Discourse Topicality in the Languages of Northern Sarawak

Charlotte Hemmings University of Oxford charlotte.hemmings@ling-phil.ox.ac.uk

1. Introduction

- ❖ This paper analyses differences in DISCOURSE TOPICALITY in the voice systems of three closely-related languages of Northern Sarawak: Lun Bawang, Kelabit and Sa'ban.
- It seeks to address two key questions:
 - 1. What can we say about ALIGNMENT in these languages?
 - 2. To what extent do they support the claim that Western Austronesian languages have undergone a SHIFT in alignment from ergative to accusative (Aldridge 2011)?

* Roadmap:

- > Symmetrical Voice Systems and the Alignment debate
- Morphosyntactic Differences between Lun Bawang, Kelabit and Sa'ban
- ➤ A Discourse Methodology for comparing voice systems
- ➤ Results
- Conclusions

2. Symmetrical Voice Systems

- ❖ Like other Western Austronesian languages, the languages of Northern Sarawak are known for their systems of SYMMETRICAL VOICE alternations.
- ❖ These are alternations in verbal morphology that indicate different mappings of arguments to functions but (seemingly) do not affect SYNTACTIC TRANSITIVITY. In other words, there are multiple transitive clause types.
- ❖ This can be illustrated from Kelabit using the root *laak* 'cook':

(1) $Kelabit^{l}$

a. Actor Voice

Nengelaak nuba' tesineh nedih PFV.AV.cook rice mother 3SG.POSS

'Her mother cooked rice'

b. Undergoer Voice

Linaak tesineh nedih nuba'
PFV.UV.cook mother 3SG.POSS rice
'Her mother cooked rice'

¹ Nb. word order is variable in Kelabit and the subject (or actor in AV and undergoer in UV) can appear both pre-verbally and clause-finally.

- ❖ Both actor and undergoer are expressed as NP arguments in AV and UV, whereas obliques are typically expressed as PPs:
 - (2) *Kelabit Obliques*

a. Actor Voice

La'ih sineh nemerey nuba' [ngen anak nedih]_{PP} man DEM PFV.AV.give rice to child 3SG.POSS 'The man gave rice to his child'

b. Undergoer Voice

Birey la'ih sineh nuba' [ngen anak nedih]_{PP} PFV.UV.give man DEM rice to child 3SG.POSS 'The man gave rice to his child'

- ❖ Moreover, there are several SYNTACTIC TESTS that support the identification of actor and undergoer as core arguments:
 - (3) *Kelabit Relative Clauses*

a. Actor Voice

Seni'er kuh **la'ih** [suk nenekul nuba' ngen seduk] UV.PFV.see 1SG man REL PFV.AV.spoon rice with spoon 'I saw the man who spooned up rice with a spoon'

b. *Seni'er kuh seduk [suk nekul la'ih nuba' nedih]
UV.PFV.see 1SG spoon REL AV.spoon man rice 3SG.POSS
For: 'I saw the spoon that the man used to spoon up his rice'

c. Undergoer Voice

Seni'er kuh **nuba'** [suk sikul la'ih sineh ngen seduk] UV.PFV.see 1SG rice REL UV.PFV.spoon man DEM with spoon 'I saw the rice that the man spooned up with a spoon'

- d. *Seni'er kuh la'ih [suk sikul **nuba'**]
 UV.PFV.see 1SG man REL UV.PFV.spoon rice
 For: 'I saw the man who spooned up rice'
- (4) Kelabit Object Position and Adverb Placement

a. Actor Voice

[Nekuman bua' kaber] la'ih sineh **ngimalem** PFV.AV.eat fruit pineapple man DEM yesterday 'The man ate pineapple yesterday'

- b. La'ih sineh [nekuman bua' kaber] **ngimalem** man DEM PFV.UV.eat fruit pineapple yesterday 'The man ate pineapple yesterday'
- c. ?[Nekuman bua' kaber] **ngimalem** la'ih sineh²
 PFV.UV.eat fruit pineapple yesterday man DEM
 'The man ate pineapple yesterday'
- d. *Nekuman **ngimalem** bua' kaber la'ih sineh
 PFV.AV.eat yesterday fruit pineapple man DEM
 For: 'The man ate pineapple yesterday'
- e. *La'ih sineh nekuman **ngimalem** bua' kaber man DEM PFV.AV.eat yesterday fruit pineapple For: 'The man ate pineapple yesterday'

f. Undergoer Voice

[Kinan la'ih sineh] bua' kaber **ngimalem**PFV.UV.eat man DEM fruit pineapple yesterday

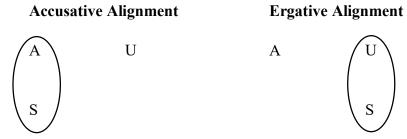
'The man ate pineapple yesterday'

- g. Bua' kaber [kinan la'ih sineh] **ngimalem** fruit pineapple PFV.UV.eat man DEM yesterday 'Pineapple is what the man ate yesterday'
- h. [Kinan la'ih sineh] **ngimalem** bua' kaber sineh
 PFV.UV.eat man DEM yesterday fruit pineapple DEM
 'The man ate that pineapple yesterday'
- i. *Kinan **ngimalem** la'ih sineh bua' kaber
 PFV.UV.eat yesterday man DEM fruit pineapple
 For: 'The man ate pineapple yesterday'
- j. *Bua' kaber kinan **ngimalem** la'ih sineh fruit pineapple PFV.UV.eat yesterday man DEM For: 'Pineapple is what the man ate yesterday'
- ❖ Hence, both AV and UV can be analysed as MORPHOSYNTACTICALLY TRANSITIVE.
- ❖ As a result, Western Austronesian languages have been subject to considerable debate over their alignment (Kroeger 1993).

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² This order is better if the clause-final argument is specific – i.e. a proper name or pronoun.

❖ Typically, alignment is assessed by comparing the core arguments of transitive and intransitive clauses:



- ❖ However, if there are multiple transitive clause types, then the question arises of which transitive clause to compare:
 - (5) Kelabit Intransitive Clause
 Uku' tudo lem bakul nedih
 dog sit in basket 3sg.poss
 'The dog is sitting in its basket'



- ❖ Three different approaches to Western Austronesian alignment have been taken in the literature:
 - 1. Alignment is accusative AV is basic, UV is a passive (Bloomfield 1917)
 - 2. Alignment is ergative UV is basic, AV is an antipassive (Aldridge 2012, Starosta 1998)
 - 3. Alignment is neither accusative nor ergative but symmetrical (Foley 2008, Kroeger 1993, Riesberg 2014)
- ❖ In fact, given both structural and semantic differences in Western Austronesian voice systems, it has been claimed that Western Austronesian languages differ in their alignment and have undergone a shift from ergative to accusative (Aldridge 2011).
- ❖ The morphosyntactic patterns shown in (3) and (4) suggest that UV is different from a passive and AV is different from an antipassive since both are transitive with two core arguments.
- ❖ This would seem to rule out both the accusative and ergative accounts, as well as the hypothesis of alignment shift (at least in the canonical understanding).

- ♦ However, transitivity is not only defined in morphosyntactic terms but also in semantic and DISCOURSE terms (Givón 1994, 2017, Hopper and Thompson 1980)
- ❖ Thus, if we want to assess alignment in a language with more than one (morphosyntactically) transitive clause, we can use discourse tests to determine which clause-type is basic (see section 4).
- ❖ Before looking at discourse topicality, however, section 3 presents more information on the three languages analysed and explains why they make a particularly interesting case study for assessing alignment and the theory of alignment shift.

3. Morphosyntactic Variation

❖ As mentioned above, Western Austronesian languages are known for their systems of SYMMETRICAL VOICE. However, there are a number of morphosyntactic differences in voice systems and related phenomena that have led many to subdivide languages into Philippine-type and Indonesian-type (Arka and Ross 2005, Himmelmann 2005):

Table 1. Philippine-type vs Indonesian-type languages (Arka 2002)

	Philippine-type	Indonesian-type
Micro-roles with voices	Y	N
Case-marking of nominal arguments	Y	N
True passive construction	N	Y
Applicative constructions	N	Y

(6) Tagalog

a. Actor Voice (AV)

b<um>ili ng isda sa tindahan ang lalake <AV>buy CORE fish OBL store SUBJ man 'The man bought fish in the store.'

b. Undergoer Voice (UV)

bi-bilh-in *ng lalake* <u>sa tindahan</u> **ang isda**IRR-buy-UV CORE man OBL store SUBJ fish
'The man will buy *the fish* in the store.'

c. Locative Voice (LV)

bi-bilh-an *ng lalake ng isda* **ang tindahan** IRR-buy-LV CORE man CORE fish SUBJ store 'The man will buy fish in the store.'

d. Benefactive Voice (BV)

i-bi-bili *ng lalake ng isda* **ang bata**BV-IRR-buy CORE man CORE fish SUBJ child
'The man will buy fish for the child.' (Foley 2008: 23)

(7) *Balinese*

a. Actor Voice

Tiang nyepak cicing-e.
1SG AV-kick dog-DEF
'I kicked the dog.'

b. Undergoer Voice

Cicing-e sepak tiang. dog-DEF UV.kick 1SG 'The dog was kicked by me.'

c. Passive

Nasi-ne ajeng-a (teken anak-e ento) Rice-def eat-pass by person-def that 'The rice was eaten (by that person)' (Artawa 1998:8-10)

❖ Differences between (6) and (7) – particular the semantic properties associated with the AV undergoer – have been used to support the alignment shift hypothesis (Aldridge 2011, 2012).

3.1 Variation in Northern Sarawak

- ❖ Lun Bawang, Kelabit and Sa'ban are part of the Apad Uat subgroup of North Sarawak languages and are mainly spoken in the Fourth and Fifth divisions of Sarawak, Malaysia³ (Martin 1996).
- ❖ What makes this subgroup interesting is that the languages lie, genetically and geographically, at a point of transition between the "Philippine-type" languages and the "Indonesian-type" languages (Hudson 1978).
- ❖ Morphosyntactically, Lun Bawang is the most conservative and preserves several 'Philippine-type' characteristics. Sa'ban is the most innovative and innovates several 'Indonesian-type' characteristics, whilst Kelabit is intermediate between the two (Blust 1993, Clayre 2005, 2014, Hemmings 2016).
- * This can be seen if we compare the voice systems in terms of:
 - > The number of voice alternations
 - > Case-marking in the pronominal systems

3.1.1 Number of Voices

❖ Lun Bawang and Kelabit have three-way voice systems, which includes an instrumental voice, whilst Sa'ban only has two alternations:

³ Though related varieties are spoken across the borders in Kalimantan, Sabah and Brunei

(8) Lun Bawang/Lundayeh

a. Actor Voice

Ngekeb lacing nih uih atun AV.cover pot DEM 1SG.NOM first 'I'm covering this pot first.' (Clayre 2005: 20)

b. Undergoer Voice

Beli-en ku lal neh ku usin nih. buy-UV.IRR 1SG.GEN hen DEM with money DEM 'I'll buy the hen with this money.'

c. Instrumental Voice

Pimeli ku lal usin nih.

IV.buy 1SG.GEN hen money DEM

'I'll use this money to buy the hen.' (Clayre 2014: 132-133)

(9) Kelabit

a. Actor Voice

La'ih sineh ne-nekul nuba' nedih ngen seduk. man DEM PFV-AV.spoon.up rice 3SG.POSS with spoon 'That man spooned up his rice with a spoon.'

b. Undergoer Voice

Sikul lai'h sineh nuba' nedih ngen seduk. UV.PFV.spoon.up man DEM rice 3SG.POSS with spoon 'That man ate his rice with a spoon.'

c. Instrumental Voice

Seduk pe-nekul la'ih sineh nuba' nedih. Spoon IV-spoon up man DEM rice 3SG.POSS 'That man used a spoon to spoon up his rice.' (Hemmings 2015)

(10) Sa'ban

a. Actor Voice (AV)

Yuet noknai n-toe éek. monkey this AV-drop 1SG 'This monkey drops me.'

b. Undergoer Voice (UV)

Yuet noknai i-toe éek. monkey this UV-drop 1sG 'I dropped the monkey.' (Clayre 2014: 138)

❖ Each language additionally has periphrastic means of encoding both UV and promoting other peripheral roles to subject.

3.1.2 Case-Marking of Pronouns

Although none of the Apad Uat languages have case-marking of nominal arguments, Lun Bawang preserves a 'Philippine-type' case system in its pronouns. NOM is used for subjects, GEN for non-subject actors and OBL for obliques and AV undergoers.

Table 2. Lun Bawang/Lundayeh Pronouns (Clayre 2005: 24)

		\ •	<u> </u>
	NOM	GEN	OBL
1s _G	uih	kuh	nekuh
2 SG	iko	mu	nemu
3sg	ieh	neh	neneh
1PL.INCL	tau	tau	netau
1PL.EXCL	kai	kai	nekai
2PL	muyuh	muyuh	nemuyuh
3PL	ideh	deh	nedeh

(11) Lun Bawang/Lundayeh

a. Actor Voice

Iko	nguit	neneh	amé	nekuh.
2sg.nom	AV.bring	3sg.obl	go	1sg.obl
'You bring hi	m to me.'			

b. Undergoer Voice

Inapung	kuh	ieh	rat	neneh.
UV.PFV.hide	1sg.gen	3sg.nom	from	3sg.obl
'I hid it from l	nim.' (Clayre 2	005: 25)		

❖ In contrast, the Sa'ban pronominal system only distinguishes NOM and OBL forms. NOM forms are used for all core arguments (i.e. actor and undergoer in both AV and UV), whilst OBL is used for obliques:

Table 3. Sa'ban Pronouns (Clayre 2005: 32)

	NOM	OBL
1s _G	éek	ne'éek
2 SG	ceh	nceh
3sg	ieh	nyeh
1PL.INCL	taam	ntaam
1PL.EXCL	amay	namay
2PL	ciem	nciem
3PL	deh	ndeh

(12) *Sa'ban*

a. Actor Voice

Éek nnal ieh 1sg.nom Av.see 3sg.nom

'I see him'

a. Undergoer Voice

Éek inal ieh 1SG.NOM PFV.UV.see 3SG.NOM 'He saw me'

b. Ndeh nok-nay ciek eu-eu iraay ieh ne'éek? why REL-this small very PFV.UV.give 3SG.NOM 1SG.OBL 'Why did he give me such a small portion?' (Clayre 2005: 33)

❖ Kelabit has a reduced set of GEN pronouns in 1sg, 2sg, 3sg and 3pl, which can be cliticised to the preposition *ngen* 'to/for/with' to create OBL forms:

Table 4. Kelabit Pronouns

	NOM	GEN	OBL	
1s _G	uih	kuh	ngekuh	
2 SG	iko	muh	ngemuh	
3 SG	ieh	neh	ngeneh	
3PL	ideh	deh	ngedeh	

- ❖ However, the distribution is quite different from Lun Bawang/Lundayeh. GEN pronouns are most-typically used for actors in non-actor voices but NOM pronouns not only express subjects but also AV undergoers and in certain contexts UV actors as well:
 - (13) *Kelabit*

a. Actor Voice

Uih ni'er ieh
1SG.NOM AV.see 3SG.NOM
'I see him.'

b. Ieh ni'er uih
3SG.NOM AV.see 1SG.NOM
'He sees me.' (elicitation, fieldnotes)

(14) Kelabit

Undergoer Voice

a. Seni'er kuh ieh
UV.see 1SG.GEN 3SG.NOM

'I saw him'

b. Seni'er uih tieh

UV.see 1sg.nom pt=3sg.nom

'I saw him' (elicitation, fieldnotes)

❖ Hence, the difference between NOM and GEN is better understood as DIFFERENTIAL ARGUMENT MARKING (Witzlack-Makarevich and Seržant to appear, Bossong 1985, Aissen 2003) and appears to relate to information structure differences:

(15) *Kelabit Focus*

Q. Senuru' iih tieh ngelaak ngen tauh?

UV.PFV.order who PT=3SG.NOM AV.cook for 1PL.INCL

'Who ordered her to cook for us?'

A1: Senuru' uih tieh.

UV.PFV.order 1SG.NOM PT=3SG.NOM

'I ordered her.'

A2: *Senuru' kuh tieh.

UV.PFV.order 1SG.GEN PT=3SG.NOM

'I ordered her.' (elicitation, fieldnotes)

- ❖ Thus, a quick comparison in the number of voices and case-marking patterns shows that Lun Bawang has some 'Philippine-type' characteristics; Sa'ban has some 'Indonesian-type' characteristics; and Kelabit is intermediate between the two (Clayre 2005, 2014).
- ❖ Hence, the Apad Uat languages present an interesting case-study to explore the question of alignment in Western Austronesian, and the theory of alignment change, since the three closely related languages appear to reflect different stages in terms of morphosyntax.

4. Discourse Topicality

❖ In languages where there is more than one transitive clause, determining alignment involves identifying which (if any) of these clauses is basic (Kroeger 2004). One means of doing this is using token frequency and topicality measures (Givón 1983, 1994, 2017).

- ❖ The basic transitive clause can be expected to be MORE FREQUENT than marked constructions.
- ❖ The basic transitive clause will have TWO TOPICAL ARGUMENTS:

Table 3. Topicality of Arguments (Cooreman 1987)

	Topicality of Arguments			
Active/Ergative	Actor	>	Undergoer	
Inverse	Undergoer	>	Actor	
Passive	Undergoer	>>	Actor	
Antipassive	Actor	>>	Undergoer	

- ❖ Givón (1994, 2017) proposes two quantitative measures to analyse the relative discourse topicality of actor and undergoer in transitive clauses: referential distance (RD) and topical persistence (TP)
- * Referential distance or *anaphoric gap* is calculated by counting the number of clauses backwards until the previous mention of a referent (Givón 1994):
 - ➤ Where a co-referential antecedent is mentioned in the immediately preceding clause or two to three clauses back a value of 1-3 is assigned. This is taken to indicate high topicality.
 - ➤ If a co-referent is not found within the three preceding clauses a value of >3 is assigned. This is taken to indicate low topicality and applies equally for inactive and newly introduced referents.
- ❖ Topical persistence or *cataphoric continuity* is calculated by counting the number of times that the same referent appears in the immediately following ten clauses, not necessarily sequentially (Givón 1994):
 - Three or more re-mentions is taken to indicate high topicality and given a value of >2.
 - > Two or fewer re-mentions, including no further mentions at all, is taken to indicate low topicality and given a value of 0-2.
 - According to Givón (1994), topical persistence provides a more indicative measure of discourse topicality for the purposes of identifying voice phenomena than referential distance.
- Looking at frequency and topicality in Tagalog, Cooreman, Fox, and Givón (1984) show that UV is more frequent and has the discourse patterns of an active clause, whilst AV has the discourse the patterns of an antipassive.
- ❖ Hence, if there has been a shift in alignment, we might expect to find variation in the discourse patterns of AV and UV in the three languages, both compared with Tagalog and with each other.

❖ In order to test this, the measurements were applied to a series of folk stories in Lun Bawang, Sa'ban and Kelabit. In some cases, the stories represent versions of the same story in different languages but in all cases the genre of the texts is comparable.

(16) Lun Bawang

Rang Dungo (Beatrice Clayre's fieldnotes, collected and transcribed by Jean Davies)

Apu Padan (Beatrice Clayre's fieldnotes, collected and transcribed by Jean Davies) Upai Kasan (Deegan and Usad 1972)

Kelabit

Dayang Beladan and the monkey

Palug Rayeh and Palug I'it catch crows

Dayang Beladan and the mouse deer

Palug Rayeh and Palug I'it go fishing

Palug Rayeh and Palug I'it fetch honey (collected during the author's fieldwork in 2013-2014)

Sa'ban

Paleeu Aa'

Sii' Beladiin sii' Tenhlet (transcribed in the early 2000s by Beatrice Clayre and later published by the Saban Association Miri in 2003)

Some coding challenges:

- ➤ Clause boundaries do we include relative clauses?
- AV or UV in Sa'ban aro' 'to do/make' is the PFV form of both AV and UV
- What counts as the same referent (generic vs specific, number shifts)

4. Results

4.1 Discourse Frequency

Table 4. Relative Frequency of AV vs UV in Folktales⁴

Language	\mathbf{AV}	UV	Total	
Lun Bawang	58 (62%)	36 (38%)	94	
Kelabit	80 (60%)	53 (40%)	133	
Sa'ban	48 (44%)	61 (56%)	109	

⁴ The category UV includes both morphological forms and periphrastic constructions. In Kelabit and Lun Bawang folktales there are very few instances of periphrastic UV. In contrast, in Sa'ban they are quite frequent (and occur 21 times vs 40 instances of non-periphrastic UV). This reflects the fact that morphological irrealis forms do not exist for many verbs.

- ❖ The voices in Sa'ban have relatively equal frequency (UV slightly more frequent), whilst in Kelabit and Lun Bawang AV is more frequent than UV.
- ❖ This largely differs from Tagalog where UV is more frequent than AV (Cooreman, Fox, and Givón 1984)

4.2 Discourse Topicality

Table 5. Referential Distance in Northern Sarawak Folktales

		Actor Voice (AV)			Unde	rgoer Voice (UV)
		1-3 (High)	>3 (Low)	Total	1-3 (High)	>3 (Low)	Total
Lun Bawang	A	57 (98%)	1 (2%)	58	32 (89%)	4 (11%)	36
_	U	36 (62%)	22 (38%)	58	32 (89%)	4 (11%)	36
Kelabit	A	71 (89%)	9 (11%)	80	49 (92%)	4 (8%)	53
	U	51 (64%)	29 (36%)	80	36 (68%)	17 (32%)	53
Sa'ban	A	45 (94%)	2 (6%)	48	58 (95%)	3 (5%)	61
	U	24 (50%)	24 (50%)	48	49 (80%)	12 (20%)	61

Table 6. Topical Persistance in Northern Sarawak Folktales

		Actor Voice (AV)			Unde	rgoer Voice (UV)
		>2 (High)	0-2 (Low)	Total	>2 (High)	0-2 (Low)	Total
Lun Bawang	A	44 (76%)	14 (24%)	58	27 (75%)	9 (25%)	36
_	U	21 (36%)	37 (64%)	58	20 (56%)	16 (44%)	36
Kelabit	A	59 (74%)	21 (26%)	80	41 (77%)	12 (23%)	53
	U	43 (54%)	37 (46%)	80	23 (43%)	30 (57%)	53
Sa'ban	A	32 (67%)	16 (33%)	48	52 (85%)	9 (15%)	61
	U	16 (33%)	32 (67%)	48	32 (52%)	29 (48%)	61

- ❖ In both Sa'ban and Lun Bawang:
 - > UV has the patterns of an active/ergative clause: both actor and undergoer have high values for RD and TP, though the actor is more topical than the undergoer.
 - AV has some properties reminiscent of an antipassive (e.g. the majority of undergoers have low values for TP) but some that more active-like (e.g. high values for RD).
- ❖ Interestingly, Kelabit behaves more symmetrically than the other two languages:
 - both AV and UV have the patterns of active/ergative clauses.
 - ➤ UV doesn't seem to be associated with highly topical actors → is AV becoming the basic clause?

Hence, there is some support for a shift from treating UV as basic (ergative alignment) to treating AV as basic (accusative alignment) but it doesn't seem to correlate with the morphosyntactic status of the language, as might have been expected.

5. Conclusion

- SYMMETRICAL VOICE languages pose a challenge to canonical models of (morphosyntactic) alignment since they have multiple transitive clauses.
- ❖ This has led to a debate as to whether they have ergative alignment, accusative alignment or a different system of alignment altogether as well as the proposal that Western Austronesian languages may have undergone an alignment shift.
- ❖ In order to address this, this paper applied discourse frequency and discourse topicality tests to a series of folktales in three closely related languages of Northern Sarawak whose voice systems are said to reflect different points in the transition from 'Philippine-type' to 'Indonesian-type'.
- * The results suggest the following analyses of the voices, based on discourse topicality:

Table 7. Discourse Analysis of Voices in Northern Sarawak

	Lun Bawang	Kelabit	Sa'ban
AV	antipassive/active	active (basic?)	antipassive/active
UV	ergative (basic)	ergative	ergative (basic)
	=discourse-ergative	=discourse-symmetrical	=discourse-ergative

- ❖ The three languages differ from Tagalog, where AV had the discourse characteristics of an antipassive and UV was basic (=ergative alignment). This supports the idea of a shift in alignment via the reanalysis of AV at the level of discourse.
- ❖ However, they also differ from one another in terms of the discourse properties of the AV and UV undergoers (and hence alignment), independently of the morphosyntactic status of the language.
- * This has several important implications:
 - ➤ It suggests that symmetrical voice and ergative/accusative alignment are not mutually exclusive, so long as the definition of alignment is broadened.
 - ➤ It supports the idea that Western Austronesian languages may have undergone a shift in alignment that is seen at a discourse level rather than in the morphosyntax.
 - ➤ However, it suggests that this shift/variation doesn't necessarily correlate exactly with the morphosyntactic properties of the voice system.
- ❖ Consequently, discourse alignment in Western Austronesian need not necessarily correspond to morphosyntactic phenomena and it is therefore important to consider both morphosyntax and discourse when analysing symmetrical voice systems.

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