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Uncovering ergative use in Murrinhpatha: Evidence from experimental data

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ABSTRACT

Murrinhpatha, a non-Pama-Nyungan language from the Daly region of the Northern Territory of Australia, has an extant ergative case marker that has been reported to be very rare in use. In this paper we report on the use of ergative marking in an experimental study of sentence production. Forty-six adult L1 speakers of Murrinhpatha were asked to describe a series of unrelated bivalent scenes that were manipulated for humanness (\pm human) in the agent and patient roles. Our results show higher than expected ergative use given previous descriptions (more than 14% of utterances with an overt agent NP). Furthermore, we found an alternating pattern between multiple ergative markers that is correlated with variations in word order and humanness of agent and patient characters. This pattern seems consistent with the available naturalistic corpus, but the rate of ergative marking is so low that it may never have been identified. Our study both contributes to the typology of ergative case marking and demonstrates the value of experimental research for language description in unearthing properties of the grammatical system that may not be easily discernible in other types of corpora.

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Ergativity; language documentation; typology; experimental corpora; Australian languages

1. Introduction

Recent years have seen a growing interest in psycholinguistics for work on diverse languages, and a recognition of the need to bring experimental research together with language documentation on small and underrepresented languages (e.g. Hellwig, 2019; Norcliffe et al., 2015; Whalen & McDonough, 2015). Much of the discussion focusses on the importance of broadening the database for psycholinguistic theorizing, which is currently based on a tiny proportion of the world's languages. Anand et al. (2015, p. 2) surveyed more than 4,000 abstracts from leading psycholinguistics journals and conferences and found that 85% of the research was based on 10 languages (with English alone accounting for 30%), and only 57 of the world's 7,000+ languages were represented at all. Jaeger and Norcliffe (2009) found that theories of processing in sentence production are based on less than 0.6% of the world's languages, and these are primarily Indo-European. Given the extent of linguistic diversity that continues to be documented by field

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Figure 1 Murrinhpatha and surrounding languages. Map drawn by Brenda Thornley

linguists, current psycholinguistic theories are based on a very typologically restricted empirical base (Evans & Levinson, 2009), which must be expanded to develop truly explanatory mechanistic theories of language use (Kidd & Garcia, 2022; Norcliffe et al., 2015).

On the other side of this equation, combining psycholinguistic research methods and language documentation has much to contribute to our understanding of linguistic diversity, and it is this point that we focus on in this paper. The experimental methodologies of psycholinguistic research can supplement the naturalistic and elicited data that are central to language documentation by targeting particular parts of the linguistic system and creating a balanced corpus across a number of controlled variables, working with a large number of participants. This not only helps to capture variation across the speech community, but can also significantly increase understanding of particular grammatical structures that may appear less frequently in naturalistic speech. Thus, with experimental methods, “at least for specific domains, it is possible to ensure generalizability – to collect comparable data from a larger sample of the population, detecting variation within a language, and, conversely, allowing for more robust generalizations of language-specific patterns” (Hellwig, 2019, p. 19).

In this paper we illustrate this point with a discussion of ergative use in an experimental corpus of Murrinhpatha (ISO639-3 code: mwf), a non-Pama-Nyungan language of the Daly region of Australia’s Northern Territory (see Figure 1). Murrinhpatha is a polysynthetic language with complex verbal morphology and minimal case marking. In previous descriptive work it has been described as having an ergative case which is extremely rare in use (Blythe, 2009; Mansfield, 2019; Nordlinger, 2015; Street, 1987; Walsh, 1976a), although no figures are given in these sources to quantify this. We report on interesting and unexpected patterns of ergative marking that we uncovered in our experimental corpus investigating sentence planning and production in Murrinhpatha (Nordlinger et al., 2022). These patterns of use are not discussed in previous Murrinhpatha descriptions, and are conditioned by factors not previously reported in the typological literature on optional ergativity (e.g. Chappell & Verstraete, 2019; McGregor, 2010). We show that subsequent investigation of these patterns in the naturalistic Murrinhpatha corpus is

consistent with our findings in the experimental corpus, but the rate of use is so small in the naturalistic corpus that we may never have noticed the patterns were it not for the focussed experimental data. These findings contribute to our understanding of Murrinhpatha grammatical structure and the typology of ergativity, and also highlight the value of experimental methods for language documentation research.

2. Murrinhpatha language

Murrinhpatha is the primary language of the Wadeye (Port Keats) community and surrounding areas, located approximately 400 km south-west of Darwin in the Northern Territory of Australia (see Figure 1). It is spoken by more than 2,500 people and is one of a small number of Australian languages still being acquired as a first language by all children in the community, and used as the language of daily communication (Marmion et al., 2014). Murrinhpatha is a polysynthetic language with complex verbal morphology (Mansfield, 2019; Mansfield & Nordlinger, 2020; Nordlinger, 2010, 2015; Nordlinger & Mansfield, 2021) and flexible word order at the clausal level (Mujkic, 2013; Nordlinger et al., 2022).

Like many polysynthetic head marking languages, Murrinhpatha does not have obligatory case marking on subjects and objects, instead relying primarily on verbal morphology to encode argument relations. Overt argument NPs are optional and are often omitted in natural speech. The following examples, all used to describe the same picture, are illustrative of basic Murrinhpatha clauses, showing word order flexibility, lack of case marking on arguments, omission of overt NPs, and the use of verbal morphology to express subject and object information.¹ In the following examples subject NPs are given in bold and object NPs are underlined.²

- (1) *kardu* *perrkenku* *mam-punku-tha-nintha*
 CLF:HUM two 3SGS.HANDS(8).NFUT-3DUO-chase-DU.M.NSIB
- ku** **kanarnturturt**
 CLF:ANIM crocodile
 'The crocodile chased the two people.' (MP25-2:20)³
- (2) **ku** **kanarnturturt** *mam-punku-tha-nintha*
 CLF:ANIM crocodile 3SGS.HANDS(8).NFUT-3DUO-chase-DU.M.NSIB
- kardu* *mamay* *purrkpurrk*
 CLF:HUM child many.small
 'The crocodile chased the small children.' (MP21-2:20)
- (3) *kardu* *mardinhpuy* *i* *kardu* *nugarn* **ku** **kanarnturturt**
 CLF:HUM girl and CLF:HUM man CLF:ANIM crocodile
- mam-punku-tha-nintha*
 3SGS.HANDS(8).NFUT-3DUO-chase-DU.M.NSIB
 'The crocodile chased the girl and the man.' (MP39-2:20)

¹The glosses used in this paper follow the Leipzig Glossing Rules wherever possible (<https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf>). Additional glosses used are: ANIM 'animate', DM 'discourse marker', HITH 'hither', HUM 'human', LANG 'language', NSIB 'non-sibling', PC 'paucal number', RR 'reflexive/reciprocal', TEMP 'temporal marker', VEG 'vegetable'.

²These examples illustrate some of the descriptions provided during the experiment for a picture in which a crocodile is chasing two people, illustrating the flexibility of word order even in discourse-neutral experimental conditions. See Nordlinger et al. (2022) for further discussion.

³Examples from the experimental data are cited with the following format: speaker code-block number: picture number (e.g. MP21-2:20). Examples taken from the Murrinhpatha corpus are cited according to the filename from which the example is taken.

- (4) *mam-punku-tha-nintha* **ku** **kanarnturturt**
 3SGS.HANDS(8).NFUT-3DUO-chase-DU.M.NSIB CLF:ANIM crocodile
 'The crocodile chase the two of them.' (MP14-2:20)
- (5) *mam-punku-tha-nintha*
 3SGS.HANDS(8).NFUT-3DUO-chase-DU.M.NSIB
 'It chased them (two).' (MP09-2:20)

Although not obligatory, the language does have an ergative/instrumental suffix *-re* (*-te* after most consonants). Early grammatical works on the language, such as Walsh (1976a), describe this marker as being used only in limited contexts requiring disambiguation (see also Street, 1987). More recent work finds ergative marking in natural speech to be very rare (Blythe, 2009; Mansfield, 2019), with transitive subjects 'almost always' unmarked for case (Nordlinger, 2015, p. 516), as in the above examples.

The limited ergative-marked examples from the naturalistic Murrinhpatha corpus (Mansfield et al., 2019) often involve inanimate agents as in (6) and (7), although even in this context ergative marking is not obligatory.

- (6) *tina-re dem-ngi-bath*
 sun-ERG 3SGS.POKE:RR(21).NFUT-1SGO-cook
 'The sun makes me hot.' (RN 20070608-002:037)
- (7) *ngarra nanthi truck-te pana punu-nga-nu*
 REL CLF:THING truck-ERG YOU.KNOW 3SGS.TRAVEL(7).FUT-1SG.OBL-FUT
 '(I'll go to school every morning) when that truck comes for me.' (9-08TNSchool 003:022)

More frequent uses of this suffix in the corpus are to mark instruments (8) or temporal NPs (9).

- (8) *nanthi truck-te ngurdu-nhi-ngkarl-u*
 CLF:THING truck-INST 1SGS.SHOVE(29).FUT-2SGO-return-FUT
 'I'll take you home in the truck' (MP-20100920-RN01)
- (9) *murrinh ngurdi-mpa-yith-nu ngarra ngay*
 CLF:LANG 1SGS.SHOVE(30).FUT-2SG.OBL-tell.story-FUT REL 1SG
kardu wakal-te ngardi-dha
 CLF:HUM small-TEMP 1SGS.BE(4).P:IPFV-P:IPFV
 'I'll tell you a story about when I was young.' (MP-20091008-RN01)

It is difficult to find clear morphosyntactic indicators of transitivity in Murrinhpatha, as discussed in detail in Nordlinger (2011). The clearest correlate is direct object marking on the verb, as in (1)–(5) above. As these examples show, the ergative marker is not obligatorily marked on subject NPs in transitive clauses since it does not appear on the subject NPs at all. Furthermore, in (7) we see an intransitive verb (with oblique marking encoding the benefactive adjunct) with ergative case marked on the subject NP. Thus, ergative marking in Murrinhpatha is not a reliable indicator of transitivity, but its use is clearly associated with agentive subjects (Nordlinger, 2015). It is this property that we focus on in our discussion here.

3. Experimental corpus

Our experimental corpus was initially developed to investigate the impact of free word order on sentence planning and production. In particular, we were interested in



Figure 2 Example stimuli pictures depicting the different event combinations

whether speakers of free word order languages, such as Murrinhpatha, show different planning processes in sentence production than speakers of fixed word order languages. The results of this study are discussed in Nordlinger et al. (2022). Although not initially one of the investigative aims of the experiment, the response data revealed some interesting patterns in ergative marking on agents, which is the focus of this paper.

The experiment consists of 48 test pictures depicting two-participant events involving agents and patients (see Figure 2 for examples), interspersed with 93 fillers (mostly of intransitive events).⁴ The test pictures fully crossed human and non-human entities in the agent and patient roles, and the location of the agent and the patient was balanced across different experimental lists. Each picture had two versions – mirror imaged to control for visual scanning biases (e.g. visually parsing a scene from left to right, which may be influenced by several factors, including reading instruction (Abed, 1991; Chung et al., 2017)), and participants were given pictures in different orders randomized across the experiment.

We recorded 46 L1 Murrinhpatha speakers (33 females, 23 males), all residents of Wadeye (Northern Territory) over three field trips in 2016 (May and October) and 2018 (July).⁵ Data from three participants were removed because they were unable to complete the experiment for various reasons. Participant ages ranged from 17 to 63 years ($M = 31.49$, $SD = 10.74$). Participants were tested individually in a quiet room in Wadeye in the company of the authors and a local Murrinhpatha-speaking research assistant. The

⁴The full set of test pictures is available from the project's Open Science Framework (OSF) page: <https://osf.io/2j3nu/>.

⁵This research is covered by University of Melbourne Human ethics approval – Project Ethics ID: 1237988.

first author is well-known to the community and many of the participants are used to working with her on language-related projects. Participants were told they would be shown a series of pictures and were asked to describe what was happening in the picture. The same instructions were given to each participant and explained in Murrinhpatha by the research assistant. The session began with a practice session that contained seven pictures. The practice session followed the same format as the test session blocks, and as such served to familiarize participants with the procedure. The characters in each picture were distinct and there was no obvious narrative relationship between any of the pictures. Participant responses were recorded on a Zoom H4 digital recorder and transcribed in ELAN by the first author in consultation with a Murrinhpatha speaker.⁶

The experiment could yield a maximum of 2,064 observations (48 stimuli × 43 participants = 2,064). A small proportion of the data (2.28%) were missing due to equipment failure, experimenter error or the participant electing not to respond. This resulted in 2,017 descriptions for analysis. Of these, 431 trials were ruled out because the response was not a full clause, or participants did not describe an event involving an agent and a patient (e.g. 'the dog is playing' instead of 'the dog is chasing a butterfly'), or their production contained self-corrections and hesitations. A further 30 trials were excluded because of speech onsets longer than 6,500 ms (and were thus not considered to reflect unconscious speech planning processes), and another 78 were removed from analysis due to being ambiguous as to whether the initial NP referred to the agent or the patient. Therefore, the final data set consisted of 1,478 sentences.

4. Results

4.1 Word order

Unsurprisingly, the results from the experiment are consistent with previous descriptions of Murrinhpatha in many respects. A great degree of variation in word order is found across the responses and across participants, confirming the language's word order flexibility – see (1)–(5) above, which illustrate a selection of word orders in the responses to one of the test pictures. All participants used multiple word orders in their responses (average = 5.45) and 10 out of 11 possible word orders were used (V(erb)–P(atient)–A(gent) is considered to be an accidental gap). Agent-initial word orders were the most common ($n = 1,014$), followed by patient-initial ($n = 344$) and verb-initial ($n = 120$). The distribution of word orders found is given in Table 1 (as reported by Nordlinger et al., 2022).

Of these responses, a total of 1,271 (86%) have an overt agent NP that could potentially be the locus of ergative marking, and it is thus these 1,271 responses that we focus on in the remainder of this paper.

4.2 Ergative marking

For this study, we consider ergative marking to be that which is found only on agents in our experimental corpus and never on patients or other nominal phrases. Clitics such as

⁶Eye-movements were also recorded using a SMI REDn Professional portable remote eye-tracker; this data is discussed in Nordlinger et al. (2022) and is not relevant to the focus of this paper, which concerns only the verbal responses.

Table 2 Frequency of ergative marking across word orders

Word order		Total	Ergative	%
Agent-initial	AVP	695	42	6.04
	APV	223	13	5.83
	AV	96	8	8.33
Patient-initial	PVA	150	76	50.67
	PAV	79	32	40.51
Verb-initial	VAP	6	4	66.67
	VA	22	6	27.27
Total		1,271	181	14.24

overwhelmingly more prevalent in the corpus (1,014/1,271 with overt A NPs), this suggests that ergative marking may be one way to indicate a less common word order choice, as in (11) and (12).

- (11) *ku pangkuy pan-kat* *ku manki-re*
 CLF:ANIM snake 3SGS.SLASH(23).NFUT-catch.with.stick CLF:ANIM monkey-ERG
 'The monkey caught the snake on a stick.' (MP06-1:07) (PVA)
- (12) *kardu kigay three dam-punku-wewu-nime* *kardu palngun-re*
 CLF:HUM youth three 3SGS.POKE(19).NFUT-PC.O-wet-PC.M CLF:HUM woman-ERG
 'The woman threw water on the three boys.' (MP25-1:01) (PVA)

We also find a significant interaction in our corpus between ergative marking and the humanness of agent and patient characters. Firstly, we find that ergative marking is more likely on non-human agents as in (13), consistent with a common pattern in languages with optional ergativity whereby ergative marking is more likely on non-prototypical or unexpected agents (Chappell & Verstraete, 2019; McGregor, 2010).

- (13) *ku kanarnturturt-re mam-punku-tha-ngintha*
 CLF:ANIM crocodile-ERG 3SGS.HANDS(8).NFUT-DU.O-chase-DU.F.NSIB
kardu two
 CLF:HUM two
 'The crocodile chased the two people.' (MP42-2:20)

Interestingly, we also find that clauses with ergative-marked agents are more likely to have human *patients* suggesting that the ergative marking is not only related to the unexpectedness of the agent, but that of the patient as well. Table 3 provides the figures; we compared the likelihood that the distribution of ergative marking on agents and patients differs from chance using binomial tests (where chance denotes an equal distribution of ergative marking). For agents, we found that picture descriptions were significantly more likely to have ergative-marked non-human agents ($p < 0.001$), and found that ergative-marked clauses were more likely to have human patients ($p < 0.001$).

Thus, a significantly greater number of ergative-marked clauses have non-human agents and/or human patients, which suggests that ergative marking may be used to indicate non-typical agent and patient characters. However, it is worth noting here that Nordlinger et al. (2022) found that descriptions of events with non-human agents and human patients were more likely to trigger patient-initial word orders, which we find to also be more likely to have ergative marking (see Table 2), so it's difficult to determine whether the word order or the humanness of the characters may be the key determining factor here.

Table 3 Interaction of ergative marking with humanness of agent and patient

	Responses with ergative	% of total ergative
Human agent	55	30.39
Non-human agent	127	70.16
Human patient	129	71.27
Non-human patient	53	29.28
Total	181	

Table 4 Distribution of ergative marking in the corpus

	Number of responses	% of total
<i>-re</i>	93	51.38
<i>-kathu</i>	66	36.46
<i>-re-kathu</i>	9	4.97
<i>-kathu-re</i>	1	0.55
<i>-dhangunu</i>	12	6.63
Total	181	100

4.3 Emerging alternating ergative marking

In the discussion so far we have treated all types of ergative marking together, but in fact our corpus contains three different markers that meet our definition of ergative marking, in that they are only found on agents in our experimental corpus. As we will see, the three markers show very different patterns of use. The three markers and their distributions in the corpus are given in Table 4.

The suffix *-re* is the ergative marker that has been identified in previous descriptions of the language and found to be very rare in its ergative function in naturalistic speech (Mansfield, 2019; Nordlinger, 2015; Walsh, 1976a). This suffix accounts for just over 50% of ergative occurrence in our corpus.

The suffix *-dhangunu* marks a ‘source’ – either a location or a person, as in (14).

- (14) *murrinh ngay-dhangunu kale nhinhi*
 CLF:LANG 1SG-SOURCE mother 2SG
 ‘That’s the message from me, your mother.’ (RN 20120228-email)

In our corpus *-dhangunu* appears only on non-human agents, and mostly ($n = 9/12$) on inanimate agents such as ‘lightning’ (15) and ‘fire’. This usage can be seen as a natural extension of the source meaning, and it is common for ergative markers to grammaticalize from ablative/source markers across languages (McGregor, 2017).

- (15) *thu malarntath-dhangunu pan-bat thay*
 CLF:WEAPON lightning-SOURCE 3SG.SLASH(23).NFUT-hit tree
 ‘The lightning hit the tree.’ (MP43-1:28)

Particularly striking in our corpus is the use of *-kathu*⁸ ‘HITHER’ on more than 40% of marked agents. This adverbial suffix is generally treated as a directional marker in previous Murrinhpatha descriptions, but its function has not been analyzed or discussed in any detail, and researchers have varied in the meaning they attribute to it. Street (1987, p. 21)

⁸Alternatively spelled *-gathu* (e.g. Blythe, 2009).

translates it as ‘towards/from’; Mansfield (2019, p. 189) gives its meaning as ‘from’, whereas Walsh (1976b, p. 251) and Blythe (2009) gloss it as ‘towards’. It is often used to encode movement from one location towards a deictic centre, often the speaker. We propose that it is best analyzed as a ‘HITHER’ suffix, thus capturing both movements away and towards as part of its meaning and accounting for the variation in the previous literature. In this use it is not restricted to agents, but can be marked on many argument types, including patients/themes (16) and locations (17), and can also be attached to verbs (18). In some examples the semantic contribution of *-kathu* appears to be metaphorical, as in (19).

- (16) *mi numi-kathu*
CLF:VEG one-HITH
‘(Give me) a cigarette.’ (overheard, RN)
- (17) *bere ku kukpi = ka punna-dha-ngime*
so CLF:ANIM black.headed.python = TOP 3DU.S.TRAVEL(7).PST:IPFV-PC.F.NSIB
da Kimul-kathu
CLF:PLACE Kimul-HITH
‘So the black-headed python family came this way from Kimul.’ (Ku Kukpi book)
- (18) *murrinh tha-ngi-rart-kathu!*
CLF:LANG 2sgS.POKE(19).FUT-1sgO-answer-HITH
‘Answer me!’ (Ford & McCormack, 2011)
- (19) *murrinh = ka ngurdi-yith-nu = ka*
CLF:LANG = TOP 1sgS.SHOVE:RR(30).FUT-tell.story-FUT = TOP
marrare-kathu = ka Ngurde
beginning_of_time-HITH = TOP Ngurde
‘The story about Ngurde I’m going to tell comes from the very beginning of time.’ (Blythe, 2009, p. 144)

Much analysis is still needed into the full range of functions of *-kathu* and its interactions with other elements in the clause. We leave a more detailed corpus-based analysis of its properties for future research, and here focus on its usage in the experimental data.

In our experimental corpus *-kathu* appears regularly and only on agents, as in (20) and (21); never on patients or other NPs. It thus appears to have an additional function of ergative marking in these clauses.

- (20) *ku pujicat mangan-tha = wurran*
CLF:ANIM cat 3sgS.SNATCH(9).NFUT-chase = 3sgS.GO(6).NFUT
ku pigipigi-kathu
CLF:ANIM pig-HITH
‘The pig is chasing the cat.’ (MP01-3:11)
- (21) *ku were-kathu mam-punku-tha-nintha*
CLF:ANIM dog-HITH 3sgS.HANDS(8).NFUT-DU.O-chase-DU.M.NSIB
ku ngalurl perrkenku
CLF:ANIM lizard_sp. two
‘The dog chased the two lizards.’ (MP07-2:35)

The large majority of ergative-marked agents in the experimental corpus are marked with one of two markers: *-re* and *-kathu*. We therefore examined the distributions of these markers to determine whether there were any identifiable factors correlating with the choice of one over the other. One possibility is that the difference is sociolinguistic – that *-kathu* is an alternative ergative marker used perhaps by younger generations of Murrinhpatha speakers. However, there is no clear correlation with age of participants in

our corpus: of the 43 participants whose responses were analyzed, nine did not use ergative marking at all, and another five used it in only one response. Of the remaining 29 the large majority ($n = 25/29$) used both *-re* and *-kathu* in their responses, across all age groups. There were four participants who used only *-re*, ranging in age from 21 to 45, and no participants with more than one agent-marked response who used only *-kathu*.

However, *-kathu* and *-re* do show different patterns of use in the corpus, in terms of word order and character humanness.⁹ Tables 5 and 6 show the distributions of *-re* and *-kathu* respectively according to agent/patient humanness and word order.

The patterns of use of *-re* and *-kathu* show a clear split. *-re* is used primarily with non-human agents (76/93, 81.7%, $p < 0.001$, binomial test) and in patient-initial word orders (75/93, 80.6%, $p < 0.001$); *-re* also prefers human patients (67/93, 72%, $p < 0.001$). On the other hand *-kathu* is not sensitive to the humanness of agents ($p = 0.36$) but prefers agent-initial word orders (46/66, 69.7%, $p < 0.001$). Like *-re*, *-kathu* also prefers human patients (45/66, 68.2%, $p < 0.001$). Thus, while both ergative markers prefer human patients, *-re* is preferred for non-human agents and P-initial word orders, while *-kathu* is more likely in A-initial word orders.

These patterns are illustrated in the following examples:

- (22) *kardu* *ku* *nirntu-re* *kanthin-wurr*
 CLF:HUM CLF:ANIM horse-ERG 3SGS.TAKE(22).NFUT-drag
 'The horse is dragging the man along.' (MP01-3:17) (PAV)
- (23) *kardu* *kigay* *bangam-lele* *ku* *kanarnturturt-re*
 CLF:HUM youth 3SGS.BASH(14).NFUT-bite CLF:ANIM crocodile-ERG
 'The crocodile bit the young man.' (MP31-1:04) (PVA)
- (24) *ku* *murrirbe-kathu* *mam-punku-ngkayway-nintha = dim*
 CLF:ANIM bird-HITH 3SGS.HANDS(8).NFUT-3DU.O-swoop-DU.M.NSIB=3SGS.SIT(1).NFUT
 'The bird is swooping them (two boys).' (MP03-1:31) (AV)
- (25) *kaleyele-kathu* *kanthin-dhuhduth = kanam* *wakal* *nigunu*
 mother-HITH 3SGS.TAKE(22).NFUT-bathe = 3SGS.BE(4).NFUT child 3SG.F
 'The mother is bathing her child.' (MP38-4:20) (AVP)

Thus, the results show an overall pattern of optional alternating ergativity (Chappell & Verstraete, 2019) conditioned by both word order and humanness of agents and patients. Agent NPs are usually unmarked, but are more likely to have ergative marking if they are non-human and the patient is human. In addition, we find an alternation between two ergative markers conditioned by the humanness of the agent in conjunction with word order: *-re* is preferred when non-human agents are non-initial in the clause and *-kathu* is preferred when agents are initial in the clause.

5. Comparison of findings with naturalistic corpus

As shown above, our experimental corpus revealed interesting patterns of ergative marking that have not been reported in previous work on Murrinhpatha. These patterns are found across the corpus and across speakers, so are unlikely to be due to the nature of the

⁹Here we consider only the responses with either *-re* or *-kathu*, excluding the few responses which contain both (e.g. *-re-kathu* and *-kathu-re*) since the numbers ($n = 9$ and $n = 1$, respectively) are too small to make any statistical analysis possible. It is notable, however that seven out of the nine responses with *-re-kathu* are P-initial and six out of nine involve non-human agents acting on human patients, so these appear to be patterning with *-re* only responses in our corpus.

Table 5 Distribution of *-re* by character humanness and word order

	A-initial	P-initial	V-initial	Total
Human agent	1	14	2	17
Non-human agent	13	61	2	76
Total	14	75	4	93
Human patient	13	50	4	67
Non-human patient	1	25	0	26
Total	14	75	4	93

Table 6 Distribution of *-kathu* by character humanness and word order

	A-initial	P-initial	V-initial	Total
Human agent	23	9	3	35
Non-human agent	23	5	3	31
Total	46	14	6	66
Human patient	31	9	5	45
Non-human patient	15	5	1	21
Total	46	14	6	66

experimental task. However, one important question is whether these patterns also exist in language use more broadly, despite not having been previously reported in the descriptive literature.

In order to address this question, we randomly selected eight different naturalistic texts from the extended Murrinhpatha corpus (Mansfield et al., 2019) for analysis. This corpus includes language recordings from a large number of Murrinhpatha speakers collected by a team of researchers since the 1970s. The selected texts were from six different speakers, totalling 1,122 clauses. Among these 1,122 clauses, we found only five clear instances of ergative marking, reinforcing the descriptive claims about its rarity in use. Interestingly, however, these five examples are consistent with the patterns of ergative marking found in the experimental data: there are two examples of *-re*, both of which involve non-human agents which are non-initial in the clause (26, 27);¹⁰ and three examples of *-kathu*, all of which are initial in the clause (and all are human agents) (28, 29).¹¹ There were no examples of *-dhangunu* in this dataset.

- (26) *pam-punku-dhardum-ngintha* *nanthi* *marrurru-re*
 3SGS.SLASH:RR(24).NFUT-3DU.O-drown-DU.F.NSIB CLF:THING Milky Way-ERG
 'The Milky Way drowned them.' (1976_CS1 60.1)
- (27) *ngarra nanthi truck-re pana punu-nga-nu*
 REL CLF:THING truck-ERG YOU.KNOW 3SGS.TRAVEL(7).FUT-1SG.OBL-FUT
 '(I'll go to school every morning) when that truck comes for me.' (9-08TNSchool 003:022)
- (28) *ngay-warda-kathu ngurdu-wurl-nu-tharra*
 1SG-TEMP-HITH 1SGS.SHOVE(29).FUT-return-FUT-MOVING
 'I'll be coming back.' (1976_CS1 115.1)
- (29) *Kaykay-kathu-warda murrinh-yu report*
 Kaykay-HITH-TEMP CLF:LANG-DM report
- me-ngarru-dha-ngime = kardi*
 3SGS.HANDS(8).P.IPFV-1PC.EXC.OBL-PST-PC.F.NSIB = 3SGS.BE(4).P.IPFV
 'Kaykay was dobbing us in.' (CP_Bush Holiday 110)

¹⁰Note that (27) and (28) are both examples of ergative-marked agents in non-transitive clauses. Both involve intransitive verbs, with (27) also having a benefactive marked with an oblique prefix.

¹¹The third instance of *-kathu* marking an agent is identical to (28) and is a repeated line in the same text.

These numbers are clearly too small for us to make definitive claims about the patterns of ergative use in Murrinhpatha overall. However, it is notable that they are consistent with the patterns found in the experimental corpus, and therefore suggest that a more comprehensive analysis of the naturalistic corpus is warranted. For our purposes, these few examples illustrate the value of the experimental method for language description: the narrowly focussed nature of the experimental task has brought to light patterns of ergative use that appear too infrequently in the naturalistic corpus for researchers to have identified them.

6. Discussion and conclusion

Our experimental corpus of Murrinhpatha revealed ergative use beyond that which would have been expected given existing descriptions of it being extremely rare and virtually non-existent in language use. Although the large majority (more than 85%) of overt agents appeared without any ergative marking at all, 14.24% of overt agents in the corpus do have some sort of ergative marking. The Murrinhpatha data therefore have implications for the typology of optional ergativity, whereby an ergative marker can be present or absent in a particular environment without affecting grammatical roles (Chappell & Verstraete, 2019, p. 2; see also McGregor, 2010). Optional ergativity has been reported for other Australian languages (e.g. Jaminjung (Schultze-Berndt, 2000), Kuuk Thaayorre (Gaby, 2010), Umpithamu (Verstraete, 2010) and Warrwa (McGregor, 2006)); however, in these languages the rates of ergative marking on agents is substantially higher than in Murrinhpatha. Although ergative marking is substantially less frequent in Murrinhpatha, the pattern of marking is similar to those of other languages in the prevalence of marking on non-human (and therefore non-prototypical) agents (see Table 3). However, we find that the occurrence of ergative marking in Murrinhpatha is also sensitive to the humanness of the patient: overt agent NPs are more likely to be ergative marked when the patient is human (Table 3), and we also find a preference for ergative marking on agents in P-initial clauses (Table 2). These facts suggest that ergative marking may be used to signal unexpected alignments of referents and semantic roles in the event (non-human agents, human patients) and/or a less-typical word order choice.

This pattern of ergative marking raises the question of whether the marking is a production- or a comprehension-driven effect. That is, do speakers use ergative marking to ease the cognitive effort of tracking agents and patients during production, or are they overtly marking agents for the benefit of the hearer? Although the experimenter was present, our task was not typically communicative in the sense that there was no interaction; participants simply described each picture as it emerged. This may have reduced the possibility that the effect is comprehension-driven. This is further supported by the fact that ergative marking was relatively infrequent. If we assume that a comprehension-driven effect involves audience design, and that ergative marking in Murrinhpatha is one clear unambiguous method of signalling case roles, then we might expect the use of the ergative markers to be higher (e.g. if speakers were assumed to consistently avoid ambiguity in aid of the hearer, as in the Gricean Maxim of Manner (Grice, 1975)).

Accordingly, we suspect that the use of the ergative markers may have served to help speakers distinguish between agent and patients during the process of linguistic

encoding (Bock & Levelt, 1994), driven by the atypical features of the environments in which we see marking. That is, we suspect that it was a production-driven effect. Thus, when describing a picture where a crocodile is biting a man, the combination of a non-human agent and human patient leads to a greater likelihood of producing a P-initial word order (as it would also more likely correlate with a passive in a European language). The use of ergative marking, in this context *-re* (see (23)), may help the speaker keep track of the participant roles during the production process. This interpretation is consistent with other work demonstrating that audience design does not always guide speakers' syntactic choices during production (see Arnold et al., 2004; Ferreira & Dell, 2000; Ferreira & Schotter, 2013; Jaeger, 2010; Morgan & Ferreira, 2022). This is not to say that the inclusion of the ergative marker does not aid comprehension; overt and unambiguous case marking should provide local cues to grammatical function (Bates & MacWhinney, 1989), but our point is that this may not have been the primary function of its use.

The Murrinhpatha data also reveal a conditioned split between three alternative ergative markers: *-re*, *-dhangunu* and *-kathu*. The use of different case markers to encode the same grammatical role has been referred to as differential ergative case marking (McGregor, 2010) or alternating ergative case marking (Chappell & Verstraete, 2019). Differential ergative case marking has been reported for other Australian languages such as Jaminjung, where the ablative case marker can be used in place of the ergative case to mark contrastive or unexpected agents (Schultze-Berndt, 2000, p. 168), similar to the use of the source marker *-dhangunu* to mark non-prototypical inanimate agents in the Murrinhpatha corpus (e.g. (15)). Warrwa has two alternative ergative markers one of which is used to put the agent in focus, especially when it is an unexpected agent (McGregor, 2006). Similar to Murrinhpatha, Warrwa combines a differential/alternating ergative case system with an optional ergative system since both of the ergative markers are optional so that agents may also appear unmarked (McGregor, 2010).

The Murrinhpatha data thus show similarities with optional and alternating ergative systems in other languages. These data also, however, show some additional conditioning properties that are not reported for other languages. Firstly, the use of ergative marking overall in Murrinhpatha appears to be sensitive to semantic properties of the patient referent, namely whether the patient is human or not. This is unusual for optional ergative systems cross-linguistically, which are commonly sensitive to properties of the agent, but not the patient (McGregor, 2010). Furthermore, in Murrinhpatha we find alternating ergative markers, *-re* and *-kathu*, the choice of which is driven largely by word order: *-re* is found predominantly on agents that are not initial in the clause (Table 5), and *-kathu* is found predominantly on agents that are clause initial (see Table 6). This type of (optional) conditioned-split has not been previously reported for the language itself, or in the typological literature on multiple ergative marking (Arkadiev, 2017; Chappell & Verstraete, 2019; McGregor, 2010).

At a broader level, the greater incidence of ergative marking that we have found in Murrinhpatha using experimental methods raises questions about the degree to which ergative marking is maintained in a language under circumstances in which it is not strictly required. Bickel et al. (2015) have argued that languages typically shift from ergative-absolutive marking towards nominative-accusative marking rather than the other way around, and explain this by arguing that ergative alignment is more complex than

nominative-accusative alignment (for neurophysiological evidence see Sauppe et al. (2021)). What our data show is that ergative marking can remain in a language to aid argument marking in specific circumstances that involve unexpected agents and/or patients, with the use of individual markers varying with word order. That is, ergativity is maintained where there is a functional reason to do so, even if, given the language, it is not strictly necessary or particularly common in use. At the same time, the novel use of the directional adverb *-kathu* 'HITHER' shows that existing forms can be re-analyzed to mark agents in those circumstances where it aids to distinguish agents from human patients.¹²

These findings are interesting typologically and demonstrate the value of experimental methodologies for descriptive and typological research. In experimental contexts speakers are pushed to draw upon their linguistic resources in ways that may not be required very often in naturalistic speech, unearthing properties of the grammatical system that may otherwise be missed. While language is elicited outside its naturalistic context of use, these patterns can then be verified and further investigated and explored in more naturalistic contexts, leading to a more comprehensive description of the linguistic system when results align, as we have found to some degree in our data. One issue for further investigation in Murrinhpatha is the extent to which the conditioning properties identified in the experimental corpus – word order, humanness of agent and patient – interact with information structure (namely, topic and/or focus) in naturalistic language use.

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Data availability statement

The experimental data that support the findings of this study are openly available in PARADISEC at paradisec.org.au, reference number RN3. The corpus data that were included in this paper are not available as not all participants gave written consent for their data to be shared publicly, so due to the sensitive nature of the research these supporting data are not available.

¹²McGregor (2017, p. 12) claims that it is unusual and unexpected that an ergative would grammaticalize from a directional marker, but cites Rude (1991) who argues that the ergative suffix in Nez Perce has developed from a directional marker meaning 'hither', interestingly similar to what appears to have happened in Murrinhpatha.

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References

- Abed, F. (1991). Cultural influences on visual scanning patterns. *Journal of Cross-Cultural Psychology*, 22(4), 525–534. <https://doi.org/10.1177/0022022191224006>
- Anand, P., Chung, S., & Wagers, M. (2015). *Widening the net: Challenges for gathering linguistic data in the digital age*. <https://people.ucsc.edu/~schung/anandchungwagers.pdf>.
- Arkadiev, P. (2017). Multiple ergatives: From allomorphy to differential agent marking. *Studies in Language*, 41(3), 717–780. <https://doi.org/10.1075/sl.41.3.06ark>
- Arnold, J. E., Wasow, T., Asudeh, A., & Alrenga, P. (2004). Avoiding attachment ambiguities: The role of constituent ordering. *Journal of Memory and Language*, 55(1), 55–70. <https://doi.org/10.1016/j.jml.2004.03.006>
- Bates, E., & MacWhinney, B. (1989). Functionalism and the competition model. In B. MacWhinney, & E. Bates (Eds.), *The crosslinguistic study of sentence processing* (pp. 3–76). Cambridge University Press.
- Bickel, B., Witzlack-Makarevich, A., Choudhary, K. K., Schlesewsky, M., & Bornkessel-Schlesewsky, I. (2015). The neurophysiology of language processing shapes the evolution of grammar: Evidence from case marking. *PLoS ONE*, 10(8), e0132819. <https://doi.org/10.1371/journal.pone.0132819>
- Blythe, J. (2009). *Doing referring in Murrinh-Patha conversation* [Doctoral dissertation]. University of Sydney. <https://ses.library.usyd.edu.au/handle/2123/5388>
- Bock, K., & Levelt, W. J. M. (1994). Language production: Grammatical encoding. In M. A. Gernsbacher (Ed.), *Handbook of psycholinguistics* (pp. 945–984). Academic Press.
- Chappell, H., & Verstraete, J. (2019). Optional and alternating case marking: Typology and diachrony. *Language and Linguistics Compass*, 13(3), e12311. <https://doi.org/10.1111/lnc3.12311>
- Chung, H. K. S., Liu, J. Y. W., & Hsiao, J. S. (2017). How does reading direction modulate perceptual asymmetry effects? *Quarterly Journal of Experimental Psychology*, 70(8), 1559–1574. <https://doi.org/10.1080/17470218.2016.1193549>
- Evans, N., & Levinson, S. C. (2009). The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences*, 32(5), 429–448. [https://doi.org/10.1017/s0140525\(0999094x](https://doi.org/10.1017/s0140525(0999094x)
- Ferreira, V. S., & Dell, G. S. (2000). The effect of ambiguity and lexical availability on syntactic and lexical production. *Cognitive Psychology*, 40(4), 296–340. <https://doi.org/10.1006/cogp.1999.0730>
- Ferreira, V. S., & Schotter, E. R. (2013). Do verb bias effects on sentence production reflect sensitivity to comprehension or production factors? *Quarterly Journal of Experimental Psychology*, 66(8), 1548–1571. <https://doi.org/10.1080/17470218.2012.753924>

- Ford, L., & McCormack, D. (2011). *Murrinhpatha–English legal glossary*. Batchelor Press.
- Gaby, A. (2010). From discourse to syntax and back: The lifecycle of Kuuk Thaayorre ergative morphology. *Lingua. International Review of General Linguistics. Revue internationale De Linguistique Generale*, 120(7), 1677–1692. <https://doi.org/10.1016/j.lingua.2009.05.014>
- Grice, H. P. (1975). Logic and conversation. In P. Cole, & J. L. Morgan (Eds.), *Speech acts* (Vol 3, pp. 41–58). Academic Press.
- Hellwig, B. (2019). Linguistic diversity, language documentation and psycholinguistics: The role of stimuli. In A. Lahaussois, & M. Vuillemer (Eds.), *Methodological tools for linguistic description and typology* (pp. 5–30). University of Hawaii Press. <https://scholarspace.manoa.hawaii.edu/handle/10125/24855>.
- Jaeger, T. F. (2010). Redundancy and reduction: Speakers manage syntactic information density. *Cognitive Psychology*, 61(1), 23–62. <https://doi.org/10.1016/j.cogpsych.2010.02.002>
- Jaeger, T. F., & Norcliffe, E. J. (2009). The cross-linguistic study of sentence production. *Language and Linguistics Compass*, 3(4), 866–887. <https://doi.org/10.1111/j.1749-818X.2009.00147.x>
- Kidd, E., & Garcia, R. (2022). How diverse is child language acquisition research? *First Language*, 42(6), 703–735. <https://doi.org/10.1177/01427237211066405>
- Mansfield, J. (2019). *Murrinhpatha morphology and phonology*. de Gruyter Mouton.
- Mansfield, J., Blythe, J., Nordlinger, R., & Street, C. (2019). *Murrinhpatha Morpho-Corpus* [Digital corpus]. langwidj.org/Murrinhpatha-morpho-corpus.
- Mansfield, J., & Nordlinger, R. (2020). Demorphologization and deepening complexity in Murrinhpatha. In P. Arkadiev, & F. Gardani (Eds.), *The complexities of morphology* (pp. 52–80). Oxford University Press.
- Marmion, D., Obata, K., & Troy, J. (2014). *Community, identity, wellbeing: The report of the Second National Indigenous Languages Survey* (pp. 1–63). AIATSIS. https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0CB0QFjAA&url=http%3A%2F%2Fwww.aiatsis.gov.au%2F_files%2Fresearch%2Freport_of_the_2nd_national_indigenous_languages_survey.pdf&ei=oJ2TVN6yF9bk8AXI54CQBA&usq=AFQjCNHu4jFDxOS3MGxxMeAPb0VaCiw8A&sig2=FbTTQRJcoAygrjpaGPYtg&bvm=bv.82001339,d.dGc
- McGregor, W. (2010). Optional ergative case marking systems in a typological-semiotic perspective. *Lingua*, 120(7), 1610–1636. <https://doi.org/10.1016/j.lingua.2009.05.010>
- McGregor, W. B. (2006). Focal and optional ergative marking in Warrwa (Kimberley, Western Australia). *Lingua*, 116(4), 393–423. <https://doi.org/10.1016/j.lingua.2005.02.002>
- McGregor, W. B. (2017). In J. Coon, D. Massam, & L. D. Travis (Eds.), *Grammaticalization of ergative case marking*. Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780198739371.013.19>
- Morgan, A. M., & Ferreira, V. S. (2022). Still no evidence of audience design in syntax: Resumptive pronouns are not the exception. *Journal of Memory and Language*, 127, 104368. <https://doi.org/10.1016/j.jml.2022.104368>
- Mujkic, E. (2013). *Murrinh-Patha syntax: Clausal structure and the noun phrase*. BA Honours.
- Norcliffe, E., Harris, A. C., & Jaeger, T. F. (2015). Cross-linguistic psycholinguistics and its critical role in theory development: Early beginnings and recent advances. *Language, Cognition and Neuroscience*, 30(9), 1009–1032. <https://doi.org/10.1080/23273798.2015.1080373>
- Nordlinger, R. (2010). Verbal morphology in Murrinh-Patha: Evidence for templates. *Morphology*, 20(2), 321–341. <https://doi.org/10.1007/s11525-010-9184-z>
- Nordlinger, R. (2011). Transitivity in Murrinh-Patha. *Studies in Language*, 35(3), 702–734. <https://doi.org/10.1075/sl.35.3.08nor>
- Nordlinger, R. (2015). Inflection in Murrinhpatha. In M. Baerman (Ed.), *The Oxford handbook of inflection* (pp. 491–519). Oxford University Press.
- Nordlinger, R., Garrido Rodriguez, G., & Kidd, E. (2022). Sentence planning and production in murrinhpatha, an Australian ‘free word order’ language. *Language*, 98(2), xxx–xxx. <https://doi.org/10.1353/lan.2022.0008>
- Nordlinger, R., & Mansfield, J. (2021). Positional dependency in Murrinhpatha: Expanding the typology of non-canonical morphotactics. *Linguistics Vanguard*, 7(1), 2020079. <https://doi.org/10.1515/lingvan-2020-0079>

- Rude, N. (1991). On the origin of the Nez Perce ergative NP suffix. *International Journal of American Linguistics*, 57(1), 24–50. <https://doi.org/10.1086/ijal.57.1.3519712>
- Sauppe, S., Choudhary, K. K., Blasi, D. E., Norcliffe, E., Bhattamishra, S., Gulati, M., Egurtzegi, A., Bornkessel-Schlesewsky, I., Meyer, M., & Bickel, B. (2021). Neural signatures of syntactic variation in speech planning. *PLOS Biology*, 19(1), e3001038. <https://doi.org/10.1371/journal.pbio.3001038>
- Schultze-Berndt, E. (2000). *Simple and complex verbs in Jaminjung*. Max Planck Institute for Psycholinguistics.
- Street, C. (1987). *An introduction to the language and culture of the Murrinh-Patha*. Summer Institute of Linguistics, Australian Aborigines Branch Darwin, Northern Territory.
- Verstraete, J.-C. (2010). Animacy and information structure in the system of ergative marking in umpithamu. *Lingua. International Review of General Linguistics. Revue internationale De Linguistique Generale*, 120(7), 1637–1651. <https://doi.org/10.1016/j.lingua.2009.05.011>
- Walsh, M. (1976a). Ergative, locative and instrumental case inflections: Murinjpata. In R. M. W. Dixon (Ed.), *Grammatical categories in Australian languages* (pp. 405–408). Australian Institute for Aboriginal Studies.
- Walsh, M. (1976b). *The Murinypata language of North West Australia* [Doctoral dissertation]. Australian National University.
- Whalen, D. H., & McDonough, J. (2015). Taking the laboratory into the field. *Annual Review of Linguistics*, 1(1), 395–415. <https://doi.org/10.1146/annurev-linguist-030514-124915>