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Abstract: Argument marking with trivalent verbs exhibits a much larger variation than argument marking with bivalent verbs. In many cases, this variation – stemming both from referential and lexical factors – presents a problem when attempting crosslinguistic comparison of alignment patterns of trivalent verbs. Often, this problem results in picking just one of a number of patterns as representative for comparative purposes and thus ignoring the rest of the variation. This paper addresses these general challenges by discussing a case study of trivalent verbs in Yakima Sahaptin, a language with a large amount of alignment variation in indexing and flagging. In doing so, the paper elaborates the recently developed method for alignment typology called *exhaustive alignment*, adjusting the method to meet the challenges of constructions with trivalent verbs and pointing out its limitations.

Keywords: ditransitives, alignment, non-canonical marking, hierarchical agreement, Sahaptian

1 Introduction

This paper connects two recent developments in typological and descriptive linguistics. The first concerns *alignment typology*, more specifically the question of how to deal – in a crosslinguistically consistent and comparable way – with variation in alignment patterns of argument coding or behavior conditioned by referential and lexical factors. Referential factors include both inherent lexical properties of arguments, such as animacy and person, as well as non-inherent discourse-based properties, such as definiteness or topicality. Lexical factors

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involve the subcategorization requirements or valency frames of specific verbs or verb classes.

The second issue concerns crosslinguistic variation of argument coding with trivalent verbs, i. e., verbs that semantically select – or subcategorize for – three arguments. The range of verbs covered in this paper is broader than the one considered in Malchukov et al. (2010a: 1), who restrict the scope of their investigation to constructions involving an agent, a theme, and a recipient or addressee, and exclude constructions with a spatial goal or source (instead of a recipient) or an instrument (instead of a theme). The scope of the constructions considered in this paper is, however, narrower than the one covered in Margetts and Austin's (2007) study, which also includes constructions with serial verbs.[1] We take into account any semantic argument of a verb no matter whether it is realized as a syntactic core argument or as an oblique (in this respect following both Margetts and Austin 2007; Malchukov et al. 2010a).

The present study seeks to improve the analysis of language-specific variation of argument marking in a way that preserves crosslinguistic comparability.[2] The organization of the paper is as follows: In Section 2 we set out the problems posed for alignment typology by trivalent verbs in several genetically and areally diverse languages. We exemplify a wide range of variation conditioned by referential and lexical factors, each having a distinct effect on argument marking. In Section 3 we discuss the recently proposed method of *exhaustive alignment*, which has been used to analyse alignment variation with mono- and bivalent verbs in and across languages (Bickel et al. 2010; Witzlack-Makarevich 2011; Witzlack-Makarevich et al., this issue). In Section 4, we apply this method to the three-argument constructions of Yakima Sahaptin, a language that shows an extensive range of argument marking variation with trivalent verbs. We capture this variation in terms of basic alignment patterns, which are found in different proportions in specific constellations of referential argument types as well as in specific bi- and trivalent verb classes. The case study shows that while exhaustive alignment is fully capable of accounting for referentially conditioned and lexically conditioned variation in isolation, the two conditioning factors are not straightforwardly combinable into a single analysis. In Section 5 we summarize our findings and discuss their implications for intra- and crosslinguistic analysis and comparison.

1 The reason for this is two-fold: first, it is not always straightforward to distinguish between serial verb constructions and multiple clauses in individual languages. Second, serial verb constructions are not relevant for the analysis of Yakima Sahaptin ditransitives.

2 In principle, the method we argue for is also applicable to behavioral constructions. In this paper, however, we do not explore this line of research.

2 Problem statement: Referentially and lexically conditioned variation of alignment patterns with trivalent verbs

In this section we provide a general introduction to alignment patterns with trivalent verbs and the challenges that variation in such patterns pose for alignment typology. This problem statement is illustrated by examples from a number of diverse languages.

2.1 Alignment with trivalent verbs: Earlier studies

The concept of morphosyntactic alignment has become widely accepted since the late 1980s to early 1990s due to work by Dixon (1979), Comrie (1981) and Mallinson and Blake (1981). The notions of S, A, and P (sometimes abbreviated as O) have been used to compare the coding and behavior of arguments across languages with various alignment types. The extension of the notion of morphosyntactic alignment from predicates with one and two arguments to predicates with three arguments was first proposed by Dryer (1986) and elaborated in Croft (1990: 102–111) (see also Siewierska 2003, 2004; Haspelmath 2005a, 2005b; Malchukov et al. 2010a). In this original formulation, one compares the encoding of P, T, and G arguments rather than S, A, and P arguments. The basic alignment types of these three arguments are *neutral* (P = T = G), *indirective* (P = T ≠ G), *secundative* (P = G ≠ T), *horizontal* (P ≠ T = G) and *tripartite* (P ≠ T ≠ G) (Haspelmath 2005a).

As is extensively discussed in Haspelmath (2011), there are at least three different views as to what the S/A/P/T/G terms stand for. In this paper we take what Haspelmath (2011) calls the “Bickelian” approach to semantic roles (see Bickel 2010; Witzlack-Makarevich 2011; Bickel et al. 2014): S is the sole argument of a monovalent verb; A is the more agent-like argument of both bi- and trivalent verbs; P is the less agent-like argument of a bivalent verb; G is stationary relative to movement of another participant (T) and is receiving or being exposed to an experience. Importantly, our notion of argument is a semantic one: an argument is defined as an entity entailed by the semantics of the verb and is thus independent of its morpho-syntactic expression.

Recently, three-argument constructions have received increased research interest, which has resulted in a number of detailed case studies on individual languages, including languages whose argument coding systems are strongly influenced by referential factors (see the contributions in Siewierska and Hollmann 2007; Malchukov et al. 2010b; van Lier 2012). Additionally, the available data show that lexical effects are also pervasive: Malchukov et al. (2010a: 2) note that "while all languages have a substantial class of transitive verbs that behave uniformly, some languages have only a handful of ditransitive[3] verbs, and not uncommonly these do not behave uniformly". This language-internal diversity has been either explicitly or (more frequently) implicitly ignored when discussing the alignment of trivalent arguments by focusing on the arguments of typical physical transfer verbs of possession, such as 'give' (cf. Haspelmath 2005b, 2011). This decision is not without its problems: among other things, it has been frequently noted that translational equivalents of 'give' are often unique in their grammatical behavior and differ from other trivalent verbs (Comrie and Borg 1984; Kittilä 2006) and thus are not necessarily representative for trivalent verbs of a language. More importantly, the focus on just one verb or a small class of trivalent verbs in a language implies a conscious decision to ignore intra-linguistic diversity and thus – at least according to some views – defeats the purpose of linguistic typology (Bickel 2007).[4]

2.2 Cross- and intralinguistic variations in argument marking with trivalent verbs: Some examples

In this section we illustrate some of the variation seen with argument marking in trivalent constructions, with examples from several languages. First, we consider data showing that in a given language the referential factors conditioning argument marking in clauses with trivalent verbs can be different from those at work in clauses with bivalent verbs. At the same time, we illustrate how these factors affect alignment patterns of argument encoding devices. Araki (François 2002, 2012) provides this example: the P arguments of one specific class of

3 Malchukov et al. (2010b) use the term 'ditransitive' to include any three-argument construction with a semantic recipient-like argument (R) and a theme argument (T) independent of the formal realization of these arguments.

4 Haspelmath's (2011: 560) argument for this choice boils down to noticing that by extending the scope of research to other trivalent verbs one has "fewer chances of finding cross-linguistic generalizations". We think that this is essentially an empirical question and cannot be satisfactorily answered without first attempting to find such generalizations. Considering the number of existing studies dedicated to typical physical transfer verbs of possession, the study of other trivalent verbs needs considerable investigation before one can claim with certainty that no interesting generalizations can be found. In a pilot study of mono- and bivalent verbs (Bickel et al. 2010) the expansion of the scope of considered verbs to include all classes seems to deliver interesting generalizations in terms of alignment (see also Bickel et al. 2014 for further examples of considering numerous verb classes for a different research question).

bivalent verbs (which we refer to as *class I*)[5] show differential indexing conditioned by *humanness* and *anaphoricity*:[6] pronominal and non-human nominal Ps are indexed, as in (1a) and (1b), while human nominal Ps are not, as in (1c).

(1) Araki (Oceanic; Vanuatu)[7]

a.

	P[pro]	
naivou-ku	*mo = poi-a*	
wife-my	3.REAL = like-**3SG.O**	

'My wife likes him/her/it.'

b.

		P [-human]
naivou-ku	*mo = poi-**a***	*hija-ma*
wife-my	3.REAL = like-**3SG.O**	name-your

'My wife likes your name.'

c.

		P [+human]
naivou-ku	*mo = poi*	*naviou-m*
wife-my	3.REAL = like	wife-your

'My wife likes your wife.'
(François 2012: 102–103)

In another class of bivalent verbs (*class II*), there is no differential P marking. Rather, P is invariably un-indexed and marked by a locative preposition, as in (2):

(2)

	P		
nam = vavēre	***lo***	*vēre*	*mo = hese*
1SG.REAL = sing	**LOC**	song	3:REAL = one

'I sang a song.'
(François 2012: 105)

5 We use Latin numbering for language-specific bivalent verb classes and Arabic numbering for trivalent verb classes throughout the paper.

6 We use the terms *indexing* and *flagging* as proposed in Haspelmath (2005a); the former to refer to person marking (including agreement and cross-referencing), the latter to refer to case and adpositional marking. We use the terms *coding* and *marking* interchangeably to refer to both indexing and flagging. Note that we do not take into account argument marking by means of word order.

7 Abbreviations: A: agent, ABL: ablative, ABS: absolutive, APPL: applicative, CAUS: causative, CLS: classifier, cislocative, DAT: dative, DU: dual, ERG: ergative, EX: exclusive, EXCL: exclusive, FN: example from fieldnotes, FUT: future, GEN: genitive, HAB: habitual, HUM: human, INST: instrumental, INV: inverse, IPFV: imperfective, IRR: irrealis, LOC: locative, NMLZ: nominalizer, NON-HUM: non-human, NON-TOP: non-topical, NS: non-subject, NSG: non-singular, O: object, OBJ: object case, OBV: obviative, P: patient, PFV: perfective, PL: plural, PN: pronoun, POSS: possessive, PROH: prohibitive, PRX: proximate, PST: past, REAL: realis, SAP: speech act participant, SG: singular, SBJ: subject, TOP: topic, topical, TX: example from text.

And with yet another class of bivalent verbs (*class III*) P is always flagged by a dative marker (and again never indexed on the verb), as in (3):

(3)				**P**
	Nra	*mo = re*	*ha = v̈alum*	***isa**-m̈am*
	3PL	3.REAL = say	3PL.IRR = fight	**DAT**-1EX.PL

‘They want to fight with us.’
(François 2012: 106)

In clauses with trivalent verbs, the coding of T and G is regulated quite differently. With one small class of trivalent verbs (*class 1*), the coding depends on the relative referential properties of T and G, with the primarily relevant factors being *humanness* and *person*. Specifically, when T is non-human and G is human, G will be indexed in the same way as P of bivalent *class I*, cf. (1) above. T is not indexed, but is flagged by a locative preposition, just as is P of bivalent *class II*, cf. (2) above. This is illustrated in (4):

(4)	**G [+ human]**	**T [-human]**		
	*o = vsei-**á***	*lo*	*pla-m*	*to*
	2SG.IRR = show-**1SG.O**	**LOC**	farming-2SG	chicken

‘Show me your farm chickens!’
(François 2012: 113)

When T is a 3rd person human and G a speech act participant (henceforth SAP), the same coding pattern as in (4) is used. However, in the reverse scenario (with SAP T and 3rd person human G), the pronominal T is indexed like P of bivalent *class I*.[8] The (pronominal) G remains un-indexed and is flagged DATIVE, like P of bivalent *class III*, cf. Example (3) above. This is shown in (5):

(5)		**T[SAP]**	**G[3rd + human]**
	O = kan	*slei-**á***	***sa**-na*
	2SG.IRR = PROH	give-**1SG.O**	**DAT**-3SG

‘Don’t give me to him!’
(François 2012: 111)

When T and G are both 3rd-person human or both SAP, which of the two coding patterns illustrated in (4) and (5) is used depends on the relative topicality of the two non-agents.

8 The term *scenario* was introduced by Zúñiga (2006); see also Bickel (2010).

As already mentioned, the argument coding alternation described above is possible only with one class of trivalent verbs in Araki. All other trivalent verbs (*class 2*) allow only the pattern illustrated in (5) above, independent of the referential properties of the non-agentive arguments. An example of this construction with a trivalent verb from *class 2* is provided in (6).

(6)

	T		G
*na = pa = sohani-**a***	*leta*	*mo = hese*	***isa** = m*
1SG:IRR = FUT = send-**3SG.O**	letter	3SG.REAL = one	**DAT**-2SG

'I'll send a letter to you.'
(François 2012: 107)

A summary of these data is provided in Tables 1 (bivalent) and 2 (trivalent) below. They show that in Araki the choice of the argument coding patterns with bivalent and trivalent verbs depends on partially different referential factors, which are applied in different ways to different arguments. Moreover, the Araki

Table 1: Overview of P coding with Araki bivalent verbs.

Bivalent verb class	Indexing of P	Flagging of P	Example
I	Differential (yes for PRO and -HUM; no for + HUM)	–	(1a–c)
II	–	LOC	(2)
III	–	DAT	(3)

Table 2: Overview of T/G-coding (compared to P-coding) with Araki trivalent verbs.

Trivalent verb class	Scenario	Indexing of T and G	Flagging of T and G	Example
1	T[-HUM], G[+ HUM] T[3rd + HUM], G[SAP]	T: – (=P class II/III) G: differential (=P class I)	T: LOC (=P class II) G: – (=P class I)	(4)
	T[SAP], G[3rd + HUM]	T: yes (=P class I) G: – (=P class I/II)	T: – (= P class I) G: DAT (= P class III)	(5)
	T[SAP], G[SAP] T[3rd + HUM], G[3rd + HUM]	T: -- (=P class II/III) G: differential (=P class I) or T: differential (=P class I) G: – (=P class I/II)	T: LOC (=P class II) G: – (=P class I) or T: – (= P class I) G: DAT (= P class III)	–
2	any	T: differential (=P class I) G: – (=P class I/II)	T: – (= P class I) G: DAT (= P class III)	(6)

data provide evidence that bivalent as well as trivalent lexical verb classes affect the resulting alignment patterns, and that they do so in distinct ways for indexing as opposed to flagging.

Whereas in Araki certain generalizations about argument encoding apply to classes of multiple verbs, in some languages it seems impossible to generalize across several verbs and one has to refer to individual lexical items instead. For instance, Yakkha displays a range of distinct coding patterns with trivalent verbs. Individual trivalent verbs vary in terms of which of these pattern types they can occur with, under specific referential conditions. The attested variation is of several types: there are multiple potentially relevant referential factors (person, animacy, topicality); sometimes the referential properties of a single argument affect the coding, while sometimes those of two arguments do; sometimes the variation manifests itself in indexing, sometimes in flagging, and sometimes in both. For example, when T is inanimate and G is human, the verbs *sopmepma* 'show' and *camepma* 'feed' occur with T and G unflagged and only G is indexed in the same way as the P argument (the coding of which is in turn co-determined by its A co-argument; see Schackow 2012: 151). This is illustrated in (7) and (8).

(7) Yakkha (Sino-Tibetan, Kiranti; Nepal)

	G[HUM]	**T[INANIM]**
a-ni = ŋa	*ka*	*u-phoṭo*
1SG.POSS-elder.sister = ERG	1SG	3SG.POSS-photo

*sopmet-a-**ŋ** = na*
show[3SG.A]-PST-**1SG** = NMLZ[9]
'My elder sister showed me her photo.'
(Schackow 2012: 156)

(8)

	G[**HUM**]	**T**[**INANIM**]
u-ma = ŋa	*picha-ci*	*cama*
3SG.POSS-mother = ERG	child-NSG	cooked.rice

*camet-**u-ci** = ha*
feed[3SG.A]-**3P**[PST]-**NS.P** = NMLZ.NSG
'The mother fed rice to the children.'
(Schackow 2012: 157)

9 In Yakkha, the nominalizing clitic (*=na* for singular, *=ha/=ya* for nonsingular) is not only used in dependent (complement and relative) clauses, but also frequently attaches to the main verb of an independent clause. Schackow (2012: 152–153) tentatively analyzes such nominalized main clauses as focus constructions in line with nominalization functions in other Tibeto-Burman languages. In bivalent clauses, the nominalizer agrees in number with P. Examples (8) and (9) show that in trivalent constructions it may agree with G, as in (8) or with T, as in (9), depending on the coding frame.

However, when T is a SAP and G is 3rd person, T is indexed instead, as can be seen in (9) and (10). Notably, the flagging pattern is verb-specific under these circumstances: *sopmepma* 'show' has G locative-marked, as in (9), which is not possible with *camepma* 'feed' in (10). When T and G are both SAPs, the alternation is not possible.

(9) **T**[SAP] **G[3rd]**
ka nda appa-ama = ***be*** *sopmeʔ-nen = na*
1SG 2SG mother-father = **LOC** show[PST]-1>**2** = NMLZ.SG
'I showed you to my parents.'
(Schackow 2012: 156)

(10) **T**[SAP] **G[3rd]**
*ka nda kiba****(* = be)*** *cameʔ-meʔ-nen = na*
1SG 2SG tiger**(* = LOC)** feed-NPST-1>**2** = NMLZ.SG
'I will feed you to the tiger.'[10]
(Schackow 2012: 157)

Another verb, *nakma* 'ask', displays the same formal alternation as *sopmepma* 'show', but under different referential conditions. Specifically, it seems that the relative topicality of T and G determines which of them is treated like P in terms of indexing. Example (11) illustrates the construction with G indexed and T and G both zero-flagged; Example (12) shows the construction with the topical SAP T indexed and zero-flagged, while the SAP G is not indexed (and is not otherwise expressed as an independent pronoun). The topicality factor is overridden by the factor of person when T is SAP and G is 3rd person. In that case, only the construction with indexing of T is allowed.

(11) **G**[TOP] **T**
ka nda chemha nak-nen = ha
1SG 2SG liquor ask[PST]-1>**2** = NMLZ.NSG
'I asked you for liquor.'

(12) **T**[TOP]
kanciŋ nakt-a-ŋ-c-u-ŋ = na = cen ina baŋniŋ,
1DU ask.for-PST-EXCL-DU-3P.PST-EXCL = NMLZ.SG = TOP what TOP
'As for what it is that we two asked (you) for, [...]'
(Schackow 2012: 159)

10 This construction is in fact ambiguous; it may also be used to express the meaning 'I will feed the tiger to you'.

With other Yakkha verbs, such as *ipma* 'fill' the relative topicality of T and G triggers a different kind of construction alternation, namely, between the construction type illustrated in (11) above and a construction which has G indexed and unflagged, and T marked by the instrumental case (and un-indexed).[11] Once again, there is a referential restriction on when this topicality-based alternation is allowed. Here, however, the restriction involves the factor of animacy (rather than person) and applies only to G (rather than to a scenario with T and G): when G is inanimate, the construction with G-indexing is disallowed.

Table 3: Overview of T and G-coding (compared to P-coding) in Yakkha.

Trivalent verb(s)	Scenario	T-coding		G-coding		Relevant example
		flagging	indexing	flagging	indexing	
sopmepma 'show', *camepma* 'feed'	T[INANIM], G[HUM] T[SAP], G[SAP]	–	–	–	yes (=P)	(7), (8)
sopmepma 'show'	T[SAP], G[3rd]	–	yes (=P)	LOC	–	(9)
camepma 'feed'		–	yes (=P)	–	–	(10)
nakma 'ask'	T[NON-TOP], G[TOP]	–	–	–	yes (=P)	(11)
	T[TOP], G[NON-TOP] T[SAP], G[3rd]	–	yes (=P)	(LOC)	–	(12) –
ipma 'fill'	T[NON-TOP], G[TOP]	INSTR	–	–	yes (=P)	–
	T[TOP], G[NON-TOP]	–	yes (=P)	LOC	–	–

The Yakkha data, summarized in Table 3, provide ample evidence that referential and lexical effects on argument coding with trivalent verbs can be intertwined: both the specific referential conditions and their formal consequences are highly lexically specific.

A final example of the complex interplay between referential and lexical factors relates specifically to the distinction between underived and derived three-argument constructions. Upper Necaxa Totonac displays a formal difference between these two in terms of person indexing. Underived three-argument constructions typically display person indexing of G only, as is illustrated in (13).[12]

11 See Schackow (2012: 163, Examples [22a–b]). As she notes, this type of alternation is cross-linguistically common; it is often referred to as the *spray-load alternation*.

12 The only exception to this pattern can occur when both T and G are SAP; in that scenario, either of them can be indexed, according to an anonymous reviewer. This information was not available to use from Beck (2006), and we are grateful for this additional data.

(13) Necaxa Totonac (Totonac-Tepehua; Mexico)

T			G	
Wix,	*tzumaját*,	*na-ik-maxkí:-ya:-**n***	*wamá*:	*hawácha'*
you	girl	FUT-1SG.SBJ-give-IPFV-**2OBJ**	this	boy

'You, daughter, I'm going to give you this boy.'
(Beck 2006: 3)

In contrast, constructions derived with one of the valency-increasing applicatives show a competition between G and T as potential controllers of indexing. Whether G or T is indexed depends on their relative referential properties: whenever a SAP and a 3rd person co-occur, the SAP will be indexed. Whenever an inanimate and an animate 3rd person co-occur, typically the animate argument will be indexed. However, if the inanimate one is more salient in the discourse, it will be indexed instead, as is illustrated in (14) (where the discourse-prominent instrument – the two knives – is the applied participant and the stabbed man is the P of the underived construction).[13]

(14)

	T		G	
Ásta	***hen-tú:***	***kuchílu***	*cha:-tín*	*chixkú*
even	CLS-two	knife	CLS-one	man

ka*:-li:-lhtukú-lh ho't-ni'*
PL.OBJ-INS-stab-PFV drink-NMLZ
'With *two knives* the drunk stabbed a man.'
(Beck 2006: 10)

Thus, only in derived three-argument constructions does Upper Necaxa Totonac display co-argument conditioned indexing, based on three internally ranked referential factors.

2.3 Summary: The challenge of trivalent alignment typology

In sum, coding patterns of trivalent verbs can be heavily dependent on lexical and referential factors. Referential effects may stem from the properties of a single argument or be co-argument conditioned. They may affect indexing and/ or flagging. Finally, the nature of referential effects may vary across verbs or verb classes.

13 When both T and G are SAP, either of them can be indexed, see Beck (2006: 4). In this respect, then, derived and underived three-argument constructions do not differ.

In crosslinguistic studies of the morphosyntactic properties of arguments of trivalent verbs to date, the range of variation described above is not fully accounted for. Margetts and Austin (2007), for instance, discuss a variety of strategies used by individual languages to encode a broad range of three-participant events, but they offer no comprehensive account of the factors involved in choosing between such coding strategies. Malchukov et al. (2010a), in their introduction to a geographically and genealogically diverse collection of case studies on what they refer to as ditransitive constructions (see Section 1), point out that "the identification of ditransitive alignment patterns requires that we identify a major monotransitive construction, so that we know what the monotransitive P is that we compare the ditransitive T and R with. This is not straightforward if there is a major split in the coding of monotransitives" (Malchukov et al. 2010a: 7). In order to avoid addressing alignment splits with bivalent verbs, Malchukov and colleagues discuss only what they consider to be the most typical transitive construction: the one with an inanimate P.[14] Moreover, as mentioned in Section 1, their definition of ditransitives includes only a preselected type of three-participant events and only the most prototypical referential participants in these events.

As we have demonstrated in this section, the referential properties of P, T and G arguments may vary along multiple parameters. Moreover, the encoding of P, T, and G may depend not only on the referential properties of each of these participants considered in isolation, but also on the properties of their co-argument(s). Finally, the lexical properties of both bivalent and trivalent verbs may (co-)determine the argument expression frame, and this potentially influences the outcome of any comparison between the coding of P, T, and G. This means that the approach adopted in Malchukov et al. (2010a) excludes a large portion of the actually attested variation.[15]

14 Notably, Comrie (2013) makes a different choice in his WALS chapter on alignment of case marking: in the case of a split, he chooses the overtly marked P, which typically corresponds to the relative high-ranking P on a referential hierarchy.

15 We do not mean to suggest that typological studies of ditransitive constructions altogether ignore referential and lexical effects on argument encoding – on the contrary, the work by Haspelmath (2007), Kittilä (2006, 2008), and Malchukov (2008), among others, is specifically concerned with referential effects, including a type of co-argument conditioned alignment variation that is widely known as the *ditransitive person constraint*. Malchukov (2011) investigated which types of argument encoding strategies are crosslinguistically associated with particular semantic groups of verbs.

The goal of this paper is to capture and account for the full range of variation in argument coding. In order to give an accurate and complete answer to the question of whether T, G, both or neither is/are coded like P, the question must be reformulated as follows: To what extent do we find equal coding of (i) a P argument of a specific referential type, occurring with a specific lexical verb and with an A co-argument of a specific referential type and (ii) a T/G argument of a specific referential type, occurring with a specific lexical verb and with A and G/T co-arguments of specific referential types? In other words, we need to consider for both two- and three-argument constructions which verb is used and what are the relevant referential properties of which arguments. Obviously, we also need to independently address the alignment of indexing and flagging.

As mentioned in Section 1, in the realm of mono- and bivalent predicates, a novel method called *exhaustive alignment* has recently been proposed to deal with problems of lexically and referentially conditioned alignment variation (Bickel et al. 2010; Witzlack-Makarevich 2011; Witzlack-Makarevich et al., this issue). In the next section we briefly describe this method. Subsequently, in Section 4, we assess the relevance and applicability of the method for alignment of trivalent verbs via a case study of Yakima Sahaptin.

3 Capturing alignment variation with mono- and bivalent verbs: Exhaustive alignment

In this section we will first provide a short overview of the notion of alignment typology and cases which present challenges to the way alignment type is determined traditionally. We then proceed with a presentation of the method of exhaustive alignment, developed to tackle these challenges.

3.1 Theoretical and typological background

In the course of the past decades, typologists have shown that alignment patterns are construction-specific, i. e., within one language flagging can, for instance, show neutral alignment, indexing can show ergative alignment and conjunction reduction can align accusatively (for discussion and examples see e. g., Comrie 1978; Moravcsik 1978; Dixon 1979; Van Valin 1981; Croft 2001; Bickel 2010). Further variation in alignment patterns found in a language can be conditioned by referential properties of arguments or by properties of the clause (such as tense or aspect). In such cases it has been common to consider the system of argument encoding as showing split alignment and to specify alignment of individual subsystems (e. g., flagging alignment of nouns vs. pronouns or indexing alignment of past vs. non-past clauses, cf. Dixon 1994). However, some properties of the clause are of such an intricate nature that a mere split into two or more subsystems is impossible. In order to deal with these cases the method of exhaustive alignment has been proposed (Bickel et al. 2010; Witzlack-Makarevich 2011; Witzlack-Makarevich et al. this issue). Specifically, this method accounts for two types of argument coding variation that have not previously been satisfactorily dealt with in alignment typology: (i) variation typically referred to as *hierarchical alignment* in earlier studies (Nichols 1992; Siewierska 2004), and (ii) variation due to argument expression frames of lexical verb classes, sometimes treated under the heading of non-canonically marked subjects and objects (Aikhenvald et al. 2001). The way these two types of argument coding variation are dealt with in exhaustive alignment will be presented in the following discussion.

First consider the analysis of so-called hierarchical alignment. Traditionally, this term refers to systems in which two arguments compete for indexing by a specific marker and the argument ranking highest on a referential hierarchy – typically a hierarchy of person – "wins" this competition (see Mallinson and Blake 1981).[16] This alignment variation is a subtype of a more general pattern of co-argument or scenario conditioned differential argument marking (cf. Zúñiga 2006, 2007; Witzlack-Makarevich 2011). In a co-argument conditioned system of marking (no matter whether one can postulate a single hierarchy to describe it or not) argument marking depends on the referential properties of two arguments, in contrast to more common cases of splits (differential subject and object marking, split ergativity, etc.), where grammars are sensitive to the properties of just a single argument. Though frequently considered as a separate type, such systems of coding have been claimed to contain traces of the basic alignment types, i. e., accusative, ergative, neutral, etc. (Nichols 1992; Bickel 1995; Zúñiga 2006).

In hierarchical and other systems of co-argument conditioned marking the determination of basic alignment for individual subsystems is problematic, as it is unclear how such subsystems could be established. The problem is that the coding of a particular argument, e. g., of the 1st person A, depends on the referential nature of its co-argument. Thus, we have a 1st person agent acting on a 2nd person patient (this scenario will be referred to as A_1 [with P_2] in the following), but also 1st person agent acting on 3rd person patient (this scenario will be referred to as A_1 [with P_3]). Similarly, the coding of the P argument might

16 Note that the term hierarchical alignment had been used exclusively for indexing systems and not for flagging.

be conditioned by the nature of the A argument. No straightforward split into two or more subsystems is possible, as individual conditions (i. e., the nature of the co-argument) do not apply to all argument roles: S has no co-arguments to begin with; A can only be conditioned by the nature of P; and P only by the nature of A.

To solve this problem and to arrive at statements of basic alignment types, Witzlack-Makarevich et al. (this issue) suggest retrieving all possible alignment patterns for each referential type of argument under the condition of every possible co-argument. The results of such an analysis can be expressed as proportions of basic alignment patterns displayed by specific referential types of arguments.[17] This allows us to characterize a particular language system as, for instance, being predominantly accusative or ergative aligning, allows us to say something about the type of conditions that trigger a specific alignment pattern, and to straightforwardly compare these data points across languages.

An important advantage of the exhaustive alignment method – from a comparative perspective – is that it does not require the postulation of non-basic alignment types, such as hierarchical alignment, which do not rely exclusively on identical or different coding (or behavior) of S, A, and P, the way the five basic alignment types – viz. nominative-accusative, ergative-absolutive, tripartite, neutral, and horizontal – do (see the discussion in Witzlack-Makarevich et al. this issue). This problem disappears in an exhaustive alignment analysis, which involves a combination of basic alignment types, each occurring under the condition of specific scenarios. Moreover, an exhaustive alignment analysis avoids the necessity of formulating referential hierarchies, which turn out to be not only language-specific, but also specific to individual constructions or markers within languages (see e. g., Zúñiga 2006; Macaulay 2009).

The second area in which the method of exhaustive alignment can be successfully applied involves lexically or verb-class conditioned variation. Languages vary extensively with respect to their inventory of verb classes that display specific argument expression frames. However, this variation is typically ignored in typological studies of alignment, which are usually based on the alignment pattern of what are considered the prototypical or default (in)transitive verb classes of a particular language. Apart from the fact that it is not obvious how to establish such prototypical classes (see Haspelmath 2011; Witzlack-Makarevich 2011 for discussion), in a pilot study Bickel et al. (2010) show that their alignment pattern is not representative: it fails to approximate the alignment picture that emerges once all of a language's verb classes are taken into account.

17 For a concrete example, see the analysis of Plains Cree in Witzlack-Makarevich et al. (this issue).

The exhaustive alignment approach proposes to capture lexically conditioned alignment variation in essentially the same way as co-argument conditioned alignment variation, namely by comparing everything with everything else. Specifically, the coding of arguments of any monovalent verb class is compared with the coding of arguments of any bivalent verb class or – in the case of trivalent alignment – the coding of arguments of any bivalent verb class with the coding of arguments of any trivalent verb class. Depending on which pairs of verb classes one considers, the observed alignment patterns might be different. As in the case of co-argument conditioned marking, the exhaustive method results in a proportional set of basic alignment patterns, but this time they occur under specific lexical (rather than referential) conditions. In the next subsection we lay out the methodological details of applying the exhaustive alignment method to the argument coding of trivalent verbs, as this is a prerequisite for our analysis of alignment in Yakima Sahaptin.

3.2 Exhaustive alignment with trivalent verbs: Methodological implementation

When determining the alignment pattern of arguments of trivalent verbs we compare the encoding of P, T and G. It is important to note that the P argument of bivalent verbs, which serves as the comparative standard in determining the alignment of P, T, and G, is *not* the single argument of its construction: it co-occurs with an A argument. (This is unlike monovalent verbs, in which the S argument is used as a standard of comparison to determine the alignment of S, A, and P.) Moreover, the T and G arguments of a trivalent verb each have two co-arguments: T has A and G, while G has A and T. Since the encoding of each of these arguments may be co-determined by the referential properties of the respective co-argument(s), these properties need to be specified in order to determine all possible alignment patterns exhaustively.

We compare the encoding of P, T, and G arguments with the same relevant referential property (or properties) and with the same referential type of co-argument(s) (for the latter, see further below). Let us first consider a hypothetical example involving the referential factor of person and start by comparing the encoding of 1st person P/T/G arguments. (Eventually, of course, we will also consider 2nd and 3rd person P/T/G, as well as referential properties other than person. We begin here with 1st person arguments for the sake of the example.) Each of the three 1st person arguments (P, T, and G) may occur in a number of different scenarios, i. e., with co-arguments of specific person-values. The first step is to list all these possible scenarios: the 1st person P of monovalent verbs can co-occur with either a 2nd or a 3rd person A. The notation we use for these two respective scenarios is P_1 [with A_2] and P_1 [with A_3], as in Table 4 below (first column). Note that the A co-argument is represented in the square brackets, so as to highlight that it is the encoding of P rather than the encoding of A that serves as a standard of comparison when determining the alignment of arguments of trivalent verbs. Note also that we exclude reflexive scenarios as they form a distinct paradigm.

With trivalent verbs (again excluding reflexives), a 1st person T can co-occur with a 2nd person or a 3rd person G. When co-occurring with a 2nd person G, the A argument can only be 3rd person. When co-occurring with a 3rd person G, the A argument can be either 3rd or 2nd person. This gives us three possible scenarios for 1st person T, which are notated as follows: T_1 [with A_3 and G_2], T_1 [with A_3 and G_3], and T_1 [with A_2 and G_3]. These scenarios are also listed in Table 4 below (second column). The same logic applies to the 1st person G and its possible T and A co-arguments: it appears in three possible scenarios, notated respectively as: G_1 [with A_3 and T_2], G_1 [with A_3 and T_3], and G_1 [with A_2 and T_3]. These scenarios appear in the third column of Table 4.

Table 4: Triads of scenarios for determination of alignment of 1st person P/T/G.

Comparative triads			**Alignment**
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3]	T_1 [with A_3 and G_2]	G_1 [with A_3 and T_2]	…
P_1 [with A_3]	T_1 [with A_3 and G_3]	G_1 [with A_3 and T_3]	…
P_1 [with A_2]	T_1 [with A_2 and G_3]	G_1 [with A_2 and T_3]	…

Once we have listed all possible scenarios in which the 1st person P/T/G arguments can occur, the next step is to determine actual alignment patterns by comparing the encoding of the P/T/G arguments in each specific scenario. We do this by composing *comparative triads*: sets of one bivalent scenario (involving a P_1) and two trivalent scenarios (one involving a T_1 and another involving a G_1). We compose these comparative triads in such a way that T_1 and G_1 have the same types of co-arguments and that P_1 also has the same type of A co-argument as in both trivalent scenarios.[18] In our example with 1st person arguments, this involves the comparative triads listed in the three rows of Table 4. The alignment column has not been filled in, since we have not looked at actual coding strategies so far – this will be done in Section 4.2.

The same methodology used for 1st person P/T/G arguments (and their co-arguments) can be applied to arguments with different person values: As

Table 5: Triads of scenarios for determination of alignment of 2nd person P/T/G.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_2 [with A_3]	T_2 [with A_3 and G_1]	G_2 [with A_3 and T_1]	...
P_2 [with A_3]	T_2 [with A_3 and G_3]	G_2 [with A_3 and T_3]	...
P_2 [with A_1]	T_2 [with A_1 and G_3]	G_2 [with A_1 and T_3]	...

for 2nd person P/T/G arguments, their alignment is determined by comparing their encoding across the triads of scenarios represented in the rows of Table 5. Again, the alignment patterns are not yet filled in, since we have not yet looked at actual argument coding strategies of specific verb classes.

Finally, looking at the alignment of 3rd person P/T/G arguments, Table 6 below represents the relevant comparative triads, where T_3 and G_3 have the same type of co-arguments (A, G, T) across the two trivalent scenarios, and where P_3 in the bivalent scenario also has the same type of A as in the two trivalent scenarios.

Table 6: Triads of scenarios for determination of alignment of 3rd person P/T/G.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_3 [with A_2]	T_3 [with A_2 and G_1]	G_3 [with A_2 and T_1]	...
P_3 [with A_3]	T_3 [with A_3 and G_1]	G_3 [with A_3 and T_1]	...
P_3 [with A_1]	T_3 [with A_1 and G_2]	G_3 [with A_1 and T_2]	...
P_3 [with A_3]	T_3 [with A_3 and G_2]	G_3 [with A_3 and T_2]	
P_3 [with A_1]	T_3 [with A_1 and G_3]	G_3 [with A_1 and T_3]	
P_3 [with A_2]	T_3 [with A_2 and G_3]	G_3 [with A_2 and T_3]	
P_3 [with A_3]	T_3 [with A_3 and G_3]	G_3 [with A_3 and T_3]	

18 Notably, we could theoretically also have included comparative triads of scenarios in which P/T/G do *not* share the same co-argument(s), as Witzlack-Makarevich et al. (this issue) originally presented in their exhaustive alignment method. However, here we propose that alignment, i. e., patterns of equivalence and difference of the coding of the three arguments, should be determined under *maximally* equal circumstances for each of the three compared arguments. This implies keeping constant not only the relevant referential properties for the three compared arguments themselves, but also for their co-argument(s).

Having looked at the referential factor of person, we should add that a similar method can be applied to arguments with other types of referential properties, such as animacy. We will see below that this is relevant for Yakima Sahaptin as well.

Before continuing with the actual analysis of P/T/G alignment in Yakima Sahaptin, however, there are two further methodological considerations that we wish to point out. One has to do with lexical restrictions on the referential types of arguments that a specific trivalent verb may take. For instance, we will see below that the Sahaptin verb *ní* 'give' allows for our consultants human Gs only, while its T argument can be either human or non-human. The fact that non-human Gs are disallowed with this particular verb means that we cannot compare the encoding of non-human Ts and Ps (in their specific scenarios) with the encoding of non-human Gs. Also, it is impossible to compare (i) the encoding of a human G under the condition of a non-human T co-argument with (ii) a human T under the condition of a non-human G co-argument. Obviously, this reduces the number of possible comparative triads with equal co-argument conditions. If no comparison can be made, no alignment statement pattern can be determined and this in turn affects the calculation of proportions of alignment patterns. In fact, as we will see, if a lexical verb is very rigid in terms of which referential types of T and G arguments it allows, it may be impossible to construct any comparative triad (cf. the analysis of trivalent verb class 3 ['say' verbs] in Yakima Sahaptin; Section 4.2.3).[19]

Finally, it should be noted that the studies of exhaustive alignment referred to in Section 3.1 addressed referential and lexical factors separately. Thus, though going in the right direction they still give a too simplistic view of this complex phenomenon by focusing either on referential factors (ignoring differences between lexical verb classes) or on lexical factors (ignoring the possibility of intervening referential factors). The present study attempts to cover both factors simultaneously. Such a combined analysis involves a multiplication of each comparative triad by a factor depending on the number of language-specific bivalent and trivalent verb classes. For our case study we consider the encoding of T and G with five classes of trivalent verbs (of which three are underived and two derived) and compare them to the encoding of P of two classes of bivalent verbs.

The general objective of the exhaustive alignment method is to allow for crosslinguistic comparison of alignment patterns without compromising

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19 We wish to stress that while lexical restrictions on referential argument types may be difficult to handle by the exhaustive alignment method, such restrictions constitute interesting data in themselves, which deserve further (crosslinguistic) investigation.

descriptive (and consequently typological) adequacy in the form of language- and construction-specific variation. Thus, it enables a principled analysis of two major sources of alignment variation: referential and lexical factors. In the next section we will use the exhaustive method to analyze the P/T/G alignment in Yakima Sahaptin. As mentioned above, person is a primary conditioning factor in Yakima Sahaptin, but other referential factors can also play a role. These additional factors will be taken into account where relevant, i. e., per verb class, in the next section.

4 A case study: Capturing alignment variation of trivalent verbs in Yakima Sahaptin

In the discussion that follows we apply the method of exhaustive alignment presented in Section 3 to the system of argument coding of Yakima Sahaptin trivalent verbs. Section 4.1 provides a brief introduction to argument coding with Yakima Sahaptin monovalent verbs. The exhaustive analysis of P/T/G alignment in Yakima Sahaptin is presented in Section 4.2.

4.1 Brief introduction to Yakima Sahaptin argument coding system with bivalent verbs

Yakima Sahaptin (a dialect of the Sahaptin/Ichishkíin language) is spoken in the plateau region of the Pacific Northwest of the United States. The analysis presented in this section is based on data from Jansen (2010, 2012) and additional fieldwork. These data are from recorded and analyzed texts collected by Jansen and from consultation with two native speakers. The language is severely endangered; there are only a handful of fluent elders who speak Sahaptin as their first language, all of whom also speak English.

The encoding of A and P with most bivalent verbs in Yakima Sahaptin (we will refer to them as *bivalent verb class I*; see below for other bivalent verbs) can be effectively described in terms of scenarios: combinations of specific referential types of A and P. An important conditioning factor is person, but humanness/animacy and topicality also play major roles. Plurality of A is also a factor but we restrict the discussion to clauses with a singular A for the purposes of this paper.

Yakima Sahaptin bivalent verbs of class I display person indexing, an inverse marker *pá-*, and flagging (case marking). The inverse marker (a verbal prefix) is used in [2sg>1sg] scenarios and in scenarios where a less topical 3rd person singular (obviative) acts on a more topical one (proximate); the latter scenario is illustrated in (15) below. Perhaps unexpectedly, the inverse marker is not used in scenarios where a 3rd person acts on a SAP.[20]

(15) *ku* *kwnak* *wítx̱upt-in* ***pá***-*wínp-a*
and there blizzard-3>3.erg[21] inv-take-pst
'and there the bitter blizzard caught them.'
(Jansen 2012: 41)

When a 1st or a 2nd person singular A acts on a 3rd person P, a second-position pronominal enclitic indexes A (= *(n)ash* for 1st person; = *(n)am* for 2nd person) and the verbal prefix *á(w)-* indexes P, as (16).

(16) *ku* = ***nash*** *á-ḵ'ínu-ta*
and = 1sg 3o-see-fut
'and I will see him/her'
(Jansen 2012: 39)

When P is a full NP or an independent pronoun it is differentially flagged: human Ps are always marked with one of the "object markers" *-nan* (singular), *-inan* (dual) or *-maman* (plural).[22] Animate (non-human) and inanimate Ps are obligatorily flagged only in inverse scenarios of the type [3 obviative>3proximate]. When a 3rd person singular A acts on a SAP P, as in (17), the latter is indexed by the same enclitics as the A in a [SAP>3] scenario. Moreover, A is indexed by the prefix *i-* '3sg.sbj' and, if it is a full NP, it is flagged by the case marker *-nɨm* '3>sap.erg'.

20 Cf. DeLancey (1981: 641), who states that a direct-inverse opposition involves particularly (if not exclusively) mixed scenarios. Due to space limitations, we do not give examples of all scenarios and corresponding argument marking patterns. For more examples, see Jansen (2010) and (2012).
21 The scenario (3>3) is part of the glossing of the case marker to indicate that the form of the case-marking of A is scenario-dependent: while it is *-in* in local scenarios, in mixed scenarios (with a SAP P), it is *-nɨm*, cf. Example (17) and Table 7.
22 As is seen in the examples in this section, in Yakima Sahaptin grammatical relations are richly indicated morphologically. We use the language-specific label "object marker" as these markers consistently indicate the P argument of monotransitive (as opposed to other bivalent) verbs.

(17) *íkush* = *nash* *i-shapá-ttáwax̱-ɨn-x̱a-na* *X̱ax̱ísh-nɨm*
thus = 1SG 3SG.SBJ-CAUS-grow-HAB-PST *X̱ax̱ísh*-3>SAP.ERG
'In that way, X̱ax̱ísh raised me.'
(Jansen 2012: 40)

When a 1st person singular A acts on a 2nd person singular P, a portmanteau enclitic = *mash* is used, which indicates this particular [1>2] scenario only. In the reverse situation, with a 2nd person singular acting on a 1st person singular, the 2nd person enclitic = *nam* indexes A and the inverse marker *pá-* appears. P is not indexed; if it is expressed as an independent pronoun it has "object" flagging.

Finally, when two 3rd singular persons act on each other, one will be the more topical, proximate argument and the other the less topical, obviative argument.[23] When A is proximate and P obviative, A is indexed with the verbal prefix *i-* (and remains unflagged); P is not indexed but does receive differential flagging. In the inverse scenario, with obviative A and proximate P, the inverse marker *pá-* appears, but neither A nor P is otherwise indexed. If they are full NPs, both A and P are obligatorily flagged: *-(y)in* for A and "object" marking for P. Table 7 reviews the argument coding of Yakima Sahaptin bivalent verbs from class I with singular A and P.

Table 7: Summary of argument coding of Yakima Sahaptin clauses with verbs from bivalent class I with singular A.

Scenario	A	P	pronominal enclitic	verb prefix	A case marking†	P case marking†
Local	A_1	P_2	= *mash* '1>2'	–	ABS PN	OBJ PN
	A_2	P_1	= *nam* '2SG'	*pá-* 'INV'	ABS PN	OBJ PN
Mixed	A_{SAP}	P_3	= *nash* '1SG' = *nam* '2SG'	*á-* '3O'	ABS PN	(-*nan* 'OBJ')
	A_3	P_{SAP}	= *nash* '1SG' = *nam* '2SG'	*i-* '3SG.SBJ'	-*nɨm* '3>SAP.ERG'	OBJ PN
Non-local	A_{3PRX}	A_{3OBV}	–	*i-* '3SG.SBJ'	-Ø	(-*nan* 'OBJ')
	A_{3OBV}	A_{3PRX}	–	*pá-* 'INV'	-*in*'3>3.ERG'	-*nan* 'OBJ'

†Recall that A and P may not be overt, so case marking may not appear in the clause. These columns indicate what form A and P would take if overt. Parentheses indicate optionality; *-nan* 'OBJ' is not obligatory in all scenarios.

23 As Jansen describes (2012: 41), "a number of factors lead to Yakima Sahaptin speakers' use of direct versus inverse. These fall under broad areas of topicality, topic switching, empathy, and animacy." The exact nature and workings of these factors are beyond the scope of this paper.

In addition to bivalent class I, there are several two-participant verbs in Sahaptin in which P does not trigger indexing or inverse marking, nor does it receive (differential) "object" marking. Instead, P is flagged by the "dative marker" *-yaw* when it is non-human, as in (18a) below or a combination of genitive and dative *-mí-yaw* when it is human, as in (18b).[24] We will refer to verbs like the one in (18) as bivalent class II.

(18) a. *pa-wisaláti-x̱a yáamash ku tł'álk-yaw*[25]
3PL.SBJ-hunt-HAB mule.deer and elk-DAT
'They hunt for mule deer and elk.'
(Jansen 2010: 181)
b. *i-wisaláti-x̱a twálx̱-ma-mí-yaw*
3SG.SBJ-hunt-HAB enemy-PL-GEN-DAT
'He hunts for the enemy.' (fn:VB)

With this we conclude our discussion of argument encoding with bivalent verbs in Yakima Sahaptin. When we discuss the language's three-argument constructions in Section 4.2, we will see that the interaction of referential and lexical effects lead to a great degree of alignment variation. The complexity of the Yakima Sahaptin system makes it a good case study of how well the exhaustive alignment method can capture such variation.

4.2 An exhaustive analysis of P/T/G alignment in Yakima Sahaptin

4.2.1 Analysis of trivalent verb class 1 ('give')

Yakima Sahaptin trivalent class 1 comprises verbs that follow the pattern of *ní-* 'give'. Apart from person, humanness is a relevant referential factor for argument coding with this verb class: When T is non-human, G will be treated like the P of a verb from bivalent class I (in terms of both indexing and flagging),

24 We have used the label "dative" for this specific case marker following the conventions for the language (see Rigsby and Rude 1996; Jansen 2010) and as this marker indicates the recipient/goal in prototypical ditransitive constructions. As seen in examples here and in Jansen 2010, this case marker covers a broad range of meanings extended from its most basic of *motion to or into* (See Rude 2009, who labels this 'allative' in relation to its role as an oblique case marker).

25 Note that it would also be grammatical for both to be marked: *yáamash-yaw ku tł'álk-yaw* 'mule.deer-DAT and elk-DAT'.

while T remains unmarked for indexing and flagging. This is shown in (19): the P in (19a) and the human G in (19b) are encoded identically.

(19) a. *pá-látk'i-sha-na* *Spilyáy-in* *Twit'áaya-nan*
INV-look.at-IPFV-PST Coyote-3>3ERG Grizzly.Bear-OBJ
'Coyote was looking at Grizzly Bear.' (tx:VB)

b. *Ku* *pá-ní-ya* *ts'wáywit* *Kít-nan*
and INV-give-PST right Kit-OBJ
'And he gave the rights to Kit.' (tx:VB)

When T is human, there are several possibilities: a 3rd person human T can be marked like a P of class I, namely when this T is more topical than its co-argument G, which can be either a 3rd person (human) or a SAP. If T is treated like P of class I, as in (20) below, G remains un-indexed and receives GENITIVE-DATIVE flagging, like P of bivalent class II (see Example [18b] above).

(20) *i-'isíkw'a-na* *ɨwínsh-nan* *áyat-mí-yaw*
3SG.SBJ-show-PST man-OBJ woman-GEN-DAT
'I showed the man to the woman.' (fn:VB)

If, however, G is more topical than its 3rd person human T co-argument, G will instead be coded as P of class I, leaving T unmarked for indexing and flagging, as in (21).

(21) *áw-isíkw'a-na = nash* *ɨwínsh* *áyat-nan*
3O-show-PST = 1SG man woman-OBJ
'I showed the woman the man.' (fn:VB)

When T is a SAP it is always coded like P of bivalent class I, independently of the properties of its G co-argument, as in (22).

(22) *áyat-mí-yaw = nam* *i-ní-ya*
woman-GEN-DAT = 2SG 3SG.SBJ-give-PST
'S/he gave you to the woman.' (fn:VB)

The referential properties of the non-agent argument (T or G) that is treated like P of class I co-determine the use of the inverse marker, following the rules described in Section 4.1 for Yakima Sahaptin two-argument constructions.

Tables 8–10 show the alignment patterns of the indexing and flagging of T and G arguments of trivalent verbs from class 1, compared with the P arguments of verbs from bivalent class I and bivalent class II. These tables, and all further tables in the remainder of the paper, can be found in the appendices. Note that in each row of a table, the P, T, and G arguments have the same person value, and their co-argument(s) also share the relevant referential properties amongst each other. We represent the alignment of 1st, 2nd, and 3rd person P, T, and G arguments in three separate tables: Tables 8, 9, and 10, respectively.

Before turning to the discussion of the actual data, two further remarks about the make-up of the tables are in order. To make these remarks more easily accessible, we provide Table 8′ – an excerpt of Table 8 in the appendix below:

Table 8′: P/T/G alignment of indexing of 1st person P/T/G in Yakima Sahaptin, with trivalent verb class 1 (‘give’) and bivalent verb class I.

Comparative triads			**Alignment**
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] = *nash*	T_1 [with A_3 and G_2] = *nash*	G_1 [with A_3 and T_2] no index	indirective
P_1 [with A_3] = *nash*	T_1 [with A_3 and $G_{3non\text{-}hum}$]*	G_1 [with A_3 and $T_{3non\text{-}hum}$] = *nash*	?

First, the information given below the scenario-specification in the first three columns of each table represents the specific encoding of the relevant P/T/G, i. e., the argument *outside* of the square brackets. (Note that the coding of the co-arguments, which are *inside* the brackets, is *not* represented, as it is not relevant for the determination of the alignment pattern). Second, certain scenarios are ‘impossible’, because they involve arguments with referential values that are not compatible with the semantics of the verbs in a particular trivalent class (e. g., non-human G is impossible with verbs of class 1). These scenarios are indicated with asterisks. Comparative triads involving one or two impossible scenarios cannot be used to make alignment statements and this is reflected by the question marks in the rightmost columns of the tables. Finally, the alignment statements in the final column of each table are based on the comparison of P, T, and G arguments of the specified person value and under the specified co-argument conditions (see Section 2 above for alignment terminology). Thus, “indirective” alignment means that, under equal co-argument conditions, a T argument of a particular person value (1st person in Table 8′ above) is treated like a P with the same person-value, while a G argument with this person-value is not. "Neutral" alignment means that T and G are both treated like P.[26] Similarly, "horizontal" alignment means that T and G are coded identically, but differently from P.

In what follows we will discuss the specifics of the data, starting with alignment of indexing and then continuing with flagging.

4.2.1.1 Indexing

Table 8 (in the appendix) provides the alignment data for indexing of 1st person P/T/G arguments of verbs from trivalent verb class 1 ('give') and bivalent verb class I. These data can be described as follows: for 1st person P/T/G arguments there are 7 logically possible comparative triads with equal co-argument conditions, of which 2 must be excluded because they involve a non-human G. Of the 5 triads that are left, 2 give indirective alignment (40 %) and 3 neutral alignment (60 %).[27]

Table 9 (appendix) represents comparable data, now for alignment of indexing of 2nd person P/T/G arguments. The results are similar to those for 1st person arguments, except that one comparative triad that yields neutral alignment with 1st persons (because the asymmetry between T and G is "invisible" in the indexing system) is indirective with 2nd persons, since a 2nd person P (and P-treated T/G) with an A_1 co-argument is indexed by the portmanteau form =*mash*, which indicates a [1>2] scenario. Thus, the results for 2nd persons are as follows: Again, there are 7 logically possible comparative triads with equal co-argument conditions, of which 2 are 'impossible' because they involve a non-human G. Of the 5 triads that are left, 3 are indirective (60 %) and 2 are neutral (40 %).

Finally, alignment of 3rd person P/T/G is represented in Table 10 (appendix). For 3rd persons we get the following outcome: There are 27 logically possible comparative triads with equal co-argument conditions, of which 13 are 'impossible' because they involve a non-human G. Of the 14 triads that are

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26 Note, however, that in some cases neutral alignment reflects a situation where T and G are both unmarked for indexation, but where it may be argued that there is a difference in the cause of un-markedness: in one case it is due to alignment with P of monotransitive class I (which happens to be un-indexed in a particular scenario), while in the other case it is due to complete denial of access to the possibility of indexation, i. e., to *non*-alignment with P. Consider for instance row 5 of Table 10 (appendix): the T argument in the second column is zero-indexed, in alignment with P in the first column. In contrast, in the scenario in the third column, the $G_{3hum.top}$ argument remains zero-marked because it does not align with P (rather, the T_1 aligns with the P_1 in this scenario and is as such indexed).

27 Of course, it is also possible to calculate the alignment proportions on the basis of the total number of triads (N = 7 for 1st and 2nd persons, N = 27 for 3rd persons; see further below) instead of on the basis of only the possible triads (N = 5 for 1st and 2nd persons, N = 14 for 3rd persons; see further below). This does not significantly change the results in terms of relative proportions of alignment patterns.

left, 2 show indirective alignment (14 %), 8 neutral (57 %), and 4 (29 %) horizontal.

We may now compare the results in Tables 8, 9, 10 with those in Tables 11, 12, 13 (appendix). Tables 11, 12, 13 also show alignment of indexing of 1st, 2nd, and 3rd person P/T/G arguments, but consider the P of bivalent verb class II (and the T and G of trivalent class 1). As Tables 11, 12, 13 make clear, Ps of bivalent verbs from class II are never indexed. (The coding of T and G remains the same as in Tables 8, 9, 10, as we are still looking at trivalent class 1.) This yields a distinct set of alignment statements, which we again represent separately for 1st person arguments (Table 11), 2nd person arguments (Table 12) and 3rd person arguments (Table 13).

In Table 11 we see the following patterns: for 1st person P/T/G there are 2 triads yielding secundative alignment (40 %), 2 neutral (40 %) and 1 horizontal (20 %). The 1st person T is never marked identically to the 1st person P; a 1st person G aligns with P in those scenarios where G has a SAP or human and topical T co-argument. For 2nd persons (Table 12), we find 3 triads with secundative alignment (60 %) and 2 with horizontal alignment (40 %). The difference with 1st persons is due to the fact that 2nd person T/G is always indexed, yielding a horizontal pattern when compared with the 2nd person P, which is not indexed with bivalent class II (since P is never indexed at all). Table 13 shows the attested alignment patterns for 3rd person arguments; we see that for 3rd persons there are 2 instances of secundative alignment (14.5 %), 10 of neutral alignment (71 %) and 2 (14,5 %) of horizontal alignment.

Together, the data represented in Tables 8, 9, 10 and Tables 11, 12, 13 can be interpreted as follows: There is a general prominence of referentially ‘high’ Ts with trivalent verb class 1 in terms of their access to indexing: SAP Ts and human, topical 3rd person Ts are indexed even in the presence of a SAP G co-argument. This ‘advantage’ of high Ts disappears when both T and G are 3rd person humans; whichever of the two is the most topical will be treated like P for the purposes of indexing. This is reflected by the fact that in the majority of the cases with 3rd person P/T/G arguments the T and G are treated identically: either they are both indexed in their respective scenarios (yielding neutral alignment with bivalent class I and horizontal alignment with class II) or neither of them is indexed (resulting in horizontal alignment with bivalent class I and neutral with class II). The remaining proportions of alignment statements (14 % indirective with bivalent class I and 14 % secundative with class II) obtain in scenarios with (i) a SAP T argument or (ii) a SAP G occurring as a co-argument of a human, topical 3rd person T. These results reflect the primacy of ‘high’ Ts of trivalent verbs of class 1 in the competition with G for indexing and the general primacy of 2nd persons in the overall indexing system.

4.2.1.2 Flagging

We now turn to alignment patterns established by Yakima Sahaptin flagging, for trivalent verb class 1 and bivalent verb classes I and II. The relevant tables (Tables 14, 15, 16 and Tables 17, 18, 19) involve the same comparative triads as the indexing Tables 8–13 above.[28] As for the indexing data, we provide separate tables for 1st, 2nd, and 3rd person arguments.

Table 14 represents alignment of flagging of 1st person P/T/G arguments of trivalent class 1 and bivalent class II. We see that, out of 5 possible triads, there are 3 (60 %) that yield indirective, and 2 (40 %) that yield neutral alignment. Table 15 shows that the alignment patterns for 2nd person arguments are the same. With 3rd persons, represented in Table 16, 4 out of 13 possible triads (31 %) display indirective alignment, 2 (15 %) are neutral, and 7 (54 %) are tripartite. Note that tripartite alignment involves a situation in which neither T nor G is treated like P in their respective scenarios, but with distinct formal consequences for T and G arguments: while T arguments remain unflagged (or completely unexpressed if pronominal) when they do not align with P, G arguments under the same condition are flagged GENITIVE-DATIVE.

As was the case with indexing, we see that in the majority of scenarios in which 3rd person T and G arguments may occur, the two non-agents are treated alike: both or neither behave like the P of bivalent class I (resulting in neutral alignment or tripartite alignment with P of bivalent class I). The remaining portion of indirective alignment (19 %) is due to the primacy of referentially high T (co-)arguments. For the same reason, we find higher percentages (60 %) of indirective alignment for 1st and 2nd person arguments.

Next, we consider alignment of flagging between P/T/G arguments of verbs from trivalent class 1 and bivalent class II. Similar to what we saw in Tables 14 and 15 above, the results for 1st and 2nd person arguments are identical, as shown in Tables 17 and 18: For both 1st and 2nd persons we get 3 instances (60 %) of secundative alignment and 2 instances (40 %) of horizontal alignment. Finally, Table 19 shows that for 3rd persons as well we see a large proportion of secundative alignment: 11 out of 13 possible triads (85 %), and a small proportion (2 instances, 15 %) of horizontal alignment.

28 Note further that Tables 9 and 10 represent a simplification to the extent that they do not take into account the different forms of object marking – conditioned by number – in Yakima Sahaptin (see Section 4.1): we compare P/T/G with the same number value and use "OBJ" as a general means to indicate any member of the set of object markers. Pronominal arguments may remain unexpressed as free forms; the data in Table 9 and 10 refer to the way pronominal arguments are marked whenever they *are* overt.

4.2.2 Other trivalent verb classes

We will now discuss argument encoding and alignment in constructions involving verbs from trivalent verb classes other than the 'give'-class (class 1) in Yakima Sahaptin. For reasons of space, we do not present the data in full detail, but only provide tables for 1st person P/T/G arguments, in order to show how the other trivalent verb classes can be integrated into an exhaustive alignment analysis.

4.2.2.1 Trivalent verb class 2: 'put'

This class comprises verbs with caused-motion meanings like 'put', 'place', 'throw', and 'attach to'. Typically, in Sahaptin these are bipartite stem verbs indicating the means and motion or direction of caused travel of T, as seen in (23): *tamaníi* 'throw in water' is comprised of *tama* 'throw, with throwing motion' and *nii* 'into water'.

(23)	*uyt*	*ɨpáx̱pax*	*áyat*	*i-tamaníi-x̱a*	*chíish-yaw*
	first	hide	woman	3SG.SBJ-throw.in.water-HAB	water-DAT
	'First the woman puts the hide in water.' (tx:VB)				

This verb class differs from trivalent verb class 1 in two important ways: (i) There is no alternation based on the (relative) referential properties of T and G; (ii) non-human Gs are possible; in fact, verbs of class 2 typically (but not obligatorily) occur with inanimate G (and T). Since trivalent verb class 2 displays no construction alternation, non-humanness of T and G is irrelevant in this respect, as is the relative topicality of 3rd person human T and G. These two referential factors can thus be left out of the analysis of indexing. However, the factor of humanness does remain relevant for the flagging of T when it is treated like P of bivalent class I, as well as for differential flagging of P of bivalent class II and of G whenever the latter does not align with P: non-humans take DATIVE, while humans take GENITIVE-DATIVE.

Tables 20 and 21 (in the appendix) show the alignment patterns for indexing of 1st person T/G arguments of trivalent verbs from class 2 with 1st person Ps of bivalent class I and II, respectively. Tables 22 and 23 do the same for alignment of flagging.

Additional trivalent verbs follow the indexing pattern of trivalent class 2 (as shown in Tables 20 and 21), and we include a brief discussion here for the sake of completeness. They have no alternation based on the referential properties of T and G. These verbs, again typically with inanimate non-A arguments, involve a physical transfer from or to a location or the use of an instrument. If overt in the clause, these are flagged, as in (24):

(24) *twak'aatkáwaas-ki i-twák'aatk-x̱a ɨpáx̱*
scraper-INST 3SG.SBJ-shave.away hide
'She scrapes the hide with a scraper.' (Jansen 2010, 183)

The factor of humanness again is relevant for the flagging of T; it is treated like P of bivalent class I. In addition, there is differential flagging as there is for P of bivalent class II (although the specific marker is different): humans take a genitive marker as well as the relevant case marker, as seen in (25):

(25) *pa-shapá-nák-tux̱-ɨnm-a sápsikw'at tamanwiłá-nmí-knik*
3PL.SBJ-CAUS-carry-return-CSL-PST teaching creator-GEN-ABL
'They sent back teachings from the Creator.' (Jansen 2010, 196)

4.2.2.2 Trivalent verb class 3: 'say'

This class comprises verbs of speaking, telling, asking and requesting, including verbs such as *ɨn* 'tell' and *atł'áwi* 'request, ask for'. G is normally treated like the P of bivalent class I (irrespective of the properties of co-arguments), while T is unmarked. Note however, that T can be optionally flagged with DATIVE case, like the non-human P of a verb of bivalent class II. This is seen in (26), in which *sápsikw'at* 'teaching' is marked by *-yaw* in (26a), but not in (26b).

(26) a. *áw-atł'áwi-ya nch'ínch'i-maman piimyúuk sápsikw'at-yaw*
3O-ask.for-PST elder-PL.OBJ 3PL.PN.GEN.DAT teaching-DAT
'I asked the elders for their teachings.' (tx:VB)
b. *áw-atł'áwi-ta = nam sápsikw'at nch'ínch'i-maman ttáwax̱t-maman*
3O-ask.for-FUT = 2SG teaching elder-PL.OBJ family-PL.OBJ
'you will ask the family elders for teachings.'[29] (tx:VB)

It is not at this point clear in text examples or through elicitation what conditions prompt the use of *-yaw*.

Furthermore, trivalent class 3 is very rigid in terms of the referential types of T/G arguments it allows: T is necessarily inanimate, while G must be human. Therefore, unlike the situation with trivalent class 1 and 3, with class 3 it is not

29 These examples from texts also differ in that the first includes *piimyúuk*, a possessive pronoun that agrees in case with the noun it modifies. Pronouns are used for clarification or emphasis; the use of the pronoun has no effect on the presence of the case marker. In this case, in the first text, the speaker was emphasizing that it was important that she knew the teachings of those particular elders. *Sápsikw'at*, the nominalized form of *sápsikw'a* 'teach', has a variety of meanings, such as 'teachings, lessons, class'.

possible to keep co-argument conditions constant. This is clear from Table 24, which represents the alignment of indexing for 1st person P/T/G arguments of trivalent verb class 3 and bivalent verb class I. Of course, one could simply describe the alignment of indexing patterns of trivalent class 3 and bivalent class I as "secundative" (and as "indirective" if one instead takes P of bivalent class II as the standard of comparison), without further specification of the argument properties. However, this raises issues of comparability with the other trivalent verb classes, which we will discuss in detail in Section 4.3.3, after completing our overview of the alignment data.

4.2.2.3 Trivalent verb class 4: Derived applicative

Yakima Sahaptin has three distinct applicative derivational suffixes we will address here: *-ani* (adds a benefactor/possessor), *-uu* (adds a goal), and *-twii* (adds an associative participant).[30] The three applicatives behave alike in terms of argument marking and are therefore discussed as a single class. Derived applicative trivalent verbs do not display construction alternation; the applied object (G) is always treated like the P of a bivalent verb from class I in terms of indexing and flagging, while the T (corresponding to the P of the underived construction) always remains unmarked. The applied participant is necessarily animate and almost always human. In (27), bivalent *sháx̱tł'k-* 'cut' is seen with applicative *-ani*, which adds a human benefactor.

(27) *á-sháx̱tł'k-ani-sha = ash ílkwaas áyat-nan*
3O-cut-APPL-IPFV = 1SG wood woman-OBJ
'I'm cutting wood for the woman.' (fn:VB)

Table 25 gives the alignment of indexing for 1st person P/T/G arguments of trivalent class 4 and bivalent class I; Table 26 does the same but with bivalent class II. Similarly, Tables 27 and 28 represent alignment of flagging for 1st person P/T/G arguments of trivalent class 4 compared with bivalent class I and II, respectively.

4.2.2.4 Trivalent verb class 5: Derived causative

Verbs derived with the causative marker *shapá-* comprise trivalent class 5. The causative codes successful manipulation and can indicate a range of action from stronger 'make' or 'force' to less forceful 'have' or 'let'. In (28) the causative is added to the bivalent verb *ímałak* 'clean':

30 See Jansen (2010) for discussion of several additional semi-productive applicatives that are also synchronically directionals.

(28) *awkú = nash* *á-shapá-ímałak-a* *áyat-nan* *ɨníit*
then = 1SG 3O-CAUS-clean-PST woman-OBJ house
'I had the woman clean the house.' (Jansen 2010:358)

Causative constructions match constructions with verbs from trivalent class 1 in that G (the causee)[31] is necessarily human, while T (corresponding to P of the underived clause) can be either human or non-human/inanimate. As with trivalent verb class 1, when T is non-human and G is human, the latter is treated like the P of a bivalent verb from class I, while the former remains unmarked.

In contrast to trivalent class 1 however, when T and G are both 3rd person human, there are three argument coding options with causative trivalent verbs:[32]

(i) the relatively more topical G is treated like the P of a verb from bivalent class I, while the relatively less topical T is not;
(ii) the relatively more topical T is treated like the P of a verb from bivalent class I, while the relatively less topical G is not;
(iii) T and G are both equally topical and therefore both treated like the P of a verb from bivalent class I, at least as far as flagging is concerned.[33] The result is a so-called *double object construction* (or *DOC*, for short).

Furthermore, when T is SAP and G is 3rd person human, there are two options:

(i) T is more topical and treated like the P of a verb from bivalent class I (i. e., indexed by a pronominal enclitic) while the less topical G remains unindexed and receives GENITIVE-DATIVE marking, identical to the (human) P of a verb from bivalent class II;
(ii) T and G are both equally topical and therefore both treated like the P of a verb from bivalent class I – again, as far as flagging is concerned – resulting in a DOC.[34]

31 Derived causative constructions are not covered in the "Bickelian" approach to semantic argument roles we adopted as a basis here (cf. Section 3.1 and Bickel 2010; Witzlack-Makarevich 2011; Bickel et al. 2014, as well as Haspelmath 2011 for a comparison to other approaches). To distinguish the argument roles in causative constructions we expand Primus' (1999, 2006) original proposal (which inspired "Bickelian" approach) to regard G (Primus's Proto-Recipient) as an argument role combining A and P properties (Primus' Proto-Agent and Proto-Patient): G is thus similar to A by being able to *control* the situation denoted by the base verb of a causative construction, e. g., by 'clean' in (26).

32 For examples illustrating these scenarios we refer to Jansen (2010: Section 3.5) and Rude 1997.

33 The situation with respect to indexation is unclear: the relevant example, where T and G are both 3rd person human, does have the prefix *á-* for 3rd person P (with a 1st person A co-argument), but the prefix could index either T or G.

34 It seems that G is treated like P of monovalent class I for indexing, as T is not expressed by the enclitic. This is not certain, however, since the relevant example involves a scenario with a 3rd person A in which the 3rd person P is not indexed anyway.

When T and G are both SAP's, T is marked like the P of a verb from bivalent class I (indexed by a pronominal enclitic) and G is not indexed and flagged GENITIVE-DATIVE. This pattern matches trivalent verb class 1.

Finally, when T is 3rd person human and G is SAP, again they share the status of a P of a verb from bivalent class I, although here the options for flagging and indexing are fixed: T is flagged with an "object" marker but remains unindexed, while G may be indexed (like P), but is flagged GENITIVE-DATIVE if expressed as an independent pronoun.

Thus, unlike what happens with trivalent verb class 1, SAP Ts in causative constructions are not 'automatically' (i. e., independently of the referential properties of G) treated like the P of a verb from bivalent class I. Rather, in a causative construction a SAP T can share this status with a 3rd person human G. The same may also happen when T is 3rd person and human. This suggests that the degree to which referentially 'high' Ts are considered salient is partly dependent on the lexical verb: arguably, a causative construction occurs more 'easily' with human T and G than a verb of the 'give' class' (cf. Siewierska and van Lier 2013).

The indexing and flagging alignment for 1st person P/T/G arguments of trivalent verb class 5 and bivalent verb classes I and II are represented in Tables 29, 30, 31, and 32.

4.2.3 General discussion

The analysis presented in Sections 4.3.1 and 4.3.2 shows that it is possible to compare how T/G arguments of various trivalent verb classes align, in some specific scenario, with the P of a specific bivalent verb class. For example, one may consider alignment of indexing in the following scenario: [A_1 T_3 G_2], taking P of bivalent class I as the standard of comparison. With a verb from trivalent class 1 ('give'), indexing depends on the humanness and topicality of the T_3 argument: when T_3 is non-human or human but non-topical, G_2 will be indexed in the same way as P_2 (of bivalent class 1). However, when T_3 is human and highly topical, it can "overtake" indexing from its G co-argument. In contrast, with a verb from trivalent class 2 ('put') or 3 ('say') there are no such alternations: with trivalent class 2 the T_3 will be treated like the P of monovalent class I, no matter what its referential properties and those of its co-argument are; with trivalent class 3 the T_3 is necessarily inanimate and never has the status of a monovalent class I P argument. Also in derived constructions (both applicative, i. e., class 4, and causative, i. e., class 5) the T_3 never has this status for indexing, regardless of referential properties.

In some cases, however, it proved difficult to compare alignment patterns across verb classes, because co-argument conditioned alignment is relevant only for some verbs. Specifically, trivalent verbs from class 1 ('give') in Yakima Sahaptin allow various distinct referential types of T and G arguments. Moreover, the relative referential properties of these arguments condition a construction alternation (and hence differences in alignment patterns). Verbs of class 2 ('put') also show flexibility in terms of their referential argument properties, but – unlike verbs from class 1 – these properties do not condition any construction alternations. Verbs of class 3 ('say') are again different in that they are much more rigid in the referential types of T and G arguments that they can occur with.

A direct consequence of these lexical differences is that an alignment statement like "secundative" is charged quite differently depending on the verb class of the relevant verb: for a verb of class 1 such a statement is subject to strict referential conditions; for a verb of class 2, while it is also subject to referential specifications, these are not relevant in that they do not trigger any alternation; and for a verb of class 3 the alignment cannot be referentially conditioned as there is no possibility to vary referential properties in the first place. Hence, especially comparisons between verbs like those from Yakima Sahaptin class 1 (with variation in referential properties) and those from class 3 (without such variation) are problematic: while one can say that verbs from class 3 show invariable secundative alignment (at least when T and G are compared to the P of bivalent class 1), this obscures the fact that any possible source of variation in this alignment pattern (of the kind found with verb of class 1: referential properties) is a priori, for lexico-semantic reasons, ruled out. In other words: while we can say that 'say' verbs are fully secundatively aligned, while 'give' verbs are only partially so, the possible space of variation is unequal for the two verb types, so that this comparison is in a sense 'unfair'.

This means that, while the exhaustive alignment approach is capable of describing referentially conditioned and lexically conditioned alignment variation when each is considered in isolation, the method does not straightforwardly allow for a combination of the two types of variation into a single analysis. Importantly, the main reason for this problem is at least partly specific to the analysis of three-argument constructions: many (but not all) trivalent verbs have relatively strong restrictions on the referential properties of their (non-agent) argument(s).

5 Conclusion

The data presented in this paper show a wide range of variation in the alignment patterns of three-argument constructions, conditioned by interacting referential and lexical factors. We investigated to what extent this variation, which has remained largely unexplored in typological work to date, can be assessed in an integrated fashion applying the exhaustive alignment methodology, which proportionally associates basic alignment patterns with specific referential argument types or with specific lexical verb classes.

Our case study of Yakima Sahaptin illustrates how exhaustive alignment can be applied to three-argument constructions in a language where referential and lexical effects on argument marking are pervasive. More generally, it shows that the exhaustive alignment methodology, which takes into account the full range of referentially and lexically conditioned alignment variation, is relevant for the area of three-argument constructions.

Regarding referential factors, co-argument conditioned variation is often at work in three-argument constructions: Unlike intransitive S (the standard of comparison for S/A/P alignment), P (the standard of comparison for P/T/G alignment) always has a co-argument A. Moreover, trivalent verbs have two non-agentive arguments, which are potentially in competition for a particular (P) argument status.

With respect to lexical factors, exhaustive alignment as applied across different verb classes is also clearly relevant for trivalent verbs: establishing a prototypical verb class is often less feasible for trivalent than for bivalent verbs, as the former seem to display a relatively high degree of lexically conditioned variation in argument coding. To a certain extent, such lexical conditions on alignment can be considered as 'frozen' versions of referential conditions. For instance, trivalent verb class 3 ('say') in Yakima Sahaptin allows only the pattern which is attested with trivalent verb class 1 ('give') when the latter occurs with an inanimate T and a human G. Crucially, this combination of referential types of arguments is the only option for trivalent verb class 3. Possibly, this kind of lexicalization or fossilization of referential factors is more pervasive with trivalent than with bivalent verbs, in the sense that the former are more severely restricted in terms of the possible referential properties of their arguments. Such restrictions could be absolute (e. g., 'non-human Gs are not allowed'), but also relative (e. g., 'human Ts are less frequent compared to inanimate Ts'), in which case their detection requires corpus-based investigation and might be impossible with small-scale corpuses of endangered understudied languages.

Directly related to this issue, this study identified a limitation of the exhaustive alignment method, which has come to the fore as a result of our attempt to assess referentially and lexically conditioned P/T/G alignment variation in a unified analysis. The problem concerns the comparability of alignment statements across multiple different trivalent verb classes. As explained in Section 4.2.3, with verbs that are restricted in terms of the referential properties of their arguments, the possibility for argument marking variation is lexically eliminated (or at least reduced). As a result of this, there is no equal basis on which to compare categorical alignment statements about the arguments of verbs with lexically predetermined argument properties with proportional alignment statements about the arguments of verbs with co-argument conditioned alignment.[35] This means that while co-argument conditioned argument marking (sub)systems can be analyzed and compared amongst each other in terms of basic alignment patterns, these systems still present a challenge when compared with (sub)systems in which argument marking is *not* subject to referential conditioning factors.

Finally, our study showed that individual verbs in individual languages may display various types and degrees of limitation in terms of the referential properties they allow their arguments to have. Such differences have typically been glossed over in alignment typology, and have not received much attention in lexical typology either. Therefore, suggesting a new direction for research, it would be interesting to compare the flexibility versus strictness of individual verbs across languages towards their referential argument types. Such an endeavor would offer an alternative way to integrate lexical and referential conditions on argument marking, from a typological perspective.

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35 It seems that keeping referentially conditioned and lexically conditioned variation of P/T/G separated has its merits anyway. For instance, it has been shown that flagging is more readily affected by lexical factors, while indexing is more susceptible to referential effects (van Lier et al. 2011).

References

Aikhenvald, Alexandra, R. M. W. Dixon & Masayuki Onishi (eds.). 2001. *Non-canonical marking of subjects and objects*. Amsterdam & Philadelphia: Benjamins.
Beck, David. 2006. Control of agreement in multi-object constructions in Upper Necaxa Totonac. In Atsushi Fujimoro & Maria Amalia Reis Silva (eds.), *Proceedings of the 11th workshop on structure and constituency in the languages of the Americas*, 1–11. Vancouver: UBC Working papers in Linguistics.
Bickel, Balthasar. 1995. In the vestibule of meaning: Transitivity inversion as a morphological phenomenon. *Studies in Language* 19. 73–127.
Bickel, Balthasar. 2007. Typology in the 21st century: Major current developments. *Linguistic Typology* 11. 239–251.
Bickel, Balthasar. 2010. Grammatical relations typology. In Jae Jung Song (ed.), *The Oxford handbook of language typology*, 399–444. Oxford: Oxford University Press.
Bickel, Balthasar, Alena Witzlack-Makarevich & Taras Zakharko. 2010. Case alignment across the lexicon. Paper presented at *Syntax of the World's Languages IV*, Lyon 23–26 September. http://www.comparativelinguistics.uzh.ch/dam/jcr:00000000-774a-e877-ffff-fffff509a176/SWLiv_Alignment_lexicon.pdf
Bickel, Balthasar, Taras Zakharko, Lennart Bierkandt & Alena Witzlack-Makarevich. 2014. Semantic role clustering: An empirical assessment of semantic role types in non-default case assignment. *Studies in Language* 38(3). 485–511.
Comrie, Bernard. 1978. Ergativity. In Winfred Philipp Lehmann (ed.), *Syntactic typology: Studies in the phenomenology of language*, 329–394. Austin, TX: University of Texas Press.
Comrie, Bernard. 1981. *Language universals and linguistic typology: Syntax and morphology*. Oxford: Blackwell.
Comrie, Bernard. 2013. Alignment of case marking of full noun phrases. In Matthew S. Dryer & Martin Haspelmath (eds.) *The world atlas of language structures online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. http://wals.info/chapter/98 (accessed 26 December 2015).
Comrie, Bernard & Albert Borg. 1984. Object diffuseness in Maltese. In Frans Plank (ed.), *Objects: Towards a theory of grammatical relations*, 109–126. New York: Academic Press.
Croft, William. 1990. *Typology and universals*. Cambridge: Cambridge University Press.
Croft, William. 2001. *Radical construction grammar: Syntactic theory in typological perspective*. Oxford: Oxford University Press.
DeLancey, Scott. 1981. An interpretation of split ergativity and related patterns. *Language* 57. 626–657.
Dixon, Robert M. W. 1979. Ergativity. *Language* 55. 59–138.
Dixon, Robert M. W. 1994. *Ergativity*. Cambridge: Cambridge University Press.
Dryer, Matthew. 1986. Primary objects, secondary objects, and antidative. *Language* 62. 808–845.
François, Alexandre. 2002. *Araki. A disappearing language of Vanuatu* (Pacific Linguistics 522). Canberra: Pacific Linguistics.
François, Alexandre. 2012. Ditransitive alignment and referential hierarchies in Araki. *Linguistic Discovery* 10(3). 97–124.
Jansen, Joana. 2010. *A grammar of Yakima Sahaptin*. Eugene, OR: University of Oregon dissertation.
Jansen, Joana. 2012. Ditransitive alignment in Yakima Sahaptin. *Linguistic Discovery* 10(3). 37–54.

Haspelmath, Martin. 2005a. Argument marking in ditransitive alignment types. *Linguistic Discovery* 3(1). 1–21.
Haspelmath, Martin. 2005b. Ditransitive constructions: The verb 'give'. In Martin Haspelmath, Matthew S. Dryer, David Gil & Bernard Comrie (eds.), *The world atlas of language structures*, 426–429. Oxford: Oxford University Press.
Haspelmath, Martin. 2007. Ditransitive alignment splits and inverse alignment. *Functions of Language* 14(1). 197–102.
Haspelmath, Martin. 2011. On S, A, P, T and R as comparative concepts for alignment typology. *Linguistic Typology* 15(3). 535–567.
Kittilä, Seppo. 2006. The woman showed the baby to her sister: On humanness-driven ambiguity in ditransitives. In Leonid Kulikov, Andrej Malchukov & Peter de Swart (eds.), *Case, valency and transitivity*, 291–308. Amsterdam & Philadelphia: John Benjamins.
Kittilä, Seppo. 2008. Animacy effects on differential Goal marking. *Linguistic Typology* 12(2). 245–268.
van Lier, Eva (ed.). 2012. Referential hierarchies in three-participant constructions [Special issue]. *Linguistic Discovery* 10(3).
van Lier, Eva, Alena Witzlack-Makarevich & Anna Siewierska 2011. Alignment typology in three-participant constructions. Paper presented at the 9th Biennial Conference of the Association for Linguistic Typology (ALT9). Hong Kong, 21–24 July 2011.
Macaulay, Monica. 2009. On prominence hierarchies: Evidence from Algonquian. *Linguistic Typology* 13(3). 357–389.
Malchukov, Andrej. 2008. Animacy and asymmetries in differential case marking. *Lingua* 118(2). 203–221.
Malchukov, Andrej. 2011. Exploring the domain of ditransitive constructions: Issues in lexical typology. Paper presented at the Workshop on Referential Hierarchies in Three-Participant Constructions, Lancaster University, 21 May 2011, Lancaster, UK.
Malchukov, Andrej, Martin Haspelmath & Bernard Comrie. 2010a. Ditransitive constructions: A typological overview. In Andrej Malchukov, Martin Haspelmath & Bernard Comrie (eds.), *Studies in ditransitive constructions: A comparative handbook*, 1–64. Berlin & New York: Mouton de Gruyter.
Malchukov, Andrej, Martin Haspelmath & Bernard Comrie (eds.). 2010b. *Studies in ditransitive constructions: A comparative handbook*. Berlin & New York: Mouton de Gruyter.
Mallinson, Graham & Barry Blake. 1981. *Language typology: Cross-linguistic studies in syntax*. Amsterdam: North-Holland.
Margetts, Anna & Peter Austin. 2007. Three-participant events in the languages of the world: Towards a crosslinguistic typology. *Linguistics* 45(3). 393–452.
Moravcsik, Edith. 1978. On the distribution of ergative and accusative patterns. *Lingua* 45(3/4). 233–279.
Nichols, Johanna. 1992. *Linguistic diversity in space and time*. Chicago, IL: University of Chicago Press.
Rigsby, Bruce & Noel Rude. 1996. Sketch of Sahaptin, a Sahaptian language. In Ives Goddard & William C. Sturtevant (eds.), *Handbook of North American Indians, vol. 17: languages*, 666–692. Washington, DC: Smithsonian Institution.
Rude, Noel. 1997. Dative shifting and double objects in Sahaptin. In Talmy Givón, (ed.), *Grammatical relations: A functionalist perspective*, 323–349. Amsterdam & Philadelphia: John Benjamins.
Rude, Noel. 2009. Transitivity in Northwest Sahaptin. *Journal of Northwest Linguistics* 3(3). 1–37.
Schackow, Diana. 2012. Referential hierarchy effects in Yakkha three-argument constructions: Ditransitive alignment and referential hierarchies in Araki. *Linguistic Discovery* 10(3). 148–193.

Siewierska, Anna. 2003. Person agreement and the determination of alignment. *Transactions of the Philological Society* 101(2). 339–370.
Siewierska, Anna. 2004. *Person*. Cambridge: Cambridge University Press.
Siewierska, Anna & Willem Hollmann (eds.). 2007. Ditransitive constructions [Special issue]. *Functions of Language* 14(1).
Siewierska, Anna & Eva van Lier. 2013. Introduce: Encoding a non-prototypical three-participant event across Europe. In Elly van Gelderen, Michaela Cennamo & Johanna Barðdal (eds.), *Argument structure in flux: The Naples/Capri papers*, 169–200. Amsterdam & Philadelphia: John Benjamins.
Van Valin, Robert D. 1981. Grammatical relations in ergative languages. *Studies in Language* 5(3). 361–394.
Witzlack-Makarevich, Alena. 2011. *Typological variation in grammatical relations*. Leipzig: University of Leipzig dissertation.
Zúñiga, Fernando. 2006. *Deixis and alignment: Inverse systems in indigenous languages of the Americas*. Amsterdam & Philadelphia: John Benjamins.
Zúñiga, Fernando. 2007. From the typology of inversion to the typology of alignment. In Matti Miestamo & Bernhard Wälchli (eds.) *New challenges in typology*, 199–220. Berlin & New York: Mouton de Gruyter.

Appendix: Tables summarizing Yakima Sahaptin alignment patterns with trivalent verbs

Table 8: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, with trivalent verb class 1 (‘give’) and bivalent verb class I.

Comparative triads			**Alignment**
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] *=nash*	T_1 [with A_3 and G_2] *=nash*	G_1 [with A_3 and T_2] no index	indirective
P_1 [with A_3] *=nash*	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] *=nash*	?
P_1 [with A_3] *=nash*	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] *=nash*	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] *=nash*	neutral
P_1 [with A_3] *=nash*	T_1 [with A_3 and $G_{3hum.top}$] *=nash*	G_1 [with A_3 and $T_{3hum.top}$] no index	indirective
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] no index	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] no index	neutral
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.top}$] no index	G_1 [with A_2 and $T_{3hum.top}$] no index	neutral

Table 9: Alignment of 2nd person P/T/G indexing in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_2 [with A_3] =*nam*	T_2 [with A_3 and G_1] =*nam*	G_2 [with A_3 and T_1] no index	indirective
P_2 [with A_3] =*nam*	T_2 [with A_3 and $G_{3non\text{-}hum}$] *	G_2 [with A_3 and $T_{3non\text{-}hum}$] =*nam*	?
P_2 [with A_3] =*nam*	T_2 [with A_3 and $G_{3hum.non\text{-}top}$] =*nam*	G_2 [with A_3 and $T_{3hum.non\text{-}top}$] =*nam*	neutral
P_2 [with A_3] =*nam*	T_2 [with A_3 and $G_{3hum.top}$] =*nam*	G_2 [with A_3 and $T_{3hum.top}$] no index	indirective
P_2 [with A_1] =*mash* (=1>2)	T_2 [with A_1 ad $G_{3non\text{-}hum}$] *	G_2 [with A_1 and $T_{3non\text{-}hum}$] =*mash* (=1>2)	?
P_2 [with A_1] =*mash* (=1>2)	T_2 [with A_1 and $G_{3hum.non\text{-}top}$] =*mash* (=1>2)	G_2 [with A_1 and $T_{3hum.non\text{-}top}$] =*mash* (=1>2)	neutral
P_2 [with A_1] =*mash* (=1>2)	T_2 [with A_1 and $G_{3hum.top}$] =*mash* (=1>2)	G_2 [with A_1 and $T_{3hum.top}$] no index	indirective

Table 10: Alignment of 3rd person P/T/G indexing in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3non\text{-}hum}$ [with A_2] *á-*	$T_{3non\text{-}hum}$ [with A_2 and G_1] no index	$G_{3hum.top}$ [with A_2 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_2] *á-*	$T_{3hum.non\text{-}top}$ [with A_2 and G_1] no index	$G_{3hum.non\text{-}top}$ [with A_2 and T_1] no index	horizontal
$P_{3hum.top}$ [with A_2] *á-*	$T_{3hum.top}$ [with A_2 and G_1] *á-*	$G_{3hum.top}$ [with A_2 and T_1] no index	indirective
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and G_1] no index	$G_{3non\text{-}hum}$ [with A_3 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_3] no index	$T_{3hum.non\text{-}top}$ [with A_3 and G_1] no index	$G_{3hum.non\text{-}top}$ [with A_3 and T_1] no index	neutral
$P_{3hum.top}$ [with A_3] no index	$T_{3hum.top}$ [with A_3 and G_1] no index	$G_{3hum.top}$ [with A_3 and T_1] no index	neutral
$P_{3non\text{-}hum}$ [with A_1] *á-*	$T_{3non\text{-}hum}$ [with A_1 and G_2] no index	$G_{3non\text{-}hum}$ [with A_1 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_1] *á-*	$T_{3hum.non\text{-}top}$ [with A_1 and G_2] no index	$G_{3hum.non\text{-}top}$ [with A_1 and T_2] no index	horizontal

(*continued*)

Table 10: (*continued*)

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3hum.top}$ [with A_1] *á-*	$T_{3hum.top}$ [with A_1 and G_2] *á-*	$G_{3hum.top}$ [with A_1 and T_2] no index	indirective
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and G_2] no index	$G_{3non\text{-}hum}$ [with A_3 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_3] no index	$T_{3hum.non\text{-}top}$ [with A_3 and G_2] no index	$G_{3hum.non\text{-}top}$ [with A_3 and T_2] no index	neutral
$P_{3hum.top}$ [with A_3] no index	$T_{3hum.top}$ [with A_3 and G_2] no index	$G_{3hum.top}$ [with A_3 and T_2] no index	neutral
$P_{3non\text{-}hum}$ [with A_1] *á-*	$T_{3non\text{-}hum}$ [with A_1 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_1 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_1] *á-*	$T_{3non\text{-}hum}$ [with A_1 and G_{3hum}] no index	$G_{3non\text{-}hum}$ [with A_1 and T_{3hum}] *	?
P_{3hum} [with A_1] *á-*	T_{3hum} [with A_1 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_1 and $T_{3non\text{-}hum}$] *á-*	?
$P_{3hum.non\text{-}top}$ [with A_1] *á-*	$T_{3hum.non\text{-}top}$ [with A_1 and $G_{3hum.top}$] no index	$G_{3hum.non\text{-}top}$ [with A_1 and $T_{3hum.top}$] no index	horizontal
$P_{3hum.top}$ [with A_1] *á-*	$T_{3hum.top}$ [with A_1 and $G_{3hum.non\text{-}top}$] *á-*	$G_{3hum.top}$ [with A_1 and $T_{3hum.non\text{-}top}$] *á-*	neutral
$P_{3non\text{-}hum}$ [with A_2] *á-*	$T_{3non\text{-}hum}$ [with A_2 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_2 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_2] *á-*	$T_{3non\text{-}hum}$ [with A_2 and G_{3hum}] no index	$G_{3non\text{-}hum}$ [with A_2 and T_{3hum}] *	?
P_{3hum} [with A_2] *á-*	T_{3hum} [with A_2 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_2 and $T_{3non\text{-}hum}$] *á-*	?
$P_{3hum.non\text{-}top}$ [with A_2] *á-*	$T_{3hum.non\text{-}top}$ [with A_2 and G_{3hum}] no index	$G_{3hum.non\text{-}top}$ [with A_2 and T_{3hum}] no index	horizontal
$P_{3hum.top}$ [with A_2] *á-*	$T_{3hum.top}$ [with A_2 and G_{3hum}] *á-*	$G_{3hum.top}$ [with A_2 and T_{3hum}] *á-*	neutral
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_3 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and G_{3hum}] no index	$G_{3non\text{-}hum}$ [with A_3 and T_{3hum}] *	?
P_{3hum} [with A_3] no index	T_{3hum} [with A_3 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_3 and $T_{3non\text{-}hum}$] no index	?
$P_{3hum.non\text{-}top}$ [with A_3] no index	$T_{3hum.non\text{-}top}$ [with A_3 and $G_{3hum.top}$] no index	$G_{3hum.non\text{-}top}$ [with A_3 and $T_{3hum.top}$] no index	neutral
$P_{3hum.top}$ [with A_3] no index	$T_{3hum.top}$ [with A_3 and $G_{3hum.non\text{-}top}$] no index	$G_{3hum.non\text{-}top}$ [with A_3 and $T_{3hum.non\text{-}top}$] no index	neutral

Table 11: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] no index	T_1 [with A_3 and G_2] =*nash*	G_1 [with A_3 and T_2] no index	secundative
P_1 [with A_3]	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] =*nash*	?
P_1 [with A_3] no index	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] =*nash*	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] =*nash*	horizontal
P_1 [with A_3] no index	T_1 [with A_3 and $G_{3hum.top}$] =*nash*	G_1 [with A_3 and $T_{3hum.top}$] no index	secundative
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] no index	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] no index	neutral
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.top}$] no index	G_1 [with A_2 and $T_{3hum.top}$] no index	neutral

Table 12: Alignment of 2nd person P/T/G indexing in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_2 [with A_3] no index	T_2 [with A_3 and G_1] =*nam*	G_2 [with A_3 and T_1] no index	secundative
P_2 [with A_3] no index	T_2 [with A_3 and $G_{3non\text{-}hum}$] *	G_2 [with A_3 and $T_{3non\text{-}hum}$] =*nam*	?
P_2 [with A_3] no index	T_2 [with A_3 and $G_{3hum.non\text{-}top}$] =*nam*	G_2 [with A_3 and $T_{3hum.non\text{-}top}$] =*nam*	horizontal
P_2 [with A_3] no index	T_2 [with A_3 and $G_{3hum.top}$] =*nam*	G_2 [with A_3 and $T_{3hum.top}$] no index	secundative
P_2 [with A_1] no index	T_2 [with A_1 and $G_{3non\text{-}hum}$] *	G_2 [with A_1 and $T_{3non\text{-}hum}$] =*mash* (=1>2)	?
P_2 [with A_1] no index	T_2 [with A_1 and $G_{3hum.non\text{-}top}$] =*mash* (=1>2)	G_2 [with A_1 and $T_{3hum.non\text{-}top}$] =*mash* (=1>2)	horizontal
P_2 [with A_1] no index	T_2 [with A_1 and $G_{3hum.top}$] =*mash* (=1>2)	G_2 [with A_1 and $T_{3hum.top}$] no index	secundative

Table 13: Alignment of 3rd person P/T/G indexing in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3non\text{-}hum}$ [with A_2] no index	$T_{3non\text{-}hum}$ [with A_2 and G_1] no index	$G_{3non\text{-}hum}$ [with A_2 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_2] no index	$T_{3hum.non\text{-}top}$ [with A_2 and G_1] no index	$G_{3hum.non\text{-}top}$ [with A_2 and T_1] no index	neutral
$P_{3hum.top}$ [with A_2] no index	$T_{3hum.top}$ [with A_2 and G_1] *á-*	$G_{3hum.top}$ [with A_2 and T_1] no index	secundative
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and G_1] no index	$G_{3non\text{-}hum}$ [with A_3 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_3] no index	$T_{3hum.non\text{-}top}$ [with A_3 and G_1] no index	$G_{3hum.non\text{-}top}$ [with A_3 and T_1] no index	neutral
$P_{3hum.top}$ [with A_3] no index	$T_{3hum.top}$ [with A_3 and G_1] no index	$G_{3hum.top}$ [with A_3 and T_1] no index	neutral
$P_{3non\text{-}hum}$ [with A_1] no index	$T_{3non\text{-}hum}$ [with A_1 and G_2] no index	$G_{3non\text{-}hum}$ [with A_1 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_1] no index	$T_{3hum.non\text{-}top}$ [with A_1 and G_2] no index	$G_{3hum.non\text{-}top}$ [with A_1 and T_2] no index	neutral
$P_{3hum.top}$ [with A_1] no index	$T_{3hum.top}$ [with A_1 and G_2] *á-*	$G_{3hum.top}$ [with A_1 and T_2] no index	secundative
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and G_2] no index	$G_{3non\text{-}hum}$ [with A_3 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_3] no index	$T_{3hum.non\text{-}top}$ [with A_3 and G_2] no index	$G_{3hum.non\text{-}top}$ [with A_3 and T_2] no index	neutral
$P_{3hum.top}$[with A_3] no index	$T_{3hum.top}$ [with A_3 and G_2] no index	$G_{3hum.top}$ [with A_3 and T_2] no index	neutral
$P_{3non\text{-}hum}$ [with A_1] no index	$T_{3non\text{-}hum}$ [with A_1 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_1 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_1] no index	$T_{3non\text{-}hum}$ [with A_1 and G_{3hum}] no index	$G_{3non\text{-}hum}$ [with A_1 and T_{3hum}] *	?
P_{3hum} [with A_1] no index	T_{3hum} [with A_1 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_1 and $T_{3non\text{-}hum}$] *á-*	?
$P_{3hum.non\text{-}top}$ [with A_1] no index	$T_{3hum.non\text{-}top}$ [with A_1 and $G_{3hum.top}$] no index	$G_{3hum.non\text{-}top}$ [with A_1 and $T_{3hum.top}$] no index	neutral
$P_{3hum.top}$ [with A_1] no index	$T_{3hum.top}$ [with A_1 and $G_{3hum.non\text{-}top}$] *á-*	$G_{3hum.top}$ [with A_1 and $T_{3hum.non\text{-}top}$] *á-*	horizontal
$P_{3non\text{-}hum}$ [with A_2] no index	$T_{3non\text{-}hum}$ [with A_2 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_2 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_2] no index	$T_{3non\text{-}hum}$ [with A_2 and G_{3hum}] no index	$G_{3non\text{-}hum}$ [with A_2 and T_{3hum}] *	?
P_{3hum} [with A_2] no index	T_{3hum} [with A_2 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_2 and $T_{3non\text{-}hum}$] *á-*	?
$P_{3hum.non\text{-}top}$ [with A_2] no index	$T_{3hum.non\text{-}top}$ [with A_2 and G_{3hum}] no index	$G_{3hum.non\text{-}top}$ [with A_2 and T_{3hum}] no index	neutral

(*continued*)

Table 13: (*continued*)

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3hum.top}$ [with A_2] no index	$T_{3hum.top}$ [with A_2 and G_{3hum}] *á-*	$G_{3hum.top}$ [with A_2 and T_{3hum}] *á-*	horizontal
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_3 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_3] no index	$T_{3non\text{-}hum}$ [with A_3 and G_{3hum}] no index	$G_{3non\text{-}hum}$ [with A_3 and T_{3hum}] *	?
P_{3hum} [with A_3] no index	T_{3hum} [with A_3 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_3 and $T_{3non\text{-}hum}$] no index	?
$P_{3hum.non\text{-}top}$ [with A_3] no index	$T_{3hum.non\text{-}top}$ [with A_3 and $G_{3hum.top}$] no index	$G_{3hum.non\text{-}top}$ [with A_3 and $T_{3hum.top}$] no index	neutral
$P_{3hum.top}$ [with A_3] no index	$T_{3hum.top}$ [with A_3 and $G_{3hum.non\text{-}top}$] no index	$G_{3hum.top}$ [with A_3 and $T_{3hum.non\text{-}top}$] no index	neutral

Table 14: Alignment of 1st person P/T/G flagging in Yakima Sahaptin, with trivalent verb class 1 (‘give’) and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] OBJ	T_1 [with A_3 and G_2] OBJ	G_1 [with A_3 and T_2] GEN-DAT	indirective
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] OBJ	neutral
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3hum.top}$] OBJ	G_1 [with A_3 and $T_{3hum.top}$] GEN-DAT	indirective
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] OBJ	neutral
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3hum.top}$] OBJ	G_1 [with A_2 and $T_{3hum.top}$] GEN-DAT	indirective

Table 15: Alignment of 2nd person P/T/G flagging in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_2 [with A_3] OBJ	T_2 [with A_3 and G_1] OBJ	G_2 [with A_3 and T_1] DAT	indirective
P_2 [with A_3] OBJ	T_2 [with A_3 and $G_{3non\text{-}hum}$] *	G_2 [with [A_3 and $T_{3non\text{-}hum}$] OBJ	?
P_2 [with A_3] OBJ	T_2 [with A_3 and $G_{3hum.non\text{-}top}$] OBJ	G_2 [with A_3 and $T_{3hum.non\text{-}top}$] OBJ	neutral
P_2 [with A_3] OBJ	T_2 [with A_3 and $G_{3hum.top}$] OBJ	G_2 [with A_3 and $T_{3hum.top}$] GEN-DAT	indirective
P_2 [with A_1] OBJ	T_2 [with A_1 $G_{3non\text{-}hum}$] *	G_2 [with A_1 and $T_{3non\text{-}hum}$] OBJ	?
P_2 [with A_1] OBJ	T_2 [with A_1 and $G_{3hum.non\text{-}top}$] OBJ	G_2 [with A_1 and $T_{3hum.non\text{-}top}$] OBJ	neutral
P_2 [with A_1] OBJ	T_2 [with A_1 and $G_{3hum.top}$] OBJ	G_2 [with A_1 and $T_{3hum.top}$] GEN-DAT	indirective

Table 16: Alignment of 3rd person P/T/G flagging in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3non\text{-}hum}$ [with A_2] no flag	$T_{3non\text{-}hum}$ [with A_2 and G_1] no flag	$G_{3non\text{-}hum}$ [with A_2 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_2] OBJ	$T_{3hum.non\text{-}top}$ [with A_2 and G_1] no flag	$G_{3hum.non\text{-}top}$ [with A_2 and T_1] GEN-DAT	tripartite
$P_{3hum.top}$ [with A_2] OBJ	$T_{3hum.top}$ [with A_2 and G_1] OBJ	$G_{3hum.top}$ [with A_2 and T_1] GEN-DAT	indirective
$P_{3non\text{-}hum}$ [with A_3][a] no flag	$T_{3non\text{-}hum}$ [with A_3 and G_1] no flag	$G_{3non\text{-}hum}$ [with A_3 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_3] OBJ	$T_{3hum.non\text{-}top}$ [with A_3 and G_1] no flag	$G_{3hum.non\text{-}top}$ [with A_3 and T_1] GEN-DAT	tripartite
$P_{3hum.top}$ [with A_3] OBJ	$T_{3hum.top}$ [with A_3 and G_1] OBJ	$G_{3hum.top}$ [with A_3 and T_1] GEN-DAT	indirective

(*continued*)

Table 16: (*continued*)

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3non\text{-}hum}$ [with A_1] no flag	$T_{3non\text{-}hum}$ [with A_1 and G_2] no flag	$G_{3non\text{-}hum}$ [with A_1 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_1] OBJ	$T_{3hum.non\text{-}top}$ [with A_1 and G_2] no flag	$G_{3hum.non\text{-}top}$ [with A_1 and T_2] GEN-DAT	tripartite
$P_{3hum.top}$ [with A_1] OBJ	$T_{3hum.top}$ [with A_1 and G_2] OBJ	$G_{3hum.top}$ [with A_1 and T_2] GEN-DAT	indirective
$P_{3non\text{-}hum}$ [with A_3] no flag	$T_{3non\text{-}hum}$ [with A_3 and G_2] no flag	$G_{3non\text{-}hum}$ [with A_3 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_3] OBJ	$T_{3hum.non\text{-}top}$ [with A_3 and G_2] no flag	$G_{3hum.non\text{-}top}$ [with A_3 and T_2] GEN-DAT	tripartite
$P_{3hum.top}$ [with A_3] OBJ	$T_{3hum.top}$ [with A_3 and G_2] OBJ	$G_{3hum.top}$ [with A_3 and T_2] GEN-DAT	indirective
$P_{3non\text{-}hum}$ [with A_1] no flag	$T_{3non\text{-}hum}$ [with A_1 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_1 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_2] no flag	$T_{3non\text{-}hum}$ [with A_2 and G_{3hum}] no flag	$G_{3non\text{-}hum}$ [with A_2 and T_{3hum}] *	?
P_{3hum} [with A_2] OBJ	T_{3hum} [with A_2 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
$P_{3hum.non\text{-}top}$ [with A_2] OBJ	$T_{3hum.non\text{-}top}$ [with A_2 and $G_{3hum\text{-}top}$] no flag	$G_{3hum.non\text{-}top}$ [with A_2 and $T_{3non\text{-}hum}$] GEN-DAT	tripartite
$P_{3hum.top}$ [with A_2] OBJ	$T_{3hum.top}$ [with A_2 and $G_{3hum.non\text{-}top}$] OBJ	$G_{3hum.top}$ [with A_2 and $T_{3hum.non\text{-}top}$] OBJ	neutral
$P_{3non\text{-}hum}$ [with A_3] no flag	$T_{3non\text{-}hum}$ [with A_3 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_3 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_3] no flag	$T_{3non\text{-}hum}$ [with A_3 and G_{3hum}] no flag	$G_{3non\text{-}hum}$ [with A_3 and T_{3hum}] ?	?
P_{3hum} [with A_3] OBJ	T_{3hum} [with A_3 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_3 and $T_{3non\text{-}hum}$] GEN-DAT	?
$P_{3hum.non\text{-}top}$ [with A_3] OBJ	$T_{3hum.non\text{-}top}$ [with A_3 and $G_{3hum.top}$] no flag	$G_{3hum.non\text{-}top}$ [with A_3 and $T_{3hum.top}$] GEN-DAT	tripartite
$P_{3hum.non\text{-}top}$ [with A_3] OBJ	$T_{3hum.non\text{-}top}$ [with A_3 and $G_{3hum.top}$] no flag	$G_{3hum.non\text{-}top}$ [with A_3 and $T_{3hum.top}$] GEN-DAT	tripartite
$P_{3hum.top}$ [with A_3] OBJ	$T_{3hum.top}$ [with A_3 and $G_{3hum.non\text{-}top}$] OBJ	$G_{3hum.top}$ [with A_3 and $T_{3hum.non\text{-}top}$] OBJ	neutral

Note: [a]Non-human Ps are obligatorily marked only in inverse 3obv → 3prox scenarios. These could occur only when A is also non-human and less topical than P.

Table 17: Alignment of 1st person P/T/G flagging in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and G_2] OBJ	G_1 [with A_3 and T_2] GEN-DAT	secundative
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] OBJ	horizontal
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3hum.top}$] OBJ	G_1 [with A_3 and $T_{3hum.top}$] GEN-DAT	secundative
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] OBJ	horizontal
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3hum.top}$] OBJ	G_1 [with A_2 and $T_{3hum.top}$] GEN-DAT	secundative

Table 18: Alignment of 2nd person P/T/G flagging in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_2 [with A_3] GEN-DAT	T_2 [withA_3 and G_1] OBJ	G_2 [with A_3 and T_1] GEN-DAT	secundative
P_2 [with A_3] GEN-DAT	T_2 [withA_3 and $G_{3non\text{-}hum}$] *	G_2 [with A_3 and $T_{3non\text{-}hum}$] OBJ	?
P_2 [with A_3] GEN-DAT	T_2 [withA_3 and $G_{3hum.non\text{-}top}$] OBJ	G_2 [with A_3 and $T_{3hum.non\text{-}top}$] OBJ	horizontal
P_2 [with A_3] GEN-DAT	T_2 [withA_3 and $G_{3hum.top}$] OBJ	G_2 [with A_3 and $T_{3hum.top}$] GEN-DAT	secundative
P_2 [with A_1] GEN-DAT	T_2 [with A_1 and $G_{3non\text{-}hum}$] *	G_2 [with A_1 and $T_{3non\text{-}hum}$] OBJ	?
P_2 [with A_1] GEN-DAT	T_2 [with A_1 and $G_{3hum.non\text{-}top}$] OBJ	G_2 [with A_1 and $T_{3hum.non\text{-}top}$] OBJ	horizontal
P_2 [with A_1] GEN-DAT	T_2 [with A_1 $G_{3hum.top}$] OBJ	G_2 [with A_1 and $T_{3hum.top}$] GEN-DAT	secundative

Table 19: Alignment of 3rd person P/T/G flagging in Yakima Sahaptin, with trivalent verb class 1 ('give') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
$P_{3non\text{-}hum}$ [with A_2] DAT	$T_{3non\text{-}hum}$ [with A_2 and G_1] no flag	$G_{3non\text{-}hum}$ [with A_2 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_2] GEN-DAT	$T_{3hum.non\text{-}top}$ [with A_2 and G_1] no flag	$G_{3hum.non\text{-}top}$ [with A_2 and T_1] GEN-DAT	secundative
$P_{3hum.top}$ [with A_2] GEN-DAT	$T_{3hum.top}$ [with A_2 and G_1] OBJ	$G_{3hum.top}$ [with A_2 and T_1] GEN-DAT	secundative
$P_{3non\text{-}hum}$ [with A_3] DAT	$T_{3non\text{-}hum}$ [with A_3 and G_1] no flag	$G_{3non\text{-}hum}$ [with A_3 and T_1] *	?
$P_{3hum.non\text{-}top}$ [with A_3] GEN-DAT	$T_{3hum.non\text{-}top}$ [with A_3 and G_1] no flag	$G_{3hum.non\text{-}top}$ [with A_3 and T_1] GEN-DAT	secundative
$P_{3hum.top}$ [with A_3] GEN-DAT	$T_{3hum.top}$ [with A_3 and G_1] OBJ	$G_{3hum.top}$ [with A_3 and T_1] GEN-DAT	secundative
$P_{3non\text{-}hum}$ [with A_1] DAT	$T_{3non\text{-}hum}$ [with A_1 and and G_2] no flag	$G_{3non\text{-}hum}$ [with A_1 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_1] GEN-DAT	$T_{3hum.non\text{-}top}$ [with A_1 and G_2] no flag	$G_{3hum.non\text{-}top}$ [with A_1 and T_2] GEN-DAT	secundative
$P_{3hum.top}$ [with A_1] GEN-DAT	$T_{3hum.top}$ [with A_1 and G_2] OBJ	$G_{3hum.top}$ [with A_1 and T_2] GEN-DAT	secundative
$P_{3non\text{-}hum}$ [with A_3] DAT	$T_{3non\text{-}hum}$ [with A_3 and G_2] no flag	$G_{3non\text{-}hum}$ [with A_3 and T_2] *	?
$P_{3hum.non\text{-}top}$ [with A_3] GEN-DAT	$T_{3hum.non\text{-}top}$ [with A_3 and G_2] no flag	$G_{3hum.non\text{-}top}$ [with A_3 and T_2] GEN-DAT	secundative
$P_{3hum.top}$ [with A_3] GEN-DAT	$T_{3hum.top}$ [A_3 and G_2] OBJ	$G_{3hum.top}$ [with A_3 and T_2] GEN-DAT	secundative
$P_{3non\text{-}hum}$ [with A_1] DAT	$T_{3non\text{-}hum}$ [with A_1 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [with A_1 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_2] DAT	$T_{3non\text{-}hum}$ [with A_2 and G_{3hum}] no flag	$G_{3non\text{-}hum}$ [with A_2 and T_{3hum}] *	?
P_{3hum} [with A_2] GEN-DAT	T_{3hum} [with A_2 and $G_{3non\text{-}hum}$] *	G_{3hum} [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
$P_{3hum.non\text{-}top}$ [with A_2] GEN-DAT	$T_{3hum.non\text{-}top}$[with A_2 and $G_{3hum.top}$] no flag	$G_{3hum.non\text{-}top}$ [with A_2 and $T_{3hum.top}$] GEN-DAT	secundative
$P_{3hum.top}$ [with A_2] GEN-DAT	$T_{3hum.top}$[with A_2 and $G_{3hum.non\text{-}top}$] OBJ	$G_{3hum.top}$ [with A_2 and $T_{3hum.non\text{-}top}$] OBJ	horizontal
$P_{3non\text{-}hum}$ [with A_3] DAT	$T_{3non\text{-}hum}$ [A_3 and $G_{3non\text{-}hum}$] *	$G_{3non\text{-}hum}$ [A_3 and $T_{3non\text{-}hum}$] *	?
$P_{3non\text{-}hum}$ [with A_3] DAT	$T_{3non\text{-}hum}$ [A_3 and G_{3hum}] no flag	$G_{3non\text{-}hum}$ [A_3 and T_{3hum}] ?	?
P_{3hum} [with A_3] GEN-DAT	T_{3hum} [A_3 and $G_{3non\text{-}hum}$] *	G_{3hum} [A_3 and $T_{3non\text{-}hum}$] GEN-DAT	?
$P_{3hum.non\text{-}top}$ [with A_3] GEN-DAT	$T_{3hum.non\text{-}top}$ [A_3 and $G_{3hum.top}$] no flag	$G_{3hum.non\text{-}top}$ [A_3 and $T_{3hum.top}$] GEN-DAT	secundative
$P_{3hum.non\text{-}top}$ [with A_3] GEN-DAT	$T_{3hum.non\text{-}top}$ [A_3 and $G_{3hum.top}$] no flag	$G_{3hum.non\text{-}top}$ [A_3 and $T_{3hum.top}$] GEN-DAT	secundative
$P_{3hum.top}$ [with A_3] GEN-DAT	$T_{3hum.top}$ [A_3 and $G_{3hum.non\text{-}top}$] OBJ	$G_{3hum.top}$ [A_3 and $T_{3hum.non\text{-}top}$] OBJ	horizontal

Table 20: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, trivalent verb class 2 ('put') and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] =*nash*	T_1[with A_3 and G_2] =*nash*	G_1 [with A_3 and T_2] no index	indirective
P_1 [with A_3] =*nash*	T_1 [with A_3 and G_3] =*nash*	G_1 [with A_3 and T_3] no index	indirective
P_1 [with A_2] no index	T_1 [with A_2 and G_3] no index	G_1 [with A_2 and T_3] no index	neutral

Table 21: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, trivalent verb class 2 ('put') and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] no index	T_1 [with A_3 and G_2] =*nash*	G_1 [with A_3 and T_2] no index	secundative
P_1 [with A_3] no index	T_1 [with A_3 and G_3] =*nash*	G_1 [with A_3 and T_3] no index	secundative
P_1 [with A_2] no index	T_1 [with A_2 and G_3] no index	G_1 [with A_2 and T_3] no index	neutral

Table 22: Alignment of flagging of 1st person P/T/G in Yakima Sahaptin, trivalent verb class 2 ('put') and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] OBJ	T_1 [with A_3 and G_2] OBJ	G_1 [with A_3 and T_2] GEN-DAT	indirective
P_1 [with A_3] OBJ	T_1 [with A_3 and G_3] OBJ	G_1 [with A_3 and T_3] GEN-DAT	indirective
P_1 [with A_2] OBJ	T_1 [with A_2 and G_3] OBJ	G_1 [with A_2 and T_3] GEN-DAT	indirective

Table 23: Alignment of flagging of 1st person P/T/G in Yakima Sahaptin, trivalent verb class 2 (‘put’) and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and G_2] OBJ	G_1 [with A_3 and T_2] GEN-DAT	secundative
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and G_3] OBJ	G_1 [with A_3 and T_3] GEN-DAT	secundative
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and G_3] OBJ	G_1 [with A_2 and T_3] GEN-DAT	secundative

Table 24: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, trivalent verb class 3 (‘say’) and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] =*nash*	T_1 [with A_3 and G_2] *	G_1 [with A_3 and T_2] *	?
P_1 [with A_3] =*nash*	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] =*nash*	?
P_1 [with A_3] =*nash*	T_1 [with A_3 and G_{3hum}] *	G_1 [with A_3 and T_{3hum}] *	?
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and G_{3hum}] *	G_1 [with A_2 and T_{3hum}] *	?

Table 25: Alignment of 1st person P/T/G indexing in Yakima Sahaptin; trivalent verb class 4 (derived applicative) and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] =*nash*	T_1 [with A_3 and G_2] no index	G_1 [with A_3 and T_2] =*nash*	secundative
P_1 [with A_3] =*nash*	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] =*nash*	?
P_1 [with A_3] =*nash*	T_1 [with A_3 and G_{3hum}] no index	G_1 [with A_3 and T_{3hum}] =*nash*	secundative
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and G_{3hum}] no index	G_1 [with A_2 and T_{3hum}] no index	neutral

Table 26: Alignment of 1st person P/T/G indexing in Yakima Sahaptin; trivalent verb class 4 (derived applicative) and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] no index	T_1 [with A_3 and G_2] no index	G_1 [with A_3 and T_2] =*nash*	indirective
P_1 [with A_3] no index	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] =*nash*	?
P_1 [with A_3] no index	T_1 [with A_3 and G_{3hum}] no index	G_1 [with A_3 and T_{3hum}] =*nash*	indirective
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and G_{3hum}] no index	G_1 [with A_2 and T_{3hum}] no index	neutral

Table 27: Alignment of 1st person P/T/G flagging in Yakima Sahaptin; trivalent verb class 4 (derived applicative) with bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] OBJ	T_1 [with A_3 and G_2] no flag	G_1 [with A_3 and T_2] OBJ	secundative
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_3] OBJ	T_1 [with A_3 and G_{3hum}] no flag	G_1 [with A_3 and T_{3hum}] OBJ	secundative
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_2] OBJ	T_1 [with A_2 and G_{3hum}] no flag	G_1 [with A_2 and T_{3hum}] OBJ	secundative

Table 28: Alignment of 1st person P/T/G flagging in Yakima Sahaptin, trivalent verb class 4 (derived applicative) with bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and G_2] no flag	G_1 [with A_3 and T_2] OBJ	tripartite
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and G_{3hum}] no flag	G_1 [with A_3 and T_{3hum}] OBJ	tripartite
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and G_{3hum}] no flag	G_1 [with A_2 and T_{3hum}] OBJ	tripartite

Table 29: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, trivalent verb class 5 (derived causative) and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] =*nash*	T_1 [with A_3 and G_2] =*nash*	G_1 [with A_3 and T_2] no index	indirective
P_1 [with A_3] =*nash*	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] =*nash*	?
P_1 [with A_3] =*nash*	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] =*nash*	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] =*nash*	neutral
P_1 [with A_3] =*nash*	T_1 [with A_3 and $G_{3hum.top}$] no index	G_1 [with A_3 and $T_{3hum.top}$] =*nash*	secundative(?) (inconclusive data)
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] no index	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] no index	neutral
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.top}$] no index	G_1 [with A_2 and $T_{3hum.top}$] no index	neutral

Table 30: Alignment of 1st person P/T/G indexing in Yakima Sahaptin, trivalent verb class 5 (derived causative) and bivalent verb class II

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] no index	T_1 [with A_3 and G_2] =*nash*	G_1 [with A_3 and T_2] no index	secundative
P_1 [with A_3] no index	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] =*nash*	?
P_1 [with A_3] no index	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] =*nash*	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] =*nash*	horizontal
P_1 [with A_3] no index	T_1 [with A_3 and $G_{3hum.top}$] no index	G_1 [with A_3 and $T_{3hum.top}$] =*nash*	indirective(?) (inconclusive data)
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] no index	?
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] no index	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] no index	neutral
P_1 [with A_2] no index	T_1 [with A_2 and $G_{3hum.top}$] no index	G_1 [with A_2 and $T_{3hum.top}$] no index	neutral

Table 31: Alignment of 1st person P/T/G flagging in Yakima Sahaptin, trivalent verb class 5 (derived causative) and bivalent verb class I.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] OBJ	T_1 [with A_3 and G_2] OBJ	G_1 [with A_3 and T_2] GEN-DAT	indirective
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] GEN-DAT	?
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] GEN-DAT	indirective
P_1 [with A_3] OBJ	T_1 [with A_3 and $G_{3hum.top}$] OBJ	G_1 [with A_3 and $T_{3hum.top}$] GEN-DAT	indirective
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] GEN-DAT	indirective
P_1 [with A_2] OBJ	T_1 [with A_2 and $G_{3hum.top}$] OBJ	G_1 [with A_2 and $T_{3hum.top}$] GEN-DAT	indirective

Table 32: Alignment of person P/T/G flagging in Yakima Sahaptin, trivalent verb class 5 (derived causative) and bivalent verb class II.

Comparative triads			Alignment
P argument with its co-argument	**T argument with its co-arguments**	**G argument with its co-arguments**	
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and G_2] OBJ	G_1 [with A_3 and T_2] GEN-DAT	secundative
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3non\text{-}hum}$] *	G_1 [with A_3 and $T_{3non\text{-}hum}$] GEN-DAT	?
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_3 and $T_{3hum.non\text{-}top}$] GEN-DAT	secundative
P_1 [with A_3] GEN-DAT	T_1 [with A_3 and $G_{3hum.top}$] OBJ	G_1 [with A_3 and $T_{3hum.top}$] GEN-DAT	secundative
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3non\text{-}hum}$] *	G_1 [with A_2 and $T_{3non\text{-}hum}$] OBJ	?
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3hum.non\text{-}top}$] OBJ	G_1 [with A_2 and $T_{3hum.non\text{-}top}$] GEN-DAT	secundative
P_1 [with A_2] GEN-DAT	T_1 [with A_2 and $G_{3hum.top}$] OBJ	G_1 [with A_2 and $T_{3hum.top}$] GEN-DAT	secundative