalizer as a C$_N$ head also provides a straightforward means of deriving the observed concrete-object-denoting interpretation of reduplicated nominals in ASL. When [$_{C_N}$ NMLZ] merges with a VP$_{res}$ constituent containing verbal classifier structure, the null nominal argument introduced by the Classifier$_3$-P structure can serve as the head of a relativization structure.[22] Such a structure is ~~illustrated~~ for MOVE.IN.AIR.BY.PLANE~NMLZ 'airplane', 'a/the thing$_{airplane}$ for

[22] There is a degree of syncretism here in that ~NMLZ is the morphophonological realization of the C$_N$ head that nominalizes VP$_{res}$ as well as that that relativizes this projection to create concrete-object-denoting interpretations. Syncretism of this nature is commonplace in both nominalization markers and complementizers across languages. A comparable degree of syncretism, or at least multi-functionality, would also hold for an analysis in which the NMLZ targeted different verbal projections resulting in the different nominal types (see, among others, Alexiadou 2001).

moving in air' in (30), though the details of relativization structures are largely orthogonal to the issue at hand.

(30)



Because the null nominal argument introduced by Classifier$_3$-P serves as the head of the relative-clause structure, it also determines its meaning, linking the concrete-object-denoting interpretation to that associated with the classifier. Crucially, the proposed structure explains that concrete-object-denoting interpretations such as these are only available in the presence of verbal classifier structure, as only then will there be a nominal argument available for relativization. The nominal argument introduced by the verbal classifier is, for independent reasons, phonologically null and the handshape it introduces, again for independent reasons, is bundled phonologically with the verbal complex. Thus, the output of the relativization structure that gives rise to concrete-object-denoting nominals is surface identical to that of the nominalization structure giving rise to result-denoting nominals. This is the structural ambiguity underlying the observed interpretive patterns.

This account also speaks more broadly to the grammatical structure of ASL and of human language more generally. Both the nominalization analysis of result-denoting nominals and the relativization analysis of concrete-object-denoting nominals depend crucially on the morphosyntactic complexity of "lexical" forms. This idea falls in line with many recent approaches to the

computational system and, for signed languages, echoes the proposals of Brennan (1990), Kegl & Schley (1986), Meir (2001, 2002), and Zwitserlood (2003, 2008), each of whom argue that "lexicalized" or "frozen" forms similar to or derived from productive classifier predicates may retain morphosyntactic complexity as lexical items. Setting aside the individual details of these proposals, the argument made here takes this idea one step further, showing that these morphosyntactically complex structures can be manipulated by the generative system.

5. Conclusion

The account of nominalizing reduplication developed here depends on a decompositional approach to event- and argument-structural properties of the verbal predicate, properties that may be surface transparent in ASL and other signed languages. Because nominalizing reduplication reduplicates a discrete subpart of the verbal form, it straightforwardly fits into a structure-dependent approach to reduplication such as the morphological-doubling proposal of Inkelas & Zoll (2005). The verbal constituent targeted and reduplicated, or morphologically doubled, by nominalizing reduplication is the VP_{res} structure that encodes event telicity and may or may not contain the argument-structural properties associated with a low verbal classifier ($Classifier_3$-P). The observed ambiguity between concrete-object- and result-denoting interpretations of the derived nominal was shown to result from how this verbal constituent interacts with the [C_N NMLZ] nominalizer. Nominalization of VP_{res} by [C_N NMLZ] yields a result-denoting output. Relativization of the classifier argument that is present in some VP_{res} structures yield a concrete-object-denoting output. In all cases, the components of this verbal constituent and the resulting nominal are transparently evident in the surface form. Rapid deceleration and discrete phonological change mark event endpoints (telicity), while handshapes may represent event participants. The visuogestural channel of signed languages is, by its very nature, more conducive to nonarbitrary representations of meaning, but the patterns documented here show that such iconic properties are nevertheless structured and manipulated in linguistically general ways.

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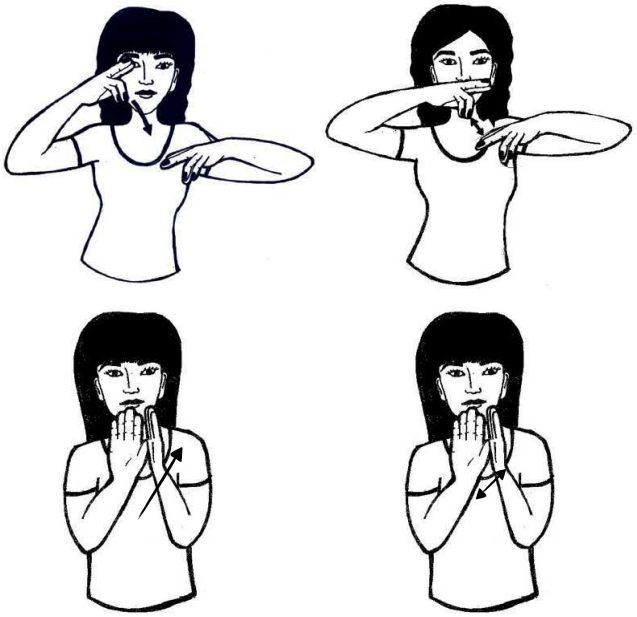

Figure 1: Illustration of the verbal and derived nominal forms in (1). The verbal forms SIT (top left) and DEVELOP (bottom left) both contain a single, elongated movement, whereas the derived nominal forms SIT~NMLZ (top right) and DEVELOP~NMLZ (bottom right) are produced with short, tense, repeated movement.

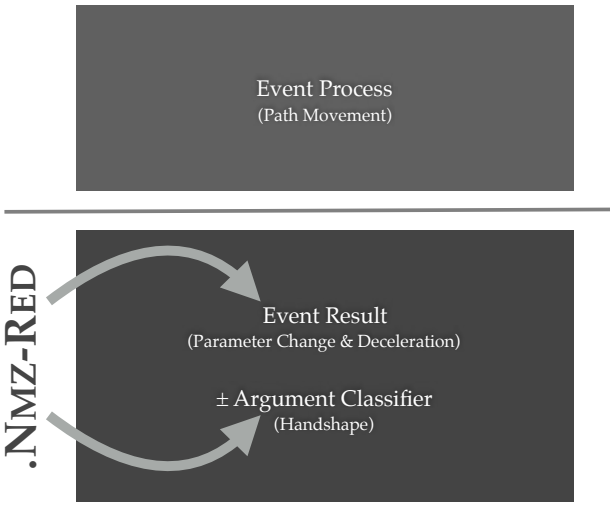

Figure 2: Structural schematic of the nominalizing reduplication process in ASL. The lower verbal layer contains information pertaining to the event result and may also contain an argument-introducing classifier. This is the layer targeted for nominalization by ~NMLZ, which may anchor its meaning to either the event result or the argument classifier.

COMP: All color images may be rendered in black and white in the print issue. If necessary for layout, image panels may be separated and stacked. For example, in Fig 3, the panels for 0, 334, and 501 ms could appear in one row, followed by the panels for 668 and 1101 ms in the next row. Whatever makes sense for layout.

Figure 3: Time-stamped video stills of the sign VOTE. The single contact movement of this verbal production occurs just subsequent to the middle (501 ms) frame.

The full video is available with this article online as Video 1 in the Supplementary materials.

Figure 4: Time-stamped video stills of the sign VOTE~NMLZ. The two instances of contact movement occur in the second (334 ms) and fourth (667 ms) frames. The full video is available with this article online as Video 1 in the Supplementary materials.

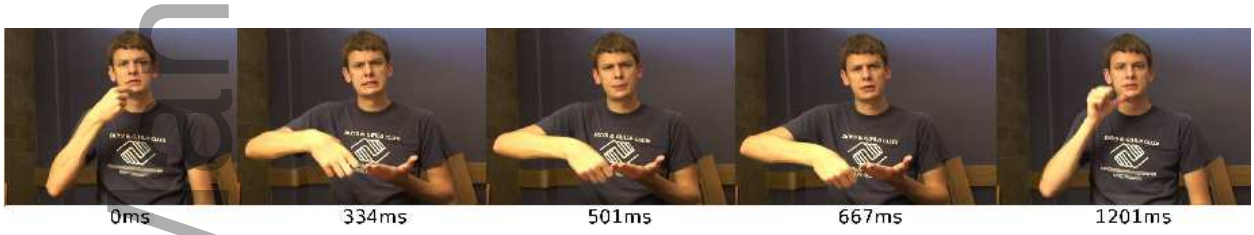

Figure 5: Time-stamped video stills of the reduplicated-aperture-change nominal STAPLE.WITH.STAPLER~NMLZ (‘stapler’).

Figure 6. Time-stamped video stills of the reduplicated-orientation-change nominal STRIKE.MATCH~NMLZ (‘match’).

Figure 7. Time-stamped video stills of the reduplicated-aperture-change nominal ACCEPT~NMLZ ('acceptance'). The full video is available with this article online as Video 3 in the Supplementary materials.

Figure 8: Time-stamped video stills of the reduplicated-orientation-change nominal ANNOUNCE~NMLZ (‘announcement’).

Properties of result nominals

		~NMLZ
(i)	Denote the outcome of an event (cf. section 2.1.1).	✓
(ii)	Do not obligatorily take arguments.	✓
(iii)	Prenominal genitives are possessives, not agents.	✓
(iv)	Do not allow agent-oriented modifiers.	✓
(v)	May be definite or indefinite.	✓
(vi)	May pluralize.	✓
(vii)	Modification by *frequent* possible only when pluralized.	(✓)
(viii)	May appear as predicate nominals.	(?)
(ix)	Do not permit aspectual modifiers.	(?)
(x)	Do not permit implicit argument control.	(?)
(xi)	'By' phrases are nonargumental.	N/A

Table 1: Properties of result nominals as identified by Grimshaw (1990).