Building verbs in Chuj:
Consequences for the nature of roots [1]

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This paper offers an in-depth look at roots and verb stem morphology in Chuj (Mayan) in order to address a larger question: when it comes to the formation of verb stems, what information is contributed by the root, and what is contributed by the functional heads? I show first that roots in Chuj are not acategorical in the strict sense (cf. Borer 2005), but must be grouped into classes based on their stem-forming possibilities. Root class does not map directly to surface lexical category, but does determine which functional heads (i.e. valence morphology) may merge with the root. Second, I show that while the introduction of the external argument, along with clausal licensing and agreement generally, are all governed by higher functional heads, the presence or absence of an *internal* argument is dictated by the root. Specifically, I show that transitive roots in Chuj always combine with an internal argument, whether it be (i) a full DP, (ii) a bare pseudo-incorporated NP, or (iii) an implicit object in an antipassive. In the spirit of work such as Levinson 2007, 2014, I connect this to the semantic type of the root; root class reflects semantic type, and semantic type affects the roots combinatorial properties. This work also contributes to the discussion of how valence morphology operates. In line with works such as Alexiadou, Anagnostopoulou & Schäfer 2006, I argue that valence morphology applies directly to roots, rather than to some "inherent valence" of a verb.

Keywords: roots, antipassive, valence, argument structure, Chuj, Mayan

1. INTRODUCTION

This paper examines roots and verb stem formation through a detailed look at verb stems in Chuj, a Q'anjob'alan Mayan language of Guatemala. Following a range of recent work, I assume that verbs are created in the syntax by combining a root with one or more functional heads (see e.g. Halle & Marantz 1993, Marantz 1997, Arad 2003, Borer 2005; and Lois & Vapnarsky 2006, Lois 2011 on Mayan in particular). The issue I address here is the division of labor between the root and the functional heads. I argue first that roots in Chuj are not strictly acategorical, but belong to specific root classes. In Chuj these are minimally: transitive ($\sqrt{}$TV), intransitive ($\sqrt{}$ITV), positional ($\sqrt{}$POS), and nominal ($\sqrt{}$NOM). However, root

classes do not map directly to surface lexical categories (i.e. nouns, adjectives, verbs), but require the addition of functional morphology in order to form surface stems. In other words, a transitive root is not a transitive verb, an intransitive root is not an intransitive verb, and—as we will see below—positional roots do not directly correspond to any surface category (England 1983, Haviland 1994, Henderson 2017).

Here, we focus specifically on the formation of verb stems. Minimally, in addition to the root, Chuj verbs involve a fuctional head which I label v/Voice^0. Following Harley (2017), I assume that in some languages, v^0 and Voice^0 heads are bundled into a single, fused head, as shown in (1).

(1)
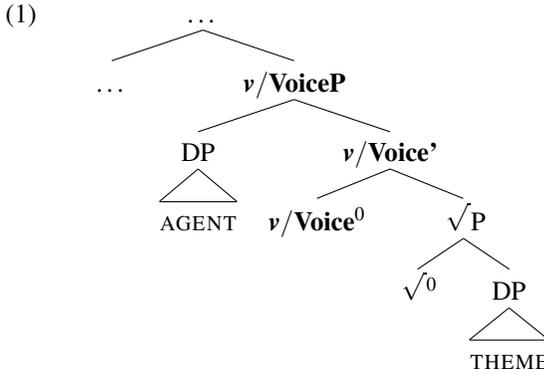
Differences in the choice of v/Voice^0 head partially determine argument structure properties of the resulting stem. In other words, following Hale & Keyser (1993) and subsequent work, argument structure is built up in the syntax.

I show below that the fused v/Voice^0 head has properties standardly associated with both v^0 and Voice^0. As v^0, it selects a root and categorizes the stem as a verb and, in some cases, it may also assign accusative case to the internal argument.[1] Like Voice^0, the bundled v/Voice^0 is responsible for introducing the external argument (Kratzer 1996), and certain v/Voice^0 heads may also assign abstract (inherent ergative) case to this argument (see e.g. Mahajan 1989, Nash 1996, Woolford 1997), discussed further below. However, I argue that it is *the root itself* which determines whether it semantically composes with (i.e. selects) an internal argument, and that this requirement cannot be undone later in the derivation. This division of labor between roots and functional heads with respect to argument introduction and licensing is summarized in (2).

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[1] Accusative case assignment is not discussed in this paper, but see Coon et al. 2014 on the Agent Focus suffix in related Q'anjob'al, a cognate of which is present in Chuj. Coon et al. argue that this suffix is a Voice^0 head which introduces the external argument and assigns accusative case to the internal argument.

	selection	licensing/agreement
internal argument	$\sqrt{}$ROOT	v/Voice^0 or Infl^0
external argument	v/Voice^0	v/Voice^0 or Infl^0

(2)

Following work such as Levinson 2007, 2014, I propose that differences in the combinatorial properties of roots are connected to their semantic differences (see also other references and discussion in Alexiadou et al. 2014). Specifically, I argue that the core Chuj root classes described below can be at least partially distinguished based on their semantic types, as shown in (3).

(3)   SEMANTIC TYPES OF CHUJ ROOTS

   $\sqrt{}$TV $< e, < s,t >>$
   $\sqrt{}$ITV $< e, < s,t >>$
   $\sqrt{}$POS $< e, < s,d >>$
   $\sqrt{}$NOM $< e,t >$

Transitive and intransitive roots always combine with an internal argument to yield an event predicate, discussed further below; transitive roots may then be directly selected by transitive v/Voice^0, which introduces the external argument. This is in line with the proposal by Davis (1997) that all predicates are based on roots which are associated with a single, internal argument. I assume that unlike $\sqrt{}$ITV roots, the events denoted by $\sqrt{}$TVs are compatible with external causation by an agent (Levin & Rappaport-Hovav 1995), though I leave aside how this should be formalized. Following Henderson 2017, positional roots denote measure functions of type $< e, < s,d >>$ and require further derivation in order to be inflected, discussed briefly in section 2.4.

The remainder of this paper is organized as follows. Section 2 provides necessary background information on roots and stem formation in Chuj. In section 3, I focus on one particular v/Voice^0 head in Chuj: the incorporation antipassive suffix -*w*. This suffix attaches to a variety of roots, always forming an agentive intransitive stem (glossed -AG), as shown by the forms in (4).[2] Though the roots in (4a–c) belong to different categories, the result in all cases is an intransitive

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[2]Abbreviations used in glosses are as follows: A – "Set A" (ergative, possessive); ABS – absolutive; AG – agentive intransitive; AGR – agreement; AP – antipassive; APPL – applicative; B – "Set B" (absolutive); CLF – noun classifier; DEM – demonstrative; DIR – directional; DIV – derived intransitive verb; DTV – derived transitive verb; INCH – inchoative; IPFV – imperfective; IRR – irrealis; IV – intransitive verb; L – linker; NML – nominal; PASS – passive; PFV – perfective; P – plural; PLUR – pluractional; PREP – preposition; PROSP – prospective; RN – relational noun; S – singular; SP – Spanish origin; STAT – stative suffix; SUF – unidentified suffix; TV – transitive verb.

Chuj is written in the official orthography established by the *Academia de Lenguas Mayas de Guatemala*; see Domingo Pascual 2007. Glosses and orthography from other published works on Chuj have been modified in some cases for consistency; translation from Spanish is my own. Unless otherwise attributed, Chuj data presented here are the result of elicitation work in Montreal and Guatemala with speakers of the San Mateo Ixtatán variant of Chuj. Data from other sources have been confirmed through elicitation.

verb stem with a single, agentive, argument. These different but related uses of the suffix *-w* have been noted in Chuj (Buenrostro 2013), as well as for the cognate form in Popti' (Day 1973, Craig 1979).

(4) (a) Ix-in-**xik**- w -i   k'atzitz.
          PFV-B1S-chop-AG-IV wood
          'I wood-chopped.'   → *transitive root*

     (b) Ix-in-**chanhal**- w -i.
          PFV-B1S-dance-AG-IV
          'I danced.'   → *nominal root*

     (c) Ix-in-**chot**- w -i.
          PFV-B1S-crouched-AG-IV
          'I hopped along crouched down.'   → *positional root*

I argue below that *-w* is a v/Voice^0 head which attaches to a root and introduces the external argument in its specifier position. However, unlike regular transitive v/Voice^0, *-w* does not assign inherent ergative case. Intransitivity of the resulting stem is indirectly ensured via the limited number of licensing heads in the clause (i.e. only finite Infl^0 is present). I provide a syntax and semantics for *-w* stems, arguing that the presence or absence of an internal argument is a direct requirement of the type of root: transitive roots like *xik* in (4a) must combine with a complement; nominal and positional roots in (4b–c) do not.

In section 4, through a comparison with other voice and valence morphology in Chuj, I further develop the argument that part of the information that the root provides is whether or not it combines with an internal argument. I characterize this as a semantic requirement, relating to the semantic type of the root (as in (3) above). For transitive roots, I show that there are three options for verbal surface stem formation: (i) a transitive stem with a full DP internal argument; (ii) an incorporation antipassive with a bare NP internal argument ((4a) above); and (iii) an absolutive antipassive with an implicit and existentially bound internal argument. Chuj's rich morphology shows us that there is no option in which a transitive root does not semantically compose with some sort of complement. Though the focus here is on Chuj, this outcome has potential consequences for the nature of roots cross-linguistically, as well as the role of valence morphology in the derivation, discussed in sections 4 and 5.

2. ROOTS AND STEMS IN CHUJ

Chuj is a member of the Q'anjob'alan branch of the Mayan language family spoken by around 70,000 people in the department of Huehuetenango in Guatemala (Piedrasanta 2009, Buenrostro 2013). Data presented here, unless otherwise cited, are from the San Mateo Ixtatán variant. For general Chuj background see also Hopkins 1967, Domingo Pascual 2007, García Pablo 2007, Buenrostro 2013.

As in other Mayan languages, roots in Chuj are overwhelmingly CVC in shape (though other forms, especially for nominal and adjectival roots, also exist; see

Hopkins 1967: ch. 2). Here we will be concerned primarily with four classes of roots, distinguishable by their formal inflectional and derivational properties: (i) transitive roots ($\sqrt{}$TV); (ii) intransitive roots ($\sqrt{}$ITV); (iii) positional roots ($\sqrt{}$POS); and (iv) nominal roots ($\sqrt{}$NOM).[3] Examples are shown in (5).

(5) CHUJ ROOT CLASSES

$\sqrt{}$TV		$\sqrt{}$ITV		$\sqrt{}$POS		$\sqrt{}$NOM	
xik	'chop'	*b'at*	'go'	*chot*	'crouched'	*pat*	'house'
chonh	'sell'	*way*	'sleep'	*jenh*	'outstretched'	*k'atzitz*	'wood'
jax	'grind'	*k'ey*	'ascend'	*chek'*	'leaning'	*ixim*	'corn'
chel	'hug'	*jaw*	'arrive'	*lich'*	'extended'	*winak*	'man'
tek'	'kick'	*ok'*	'cry'	*b'ul*	'gathered'	*chanhal*	'dance'

Nominal roots may typically appear underived directly in nominal contexts (e.g. in argument position, possessed, following prepositions, with classifiers), and are not discussed in detail here. In the remainder of this section I review some formal diagnostics for distinguishing among the first three categories.

As foreshadowed above, it is important to highlight the distinction between these four classes of *roots*, on the one hand, and classes of *inflectable stems*, on the other (see also Haviland 1994, Henderson 2017). For example, all four types of root have the ability to appear in intransitive stem forms, but they each require different types of morphology in order to do so. We thus draw a distinction, between *intransitive roots* (roots which behave as a class in terms of morphology needed to form stems), and *intransitive stems* (inflectable verb stems which combine with a single argument).

The basic template for a Chuj verb stem is shown in (6). Obligatorily we find a root, which I argue combines minimally with a v/Voice^0 head. These v/Voice^0 heads typically have the shape of a single consonant in Chuj, though are null in several specific environments, discussed below.

(6) CHUJ VERB STEM

$$\text{TAM - } \phi \text{ - } \boxed{\sqrt{}\text{ROOT - C}_{(v/Voice)}} \text{ - STATUS SUFFIX}$$

Core argument structural properties are determined by the root together with the v/Voice^0 head in (6), which form the main focus of the sections below. The stem if suffixed by a "status suffix", and preceded by person/number (ϕ) and TAM (primarily aspectual) inflection, discussed below. See England & Zavala 2013, Bennett et al. 2016, and Aissen et al. 2017 for recent overviews of Mayan grammar.

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[3]Mayan languages generally have a small class of adjectival roots (England 2004, Martínez Cruz 2007). Hopkins (1967) groups adjectival roots as a subclass of nominal roots, and I set these aside here.

2.1. *Intransitive stems*

Intransitive roots can be described as roots which appear without an overt v/Voice^0 suffix in intransitive stem forms, as in (7). Here and below, I do not parse out a null v/Voice^0 morpheme, but I assume that a "Ø" v/Voice^0 head is present.

(7) INTRANSITIVE ROOTS IN INTRANSITIVE STEMS

    (a) Ix-onh-**way**-i.
        PFV-B1P-sleep-IV
        'We slept.'

    (b) Tz-ach-**k'ey**-i.
        IPFV-B2S-ascend-IV
        'You go up.'

    (c) Ol-in-**b'ey**-ok.
        PROSP-B1S-walk-IRR
        'I will walk.'

Intransitive stems are marked by the intransitive status suffix *-i* in perfective and imperfective aspects (7a–b), and the irrealis *-ok* in the prospective aspect (7c).[4] The status suffix *-i* is dropped when the stem is not phrase final (see Dayley 1981, Henderson 2012, Buenrostro 2013), unless its omission would result in a final complex coda (Mateo Pedro 2011), discussed below (see fn. 8). Compare (8a), in which *-i* is dropped, with the form in (8b), in which the subject appears preverbally and *-i* is not dropped.

(8) (a) Ix-**b'ey** ix ix.
        PFV-walk CLF woman
        'The woman walked.'

    (b) Ix ix ix-**b'ey**-i.
        CLF woman PFV-walk-IV
        'The woman walked.'

The single argument of the intransitive stem is cross-referenced with an absolutive morpheme, known as "Set B" in Mayanist literature. The Set B marker attaches to the stem-initial aspect marker, as shown in the forms in (7) above. As in other Mayan languages, there is no overt third person singular Set B marker.

Other types of roots may also appear in intransitive stem forms, but require the presence of overt derivational suffixes, to which we return below. The intransitive stem template is shown in (9). Intransitive stems share a common inflectional exterior: TAM, Set B (possibly null), and the status suffix *-i* (possibly dropped).

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[4]Chuj shows split ergativity in the progressive aspect. The progressive involves embedding and utilizes special dependent stem forms not directly relevant to the discussion here. See Buenrostro 2004 and Coon & Carolan 2017 on the Chuj progressive.

√ITV roots appear directly in this frame (9a), while other types of roots must be derived via overt morphology in order to appear in the intransitive stem (9b).

(9) CHUJ INTRANSITIVE STEMS

    (a) TAM – SET B – $\boxed{\text{√ITV}}$ **-i** *(intransitive)*

    (b) TAM – SET B – $\boxed{\text{√ROOT – SUF}}$ **-i** *(derived intransitive)*

2.2. *Transitive stems*

Transitive roots may appear directly in transitive stem forms, as in (10):

(10) TRANSITIVE ROOTS IN TRANSITIVE STEMS

    (a) Ix-ach-ko-**chel**-a'.
        PFV-B2S-A1P-hug-TV
        'We hugged you.'

    (b) Tas   ix-e-**chonh**-o'?
        what PFV-A2P-sell-TV
        'What did you$_{PL}$ sell?'

    (c) Tz-in-**jax**   ixim ixim.
        IPFV-A1S-grind CLF corn
        'I grind the corn.'

    (d) Ol-ach-w-**il**-a'.
        PROSP-B2S-A1S-see-TV
        'I will see you.'

The transitive root appears with the transitive status suffix *-V'* in perfective, imperfective, and prospective aspects; the suffix is *-a'* for roots with non-back vowels [a], [e], and [i], and harmonic with the root vowel for roots with [o] and [u] vowels. As with the intransitive suffix, the transitive status suffix is dropped when the stem is not phrase-final. Transitive stems appear with two person/number-marking morphemes: objects are marked with Set B clitics (null for 3rd person) and transitive subjects are cross-referenced with Set A (ergative) prefixes.

In Mayanist literature a division is drawn between "root transitive" stems, like the ones in (10), and "derived transitive" stems (see e.g. Coon 2016). Root transitives are formed directly from transitive roots, while derived transitives are formed from other types of roots and appear with a special status suffix, *-ej*, shown in (11).

(11) (a) Ix-a-way-m-it-**ej**   ix   nene.
        PFV-A2S-sleep-APPL-SUF-DTV CLF baby
        'You accompanied the baby to sleep.'

    (b) Ok-ko-tz'ib'-**ej**   ch'anh hu'um.
        PROSP-A1P-writing-DTV CLF   book
        'We will write the book.'

These derived transitives include both transitives derived by overt morphology, as in (11a), as well as a number of zero-derived forms, often denominals, as with the nominal root *tz'ib'* 'letters, writing' in (11b). Note that the transitive suffix *-V'* does not cooccur with *-ej*, and *-ej* is not dropped phrase-finally.

Root and derived transitive templates are given in (12).

(12) CHUJ TRANSITIVE STEMS

    (a) TAM – SET B – SET A – $\boxed{\sqrt{\text{TV}}}$ **-V'**   *(root transitive)*

    (b) TAM – SET B – SET A – $\boxed{\sqrt{\text{ROOT} - \text{SUF}}}$ **-ej** *(derived transitive)*

2.3. *Verbal stem summary*

The TAM markers and "status suffixes" seen to this point are summarized in the table in (13):[5]

(13) TAM MARKERS AND STATUS SUFFIXES

		IV	TV	DTV	
IPFV	*tz*	*-i*	*-V'*	*-ej*	
PFV	*ix*/Ø	*-i*	*-V'*	*-ej*	
PROSP	*ol*	*-ok*	*-V'*	*-ej*	*(irrealis)*

The suffixes in (13) are listed together here for ease of reference, but note that they do not form a unified category, and it is not clear that they serve a specific derivational "function". While *-i* and *-V'* appear only in phrase-final position, *-ej* is never dropped. The intransitive suffix is replaced with *-ok* in irrealis contexts like the prospective *ol*, but the other two suffixes are not. Furthermore, while both *-i* and *-ej* appear on stem forms which have been derived, *-V'* only appears immediately following transitive roots.

This is in keeping with the description of so-called "status suffixes" in works such as Henderson 2012. As Henderson notes, Mayan status suffixes do not *alter* the transitivity of a stem, but rather "reflect valency information already available from the lexical content of the predicate, or from a combination of lexical information and derivational morphology" (Henderson 2012: 747). While the choice of status suffix depends on properties like transitivity, TAM, and clause type, this information is generally also represented elsewhere—for example in the stem-initial TAM marker. Following Clemens & Coon (to appear), and consistent with the order of morphemes on the stem, I locate the status suffix in the head of a projection at the top edge of the verbal maximal projection, above VoiceP, in a projection labelled "SSP". I tentatively assume that the choice of suffix may be

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[5]The perfective is frequently null, and at least for some speakers the choice between *ix* and Ø may be related to hodiernal versus more distant past distinctions within the perfective; see Carolan 2015.

determined by selection, but leave a full analysis of the role of status suffixes as a topic for future work. We return to verb stem structure below in section 3.

2.4. *Positional roots*

Positionals form a distinct class of roots throughout the Mayan family, distinguishable by their special stem-forming morphology as well as their meaning (see e.g. Haviland 1994, Henderson 2016, 2017). Semantically they typically make reference to position, shape, aggregation, or surface quality. Henderson (2016: 585) writes that positionals "lexicalize interval states (sitting, standing, lying down, etc.) as well as gradable properties (broken, fat, flexible, etc.)." For Tsotsil, Haviland (1994: 733) refers to an apparent "preoccupation with space, shape, and configuration," reflected in the large class of positional roots. For Chuj, Hopkins (1967: 76) notes that positional roots may be "distinguished from other form classes by a number of derivational reduplication processes which occur with no other form class."

Positionals are a class of roots, but there is no special class of positional surface stems (see e.g. England 1983, Haviland 1994, contra Evans & Levinson 2009). Positional roots in Chuj may be identified by their ability to form stative (aspectless or "non-verbal") predicates through the addition of the suffix *-an*, often accompanied by a directional particle, as in (14).

(14) POSITIONAL ROOTS IN STATIVE STEMS

    (a) **Chot**-an   em   nok' k'ok'on.
          crouched-STAT DIR.down CLF frog
          'The frog is crouched down/squat.'

    (b) **Jenh**-an   el   s-k'ax-il   nok' pech.
          outstretched-STAT DIR.exit A3S-wing-NML CLF duck
          'The duck's wings are outstretched.'

Henderson (2017) argues that positional roots in Kaqchikel denote measure functions and that they must always be derived into a relational expression before they may be inflected. Indeed, in order to form eventive transitive or intransitive predicates, positional roots in Chuj must always appear with one or more of a number of derivational suffixes, followed by the appropriate status suffix (*-i* for intransitives or *-ej* for transitives). In other words, positional roots follow the templates for derived intransitive and transitive stems in (9b) and (12b) above.[6]

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    [6]The suffix *-aj* in (15a–b) appears on many derived intransitive stems, and is discussed further in section 4. I assume the suffix *-n* in (15a) is a reduced form of the stative predicate forming suffix *-an*, though further work is needed on this and a number of other derivational and stem-forming suffixes in Chuj; see Hopkins 1967 for a comprehensive list.

(15) POSITIONAL ROOTS IN VERBAL STEMS

    (a) Ix-onh-**k'ox**-n-aj-i.
        PFV-A1P-seated-STAT-DIV-IV
        'We sat down.'

    (b) Tz-in-**mel**-tz-aj-i.
        IPFV-B1S-round.turning-PLUR-DIV-IV
        'I turn around and come back.'   (Hopkins 2012a: 197)

    (c) Tz-ko-**lich'**-b'-ej   ko-k'apak.
        IPFV-A1P-hanging-INCH-DTV A1P-clothing
        'We hang our clothing.'

While the tripartite division among intransitive, transitive, and positional roots above is a useful point of departure, in some cases a given root may not belong clearly to one or another class, or may belong to multiple classes (Haviland 1994, Lois 2011). This is particularly true in the case of transitive and positional roots, which appear to share certain derivational possibilities across the Mayan family (see Haviland 1994, Coon & Preminger 2009, and Henderson 2016, 2017), as well as in Chuj in particular (Hopkins 1967). Nonetheless, canonical positional roots may be distinguished from transitive roots by the former's inability to form transitive stems without the presence of overt derivational morphology. I focus on canonical cases here, setting aside the puzzle of what Haviland (1994) terms "mixed categories" for future work.

2.5. Summary

In addition to providing an introduction to roots and stem-formation in Chuj, this section underscores the importance of distinguishing between, for example, an *intransitive root* and an *intransitive stem*. As seen above, Chuj roots may be classed according to their formal derivational behavior, and, to some extent, their semantics (see (3) above). But roots do not inflect directly for person/number and temporal information. Rather, additional morphology is required to form stems, and a single root may enter into a variety of different stem forms through the addition of the "derivational" (v/Voice^0) and "status" suffixes seen above. Thus, while roots in Chuj clearly belong to root classes, these classes do not directly correspond to surface lexical categories. Below I argue that a transitive root ($\sqrt{\text{TV}}$), for example, requires exactly as much derivation to form a verbal surface stem as a nominal root ($\sqrt{\text{NOM}}$) does. In the sections that follow, we look in more detail at morphology used to form verb stems in order to address the question of what information is contributed by the root and what is contributed by the functional heads.

3. AGENTIVE INTRANSITIVES

In this section we examine the derivation of agentive intransitive stems (i.e. intransitives with an agentive subject) through a look at two constructions in which the suffix -*w* attaches directly to roots: unergatives (§3.1) and the "incorporation antipassive" (§3.2). I argue here that -*w* serves the same function in each: it categorizes the stem as a verb and introduces—but does not assign ergative case to—an external argument. The result is that nominal and positional roots form verbal (agentive intransitive) stems in the same way that transitive roots do. This is illustrated by the intransitive stem forms in (16), repeated from (4) above.

(16)   (a) Ix-in-**xik-**$\boxed{\text{w}}$**-**i   k'atzitz.
            PFV-B1S-chop-AG-IV wood

            'I wood-chopped.'   → *transitive root* ($\sqrt{}$TV)

      (b) Ix-in-**chanhal-**$\boxed{\text{w}}$**-**i.
            PFV-B1S-dance-AG-IV

            'I danced.'   → *nominal root* ($\sqrt{}$NOM)

      (c) Ix-in-**chot-**$\boxed{\text{w}}$**-**i.
            PFV-B1S-crouched-AG-IV

            'I hopped along crouched-down.'   → *positional root* ($\sqrt{}$POS)

A crucial difference among the forms in (16) is in the presence or absence of an internal argument: the transitive root in (16a) obligatorily appears with a nominal complement, even in an *intransitive* stem form (§3.2; see Maxwell 1976), while the stems formed from nominal and positional roots in (16b–c), discussed in section 3.1, do not. I argue that this difference is the result of different semantic requirements of the roots: transitive roots must combine directly with a nominal complement, while nominal and positional roots may not. Section 3.3 examines $\sqrt{}$ITV roots, the only class of roots to which -*w* may not attach.

3.1. Unergatives

Many agentive intransitives in Chuj are formed from nominal roots with the suffix -*w*.[7] Examples of denominal -*w* verbs and their corresponding nominal roots are shown in (17).

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[7]I take it for granted that these are unergatives for now, returning to this question in §3.3.

(17) UNERGATIVES DERIVED FROM NOMINAL ROOTS

NOMINAL ROOT		VERB STEM	
chanhal	'dance'	*chanhal-w-i*	'to dance'
at'is	'sneeze'	*at'is-w-i*	'to sneeze'
tz'ib'	'letters, writing'	*tz'ib'-w-i*	'to write'
taj	'pine (SP *ocote*)'	*taj-w-i*	'to gather pine'
patan	'cleared land (SP *roza*)'	*patan-w-i*	'to clear land'
tul	(a type of game)	*tul-w-i*	'to play *tul*'
karrel	(SP) 'run'	*karrel-w-i*	'to run'
paxyal	(SP) 'stroll'	*paxyal-w-i*	'to stroll'

Note that verbs borrowed from Spanish—for example *karrel* from the Spanish infinitive form *correr* 'to run'—enter Chuj as nominals and must be derived into verb forms (also discussed in Haviland 1994 for Tsotsil and Coon 2013 for Ch'ol). These borrowed forms suggest that the *-w* process is at least semi-productive, and not restricted to frozen lexical items (cf. Buenrostro 2013). However the process is not entirely productive (i.e. many nominal roots may not appear with *-w*), and as the forms above indicate, the meaning of the resulting verb stem is not necessarily predictable from the meaning of the nominal root. I take this to be compatible with the proposal that the v/Voice^0 head instantiated by *-w* merges directly with the root, formalized below, within the domain of special meaning (Arad 2003).

Examples of underived nominal roots in nominal environments are shown in (18); the corresponding intransitive *-w* stems are in (19).[8]

(18) (a) Ix-w-ab'   jun **at'is**.
           PFV-A1S-hear one sneeze
           'I heard a sneeze.'

      (b) Ix-in-kot'   t'a **patan**.
           PFV-B1S-arrive PREP cleared.land
           'I arrived at the cleared land.'

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[8]Note that the *-i* status suffix is maintained on the intransitive stem in (19a), even though the stem is not phrase final (compare the underived intransitive stem in (18b), in which *-i* does not surface). Following Mateo Pedro 2011 for related Q'anjob'al, I propose that this difference is related to a phonological fact, and does not indicate a deep difference between *-w* stems and other intransitive stems. Specifically, the intransitive status suffix *-i* is not dropped if its omission would result in a complex final coda. Complex final codas are generally impossible in the San Mateo Ixtatán variant of Chuj examined here (*CC#). The status suffix is thus always retained on *-w* forms since the root itself always (as far as I am aware) ends in a consonant (...C*w-i*).

Perhaps because the *-i* never drops from *-w* stems, some authors have treated the sequence *-w-i* as a single morpheme: *wi* (e.g. Buenrostro 2013). Nonetheless, stems with *-w* may also appear in other stem forms without *-i*, for example with the irrealis suffix *-ok*, as in (19b). Further evidence comes from the San Sebastián Coatán variant of Chuj, described by Maxwell (1976). Here final consonant clusters are possible, and as expected, *-i* does drop in these contexts.

(19) (a) Ix-**at'is**-w-i   ix   unin.
           PFV-sneeze-AG-IV CLF child
           'The girl sneezed.'

      (b) Ol-ach-**patan**-w-ok.
           PROSP-B2S-cleared.land-AG-IRR
           'You will clear land.'

Intransitive verb forms are also derived from positional roots (§2.4), as in the table in (20). The verbal stem form indicates some kind of movement in the position denoted by the positional root.

(20) VERBS DERIVED FROM POSITIONAL ROOTS

| POSITIONAL ROOT		VERB STEM	
chet	'on two legs'	*chet-w-i*	'jump, hop'
chot	'crouched down'	*chot-w-i*	'go along crouched-down'
jenh	'wings outstretched'	*jenh-w-i*	'fly'
kot	'on four legs'	*kot-w-i*	'crawl'
tel	'lying down'	*tel-w-i*	'fall, lie down'

Recall that positional roots in Chuj may be identified by their ability to form stative predicates with *-an*. Examples of positional roots in stative *-an* stems are given in (21); the same roots in intransitive verb stems with *-w* are shown in (22).

(21) (a) **Kot**-an   em   ix   nene.
           on.four.legs-STAT DIR.down CLF baby
           'The baby is crouched down on all fours.'

      (b) **Jenh**-an   el   s-k'ab'   winh unin.
           outstretched-STAT DIR.exit A3S-arm CLF   child
           'The boy's arms are outstretched.'

(22) (a) Tz-**kot**-w-i   ix   nene.
           IPFV-on.four.legs-AG-IV CLF baby
           'The baby crawls.'

      (b) Ol-**jenh**-w-ok   nok' pech.
           PROSP-outstretched-AG-IRR CLF duck
           'The duck will fly.'

These stems fit the pattern of intransitive stems in Chuj identified in section 2.1 above: they have a single argument, marked with Set B/absolutive (null for third person singular). They also appear with the intransitive status suffix *-i* in the perfective and imperfective aspects (22a), and with the irrealis *-ok* in the prospective (22b). I propose that ROOT-*w-i* stems like the one in (23a) have the structure in (23b).

(23) CHUJ AGENTIVE INTRANSITIVE

    (a) Ix-**chot**-w-i   nok' k'ok'on.
   PFV-crouched-AG-IV CLF frog
          'The frog hopped.'

    (b)
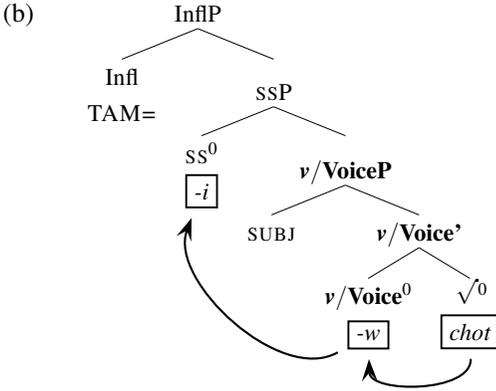
Specifically, the suffix *-w* occupies a bundled v/Voice^0 head (Pylkkänen 2002, Harley 2017), which merges directly with the root, categorizing the stem as verbal and introducing the external argument in its specifier position (along the lines of Kratzer 1996). The "status suffix" occupies the highest head in the verbal projection, labelled SSP (Clemens & Coon to appear). The root undergoes successive head-movement through v/Voice^0 to SS^0 resulting in basic verb-initial order (discussed in §3.2), and forming the verb stem; the order of morphemes is in line with the Mirror Principle (Baker 1988). The TAM particle is located in Infl^0 (Aissen 1992), which cliticizes to the verb stem.

While both agentive intransitive *-w* and regular transitive v/Voice^0 heads introduce an external argument in their specifier position, agentive intransitive *-w* differs in a crucial respect: transitive v/Voice^0 assigns inherent ergative case to the argument in its specifier, while *-w* v/Voice^0 does not (see e.g. Woolford 1997, Legate 2008 and works cited there on inherent ergative).[9] Following Coon 2017, I assume that Set A (ergative) agreement goes hand-in-hand with inherent ergative case assignment; the ergative prefix represents the spell-out of features of the external argument on the verb stem as the result of feature-sharing triggered by

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[9]Some critiques of inherent ergative case assignment are concerned with ergative languages—like Chuj—in which some external arguments (i.e. transitive subjects) receive ergative marking, while others (i.e. unergative subjects) do not; see Baker & Bobaljik 2017 for discussion. Note that if the proposal here is correct, we see overt morphological evidence for at least two distinct external argument-introducing v/Voice^0 heads: Ø assigns inherent ergative, while *-w* does not. See also fn. 14.

inherent case assignment.[10] As expected, ergative agreement is absent in agentive intransitive forms like (23a). Instead, in *-w* forms, the single absolute argument must be licensed by finite $Infl^0$, as shown in (24). Following Coon et al. (2014) for Q'anjob'al, 1st and 2nd person Set B morphemes like the one in (19b), are pronominal clitics—they are triggered by agreement with finite $Infl^0$ and attach to the TAM head.[11]

(24)   CHUJ AGENTIVE INTRANSITIVE
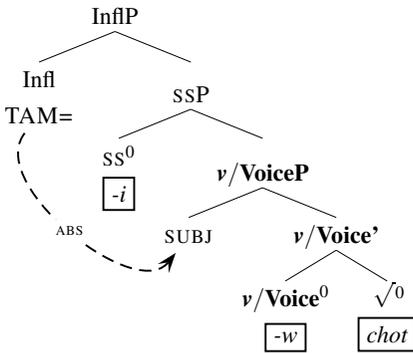
The derivation of an intransitive *-w* stem in (24) may be contrasted with the proposed derivation of a full transitive in (25); see Coon et al. 2014, Armstrong 2015, Clemens & Coon to appear.

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[10]A reviewer asks whether the placement of the Set A prefix is a problem for the proposal that the stem is formed in a Mirror-Principle-compliant manner. Set A prefixes are the only true prefixes in the language, and I assume following Coon 2017 and Clemens & Coon to appear that they are also different from the other verb-stem forming suffixes in being not *heads* (i.e. not acquired through successive head movement of the root to the edge of the verb stem), but rather the spell out of φ-features acquired through "inherent agreement" with the external argument. While it must be specified that they are prefixes, their placement does not contradict the claim that the stem reflects the syntactic derivation. See Coon 2017: 104 for a more detailed derivation.

[11]Independent evidence from nonfinite embedded clauses corroborates the proposal that absolutive arguments are licensed by finite $Infl^0$ in Chuj; see also Coon & Carolan 2017. Like its close relative Q'anjob'al, discussed in detail in Coon, Mateo Pedro & Preminger 2014, Chuj is thus an absolutive=nominative language in the sense of Legate 2008 and work cited there.

(25) CHUJ TRANSITIVE
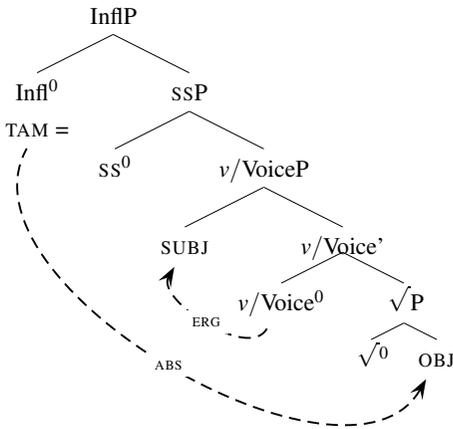
   Note that in the -*w* stem above, Infl^0 licenses the absolutive external argument; in a transitive construction like (25), Infl^0 licenses the absolutive object (here I set aside the question of whether the object raises above the subject, as in Coon et al. 2014, focusing just on which heads license which arguments). The proposal here is in keeping with the fact that absolutives are consistently licensed by Infl^0, that agreement with Infl^0 results in the Set B clitics, and that both derived and underived intransitive verbs have absolutive (Set B) subjects. These structures will be relevant to the proposal for antipassives discussed in the following section.

3.2. *Incorporation antipassives*

Chuj has been described as having two types of antipassive (e.g. Maxwell 1976, Dayley 1981, and Buenrostro 2013): (i) an absolutive antipassive; and (ii) an incorporation antipassive, -*w*.[12] Here we focus on the latter, returning to the absolutive antipassive in section 4. A transitive~incorporation antipassive pair is shown in (26):

(26) (a) TRANSITIVE
          Ix-ko-xik   te' k'atzitz.
          PFV-A1P-chop CLF wood
          'We chopped the wood.'

      (b) INCORPORATION ANTIPASSIVE
          Ix-onh-xik-**w**-i   k'atzitz.
          PFV-B1P-chop-AG-IV wood
          'We wood-chopped.'

___

[12]Smith-Stark (1978) reconstructs *-(V)w* as one of the Proto-Mayan antipassive morphemes.

In the transitive in (26a), the subject is marked with the Set A (ergative) prefix and, in the absence of post-verbal material, we would find the transitive status suffix -a' (cf. *Tas ix-a-xik-a'?* – 'What did you chop?'). The object in the transitive in (26a) appears with a noun classifier, *te'*, the classifier for wood-based elements (Hopkins 2012b, Royer 2016). As described for Chuj and other Q'anjob'alan languages (e.g. Craig 1986 for Popti'; Zavala 2000 on Akatek; Royer 2016 for Chuj), noun classifiers appear either preceding nominals in referential contexts (27a), or alone functioning as referential pronouns (27b). Though they are not limited to definite contexts (Craig 1986, Royer 2016), I translate them with the English definite determiner for simplicity, and I assume they occupy D^0.

(27) (a) Ix-chanhal-w-i   **ix**   unin.
        PFV-dance-AG-IV CLF child
        'The girl danced.'

    (b) Ix-chanhal-w-i   **ix**.
        PFV-dance-AG-IV CLF
        'She danced.'

The transitive in (26a) above has two full arguments, and like other transitive stems, the subject is marked with a morpheme from the Set A (ergative) series (here *ko-*). Incorporation antipassive forms like the one in (26b), on the other hand, only ever appear with a single person/number-marker on the verb. In (26b) the Set B (absolutive) morpheme *-onh* cross-references the subject. Though an apparent object appears, here *k'atzitz* 'wood', unlike in (26a), it does not appear with its classifier.

As others have noted (Maxwell 1976, Dayley 1981, Buenrostro 2013), incorporation antipassive stem forms like the one in (26b) appear with a non-oblique post-nominal "object", but there are restrictions. First, the nominal must be bare and non-referential, and it must appear immediately adjacent to the verb stem. The "object" in an incorporation antipassive may not appear with numerals (28a), demonstratives (28b), or noun classifiers (28c).

(28) (a) * Ol-in-man-w-ok   **jun** kaxlan.
        PROSP-B1S-buy-AG-IRR one chicken
        intended: 'We will buy one chicken.'

    (b) * Ix-onh-chonh-w-i   wakax **tik**.
        PFV-B1P-sell-AG-IV cow   DEM
        intended: 'We sold this cow.'

    (c) * Ix-onh-jax-w-i   **ixim** ixim.
        PFV-B1P-grind-AG-IV CLF   corn
        intended: 'We grind the corn.'

The incorporated object may also not be possessed, nor may it be a pronoun, as shown by the ungrammaticality of the forms in (29).

(29) (a) * Ix-in-kal-w-i   **hin**-kape.
            PFV-B1S-stir-AG-IV A1S-cafe
            intended: 'I stirred my coffee.'

      (b) * Ix-in-il-w-i   **hach**.
            PFV-B1S-see-AG-IV   B2S
            intended: 'I saw you.'

However, as Maxwell (1976) describes, the object is not restricted to a bare nominal. Certain modifiers may appear with the objects in the incorporation antipassive construction, as in (30).[13]

(30) Ix-in-man-w-i   **niwak** kaxlan.
      PFV-B1S-buy-AG-IV fat   chicken
      'I fat chicken-bought.'

Because only a limited number of modifiers may appear in this construction, Maxwell proposes that forms like *niwak kaxlan* 'fat chicken' in (30) are actually compounds. I suggest instead that modifiers which appear in these constructions are Chuj's true adjectives and sit below D^0, while others are relative clauses ('the one that is X'); this analysis is compatible with diagnostics for distinguishing adjectives from relative clauses in Martínez Cruz 2007. Forms like *niwak kaxlan* in (30) are thus bare NPs (or *n*Ps) of type <e,t>. Either possibility is compatible with the analysis below.

   The apparent object in an incorporation antipassive construction is "discourse opaque" (see Farkas & de Swart 2003). As shown by the sequence in (31), the incorporated NP may not be picked up by pronouns later in the discourse. Recall that noun classifiers serve a pronominal function in Q'anjob'alan languages; here *anh* is the classifier used for nouns denoting plant-based elements (Craig 1986, Hopkins 2012b, Royer 2016).

(31) (a) Ix-in-man-w-i   onh.
            PFV-B1S-buy-AG-IV avocado
            'I avocado-bought.'

      (b) # Yaxto anh.
             ripe CLF
             'It was ripe.' / 'They were ripe.'

   Following Maxwell (1976), we may conclude that these apparent objects in the incorporation antipassive construction are not "true nominal arguments", from either a syntactic or a semantic point of view. I propose a syntax for these constructions in section 3.2.1, and then turn to the semantics in section 3.2.2.

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[13]Maxwell (1976) describes dialectal variation in the types of modifiers allowed, and whether they may appear pre- or post-nominally, not pursued here. This data is from the San Mateo Ixtatán dialect.

3.2.1. *Syntax of incorporation antipassives*

Recall from the proposed structure in (25) that in a regular Chuj transitive construction, the ergative subject is licensed in situ by v/Voice^0, while the transitive object is licensed by finite Infl^0. Ergative (Set A) agreement goes hand-in-hand with licensing by v/Voice^0, while absolutive (Set B) clitics are the result of licensing by Infl^0. Building on Baker 1988, Massam 2001, and others, I assume that the bare "incorporated" (non-argument) object in a Chuj incorporation antipassive construction does not need to be licensed by a functional head (i.e. receive abstract case).

The syntactic picture, then, is much the same as for the unergatives in (23) above, except here the transitive root selects a nominal complement. The v/Voice^0 head -*w* merges the subject in its specifier, but again does not assign inherent ergative case; the single (case-requiring) argument is the subject in Spec,v/VoiceP, which is licensed by Infl^0.[14]

(32)
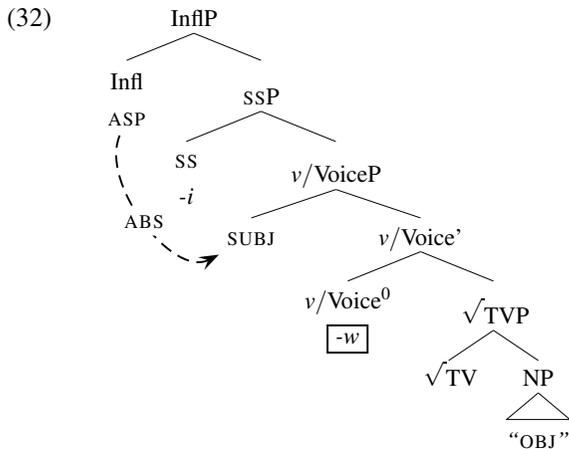
Note that the incorporated object is represented as a complement to the root (see Harley 2014). This is an important component of the proposal developed in this paper, in which the requirement to combine with a complement is a necessary semantic property of certain roots, and cannot be undone by higher functional material, discussed further in section 4.

This structure is consistent with the observation in Buenrostro 2013 that some combinations of root and NP complement receive special meanings in the

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[14]Clausal licensing properties independently restrict the -*w* head from appearing in transitive constructions, but it is an open question as to why the *transitive* v/Voice^0 head does not appear when there is a bare NP complement. One possibility is that some type of economy condition on case assignment restricts the transitive Ø head from appearing in a construction in which ergative case is not needed. Alternatively, we could posit a requirement that Infl^0 must assign case; see e.g. the Obligatory Case Parameter of Bobaljik 1993, Laka 1993.

incorporation antipassive construction. This is expected if the NP combines with the root internal to the first phase (i.e. the domain of special meaning; see e.g. Arad 2003). In (33), for example, the combination of *il* 'see' and the bare object *ak'wal* 'night' results in an idiomatic reading 'to keep vigil' (i.e. after someone dies, or is very ill).

(33) jun ak'wal b'ajtil tz-onh-il-w-i   ak'wal
      one night   when IPFV-B1P-see-AG-IV night
      'a night when we kept vigil'   (Buenrostro 2013: 245)

In further support of the structure in (32) note that if, as proposed here, the suffix *-w* attaches directly to a root, and not to an already-formed transitive stem, then there should be no way to create an incorporation antipassive from already-derived transitive forms. This prediction is borne out; (34a) is a derived transitive (see §2.2), formed from the intransitive root *way* 'sleep'. It appears to be impossible to form an incorporation antipassive from a derived transitive stem and (34b) is ungrammatical regardless of the ordering of suffixes.

(34) (a) Ix-a-way-**m**-**it**-ej   ix   nene.
           PFV-A2S-sleep-APPL-SUF-DTV CLF baby
           'You accompanied the baby to sleep.'

      (b) * Ix-ach-way-**m**-**it**-**w**-i   nene.
            PFV-B2S-sleep-APPL-SUF-AG-IV baby
            intended: 'You accompanied babies to sleep.'

This restriction is not particular to the derivational suffix *-m* (which does not appear to be productive); it is true for any derived transitive form (see §2.2).[15] In (35a) pluractional morphology attaches to the transitive root *tzil* 'to tear'. Pluractionals may also not form incorporation antipassives, as in (35b), again regardless of morpheme order.

(35) (a) Ix-ko-tzil-**ch**-**it**-ej   k-hu'um.
           PFV-A1P-tear-PLUR-SUF-DTV A1P-paper
           'We tore and tore up our papers.'

      (b) * Ix-onh-tzil-**ch**-**it**-**w**-i   hu'um.
            PFV-B1P-tear-PLUR-SUF-AG-IV paper
            intended: 'We tore and tore up papers.'

Though there may be various explanations for the ungrammaticality of (34b) and (35b)—for example, *-w* must combine directly with roots, or that the *-m* and *-ch* morphemes occupy v/Voice^0 heads and themselves introduce the external argument—any of these is compatible with the proposal here. Namely, the

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[15] A reviewer asks about *-w*'s interaction with causatives. Though many Mayan languages have a productive morphological causative construction, none is described for Chuj in Buenrostro's (2013) dissertation on voice alternations and I have also not located one.

"incorporation antipassive" does not convert a transitive stem into an intransitive stem, but rather combines directly with a root to introduce the external argument. In contrast, the ungrammaticality of (34b) is unexpected under an account in which the function of the "antipassive" is to reduce the valence of a transitive predicate.

Finally, a question remains about how to derive the correct surface order. Basic word order in Chuj is verb-initial. As in other Mayan languags, sentences with two post-verbal DPs are rare in Chuj discourse (see England 1983, Aissen 1992, and Clemens & Coon to appear for discussion), and in Chuj there is dialectal variation as to whether VOS or VSO is considered most basic (England 1991). Though I do not have sufficient information on word order in incorporation antipassive in the VSO San Sebastian Coatán variant of Chuj, if it behaves like related VSO languages Q'anjob'al and Popti' (Baquiax Barreno et al. 2005, Craig 1979), it would also require the bare NP to be adjacent in the incorporation antipassive:

(36) (a) Tz-chonh-w-i onh ix ix.
　　　　 IPFV-sell-AG-IV avocado CLF woman
　　　　 'The woman avocado-sells.'

　　 (b) * Tz-chonh-w-i ix ix onh.
　　　　　 IPFV-sell-AG-IV CLF woman avocado
　　　　　 intended: 'The woman avocado-sells.'

I suggest here, following the proposal in Clemens 2014 for incorporation structures in Niuean, and Clemens & Coon to appear for Mayan, that the verb undergoes regular head movement to the position which hosts the status suffix above the subject, as in the unergatives above (see also Armstrong 2015 on Yucatec). The bare NP complement is reordered at PF, due to a high-ranked prosodic requirement that the structurally impoverished (D^0-less) object be phrased with the verb. This would not have an effect on surface word order for VOS variants of Chuj, but would be important for VSO dialects which nonetheless require bare NP complements to be stem-adjacent in the incorporation antipassive.[16] Further work is needed to confirm whether the prosodic predictions made by this account align with the facts in Chuj; see Clemens & Coon to appear for discussion.

3.2.2. Semantics of incorporation antipassives

From a syntactic point of view, we have an explanation for why the apparent object in an incorporation antipassive construction like (37) must be a bare NP: a full DP object like *anh onh* cannot be licensed in this construction.

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[16]I set aside the question of how VSO and VOS orders in regular transitive clauses are derived. See Clemens & Coon to appear for discussion of possible derivations.

(37) Tz-in-chonh-w-i   (*anh) onh.
      IPFV-B1S-sell-AG-IV CLF   avocado
      'I avocado-sell.'

The v/Voice^0 head -*w* merges an external argument in its specifier position but does not assign ergative case. Syntactically speaking, intransitivity is ensured by the inability of a full DP object to be licensed in a construction in which inherent ergative is not assigned to the external argument. The external argument is privileged for licensing from Infl^0 by virtue of being closer—explaining why the single argument of these constructions is the external argument (see §4.1 on passives).

From a licensing point of view, we might then expect that we should be able to omit the internal argument altogether. As shown in (38), however, this is impossible: incorporation antipassive constructions *require* the presence of the bare NP complement.

(38)   * Tz-in-chonh-w-i.
         IPFV-B1S-sell-AG-IV
         intended: 'I sell.'

I propose that this requirement is a *semantic* requirement: transitive roots like *chonh* 'sell' *must* semantically compose with a complement due to their semantic type. This is in stark contrast with the -*w* stems formed from nominal or positional roots, discussed in section 3.1. These *prohibit* bare NP complements, as shown by the ungrammaticality of (39a). The grammatical version in (39b) requires a preposition.

(39) (a)   * Tz-in-chanhal-w-i   salsa.
              IPFV-B1S-dance-AG-IV salsa
              intended: 'I salsa-dance.'

      (b)   Tz-in-chanhal-w-i   t'a   salsa.
              IPFV-B1S-dance-AG-IV PREP salsa
              'I dance salsa.'

Dancing a salsa is a perfectly fine thing to do, as shown by (39b), and we will see in section 4 below that it is possible to sell things without being explicit about what one is selling (cf. (38)). Nonetheless, -*w* stems formed from transitive roots *require* a complement ("incorporation antipassives"), while -*w* stems formed from nominal and positional roots ("unergatives") prohibit one. The difference then lies not in the -*w* stem as a whole, but in the nature of the root.

In Chuj, we have already seen at least two options for how the complement to a $\sqrt{}$ TV root can be realized: as a full DP in a transitive construction, or as a bare NP in an incorporation antipassive. I adopt the fairly standard assumption that DPs are entities of type <e>, whereas NPs are properties of type <e,t>. I propose that in Chuj, nominals which lack classifiers are bare NPs, while nominals

with classifiers are DPs.[17] As expected, nominals which appear as predicates obligatorily lack a classifier (40a); nominals in referential contexts require a classifier (40b) (Royer to appear).

(40) (a) (*Winh) winak hach.
        CLF   man   B2S
        'You are a man.'

    (b) Ix-jaw   *(nok') tz'i'.
        PFV-arrive CLF   dog
        'The dog arrived.'

I assume a Davidsonian event semantics (Davidson 1967), and following Kratzer 1996 and others, I assume that the external argument is not an argument of the "verb" itself, but is added later in the derivation (i.e. via the v/Voice^0 head in (25) above). A transitive root like *chonh* 'sell' in Chuj is of type $< e, < s, t >>$ (see (3) above). It thus requires two arguments: an event argument (e) and the internal THEME argument (x), as in (41).

(41) $\llbracket$chonh$\rrbracket = \lambda x \lambda e [\text{ sell}(x)(e)]$

Below, I walk through the derivation first of the transitive root *chonh* 'sell' in a regular transitive with a full DP internal argument, as in (42a), and then of an incorporation antipassive when the root combines with a bare NP complement, as in (42b).
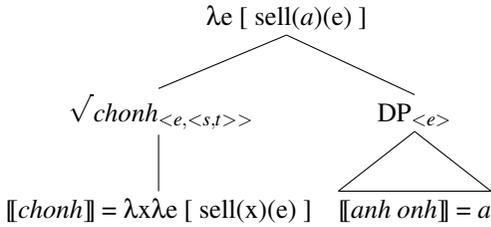
(42) (a) Ix-ko-chonh [$_{DP}$ anh onh   ].
        PFV-A1P-sell   CLF avocado
        'We sold the avocado.'

    (b) Ix-onh-chonh-w-i   [$_{NP}$ onh   ].
        PFV-B1P-sell-AG-IV   avocado
        'We sold avocados.'

In a regular transitive construction, like the one in (42a), the DP *anh onh* 'CLF avocado' is of type $<e>$ and combines with the root by Functional Application, saturating the root's THEME argument slot, as shown by the derivation in (43).

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[17]This is a slight simplification since there are certain nominals which *never* appear with a classifier in Chuj. These include nouns which denote abstract entities and concepts, as well as nouns denoting elements made of recently-introduced materials, such as plastic; see Hopkins 2012b and Royer to appear for discussion. I assume that for nominals which do appear with classifiers, the classifier is required to shift the noun from type $<e,t>$ to type $<e>$. For nouns which never appear with a classifier, I assume that this shifting is still possible, but has no overt phonological correlate.

(43)   (a)

$$\lambda e\ [\ sell(a)(e)\ ]$$

$\sqrt{} chonh_{<e,<s,t>>}$ $DP_{<e>}$

$[\![chonh]\!] = \lambda x\lambda e\ [\ sell(x)(e)\ ]$ $[\![anh\ onh]\!] = a$

(b)   FA ($\lambda x\lambda e\ [\ sell(x)(e)\ ]$, a)

= $\lambda e\ [\ sell(a)(e)\ ]$

In an incorporation antipassive like the one in (42b) above, the same transitive root *chonh* 'sell' combines with a bare NP complement; I propose that this bare NP denotes a property and is of semantic type <e,t>. The NP complement is thus unable to saturate the argument slot of the predicate *chonh*, but instead *restricts* the denotation of the predicate—in this case from events of selling, to events of avocado-selling. The NP combines via Chung & Ladusaw's (2004) operation of Restrict, as in (47b). The argument position remains unfilled, and in Chuj, it is immediately saturated by Existential Closure, as in (47c).[18,19]

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[18]Restrict and Existential Closure are defined as follows:

(44)   Restrict = $\lambda P_{<e,<s,t>>}\ \lambda Q_{<e,t>}\lambda x\lambda e\ [\ P(x)(e) \wedge Q(x)\ ]$

(45)   Existential Closure = $\lambda P_{<e,<s,t>>}\lambda e\exists x\ [\ P(x)(e)\ ]$

See Chung & Ladusaw 2004 for discussion $\exists x$ taking scope within λe in (47c).

[19]Some languages have more than one option for saturating the remaining argument slot after Restrict. This is shown for Chamorro by the sentences in (46), discussed in Chung & Ladusaw 2004.
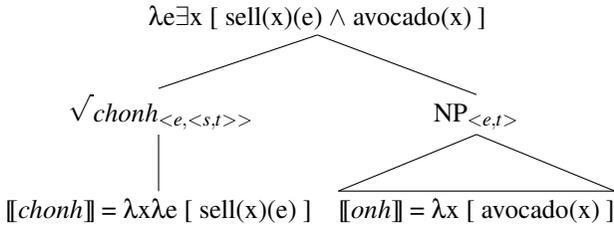
(46)   CHAMORRO INCORPORATION
   (a)   Man-gäi-ga'   häm.
         AGR-have-pet we
         'We have pets.'   (Chung & Ladusaw 2004: 76)
   (b)   Gäi-ga'   un ga'lagu ennao na patgun.
         AGR.have-pet a   dog   that   L   child
         'That child has a pet dog.'   (Chung & Ladusaw 2004: 89)

In both sentences in (46), the bare NP *ga'* 'pet' composes with the predicate 'have' via the operation Restrict. In the construction in (46a), the remaining argument slot is saturated by Existential Closure, just as in Chuj in (43). Chamorro, however, allows an additional option, not permitted in Chuj: in (46b), the remaining argument slot is saturated by an adjunct DP added later in the derivation. See Chung & Ladusaw 2004 for further discussion and cross-linguistic variation.

(47)   (a)

$$\lambda e \exists x [\text{ sell}(x)(e) \wedge \text{avocado}(x)]$$

$\sqrt{chonh}_{<e,<s,t>>}$ $NP_{<e,t>}$

$[\![chonh]\!] = \lambda x \lambda e [\text{ sell}(x)(e)]$ $[\![onh]\!] = \lambda x [\text{ avocado}(x)]$

(b)   Restrict ($\lambda x \lambda e [\text{ sell}(x)(e)], \lambda x [\text{ avocado}(x)]$)

= $\lambda x \lambda e [\text{ sell}(x)(e) \wedge \text{avocado}(x)]$

(c)   EC ($\lambda x \lambda e [\text{ sell}(x)(e) \wedge \text{avocado}(x)]$)

= $\lambda e \exists x [\text{ sell}(x)(e) \wedge \text{avocado}(x)]$

We have thus seen that a transitive root can combine with two types of internal arguments: (i) a full DP by Functional Application, resulting in a transitive construction, and (ii) a bare NP by Restrict followed by Existential Closure, resulting in the incorporation antipassive. In section 4 below we examine a third option in the absolutive antipassive construction. We first turn briefly to intransitive $\sqrt{}$ITV roots in 3.3.

3.3. Unacccusatives

To this point, we have seen the suffix *-w* appear on three of the four types of roots identified above: it appears on nominal and positional roots to form unergative predicates (§3.1), and it also appears on transitive roots to form incorporation antipassives (§3.2). Some examples are repeated in (48).

(48)

NOMINAL $\sqrt{}$NOM		POSITIONAL $\sqrt{}$POS		TRANSITIVE $\sqrt{}$TV	
chanhal-w	'dance'	*kot-w*	'crawl'	*man-w*	'buy'
paxyal-w	'stroll'	*jenh-w*	'fly'	*xik-w*	'chop'
at'is-w	'sneeze'	*chot-w*	'hop'	*jax-w*	'grind'
. . .		. . .		. . .	

The fourth type of root discussed in section 2.1 above is the class of *intransitive* $\sqrt{}$ITV roots. I propose here that *all* $\sqrt{}$ITV roots are *unaccusative*, and that unergative surface stems are always derived. Though independent unaccusativity diagnostics do not to my knowledge exist, Chuj verbs which correspond to canonical unergatives in languages for which there are such diagnostics are overwhelmingly derived by some sort of suffix or series of

suffixes: either the *-w* described above, or one of several other consonantal suffixes (see Hopkins 1967).

For example, cross-linguistically, unergatives often (though not always) include manner-of-motion verbs, verbs denoting volitional actions, as well as verbs of bodily function (e.g. Perlmutter 1978). In Chuj, such verbs are generally morphologically complex in form. Positional roots derive many manner-of-motion verbs, as seen in section 3.1 above. Additional derived intransitives belonging to these categories are shown in (49).

(49)   PUTATIVE UNERGATIVES

VERB STEM		ROOT	
tz'it-w-i	'to jump'	*tz'it* (POS)	'jumping'
aw-tan-i	'to call'	*aw* (NOM)	'shout'
taj-n-i	'to play'		
mun-l-aj-i	'to work'	*munil* (NOM)	'work'
tz'oj-b'-an-i	'to cough'	*tz'oj* (NOM)	'cough'
tza-j-i	'to defecate'	*tza'* (NOM)	'excrement'
chul-aj-i	'to urinate'	*chul* (NOM)	'urine'

While many of the putative unergative stems are transparently derived from other roots, for some the source is not transparent (e.g. *taj* is a nominal root meaning 'pine'). The proposal that all unergatives in Chuj are derived is in keeping with proposals in which unergative verbs are derived from nominals roots via abstract verbal structure—even in languages which lack morphological evidence for this derivation (Hale & Keyser 1993, 1997); see also discussion of Ch'ol in section 3.4.2 below and Davis 1997 on St'át'imcets (Salish).[20]

The class of √ITV roots, on the other hand, includes verbs of directed motion like *b'at* 'go', *ek'* 'pass', *em* 'descend', and *och* 'enter', as well as change-of-state verbs like *k'ib'* 'grow' and *cham* 'die'—forms which we would expect to pattern as unaccusatives if independent diagnostics were found (see also examples in (7)

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[20]There is at least one form which appears to be a problem for the generalization that *-w* stems are unergative/agentive. The positional root *tel* 'lying down' forms an intransitive *-w* stem which can mean 'to lie down', but for the speakers consulted, it most naturally means 'to fall', as shown in (50). It may be used in clearly non-volitional contexts.

(50)   Ix-in-tel-w-i.
PFV-B1S-lying.down-AG-IV
'I fell down.' / 'I lied down.'

A possibility for this form is that *telw* has been reanalyzed as an √ITV root. We might thus posit two lexical roots, a positional root *tel* 'lying down', and an intransitive (unaccusative) root *telw*. Assuming 'fall' to be a relatively frequent form, this is perhaps not far-fetched, though ideally we would like corroborating evidence in the form of independent unaccusativity diagnostics.

above). These roots are impossible with *-w*:[21]

(51) (a) Ix-b'at winh unin.
          PFV-go CLF child
          'The boy left.'

      (b) * Ix-b'at-w-i   winh unin.
           PFV-go-AG-IV CLF child
           intended: 'The boy left.'

Note that under the analysis presented here, the impossibility of *-w* on intransitive (i.e. unaccusative) roots is unsurprising: *-w* is a v/Voice^0 head that attaches to a root and merges an *external* argument; the internal argument in a *-w* stem is either absent entirely in the case of $\sqrt{\text{NOM}}$ and $\sqrt{\text{POS}}$ roots (§3.1), or incorporated in stems formed from $\sqrt{\text{TV}}$ roots (§3.2). Intransitive $\sqrt{\text{ITV}}$ roots, on the other hand, are unaccusative and combine *only* with an internal argument. Semantically, I propose that they are of type $< e, < s, t >>$, like transitive roots, as in (3) above; unlike transitive roots, they may not combine with the transitive-forming v/Voice^0 head which merges an agent (I do not take a particular stance on the source of this distinction). These conflicting requirements then create a licensing problem. The *-w* v/Voice^0 head introduces an external argument but does not assign inherent ergative case. The introduced argument must be licensed by finite Infl^0, leaving the internal argument of the $\sqrt{\text{ITV}}$ root unlicensed.

One imaginable possibility would be to incorporate the unaccusative subject, alleviating the licensing problem. In Chuj, unaccusatives are unable to incorporate their subjects (a noted point of variation among languages which allow transitive objects to incorporate, described, for example, in Mithun 1984). For example, in (52a), the intransitive root *ul* 'dissolve' appears in an intransitive stem with a full DP subject. The ungrammatical example in (52b) attempts to combine the intransitive (unaccusative) root with a bare nominal subject, and then to introduce an external argument via *-w*.

(52) (a) Ix-ul   atz'am atz'am.
          PFV-dissolve CLF   salt
          'The salt dissolved.'

      (b) * Ix-in-ul-w-i   atz'am.
           PFV-B1S-dissolve-AG-IV salt
           intended: 'I salt-dissolved.'

Though nothing internal to the analysis here would rule this out, the absence of unaccusative subject incorporation in unsurprising from a typological perspective.

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[21]The proposal that all intransitive roots are unaccusative is compatible with the fact that the class of $\sqrt{\text{ITV}}$ roots found in other Mayan languages is notably small. In his detailed look at Tsotsil roots, for example, Haviland finds that there are "no more than 50" intransitive roots in Tsotsil (Haviland 1994: 699), out of an inventory of 855 roots which are "basically verbal". This number is compatible with the class of $\sqrt{\text{ITV}}$ roots in Chuj.

3.4. Interim summary and a Ch'ol interlude

3.4.1. Summary

In section 2 we observed that roots in Chuj may be classified by the morphology required to form different types of stems. These root classes, however, do not map directly to surface lexical categories—all surface categories are *derived*. A transitive root like *xik* 'chop' forms a verbal stem in the same way that a nominal root like *chanhal* 'dance' does: by combining with a functional head labeled v/Voice^0. In section 3 we identified one particular functional v/Voice^0 head used to derive agentive intransitive verb stems from different classes of roots: the suffix *-w*. This suffix attaches to roots and introduces an external argument, but—unlike the phonetically null transitive v/Voice^0—it does not assign inherent ergative case to the introduced external argument in its specifier position. This is illustrated by the diagram in (53), in which transitive stems, unergative stems, and antipassive stems are all derived directly from the root.

(53)   DERIVATION OF TRANSITIVE AND ANTIPASSIVE STEMS
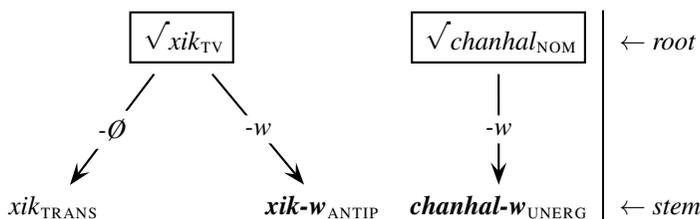
The difference between an "unergative" stem like *chanhal-w-*, and an "antipassive" stem like *xik-w-*, is thus entirely a difference in the nature of the root itself. While nominal roots like *chanhal* do not semantically compose with an internal argument, I claim that the transitive root *xik* must. The licensing limitations of *-w* stem forms ensure that the internal argument may not be a full DP, and that incorporation antipassive stems *require* the presence of a bare NP complement. We observe a final option for Chuj transitive roots in section 4, but first turn briefly to Ch'ol for evidence of the importance of particular v/Voice^0 heads to argument structure more generally.

As noted above, this analysis contrasts with a view of antipassives as elements which *reduce* the valence of an existing stem. While this would seem descriptively to capture the facts in the case of intransitive *-w* stems formed from transitive roots, it does not explain the function of *-w* on nominal or positional roots, nor does it explain why *-w* cannot attach to derived transitives. Rather than reducing the valence of a stem, *-w* (and other v/Voice^0 heads described in section 4) combines with a root to *specify* the argument structure of the resulting stem. This is in line with existing work which take voice alternations to be derived from the root (e.g. Alexiadou et al. 2006).

3.4.2. Ch'ol interlude

Though the paper focuses on Chuj, it is worth considering the cross-linguistic implications. Of course, much existing work on argument structure argues for the existence of null functional heads with various argument-introducing and case-assigning possibilities. But what would a language look like if it lacked an agentive intransitive v/Voice^0 head—Chuj's -*w*—altogether? I suggest here that Ch'ol, a Mayan language of the Tseltalan branch spoken in Chiapas, Mexico, may be exactly such a language. Notably, in Ch'ol, there is no such thing as an agentive intransitive verb stem (Gutiérrez Sánchez 2004, Vázquez Álvarez 2011, Coon 2012, 2013). Instead, all intransitive surface predicates in Ch'ol are unaccusative.

Constructions which correspond to unergatives involve roots which are called "verbal nouns" in the Ch'ol literature. These forms pass distributional tests for nouns, and require a light verb in order to function as predicates (Gutiérrez Sánchez 2004, Coon 2010). Examples are shown in (54).

(54) CH'OL "UNERGATIVES"

ROOT	AS NOMINAL	WITH LIGHT VERB
soñ	'dance'	'to dance'
alas	'game'	'to play'
ts'ijb	'writing'	'to write'
xujch'	'theft'	'to steal'
ty'añ	'speech, language'	'to speak'
k'ay	'song'	'to sing'
xej	'vomit'	'to vomit'

These roots are ungrammatical in intransitive stem forms. Just as in Chuj, Ch'ol roots can be diagnosed by the morphology they require to form surface stems. In (55a) we find the intransitive root *majl* 'go' in an intransitive (unaccusative) surface stem. The nominal root *soñ* 'dance' is ungrammatical in an intransitive surface stem, as shown in (55b). In Chuj, the suffix -*w* is required to form an intransitive stem from a nominal root, but this suffix—or a functionally equivalent head—is absent in Ch'ol.

(55) (a)   Tyi **majl**-iy-oñ.
       PFV go-IV-B1
       'I went.'

   (b)   * Tyi **soñ**(-w)-iy-oñ.
        PFV dance-AG-IV-B1
        intended: 'I danced.'

In order to serve as predicates, verbal nouns like *soñ* may appear with a light verb, such as the transitive *cha'l* in (56a). Alternatively, *soñ* may appear in a *transitive* stem with a denominal suffix, as in (56b). In other words, nominal roots

like *soñ* 'dance' may form a verb stem in Ch'ol *only if* an internal argument is
present.

(56) (a) Tyi k-cha'l-e   **soñ**.
           PFV A1-do-DTV dance
           'I danced.'

      (b) Mi   k-**soñ**-iñ   jiñi bals.
           IPFV A1-dance-DTV DET waltz
           'I dance the waltz.'

The same can be said for transitive roots and antipassives. The Ch'ol
transitive root *wuts'* 'wash' is shown in a transitive stem form with a full DP
internal argument in (57a). Ch'ol does have a construction labelled "incorporation
antipassive", shown in (57b)—but the lexical stem *wuts'-pisil* is formally a noun,
and again a light verb is required.

(57) (a) Tyi k-**wuts'**-u   jiñi pisil.
           PFV A1-wash-TV DET clothes
           'I washed the clothes.'

      (b) Tyi k-cha'l-e   **wuts'-pisil**.
           PFV A1-do-DTV wash-clothes
           'I clothes-washed.'

Surface verb stems in Ch'ol are always either transitive (like (57a)) or unac-
cusative (like (55a)). Forms which correspond to unergatives and antipassives—in
other words, agentive intransitives—surface in nominal stem forms and require a
light verb in order to act as predicates. Under the proposal advanced here, this
is entirely consistent with the pattern in Chuj. In Chuj, a single v/Voice^0 head
forms agentive intransitive stems from both nominal and transitive roots (see
(53) above); it categorizes the stem as a verb, introduces an external argument,
and does not assign ergative case. If Chuj lacked this head altogether, we would
expect it to lack the means to form verbal agentive intransitive stems—exactly as
in Ch'ol.

4. ABSOLUTIVE ANTIPASSIVES AND THE CONTENT OF ROOTS

Recall from section 3.2 that in the Chuj incorporation antipassive construction,
the patient must be a bare nominal, as in (58a). It may not be reintroduced as an
oblique, and it may not be omitted entirely, as shown in (58b).

(58) (a) Ix-in-jax-**w**-i   ixim.
           PFV-B1S-grind-AG-IV corn
           'I corn-ground.'

      (b) * Ix-in-jax-w-i   (t'a   ixim).
             PFV-B1S-grind-AG-IV   PREP corn
             intended: 'I ground corn.' / 'I did some grinding.'

The incorporation antipassive in (58) contrasts with what has been called the "absolute antipassive" marked with the suffix *-waj*, shown in (59). As in the incorporation antipassive, these are intransitive verb stems with an agentive subject, marked by Set B (absolutive) morphology. Unlike the incorporation antipassive, however, the theme may be reintroduced as an oblique with the preposition *t'a*, as in (59a–b), or omitted entirely, as in (59c).[22]

(59) (a) Tz-tum-**waj**   ix   s-nun   winh t'a   hin.
            IPFV-scold-AP CLF A3S-mother CLF PREP B1S
            'His mother scolds me.'   (Buenrostro 2013: 239)

      (b) Ix-mak'-**waj** ix   Malin t'a   waj Xun.
            PFV-hit-AP   CLF Maria PREP CLF Juan
            'Maria did some hitting to John.'   (Dayley 1981: 36)

      (c) Ix-in-man-**waj**-i.
            PFV-B1S-buy-AP-IV
            'I did some buying.'

We thus now have three options for transitive roots appearing in verbal stem forms with external arguments, summarized in (60).

(60)   THREE OPTIONS:

a.	TAM-SET.B$_{AGENT}$ - $\sqrt{}$TV-Ø-V'	DP$_{THEME}$	transitive
b.	TAM-SET.B$_{AGENT}$- $\sqrt{}$TV-**w**-i	NP$_{THEME}$	incorporation AP
c.	TAM-SET.B$_{AGENT}$- $\sqrt{}$TV-**waj**-i	($_{PP}$ DP$_{THEME}$)	absolutive AP

The root may combine with a full DP internal argument, resulting in a regular transitive stem (§2.2); it may combine with a bare NP as an incorporation antipassive (§3); and finally, it may optionally combine with an oblique PP. I argue that this latter option involves a semantically available implicit argument, reflected in the morphology, and propose a syntax and semantics for this form below.

Specifically, I propose that the absolutive antipassive suffix *-waj* should be decomposed into two suffixes: the familiar *-w*, and a suffix *-aj* which is an overt morphological manifestation of the existential binding of implicit arguments. We first turn to two kinds of passives in section 4.1 for evidence of the decomposition of *-waj*, and then to a proposal for the syntax and semantics of these constructions in section 4.2.

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[22]In (59a) the subject is *ix s-nun winh* 'his mother'; the Set A prefix on *nun* co-indexes the postnominal possessor, represented by the classifier *winh*.

  With the exception of examples from other sources, I follow Dayley (1981) in translating the absolutive antipassive into the slightly unnatural English 'do X-ing (to Y)'.

4.1. *Two kinds of passive*

The reappearance of *-w* in the absolute antipassive suffix *-waj* does not seem to be an accident. Indeed, though some works list *-waj* as the antipassive suffix, Hopkins (1967) decomposes it into *-w* plus a suffix *-aj*:

> *-aj* derives intransitive verb stems from verb stems already derived in *-t*, *-ch*, *-k'*, *-m*, *-n*, *-w*, and *-l* (Hopkins 1967: 88).

As the above quotation suggests, and as previewed in section 2 above, the suffix *-w* is one of a number of consonantal suffixes which attach to roots in order to form stems: CVC-C (see the template in (6) from section 2 above). The suffix *-aj* then attaches to some of these CVC-C bases to form an intransitive stem (which then further requires the presence of the intransitive status suffix *-i*).

Take for example the stem *el-k'-* 'steal'. This stem appears to be derived from the intransitive root *el* 'to leave', followed by the derivational suffix *-k'*. This stem then forms a derived transitive with the suffix *-ej*, as in (61a). It also forms an intransitive (unaccusative) with the suffix *-aj*, which is then followed by the intransitive status suffix *-i*, shown in (61b). Buenrostro (2013) lists *-aj* as the passive suffix for derived transitives; I gloss *-aj* as DIV for 'derived intransitive,' and propose here that it has a broader use than simply passive.[23]

(61)   (a) Ix-in-el-k'-ej   k'en tumin.
            PFV-A1S-leave-SUF-DTV CLF money
            'I stole the money.'

       (b) Tas   ix-el-k'-**aj**-i.
            what PFV-leave-SUF-DIV-IV
            'What was stolen?'

Though further work is needed on the large number of the stem-forming suffixes described by Hopkins (1967), examples like (61b) provide a first clue that *-waj* should be decomposed into the general "agentive intransitive" suffix *-w* from section 3, plus the suffix *-aj*. Indeed, we find an analogous alternation between a consonantal suffix and a *-C-aj* suffix in Chuj passives, summarized in (62).

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[23]Derived transitive stems form absolute antipassives with the suffix *-an* (Buenrostro 2013). I set aside as a topic for future work whether this suffix has a similar function to that proposed for *-aj* here.

(62) CHUJ "VOICE" MORPHOLOGY

		Antipassives	**Passives**	
a.	*-w*	incorporation antipassive	*-j*	agentless passive
b.	*-w-**aj***	absolutive antipassive	*-ch-**aj***	passive

What I label "agentless passives" in Chuj are formed with the suffix *-j*.[24] This suffix attaches to transitive roots, like *man* 'buy' and *choj* 'grind' in (63) to form an intransitive (unaccusative) stem. As with other intransitive stems in Chuj, the single argument is Set B and the intransitive status suffix *-i* appears stem finally.

(63) AGENTLESS PASSIVES

(a) S-k'apak-il   chi' tz-man-**j**-i.
A3S-cloth-NML DEM IPFV-buy-PASS-IV
'It's his cloth that is bought.'

(b) Tz-choj-**j**-i   ixim.
IPFV-grind-PASS-IV CLF
'It (*atole*) is ground.'   (Buenrostro 2013: 206)

The agentless passive forms in (63) contrast with passives formed with *-chaj*, shown in (64). As in (64), *-chaj* attaches to transitive roots—here *yam* 'catch' and *mol* 'gather'—to form an intransitive unaccusative stem. Again, the single argument is marked Set B and the stem is suffixed with *-i*.

(64) PASSIVES

(a) Jun winh unin chi' ix-yam-**chaj**-i.
one CLF   child DEM PFV-catch-PASS-IV
'That boy was caught.'   (Buenrostro 2013: 113)

(b) Niwan ixim wa'il   tz-mol-**chaj**-i.
many   CLF tortilla IPFV-gather-PASS-IV
'Many tortillas are gathered.'   (Buenrostro 2013: 202)

I propose that the difference between agentless passives with *-j* in (63) and regular passives with *-chaj* in (64) is in the presence of an implicit agent. The contrast is comparable to the difference between anticausatives and passives in English (see e.g. Roeper 1987, Baker et al. 1989, Levin & Rappaport-Hovav 1995). In English, for example, the former may appear with agentive by-phrases and agent-oriented adverbs (65a), while the latter may not (65b).

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[24]Buenrostro (2013) calls these "impersonal passives", and lists the suffix as *-ji*. Just like *-w-i* stems, I propose that the sequence *-ji* is decomposiable into the stem-forming suffix *-j* and the intransitive status suffix *-i*. The status suffix is protected from dropping because its omission would result in a final consonant cluster; see footnote 8.

(65) (a) The boat was sunk (by Mary) (on purpose).

    (b) The boat sank (*by Mary) (*on purpose).

Contrasts such as the one in (65) have been used to argue that passives contain an implicit agent, while anticausatives do not (see Bhatt & Pancheva 2006 and Williams 2015 for overviews). I offer a brief sketch of the analyses for the two constructions in Chuj, beginning with the *-chaj* passive in section 4.1.1, and turning to the *-j* agentless passive in section 4.1.2.

4.1.1. *Passives with* -chaj

I propose that Chuj *-chaj* passives have an implicit agent, and—as with *-waj* above—the suffix *-chaj* should be decomposed into a v/Voice[0] head *-ch* and the derived intransitive suffix *-aj*, as illustrated in (66). The suffix *-aj* is a morphological reflex of the existential binding of the implicit external argument.

(66) Tz-b'o'-**ch-aj**   s-wa'el   winh nhulej tik   [OBL y-uj   heb'
     IPFV-make-PASS-DIV A3S-food CLF   brother DEM   A3S-RN.by PL
     ix   ].
     CLF
     'The brother's food is made by them.'   (Buenrostro 2013)

As expected under an account in which *-chaj* passives have an implicit agent, the notional agent can be realized in an oblique phrase: *yuj heb' ix* in (66), on par with the English example in (65a). As in other Mayan languages, oblique phrases in Chuj are generally introduced by one of a set of what are called "relational nouns". The relational noun shows Set A agreement with the DP it introduces. The form *-uj* (or *-u'uj*) can be translated roughly as 'by' or 'because of.'

Also as predicted under an account in which *-chaj* passives contain an implicit agent, passives with *-chaj* allow agent-oriented adverbial material (67a), as well as control into purpose clauses, as in (67b).[25]

(67) (a)   [Sk'annhej sk'o'ol winh] ix-ch'ak-chaj   te'   te'.
          on purpose   PFV-fell-PASS CLF tree
         'The tree was felled on purpose.'

    (b)   Ix-ch'ak-chaj te'   te'   [yik s-b'o'   te'   pat   ].
          PFV-fell-PASS CLF tree   for   A3-make CLF house
         'The tree was felled in order to build a house.'

---

[25]The phrase *sk'annhej sk'o'ol winh*, translated as 'on purpose', literally involves a possessed form of *k'o'ol* 'stomach', which is used as the metaphorical center for many emotions and internal states in Chuj and other Mayan languages; see e.g. Hopkins 2012a. Nicholas Hopkins (p.c.) suggests that it involves a form of the verb 'to ask' (*k'ana'*) and may be best translated as something like 'he consulted his gut'. In this case, because the possessor of *k'o'ol* is male (indicated by *winh*), the implied agent must also be male. I leave a detailed gloss decomposition for future work.

Schematically, I propose that the *-chaj* passives have the basic argument structure in (68) (we return to *-aj* below). The suffix *-ch* is a v/Voice^0 head which—like *-w*—merges directly with the root. Like *-w*, it categorizes the stem as a verb, assigns a thematic role to an external argument, and does not assign ergative case. Here, however, the external argument is necessarily implicit. I represent the implicit argument as $x_\exists$—a variable which which must ultimately be existentially bound. The single overtly realized argument is the THEME, which is licensed by finite Infl^0. Oblique agents may optionally be adjoined higher in the structure and are then semantically associated with the implicit agent, as illustrated by the matching subscripts in (68).[26]

(68)   REGULAR PASSIVE (= 66)
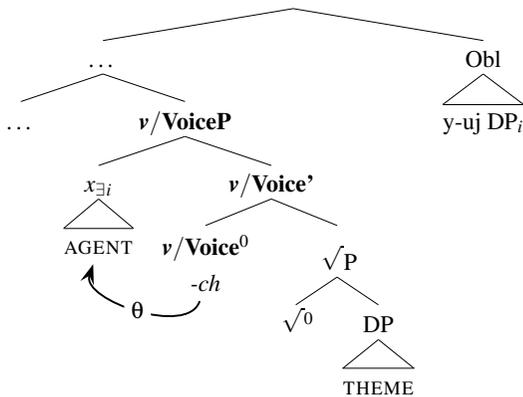
4.1.2. Agentless passives with -j

We now turn to the agentless passives. As illustrated by the forms in (69), agentless passives constructions *can* appear with an adjoined *-uj*-phrase, in apparent contrast with English anticausatives like the one in (65b). However, while the oblique in *-chaj* passives, like the one in (66) above, must be understood as the agent of the event, this is not the case with agentless passives.

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[26]A reviewer asks how the oblique agent in the passive here (and the oblique antipassive patient, below) should be integrated into the semantics. Some previous work (see e.g. Bruening 2013 and references there) takes passive constructions to involve existential quantification *only* in the absence of a *by*-phrase. An alternative, along the lines of what is sketched here, would be to propose that existential quantification occurs in all passives and that in the presence of an oblique *by*-phrase, the *by*-phrase further specifies the argument. Formally, this can be achieved through an operator in the spirit of von Stechow 1992, or in terms of Dynamic Semantics (Groenendijk & Stokhof 1991). Thanks to Alan Bale for discussion of this question.

(69)   (a)   Ix-b'o'-**j**-i   waj Xun [y-uj   anh   ].
          PFV-cure-PASS-IV CLF Juan   A3S-RN.by medicine
          'Juan was cured by the medicine.'   (Buenrostro 2013: 207)

      (b)   Ix-in-b'o'-**j**-i   [h-u'uj   ].
          PFV-B1S-cure-PASS-IV   A2S-RN.by
          'I was cured by you.' (i.e. caused by you, thanks to you, as a result of
          you)   (Buenrostro 2013: 207)

Here, as discussed in Buenrostro 2013, the oblique phrase is understood as a
CAUSE. This is clear in the case of the inanimate causer in (69a), and while not
strictly impossible with an agentive interpretation, forms like the ones in (69b) are
most naturally understood as situations in which the entity denoted by the DP in
the oblique phrase in some way causes the event without direct volitional action.
A natural context for the agentless passive in (69b), for example, would be one in
which you drove me to the hospital, or paid my medical bills.

    The forms in (70) further illustrate this contrast. In the *-chaj* passive in (70a),
the man must be understood as the agent of the event of building. In (70b), the
man is responsible for the construction of the house, but did not actually build it
and need not have been present during its construction.

(70)   (a)   CONTEXT: The man built the house with his own two hands.
          Ix-b'o'-ch-aj   te' pat   [y-uj   winh winak].
          PFV-make-PASS-DIV CLF house   A3S-RN.by CLF   man
          'The house was made by the man.'

      (b)   CONTEXT: The man purchased the materials and paid a carpenter to
          build the house, but did not himself do any building.
          Ix-b'o'-j-i   te' pat   [y-uj   winh winak].
          PFV-make-PASS-IV CLF house   A3S-RN.by CLF   man
          'The house was made thanks to the man.'

    Further evidence comes from the fact that agent-oriented adverbs and purpose
clauses are impossible with these forms, as shown by the examples in (71)
(compare (67) above).

(71)   (a)   * [Sk'annhej sk'o'ol winh] ix-ch'ak-j-i   te'   te'.
            on purpose   PFV-fell-PASS-IV CLF tree
           intended: 'The tree was felled on purpose.'

      (b)   * Ix-ch'ak-j-i   te'   te'   [yik s-b'o'   te'   pat   ].
            PFV-fell-PASS-IV CLF tree   for A3-make CLF house
           intended: 'The tree was felled in order to build a house.'

In agentless *-j* passives there is no thematic agent, implicit or otherwise. As
shown in (72), I propose that *-j* occupies a v/Voice^0 head which combines with
the root, and verbalizes the stem, but does not assign a thematic role and does
not merge an external argument. An *-uj*-phrase may adjoin higher in the structure,

but it has no association with the thematic roles of the verb. It may have any semantically plausible causal relation to the event. I propose that this causality comes directly from the meaning of the relational noun itself, which we might gloss here as something like 'because of', 'as a result of', or 'thanks to'.

(72)   AGENTLESS PASSIVE (= 69)

Compare the contrast in English anticausatives in (73). While anticausatives are incompatible with agentive by-phrases, *from* may introduce causers or causing events (see discussion in Alexiadou et al. 2006). I propose that Chuj's relational noun *-(u')uj* is broad enough in meaning to be compatible with agentive and non-agentive causation.

(73)   (a)   * The window broke by the pressure.

(b)   The window broke { from, thanks to, as a result of } the pressure.

One question that arises is whether *-j* could be analyzed as introducing an implicit *causer* in its specifier (see e.g. Alexiadou et al. 2006). In Chuj, there is reason to think that this is not the case. As discussed in Buenrostro 2013, inanimate causers are generally dispreferred as transitive subjects in Chuj. Compare the transitive in (74) with the agentless passive in (74b).

(74)   (a)   ?? Ix-s-mak   te'   pwerta ik'.
              PFV-A3S-close CLF door   wind
              'The wind closed the door.'   (Buenrostro 2013: 207)

(b)   Ix-mak-**j**-i   te'   pwerta [y-uj   ik'   ].
          PFV-close-PASS-IV CLF door   A3S-RN.by wind
          'The door closed because of the wind.'

Furthermore, while the sequence *-chaj* is only ever found attached to transitive roots, *-j* appears in a handful of isolated forms attached to non-transitive roots. In (75), we find *-j* suffixed to the adjectival root *al* 'heavy', resulting in an inchoative interpretation. This is expected under an account in which *-j* is a v/Voice^0 head

which verbalizes the stem but does not introduce any type of external argument (agent, causer, or otherwise).

(75) Ix-al-**j**-i   ko-chi'ich.
      PFV-heavy-PASS-IV A1P-moon
      'The moon grew larger (waxed).'   (Hopkins 2012a: 7)

The regular passive -*ch*, on the other hand, merges an implicit agent in its specifier position and is correctly expected to be only compatible with those roots denoting events which may be externally caused by an agent—specifically, $\sqrt{}$TV roots.

Again I suggest that Chuj's morphology may be instructive more broadly to the question of how to capture valence and voice alternations. The fact that we find two distinct overt morphemes for regular passives and agentless passives—-*ch* and -*j*—lends credit to proposals in which Voice heads may be specified for whether and what type of external arguments are introduced, as proposed in Alexiadou et al. 2006 and Wood 2015, among others.

4.2. *Implicit arguments and the suffix* -aj

Having examined two types of passives, we return to the suffix -*aj*. In both antipassives and passives the presence of -*aj* correlates with the availability of oblique DPs that are associated with particular thematic roles (see the table in (62) above). In the non-*aj* constructions, on the other hand, the argument slot is either already filled (by the bare NP object in the case of the incorporation antipassive), or is not projected at all (in the agentless passive with -*j*). Minimal pairs are provided in (76) and (77) below.

While the absolute antipassive with -*waj* permits the theme to be realized as a PP (76b), incorporation antipassives like (76a) prohibit oblique themes altogether, requiring instead that the theme be a bare NP.

(76) (a) INCORPORATION ANTIPASSIVE
           Ix-in-tek'-**w**-i   (*t'a) pelota.
           PFV-B1S-kick-AG-IV PREP ball
           'I ball-kicked.'

      (b) ABSOLUTIVE ANTIPASSIVE
           Ix-in-tek'-**w**-**aj**   *(t'a) nok' pelota.
           PFV-B1S-kick-AG-DIV PREP CLF ball
           'I did kicking to the ball.'

In the preceding section, we found that agentless passives like the one in (77a) permit an oblique, but this DP is not associated with the notional agent. Instead, it may have any semantically plausible causal relation to the event, as a result of the meaning of the relational noun which introduces it. In a regular passive like (77b), the oblique must be understood as the agent.

(77) (a) AGENTLESS PASSIVE

Ix-in-b'o'-**j**-i   h-u'uj.

PFV-B1S-cure-PASS-IV A2S-RN.by

'I was cured thanks to you.'

(b) PASSIVE

Ix-in-b'o'-**ch-aj**   h-u'uj.

PFV-B1S-cure-PASS-DIV A2S-RN.by

'I was cured by you.'

As foreshadowed above, I propose here that the suffix *-aj* in both absolutive antipassives and regular *-chaj* passives correlates with the presence of an implicit argument—an argument that contributes to the semantic interpretation, but is never overtly realized. Passives like (77b) and (78) have an implicit *external* argument, while the antipassive like (76b) and (79) have an implicit *internal* argument. In both passives and antipassives, I propose that *-aj* is an overt reflex of Existential Closure (Diesing 1992).

(78) PASSIVE — IMPLICIT AGENT

(a) Ix-man-ch-**aj**   ixim wa'il.

PFV-buy-PASS-DIV CLF tortilla

'The tortillas were bought.'

(b) $[_{IP}$ *ix* $[_{ssP}$ *-i* $[_{XP}$ *-aj* $[_{v/VoiceP}$ $\boxed{x_\exists}$ $[_{v/Voice'}$ *-ch* $[_{\sqrt{P}}$ ROOT DP$_{subj}$]]]]]]

$\quad\quad\quad\quad\quad\quad\quad$ └─ EC ──↑

(79) ABSOLUTIVE ANTIPASSIVE — IMPLICIT PATIENT

(a) Tz-in-man-w-**aj**-i.

IPFV-B1S-buy-AG-DIV-IV

'I do buying.'

(b) $[_{IP}$ *tz* $[_{ssP}$ *-i* $[_{XP}$ *-aj* $[_{v/VoiceP}$ DP$_{subj}$ $[_{v/Voice'}$ *-w* $[_{\sqrt{P}}$ ROOT $\boxed{x_\exists}$]]]]]]

$\quad\quad\quad\quad\quad$ └──────── EC ────────↑

In the forms in (78) and (79), I represent *-aj* as a morpheme located between the v/Voice^0 head which introduces the external argument, and the intransitive status suffix which demarcates the edge of the verb stem. This is in keeping with the proposal that the root undergoes head movement through the functional spine, landing in the projection that hosts the status suffix. This location for existential closure is also compatible with existing semantic work. For example, in Diesing's (1992) system, existential closure happened at the edge of VP—which, at the time of her work, was assumed to host all of the participant arguments. Translating this into modern terms, we might expect existential closure to take place just above the projection hosting the external argument, here v/VoiceP. More recently, Chung & Ladusaw (2004) propose that "[p]redicates must have their participant arguments (semantically) saturated at the event level" (Chung & Ladusaw 2004: 11). The

event argument delimits the event level, and is the highest argument of a predicate, combining after all participant arguments have been saturated. Again, we would expect existential binding to happen just above v/VoiceP—exactly in line with the order of morphemes on the Chuj stems.

I assume that the implicit argument combines with the root via regular Functional Application, but is a variable which must be existentially bound higher in the derivation. Optionally, a PP may be adjoined higher and associated with the implicit argument. Compare the transitive construction in (80a) with the absolute antipassive in (80b).

(80)   (a)   CONTEXT: The boy kicked the ball and it flew across the soccer field.
            Ix-s-tek'   nok' pelota winh unin.
            PFV-A3S-kick CLF ball   CLF child
            'The boy kicked the ball.'

       (b)   CONTEXT: The boy went to kick the ball, but he slipped and didn't
            kick it very well.
            Ix-tek'-w-aj $x_{\exists i}$ winh unin (t'a   nok' pelota$_i$).
            PFV-kick-AG-DIV   CLF   child PREP CLF ball
            'The boy did some kicking (at/to the ball).'

In both constructions, the transitive root *tek'* 'kick' composes with an internal argument via Functional Application: in (80a) it is the DP *nok' pelota*, while in (80b) it is the unexpressed implicit argument, represented as "$x_{\exists}$".

As the contexts and translations of the sentences in (80) suggest, there is a semantic difference between a transitive construction and an antipassive in which the notional patient is expressed as a PP: in the transitive, the patient has a higher degree of "affectedness" than in the corresponding antipassive (Hopper & Thompson 1980). This is in keeping with existing literature on antipassives (see e.g. Spreng 2006, Basilico 2012, Polinsky 2017), though I set the details of this construction—as well as semantic properties of the implicit internal argument, see Bhatt & Pancheva 2006 and Williams 2015 for discussion and overviews—aside as a topic for future work.[27]

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[27]Recall from section 3.2 above that Existential Closure was also needed in the case of incorporation antipassives, but crucially no *-aj* appears in these constructions. In the incorporation antipassive construction (see (47) above), the internal argument does not saturate the argument of the root and EC occurs immediately in order for the derivation to proceed. Above I followed Chung & Ladusaw (2004) in breaking the semantic composition into two steps—Restrict and EC—but note that both must take place before any other elements are merged.

The absolutive antipassive construction behaves differently. Here the internal argument does compose by regular Functional Application, saturating the argument slot of the transitive root. However, this argument is a bound variable, which must be existentially bound by a certain stage in the derivation, which I take to be just above v/VoiceP. Thus, we have a principled reason why *-aj* appears in absolutive antipassives but not in incorporation antipassives: in the incorporation antipassive construction, there is no unbound variable by the time the derivation reaches v/VoiceP, since it is bound immediately in the merge of the root with the NP complement.

5. SUMMARY AND CONCLUSIONS

5.1. Summary

This detailed tour through the Chuj verb stem provides evidence for the division of labor in (81), repeated from (2) above. Specifically, while functional projections are responsible for introducing the external argument, as well as for clausal licensing and agreement generally, it is the root itself which determines whether or not it will semantically compose with an internal argument.

(81)

	selection	licensing/agreement
internal argument	$\sqrt{}$ROOT	v/Voice^0 or Infl^0
external argument	v/Voice^0	v/Voice^0 or Infl^0

I argued that Chuj's rich verbal morphology offers a window into the syntax of its argument structure. In Chuj, as in other Mayan languages, roots may be clearly classed based on their stem-formation possibilities. Following a range of work in Mayan linguistics, and discussed in section 2, it is clear that root class does not correspond directly to surface lexical category: a $\sqrt{}$TV is not a transitive verb, a $\sqrt{}$ITV is not an intransitive verb, and $\sqrt{}$POS does not correspond to any surface lexical category (Haviland 1994, Henderson 2017).

I proposed instead that root classes in Chuj may be at least partially distinguished based on their semantic types, summarized in (3) above. Specifically $\sqrt{}$TV and $\sqrt{}$ITV roots are of type $< e, < s, t >>$ and thus combine directly with an internal argument DP to yield an event predicate, while $\sqrt{}$NOM and $\sqrt{}$POS roots—the latter discussed in depth in Henderson 2017—do not. As noted above, this is in line with the proposal by Davis (1997) that *all* predicates are based on roots which combine with a single internal argument.[28] Surface verbs are formed by combining a root with one of a number of v/Voice^0 heads (often of the form -C in Chuj); we saw in section 3 that $\sqrt{}$TV, $\sqrt{}$POS, and $\sqrt{}$NOM roots may all form agentive intransitive stems with the v/Voice^0 head -w.

Here we focused particularly on transitive roots, which may be identified by their unique ability to form transitive surface stems with no overt derivational suffix (§2.2). Options for transitive roots, along with their argument structural properties, are summarized in (82). For each v/Voice^0 head, I list the nature of the internal and external arguments, where present, along with the functional head responsible for licensing/agreement. Crucially, note that while we find variation

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[28]Davis presents a detailed look at verb stem formation in St'át'imcets (Lillooett; Salish) and argues that all roots are *unaccusative*; transitive and unergative predicates are always derived by morphosyntactic operations. Data from Chuj corroborates this proposal, once we take into account the availability of (and cross-linguistic variation in) zero v/Voice^0 heads. In Stát'imcets, *transitive* predicates appear with overt derivational morphology. I proposed above that Chuj has a Ø suffix which derives transitive stems from $\sqrt{}$TV roots (§2.2). In Chuj, the agentive intransitive v/Voice^0 head is -w (all unergatives are derived, §3.3), whereas Davis argues that a comparable head in Stát'imcets may be null.

in three out of four columns, what is common to all constructions is the presence of some type of internal argument. As in (81), this is an inalterable property of the root itself.

(82) VERB STEMS FROM TRANSITIVE ROOTS

		v/Voice^0		EXT ARG	licenser	INT ARG	licenser
a.	TRANSITIVE		Ø	✔	v/Voice^0	✔	Infl^0
b.	PASSIVE		-*ch*	✔ ($x_\exists$)	—	✔	Infl^0
c.	PASSIVE		-*j*	✘	—	✔	Infl^0
d.	ANTIPASSIVE		-*w*	✔	Infl^0	✔($x_\exists$/NP)	—

In a full transitive construction as in (82/83a), the null v/Voice^0 head introduces the external argument and assigns it ergative case. Infl^0 licenses the internal argument, the transitive object (see Coon et al. 2014 for discussion). In both regular and agentless passives in (82/83b–c), the internal argument is the only overtly present argument, and is licensed by finite Infl^0. These two passive heads differ insofar as the v/Voice^0 head -*ch* introduces an implicit agent, while -*j* does not. The implicit agent need not be licensed, but must be existentially bound by the suffix -*aj*, obligatorily present in (83b). Finally, we found two types of antipassive with -*w*, as in (83d–e). In both, the -*w* head introduces an external argument but does not assign it ergative case. The external argument must then be licensed by Infl^0. Full DP internal arguments are therefore impossible; the internal argument must be either a bare NP (83e), or an implicit argument which does not need case (83d). In the latter "absolute antipassive" construction, the suffix -*aj* is required on the stem and a PP adjunct is possible.

(83) (a) Ix-a-jax   ixim ixim.
          PFV-A2S-grind CLF corn
          'You ground the corn.'

      (b) Ix-jax-**ch**-aj   ixim ixim.
          PFV-grind-PASS-DIV CLF corn
          'The corn was ground.'

      (c) Ix-jax-**j**-i   ixim ixim.
          PFV-corn-PASS-IV CLF corn
          'The corn was ground.'

      (d) Ix-ach-jax-**w**-aj-i.
          PFV-B2S-grind-AG-DIV-IV
          'You did some grinding.'

      (e) Ix-ach-jax-**w**-i   ixim.
          PFV-B2S-grind-AG-IV corn
          'You corn-ground.'

Again, there is no option in which the transitive root selects no complement. Transitive roots like *jax* 'grind' *always* semantically compose with an internal

argument, whether as a full DP argument via Functional Application as in the transitive and passive constructions from (83a–c); an incorporated NP via Restrict as in (83e); or an implicit argument, detectable by the suffix *-aj* from (83d).

We focused specifically on the v/Voice^0 head realized by the suffix *-w*. This particular head is instructive because when it attaches to a *transitive* root an apparent conflict arises: there are not enough licensing heads in the derivation to permit a DP internal argument (Infl^0 must license the external argument DP), but the transitive root nonetheless must semantically compose with something. The fact that *-w* stems formed from nominal and positional roots do not combine with an internal argument to create event predicates provides evidence that this is a property of the root itself. This is further corroborated by the appearance of the suffix *-aj* in absolutive antipassives—the only stem to apparently lack an internal argument. Based on a comparison with two types of passive constructions, I proposed that this morpheme is an overt reflex of the existential binding of an implicit object.

5.2. *Implications and avenues for future work*

This work fits in line with a larger body of literature which takes roots to be not completely specified for their argument structure or "thematic grids". Rather, argument structure is at least partially determined during the syntactic derivation (see e.g. Halle & Marantz 1993, Arad 2003, Borer 2005, Lois & Vapnarsky 2006, Lois 2011, Harley 2017, among many others). However, in line with works such as Alexiadou et al. 2006, Levinson 2007, 2014, roots in Chuj clearly have more information than just loose semantic content (contra Borer 2005, Acquaviva 2009, and others; see discussion in Levinson 2014). Minimally, roots belong to classes, which may be at least partially distinguished based on semantic type.

In Chuj, we saw that roots which belong to the class of transitives obligatorily semantically compose with an internal argument—the internal argument cannot be removed or suppressed in later stages of the derivation, though the manner in which it is realized depends on higher functional heads. This is in keeping with proposals such as that in Koontz-Garboden 2009 on the impossibility of *removing* arguments in later stages of the derivation, and Alexiadou et al. 2006, Wood 2015, and others who argue that voice alternations (like passive~anticausative) are not derived one from the other, but rather all are derived from the root. The focus in much of this previous work is on external arguments, but Chuj provides evidence that the same holds true for internal arguments. This also lends support to proposals in which roots directly compose with internal arguments, as in Harley 2014.

Here the focus is on *roots* rather than surface stems—two categories which are easily distinguishable in a language like Chuj, but more difficult to distinguish in English and other languages without rich verbal morphology. Though the implementations are different, the proposals here about differences among root classes finds similarities in discussion of lexical categories in works such as

Baker 2003. For Baker and others, *verbs* are lexical items which combine directly with an argument (see also Davis 1997), while *nouns* are those lexical items which introduce a referential index. This general approach is compatible with the proposals regarding $\sqrt{}$TV, $\sqrt{}$ITV, and $\sqrt{}$NOM roots discussed above.

The large classes of $\sqrt{}$POS roots found across Mayan—and, as Henderson (2017) points out, the correspondingly small classes of true adjectives—make it clear that different languages may make different choices about how the conceptual space is carved up into root classes, and even what these root classes may be. Nonetheless, it is an interesting topic for future work to consider what Mayan languages might tell us about root classes and categories in other languages. Levinson (2014), for example, distinguishes at least three classes of verb roots in English: *Root Creation Verbs* ('braid', 'pile'); *Explicit Creation Verbs* ('build', 'bake'); and *Change of State Verbs* ('open', 'freeze'). Though a more systematic study is needed, the first type never seem to belong to the $\sqrt{}$TV class in Chuj (or Kaqchikel, Henderson p.c.); instead, forms with equivalent meanings surface as derived transitive stems (§2.2), derived from nominal or positional roots. Among other differences between the latter two categories, Levinson shows that theme arguments are required of *Change of State* verbs, but optional for *Explicit Creation Verbs*. If we can take Chuj's morphology to be instructive more generally, perhaps the theme in *Explicit Creation Verbs* is present implicitly—and if English had an *-aj* suffix, we would find it exactly here.

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