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Sebastian Fedden

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1. Introduction

The curious features of Mian, a Mountain Ok language spoken in Papua New Guinea, include the fact that agreement with the object is restricted to a small subset of transitive verbs. Such "sporadic" agreement (Corbett 2006: 17) is a rare and non-canonical type of agreement. The majority of transitive verbs (in terms of dictionary and corpus frequencies) does not agree with their object (1), while about one sixth of transitive verbs does, as in (2), where the object prefix appears in boldface.

(1) máam=e bou-n-o=be
mosquito=SG.M beat-REAL-3SG.F.SBJ=DECL
'She swatted the mosquito.'

(2) máam=e **a-**nâ'-n-o=be
mosquito=SG.M **3SG.M.OBJ-**hit-REAL-3SG.F.SBJ=DECL
'She hit the mosquito.'

Due to the high dictionary and corpus frequency of non-agreeing transitive verbs (84% of dictionary types, 64% of corpus types and 58% of corpus tokens do not agree; for the real numbers, see section 3.5 below), the majority of transitive verbs lack overt morphosyntactic information about their object. We should ask how such a system works in discourse; in particular, how the presence or absence of agreement relates to the overt vs. null realization of arguments, since it is conceivable that speakers use more pronouns or overt noun phrases with non-agreeing verbs to avoid potential referential ambiguity.

A common assumption about the function of agreement in discourse is that it serves referent identification and reference tracking (Lehmann 1988; Barlow 1999; Levin 2001: 21-7). The morphosyntactic features typically implicated are person and gender. The special role of person agreement in reference management has been pointed out by Siewierska & Bakker (2005: 232), for the function of gender agreement in reference management, see Heath 1975; Foley and Van Valin 1984, ch. 7; Contini-Morava & Kilarski 2013: 279-86. For opposing views, see Kibirk (2011: 355), Nichols (2019: 83-6) and Feist (2020), who all argue against reference-tracking as a major function of gender agreement. For a general overview of the functions of agreement, see Corbett (2006: 274-5) and Haig & Forker (2018: 723-4). For an overview of gender and reference tracking, see Wälchli & di Garbo (2020: 227-9).

A hypothesis about how reference is organized in discourse is the *complementarity hypothesis* (for the notion see Nichols 2018; Forker 2018), a principle of economy according to which null arguments are favoured by overt agreement markers and vice versa. This principle was originally formulated for subjects as 'Taraldsen's generalization' (Taraldsen 1978). If complementarity as a principle is operative in language in general and in Mian in particular, we

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would expect there to be fewer overt arguments with agreeing verbs and significantly more overt arguments with non-agreeing verbs.

The relation between arguments and agreement has been discussed in generative linguistics, where it is mostly associated with the term 'pro-drop' (see for example Rizzi 1986; Speas 2006) and in more functionalist and typologically-oriented work (such as Du Bois 1987; Corbett 2006; Kibrik 2011; Nichols 2018; Forker 2018). Complementarity assumes that tracking reference of arguments is optimal when economical (Nichols 2018: 861). Full complementarity would mean a complementary distribution between overt arguments and agreement (Figure 1).

Figure 1. The complementarity hypothesis visualized

		agreement	
		present	absent
argument	overt	✗	✓
	null	✓	✗

The question is whether speakers manipulate overt vs. null arguments to compensate whenever lack of agreement might make argument reference ambiguous. There are several reasons why Mian is a promising language for testing this hypothesis. First, overt arguments are not syntactically obligatory, so that speakers have the choice to overtly realize an argument or not, unhindered by syntactic constraints. Second, object agreement in Mian is present or absent, which allows studying the possible correlations between presence/absence of agreement and overt/null arguments. Third, agreement is lexically fixed, which is both an advantage and a drawback for the study. It is an advantage because it makes the study manageable. It is a drawback in the sense that complementarity from the perspective of agreement can only be properly studied if agreement was optional and not lexically either present or absent, which would give speakers the possibility to manipulate presence and absence of agreement in relation to overt or null arguments.[1]

To check the complementarity hypothesis for Mian, I conducted a discourse study (based on a fully annotated Mian test corpus of ~4,000 words, using the procedures set out in Bickel (2003) and Nichols (2018). We do find the expected discourse effects: subjects tend to be non-lexical (in fact, mainly zero in Mian), and objects among all argument types are the most likely to be realized overtly; this is helpful, given that the study looks at objects. The percentages of overtly realized arguments of verbs that agree in gender do not differ significantly (at $p < .05$, see section 6.3 below) from the percentage of overtly realized arguments of non-agreeing verbs. Under complementarity we would expect significant differences, specifically there should be more overt objects with non-agreeing verbs. Thus, the results give no support to the

[1] Complementarity from the perspective of agreement could still be relevant in the sense that speakers might manipulate agreement through lexical choice of the verb. In her study on Ingush, Nichols (2018: 851) contemplates the possibility that the choice between agreeing and non-agreeing (near-)synonymous verbs could give speakers a more direct way of manipulating agreement. A similar point can be made about Mian, where speakers could conceivably choose between (near-)synonyms as well, e.g. between *-nâ* 'hit' (agreeing, system α, see section 3) and *bou* 'swat' or *blelâ'* 'pommel' (both non-agreeing). While an interesting question, it is beyond the scope of the present study and I leave it for further research.

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complementarity hypothesis. Speakers do not compensate for the gaps in the morphology by using more pronouns or overt noun phrases with non-agreeing verbs.

This article is structured as follows. In section 2, I introduce the notion of sporadic agreement. Section 3 presents verb agreement in Mian. Section 4 provides a passage of Mian discourse as an example of the typical behaviour of arguments and agreement in discourse. Section 5 sets out the methods used in the empirical study. Section 6 presents and discusses the results of the study. It covers referential density, the proportion of overt vs. non-overt arguments by argument type and the relation between overtness of object arguments and the presence or absence of object agreement. I offer my conclusions in section 7.

2. Sporadic agreement

Canonical agreement is productively marked on all agreement targets of a given type (Corbett 2006, 2012).[2] Sporadic agreement is the non-canonical deviation from this, in which agreement is restricted to a subset of items in a word class (Corbett 2006: 17). In this sense, subject agreement in Mian is canonical, object agreement is not (cf. examples 1 and 2 above).

Following the idea in Corbett (2006: 17), Fedden (2019: 303) defines sporadic agreement in this manner: "Two items belonging to the same word class in a language display different behaviour with respect to agreement. In the same syntactic context, one item agrees, whereas the other one does not". To be perfectly clear, non-agreeing verbs are verbs like agreeing verbs and they are transitive because their objects are syntactic objects and not adjuncts. Non-agreeing verbs display the same syntax and the same morphology as agreeing verbs, with the exception of the missing object prefix. Their objects behave identically to objects of agreeing verbs with respect to syntactic tests, such as topicalization, relativization, modification, etc., and they appear in the same position in the clause.

Sporadic agreement needs to be clearly distinguished from optional agreement, another type of non-canonical agreement (Corbett 2006: 14), where an item can agree or not agree, e.g. the past participle 'broken' in the Italo-Romance variety Altamurano (DAI project data, also see Loporcaro, Romagnoli & Breimeyer 2018: 26). Consider examples (3) and (4).

(3)	Lucì	à	rròttə/rrüttə	la	bbuttigliə
	PN	have.PRS.3SG	broken.F.SG/broken.M.SG	DEF.F.SG	bottle(F).SG
	'Lucy has broken the bottle.'				

(4)	Lucì	à	rrüttə/*rròttə	u	piattə
	PN	have.PRS.3SG	broken.M.SG/broken.F.SG	DEF.M.SG	plate(M).SG
	'Lucy has broken the plate.'				

In this variety the past participle can optionally agree with the feminine controller *bbuttigliə* 'bottle' in (3) or alternatively appear in the masculine default form. If the controller is

[2] Corbett (2012: 163) gives the following criterion for canonical morphosyntactic features and their values: "Canonical features and their values are distinguished consistently across lexemes within relevant parts of speech".

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masculine, as in (4), only the default form is possible. Optional agreement is a different phenomenon from sporadic agreement. While both are non-canonical, the former presupposes that agreement is possible, the question being whether it is obligatory. For the latter, we have to compare items across the lexicon, the question being whether any given item can agree at all (Corbett 2006: 17).

Sporadic agreement systems pose challenges for linguistics. They present a puzzle: Speakers can use the agreement system, yet it is incomplete. It seems easier to always apply a rule or never apply it, rather than to apply it only sometimes, causing the syntax to frequently encounter gaps in the morphology. Yet, evidently, speakers do not stumble. Since a subset of the word class in question does not agree the system seems to work unproblematically without the agreement. Therefore, it seems a plausible assumption that sporadic agreement should disappear over time by regularizing all items as either agreeing or non-agreeing. Despite the linguistic interest of such systems, there has been relatively little research on the phenomenon outside of its analysis in individual languages. Fedden (2019) is a typological study of the phonotactic, morphological, semantic and etymological factors in sporadic agreement systems and the extent to which they allow us to predict whether a word agrees, noting that the ability to agree (or not to agree) is often simply a lexical fact about individual items. Windschuttel (2019) contains an overview of sporadic object agreement in Papuan languages. Here we examine the question of how a sporadic agreement system functions in discourse.

3. Verb agreement in Mian

Mian (Fedden 2011) is a Papuan language of Papua New Guinea. It belongs to the Ok family of languages, itself part of the larger TNG family (Ross 2005; Pawley & Hammarström 2018). The data presented in this study are from the eastern dialect of Mian, which has around 1,400 speakers. The language is morphologically synthetic with some fusion. It is mainly suffixing and head-marking. There is no morphological nor adpositional case marking for core arguments, grammatical relations are indicated by verbal affixes. No overt arguments are syntactically required and both pronouns and noun phrases are freely elided.

All finite verbs agree with their subject. As far as object agreement is concerned, transitive verbs fall into three distinct and non-overlapping lexical classes, one contains non-agreeing verbs and two contain one subtype of agreeing verb each. The vast majority of transitive verbs does not agree with their object. The Greek letters α and β in the glosses identify two concurrent agreement systems operational in the language, each with its own nominal classification system in the third person. Subject agreement is in person, number and gender according to system α. Our example is (5), repeated from (1).

(5) máam=e bou-n-o=be
mosquito=SG.Mα swat-REAL-3SG.Fα.SBJ=DECL
'She swatted the mosquito.'

About one sixth of transitive verbs agree with their object. Depending on verb class, they agree in person, number and gender with the object according to one of two different systems (α and

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β). The two gender systems operational in the third person are based on different (but overlapping) semantic distinctions and use (completely) different means of formal marking (Corbett, Fedden & Finkel 2017), see (6), repeated from (2), and (7); object prefixes appear in boldface.

(6) máam=e **a-**nâ'-n-o=be
mosquito=SG.Mα **3SG.Mα.OBJ-**hit-REAL-3SG.Fα.SBJ=DECL
'She hit the mosquito.'

(7) máam=e **dob-**ò-n-o=a
mosquito=SG.Mα **3SG.Mβ.OBJ-**take-SEQ-3SG.Fα.SBJ=MED
'She picked the mosquito up and then ...'

Here I will describe in more detail the three types of transitive verb in Mian: 3.1 is about non-agreeing verbs, 3.2 about agreement in system α and 3.3 about agreement in system β. An agreeing verb cannot be in both object agreement systems, each agreeing verb bears a prefix from either system α or system β, not both at the same time, and there are no verbs that alternate between the two systems either, nor are there verbs which alternate between either agreement system and non-agreeing.[3] Subsection 3.4 briefly touches on beneficiary marking on verbs, which is obligatory if a beneficiary is present, and also formally different from object marking. The section is rounded off by a discussion of dictionary and corpus frequency of agreeing and non-agreeing verbs (3.5).

3.1 Non-agreeing transitive verbs

The majority of transitive Mian verbs never agrees with their object, for example *fu* 'cook' in (8). It is important to bear in mind that these verbs are not invariable since they still agree with their subject (Table 1). Agreement with the subject is according to system α. Semantically these verbs can be characterized as typically having non-human objects.

(8) imen=e fu-b-o=be
taro=SG.N1α cook-IPFV-3SG.Fα.SBJ=DECL
'She is cooking taro.'

[3] There are homophonous verb roots where the presence of the prefix depends on transitivity, e.g. *-têm'* 'see s.o.' is transitive, whereas *têm'* 'look around' is intransitive.

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Table 1. Mian subject suffixes (Fedden 2011: 262)

		SINGULAR	PLURAL	assignment
1		-i	-ob	
2		-eb	-ib	
3	MASCULINE	-e	-ib	males and some epicenes
	FEMININE	-o	-ib	females and some epicenes
	NEUTER 1	-e	-o	inanimates
	NEUTER 2	-o	-o	inanimates: locations, body decoration, weather phenomena, illnesses, abstract nouns, some tools and weapons

Notice the striking pattern of syncretism in the forms. The gender values have no agreement forms which are unique to them and are therefore 'non-autonomous' values (Zaliznjak 1973[2002]: 69-74; Baerman, Brown & Corbett 2005: 15; Corbett 2012: 156).[4] The other agreement targets in the language, articles and pronouns, show agreement (in the third person) according to the same pattern of syncretism, which are illustrated in Table 1 (but not the same forms). Since the other agreement targets are not pertinent for the discussion of verb agreement I will say no more about them here.

Assignment is predominantly semantic, as originally analysed in Fedden (2011: 171) and recently shown computationally in Allassonnière-Tang, Brown & Fedden (2021). Assignment criteria are indicated in Table 1. Masculine and feminine genders contain a number of epicene nouns for which there is only a single conventionalized gender, e.g. *máam* 'mosquito' is masculine and *gwán* 'spider' is feminine.

3.2 Agreeing verbs (system α)

Now I will take a closer look at object agreement. While subject agreement is remarkably homogenous across all verb types, the variation is in the way objects are treated. I will begin with agreement in person, number and gender according to system α. An example is (9).

(9) wan=e **a-**temê'-b-o=be
bird=SG.Mα **3SG.Mα.OBJ-**look.at-IPFV-3SG.Fα.SBJ=DECL
'She is looking at the bird.'

Object prefixes from system α (Table 2) appear on only seven transitive verbs, namely *-e* 'hit, kill (IPFV)', *-fû'* 'grab (PFV)', *-lò* 'hit, kill (PFV)', *-nâ'* 'hit, kill (PFV)', *-ntamâ'* 'bite (PFV)', *-têm'* 'see (PFV)', and *-temê'* 'look at (IPFV)'. All of these transitive verbs – with the exception of *-têm'* 'see' and *-temê'* 'look at' – are high on the transitivity scale (Hopper & Thompson 1980), in

[4] A justification for distinguishing four gender values can be found in Fedden (2007, 2011: 179-181). An alternative two-gender analysis, where all *e*-forms define one gender (masculine) and all *o*-forms define a second gender (feminine), is rejected there. The main drawback of such a two-gender analysis for Mian is that it conflates the features NUMBER and GENDER by stipulating that for those nouns that have the *e*-article in the singular and the *o*-article in the plural a change in number is expressed indirectly by a change in gender.

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that they implicate or even entail a change of state in the object, which makes the object rank high in affectedness (Tsunoda 1985; Beavers 2011).

Table 2. Mian object prefixes (system α) (Fedden 2011: 266, leaving out allomorphs)

		SINGULAR	PLURAL	assignment
1		na-	i-	
2		ka-	i-	
3	MASCULINE	a-	i-	males and some epicenes
	FEMININE	wa-	i-	females and some epicenes
	NEUTER 1	a-	wa-	inanimates
	NEUTER 2	wa-	wa-	inanimates: locations, body decoration, weather phenomena, illnesses, abstract nouns, some tools and weapons

Object agreement in system α follows the same patterns as subject agreement, but does not use the same forms. Incorporated pronouns are the likely origin of system α (Fedden 2020: 1026-1031). The Mian object forms are reflexes of the ancient TNG object prefixes/proclitics, which can still be found in a range of geographically distant TNG languages (Suter 2012). Comparing with the intransitive verb *bi-Ø-o=be* [stay-IPFV-3SG.Fα.SBJ=DECL] 'she stays', we see that non-agreeing verbs and system α verbs show accusative alignment. S and A are marked by the same set of suffixes while O is marked with a prefix or not at all, depending on the verb.

3.3 Agreeing verbs (system β)

I now move on to transitive verbs which agree with their object in person, number and gender according to system β. Recall that subject agreement is always according to system α. An example is (10).

(10) naka=e **dob**-ò-s-o=be
man=SG.Mα **3SG.Mβ.OBJ**-take-RPST-3SG.Fα.SBJ=DECL
'She married the man.'

Prefixes from system β (Table 3) appear with around 40 verbs of handling or movement of entities, e.g. 'give', 'take', 'throw', 'turn', 'lift', 'fall', all of which except 'fall' are transitive.[5]

[5] The verb 'give' is in fact ditransitive, but since it follows system β for its object, i.e. the gift, it is counted as belonging to system β.

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Table 3. Mian object prefixes (system β) (adapted from Corbett, Fedden & Finkel 2017: 14, leaving out allomorphs)

		forms		assignment criteria
		FORM A ("SINGULAR")	FORM B ("NON-SINGULAR)	
1		nem-	dol-	
2		kem-		
3	MASCULINE	dob-		males and some inanimates
	FEMININE	om-		females and some inanimates
	LONG	tob-	tebel-	long objects
	BUNDLE	gol-	gulel-	bundle-like objects
	COVERING	gam-	gemel-	covering objects
	RESIDUE	ob-	ol-	residue

These are called 'verbal classifiers' in Fedden (2011, ch. 5), mainly in order to differentiate them from the other nominal classification system, which is called a gender system (*ibid*., ch. 4). But nominal classification in system β is in many respects gender-like in terms of assignment and agreement-like expression. On the analysis of Mian nominal classification systems as two concurrent systems, see Fedden & Corbett (2017); Corbett, Fedden & Finkel (2017).

The forms and the semantic distinctions are different from system α. This gender system does not have its own set of pronouns, and its origin is likely a serial verb construction (Fedden 2010). It also interacts with number in a way different from system α. System β allows the expression of a paucal, therefore FORM B in Table 3 is glossed as NON-SINGULAR. As this point will not figure further in the present study, I refer the reader to Corbett, Fedden & Finkel (2017: 34-41).

System β operates on an absolutive basis, so for the intransitive verb 'fall' the prefix is for the subject. In fact, in this case the verb doubly agrees with the subject, as can be seen from a clausal example with the only intransitive system β verb, 'fall' in (11).

(11) Dabein=o om-mêin-o=be
PN=SG.Fα 3SG.Fβ.SBJ-fall-3SG.Fα.SBJ=DECL
'Dabein fell.'

However, the result is not absolutive alignment on the level of the clause. Rather, for this one verb the S is treated like a standard subject, i.e. suffix from system α, and like O, i.e. prefix from system β (compare with the transitive verb *-ò* 'take' in (8)). This is not the typical reflexive construction either; Mian uses free reflexive pronouns for that (Fedden 2011: 134-5). More importantly, the language does not allow verbs to express a reflexive reading by having co-referential subject and object affixes, e.g. **na-têm'-Ø-i=be* [1SGα.OBJ-see-PFV-1SGα.SBJ=DECL]

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'Intended: I see myself' (Fedden 2011: 361). The verb 'fall' is simply an irregularity, which does not affect the fundamental accusative alignment of the language.[6]

Since gender in system β makes more distinctions with more specific semantics, using form-based (LONG) and function-based (BUNDLE, COVERING) classes, one might expect it to help more in establishing and maintaining reference in discourse. This topic will be taken up in section 6 below where we will see that this is not the case.

3.4 Marking of recipients

Recipients and beneficiaries, which are also objects and which were coded for as well in this study, are expressed differently. With the verb *-ûb'-* 'give' they take a form from a separate set of suffixes (12), whose full paradigms will not be given for reasons of space (see Fedden 2010, 2011: 269-273). This verb has grammaticalized into a benefactive marker, which is used for recipients and beneficiaries with other verbs (13). Recipient marking is according to system α.

(12) imen=e ob-ûb'-e-n-e=be
taro=SG.N1α 3SG.RESIDβ.OBJ-give-1PLα.R-REAL-3SG.Mα.SBJ=DECL
'He gave us taro.'

(13) imen=e fu-b'-e-n-e=be
taro=SG.N1α cook-BEN-1PLα.R-REAL-3SG.Mα.SBJ=DECL
'He cooked taro for us.'

Like subject agreement, agreement with a beneficiary is obligatory, so whenever there is such an argument in a clause, the verb agrees with it. For a thorough treatment of Mian ditransitives, see Fedden (2010); for processes of grammaticalization in the language, see Fedden (2020).

3.5 Dictionary and corpus frequencies

In terms of proportions of the three types of transitive verb in comparison to a total of 295 transitive verbs in the Mian dictionary we find the following distribution given in Table 4.

Table 4. Proportions of transitive verbs (dictionary types, according to type of object agreement)

Transitive verb type (object agreement)	count	percentage
Verbs that never agree with their object, e.g. *bou* 'swat'	248	84.1%
Verbs that agree with their object in person, number and gender according to system α, e.g. *-nâ'* 'hit, kill'	7	2.3%
Verbs that agree with their object in person, number and gender according to system β, e.g. *-ò* 'take'	40	13.6%

[6] The verb 'fall' is also rare in the Mian corpus, and a *hapax legomenon* in the test corpus used in this study.

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The overwhelming majority of transitive verbs (84%) does not agree with their object. This raises the question how such a system survives. High corpus frequency is implicated in the persistence of systems of this type. Gagliardi (2012) shows for the Nakh-Dagestanian language Tsez, in which only 27% of verbs and 4% of adjectives from the Tsez dictionary agree, that forms of agreeing verbs and adjectives are particularly frequent in discourse both in terms of corpus types and corpus tokens (in a Tsez corpus of child-directed speech) (Table 5)[7]. For comparison, figures for agreeing verbs in Mian are given in Table 6.

Table 5. Proportions of agreeing verbs and adjectives in Tsez (Gagliardi 2012: 50)

	Agreeing verbs	Agreeing adjectives
Dictionary types	27%	4%
Corpus types	60%	35%
Corpus tokens	84%	77%

Table 6. Proportions of agreeing verbs in Mian (absolute figures in brackets)

	Agreeing verbs
Dictionary types	16% (47 of 295)
Corpus types	36% (36 of 100)
Corpus tokens	42% (289 of 690)

In Mian, as in Tsez, agreeing verbs are more frequent in the corpus than in the dictionary because it is precisely verbs that are more frequently used in discourse which agree in Mian, for example, the verbs ‘see’ and ‘hit’ agree according to system α with their object and the verbs ‘give’, ‘take’, ‘get’, and ‘put’ according to system β. But unlike Tsez, in Mian, even when we look at corpus frequencies the majority of transitive verbs is still non-agreeing, so frequency alone might not be as straightforward an explanation for the persistence of agreement in Mian as it is for Tsez. We also have to bear in mind that the figures for Mian and Tsez might not be directly comparable because the Mian corpus is not a corpus of child-directed speech.

4. Arguments and agreement in Mian discourse

We begin with a sample of Mian discourse to get a feeling about how arguments and agreement behave in discourse. Example (14) below is the beginning of a traditional narrative in which a woman goes hunting and is killed and devoured in the process by a wild boar. The glosses are simplified to keep the focus on the essentials: overt and null arguments (in boldface) and agreement affixes on the verb (underlined). Arguments are given in boldface in the translation as well.

[7] Dictionary types are calculated based on dictionary entries, corpus types refer to the frequency of agreeing (verb and adjective) lexemes in Gagliardi’s (2012) corpus, and corpus tokens refer to the frequency of all agreeing (verb and adjective) word forms in this corpus.

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(14) a. Sinanggwâno **unangmôno** **tāie** **báangklie** dob-êt-n-o=a
long.time.ago woman blade stone.adze it-pick.up-SEQ-she=and
'A long time ago **a woman** picked up a **stone adze** and'

b. […]
[3 intervening clauses]
[… went hunting …]

c. **haleb** **ēta** te-s-e=a
boar 3SG.M come-DS-he=and
'**a wild boar** came'

d. **Ø** **báangklie** dob-ò-n-o=a
(she) stone.adze it-take-SEQ-she=and
'**she** took **the stone adze** and'

e. […]
[1 intervening clause]
[… fighting ensues …]

f. yē **Ø** **Ø** om-êb **Ø** tab om-fâ-n-e=a
there (he) (her) her-get (her) down her-put-SEQ-he=and
'**he** got **her**, threw **her** down and'

g. **Ø** wa-nâ' **Ø** dowôn-Ø-e=a […]
(her) her-kill (her) eat-DS-he=and […]
'**he** killed **her** and devoured **her**, and then […]'

In clauses (14a) to (14c) the main discourse participants, a woman, a traditional stone tool and a boar, are introduced with overt noun phrases, as expected for the beginning of a story. Once introduced, we find mostly anaphoric zeros in the following clauses (14c to g), regardless of whether the (transitive) verb agrees with its object (all except *dowôn'* 'eat' in clause 12g do). From the perspective of the complementarity hypothesis this is expected. Referents can be largely identified based on the inflected verb forms alone and it would go against economy to use overt noun phrases where they are not needed.

Notice the repetition of the overt noun phrase *báangklie* 'stone adze' in (14d), even when the verb *-ò* 'take' agrees with its object. In general, there is no syntactic obstacle to repeating a full noun phrase in this language, but here the activation of *báangklie*, which was last mentioned five clauses prior, has decayed enough to warrant a new overt mention. And the overt argument is also in the service of reference maintenance (see Kibrik 2011: 50 and references there): there is a rival participant that the object prefix *dob-* '3SG.Mβ.OBJ' would also be compatible with, namely *haleb* 'wild boar', which is higher in animacy and closer to the agreeing verb in terms

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of linear distance. So conceivably the speaker repeats the lexical noun phrase here to preclude a referential conflict.

In (14) only the verb *dowôn'* 'eat' in clause (14g) belongs to the class of non-agreeing verbs. These are precisely the contexts which make Mian a promising language for the purpose of studying complementarity effects in discourse. While in this case zero reference causes no problem because the woman is really the only possible participant for the object of the verb *dowôn'* 'eat', it is precisely such contexts where we would expect potential referential ambiguity to arise and a subsequent need for disambiguation by means of using overt pronouns or noun phrases.

5. Method

The discourse study is based on a fully annotated Mian test corpus of ~4,000 words, consisting of 14 texts (between 34 and 800 clauses for a total of ~1,700 clauses). The texts are mainly third-person narrative by fluent speakers between 50 and 75 years of age at the time of recording in 2004. I began by determining the referential density (RD) following the method set out in Bickel (2003), which is the ratio of actually overt arguments to possibly overt (i.e. grammatically permitted) arguments. I divided the text into clause units, each consisting of one predicate and its arguments. Then I coded the number of lexical arguments for each predicate, the number of (grammatically) possible arguments, and the number of actual, i.e. overtly realized arguments (pronoun or noun phrase). Subject positions in serial verb constructions were not counted as grammatically possible since subject sharing is obligatory in this construction (15). Serial verb constructions are pervasive in the language.

(15) dabáal=e haka dám=o om-bù-Ø-ib-bio=ta
ground=SG.N1α dig body=SG.Fα 3SG.Fβ.OBJ-bury-REAL-3PL.ANα.SBJ-GPST=MED
'they dug the ground and buried her body and then …'

There are also tight SVCs in which the object has to be shared. The second verb, which is always a system β verb, loses its prefix. In this case the object was not counted as a grammatically possible argument either. An example of such a tight SVC with the verbs *-l(ò)* 'kill' (system α) and *-êb* 'take' (system β) is (16).

(16) kulán=i ya-l-êb te-n-e=ta
game.animal=PL.ANα 3PL.ANα.OBJ-kill-take come-SEQ-3SG.Mα.SBJ=MED
'he killed and brought game animals, and then …'

Following Bickel (2003), I excluded non-argument noun phrases (e.g. locatives), relative clauses and matrix clauses (e.g. 'say that'), but counted complements. Verb-auxiliary constructions were treated like a single verb with the argument structure of the lexical verb. Existential and equational predicates were counted as having one argument position. Coordinated noun phrases and noun phrase plus apposition were treated as single noun phrases.

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Arguments were coded as S, A, O/T, or G. S and A are subjects, O, T and G are objects[8]. Mian displays indirective alignment in ditransitives, so O and T can be grouped together (Fedden 2010). For the purpose of studying the correlations between presence/absence of agreement and overt/null arguments, I follow the method set out in Nichols (2018). I coded the form of the argument (anaphoric null; overt pronoun; lexical noun), its animacy value (human; animal; inanimate), and whether agreement was present or absent, and if the former, whether agreement was according to system α or system β. I also coded all arguments for person, so that non-third-person contexts could easily be differentiated from third person contexts for separate analysis. This is necessary because first and second persons lack lexical noun phrases so that their RD is not directly comparable to the RD in the third person. Below results for RD in third person and in non-third person contexts will be presented and discussed separately.

6. Results

Here I will report the results of the empirical study. Subsection 6.1 is about referential density, 6.2 about the proportion of overt vs. non-overt arguments by argument type and 6.3 about the relation between overtness of object arguments and the presence or absence of object agreement.

6.1 Referential density

The overall RD in the corpus is low: the ratio of actually overt arguments to possibly overt arguments is .26. The totals for third person contexts are given in Table 7 together with results for individual texts and for individual argument types. Speakers appear anonymized. The text *fut* is a procedural text, the others form part of the oral Mian literature.

[8] S is the sole argument of an intransitive verb, A is the more agent-like argument of a transitive verb, O is the more patient-like argument of a transitive verb, T is the theme argument of a ditransitive verb and G is the recipient of ditransitive verb or the beneficiary of a transitive or ditransitive verb.

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Table 7. Referential density (RD) in Mian (3rd person contexts only)

text	**speaker**	**S**	**A**	**O/T**	**G**	**Total**
afoksit	AB	0.3	0.09	0.33	0	0.23
bainabol	KL	0.27	0.11	0.35	0	0.24
dafinau	AB	0.26	0.19	0.27	0.2	0.24
danenok	AB	0.29	0.36	0.51	0.38	0.4
dimosson	KL	0.32	0.19	0.6	0.5	0.37
flood	AB	0.34	0.1	0.56	0.09	0.32
fut	KL	0.5	none	0.15	none	0.19
mianmin	IH	0.22	0.07	0.46	0.06	0.24
newlyweds	AB	0.25	0.07	0.57	0.11	0.29
sobining	AB	0.15	0.33	0.43	0	0.27
sofelok1	KL	0.29	0.07	0.29	0	0.22
sofelok2	KL	0.64	0.56	0.4	0	0.51
tiam	KL	0.16	0.1	0.37	0.07	0.21
yai	AB	0.28	0.29	0.63	0.33	0.38
Mean		0.24	0.15	0.41	0.09	**0.26**

The picture is different for contexts involving speech act participants where we find an even lower RD (Table 8). Only the mean values are given for each argument type.

Table 8. Referential density (RD) in Mian (1st and 2nd person contexts)

	S	A	O/T	G	**Total**
Mean	0.15	0.08	0.14	0.06	**0.11**

The ratio of actually overt arguments to possibly overt arguments for speech act participants is .11. This confirms that speech act participants behave differently in terms of reference organization and that we are right to exclude them from the study. In the following all results and their discussion are exclusively based on third person contexts and on gender agreement. I will refer to the two gender systems as gender α and gender β, respectively

Only about one quarter of grammatically possible arguments is actually overtly expressed. Possible reasons for the low RD are the absence of case signalling grammatical relations (cf. Bickel 2003: 711-717), the preponderance of serial verb constructions with shared arguments and also local discourse preferences, which favour anaphoric zeros, particularly in traditional narratives where discourse participants are generally well-known. I caution however to make any direct comparisons with other languages because RD is highly dependent on discourse content, which makes RD measurement hardly comparable in the absence of parallel data.

The two texts *fut* and *sofelok2* are extremes. *Fut* is a procedural text, so a low RD is expected, since besides the first person referring to the speaker, which is not counted, there is only a handful of referents involved (tobacco, paper, fire). The RD for S is actually surprisingly high, but this is probably due to very low numbers (the text only contains four possible S arguments,

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two of which are overtly expressed), but RD for the other argument types is very low, including an extremely low RD for objects. The reason why *sofelok2* shows a relatively high RD is due to the large number of overt subjects (S and A). The reason for this remains unclear. *Fut* and *sofelok2* are the two shortest texts (38 and 34 clauses, respectively), and since excluding them did not change the overall RD, I left them in the study.[9]

There is substantial variation between the texts. Without the outlier texts *fut* and *sofelok2* we find a range of about 20 percentage points in the overall means. There is likewise variation between argument types, with RD lowest for G, slightly higher for A, substantially higher for S, and highest for O/T, with one text overtly realizing almost two thirds of its objects. This is helpful, since below we will look especially at objects, and a relatively high proportion of overtly realized objects will allow us to test for complementarity.

6.2. Overt vs. non-overt arguments

Having established the RD, overall and for each argument type, we can now calculate the proportions of overtly realized vs. null arguments (Table 9). Read this table in the following manner: 36% of non-overt arguments are S's, and 52% of overt arguments are O/T's, to give just two examples.

Table 9. Overt vs. non-overt arguments (3rd person contexts)

		S	**A**	**O/T**	**G**	**Total**
Non-overt	Total	540	397	401	149	1487
	%	36%	27%	27%	10%	
Overt	Pronoun	19	11	3	0	33
	NP	151	58	272	15	496
	Total	171	69	275	15	529
	%	32%	13%	52%	3%	

The corpus is large enough to show the expected discourse effects. Subjects (S and A) are among all argument types the most likely to be null (S and A together yield 63% of non-overt arguments), since they tend to be topical and given information. The proportions are particularly low for A and G, which overwhelmingly refer to humans, and are therefore likewise likely to be zero (or at least reduced). 90% of A arguments are humans. Animals from the oral literature that talk and act intentionally are counted as humans here. The effect is much reduced when we look at non-human A arguments (animals and inanimates) where the proportion of overtly realized arguments is 38%. This shows that it is humanness rather than the A argument itself that is associated with a low number of overt arguments (cf. Everett 2009; Haig & Schnell 2016: 607-612).

[9] One anonymous reviewer suggested that the high RD of the *sofelok* text could be related to the shortness of the text, which requires the introduction of all relevant discourse participants over a comparatively short stretch of discourse. While it is possible that this is a contributing factor here, it is not generally the case that shorter Mian texts have higher RDs.

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O/T arguments among all argument types are the most likely to be realized overtly because they tend to provide new information. For the same reason, overt O/T is also very rarely expressed pronominally (only 1% of overt O/T's are pronominal, as opposed to 11% of overt S and 16% of overt A arguments). The tendency for O/T arguments to be overt is also related to the fact that the majority of them are inanimate (69%, as opposed to an average across all argument types and all texts of 34% of inanimate arguments) and that the RD for inanimate arguments (all types) in the whole corpus is with .42 much higher than the average RD of .26.

Table 9 takes the perspective of the overt/non-overt distinction, which opposes overt realization of an argument (pronoun or lexical NP) with zero realization. Another perspective would be to look at the lexical/non-lexical distinction, that is whether an argument is realized as a lexical NP or whether it appears as a reduced referential device (Kibrik 2011: 71), i.e. a pronoun or zero (Table 10).

Table 10. Non-lexical vs. lexical arguments (3rd person contexts)

		S	**A**	**O/T**	**G**	**Total**
Non-lexical	Zero	540	397	401	149	1487
	Pronoun	19	11	3	0	33
	Total	559	408	404	149	1520
	%	37%	27%	27%	10%	
Lexical	Total	151	58	272	15	496
	%	30%	12%	55%	3%	

The numbers in Table 10 are very similar to the ones in Table 9 because overt pronouns are used so rarely in Mian discourse that it hardly matters whether they are counted as overt (Table 9) or non-lexical (Table 10). The free pronouns that are used refer almost exclusively to humans (88%). Du Bois (1987) claimed that the introduction of new discourse participants (by lexical NPs) proceeds on an ergative basis, i.e. we find a comparably high proportion of overt lexical noun phrases for S and O/T. The fact that S behaves differently from O/T with respect to propensity to be lexical confirms for Mian the finding of Haig and Schnell (2016) and Nichols (2018) that this aspect of discourse structure is typically not ergative.

While some of the evidence provided in this section is compatible with complementarity, notable that A arguments are usually zero, the figures are not surprising and can all be explained without recourse to complementarity, but rather by well-known discourse factors, notably topicality and the discourse effects of animacy.

6.3. O/T agreement present vs. absent

Here I will concentrate on O/T agreement, since only O/T agreement can be either absent or present in Mian (depending on whether the verb is lexically specified as agreeing). Since G agreement is obligatory if a G argument is present it is less central to this study and will not be discussed further. Table 11 summarizes the comparison of null vs. overt arguments to agreement vs. non-agreement. I include the expected percentages under full complementarity (i.e. 0% of objects overt with agreeing verbs, 100% of objects overt with non-agreeing verbs) to help contextualize actual figures.

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Table 11. Comparison of null vs. overt arguments to agreement vs. non-agreement (3rd person contexts)

	Verb agrees with object			Verb does not agree with object
	gender α	gender β	combined	
null object	41	132	173	228
overt object	20	86	106	169
% overt object	**0.33**	**0.39**	**0.38**	**0.43**
% prediction from CH	0.00	0.00	0.00	1.00

The results do not support the complementarity hypothesis. This can be shown by a series of chi-square tests, for gender α, for gender β, and for both combined, each vs. non-agreeing verbs. The difference between the values is not significant at the .05 level (gender α vs. non-agreeing: $\chi^2 = 2.09$, $p = .15$; gender β vs. non-agreeing: $\chi^2 = 0.56$, $p = .45$; gender systems α+β combined vs. non-agreeing: $\chi^2 = 1.42$, $p = .23$). Under complementarity we would expect significant differences, more specifically more overt objects with non-agreeing verbs. Since the majority of transitive verbs do not agree with their object, according to the complementarity hypothesis, referential density should be much higher.

Nevertheless, there is a slight difference between gender systems α and β as far as the proportion of overt objects is concerned. We get more overt objects with gender β than with gender α. Recall that gender β makes more distinctions (six) and has more specific semantics (especially LONG, COVERING, BUNDLE), which should increase the chances of reconstructing null objects, while gender α makes fewer distinctions (four) and has a more general semantics (MASCULINE, FEMININE, NEUTER). Under complementarity we would not expect gender β to have a higher proportion of overt objects than gender α; we would rather expect it to be the other way round. So the data do not support a modified version of the complementarity hypothesis either, according to which null arguments are more favoured to the extent that the agreement narrows down the possible referents.

7. Conclusions

The discourse study reported in this paper relates an issue of theoretical and typological interest, namely the organization of reference in discourse, particularly the relation between overt vs. null arguments and the presence or absence of agreement to a language with specific characteristics that prove useful for the investigation of this issue. In Mian, overt arguments are not syntactically obligatory and object agreement in Mian is sporadic, i.e. it is present or absent depending on the class of transitive verb, which allows to check whether speakers use more overt arguments with non-agreeing verbs to avoid potential referential conflicts.

The RD in Mian is low. Only one quarter of all possible arguments are actually overtly realized. The corpus study reveals the usual discourse effects. Subjects are typically topics and given information and therefore among all argument types most likely to be null. The effect of humanness is also quite obvious: A arguments being overwhelmingly human are rarely lexical,

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in fact in Mian they are typically non-overt. O/T arguments are among all argument types most likely realized overtly. Again, this is plausible from a discourse perspective since they tend to provide new information. O/T arguments are also typically inanimate.

As far as the comparison of null vs. overt arguments to agreement vs. non-agreement is concerned, the results from Mian do not support the complementarity hypothesis. The proportions of overtly realized objects for gender α, gender β and both combined, each in relation to non-agreeing verbs do not differ significantly. As the majority of transitive verbs do not agree with their object, both in terms of corpus type and corpus token frequency, under complementarity RD should be higher. This confirms Nichols' (2018) results on Ingush, which is a language with a high RD (.79) (Nichols 2018: 854). Bickel (2003) did not find any evidence of an effect of agreement in overt argument realization either, though he did not study the discourse behaviour of a sporadic agreement system, like the one in Mian or Ingush. The results for Mian do not support the modified complementarity hypothesis either. The gender system that is less apt to narrow down reference favours overt object arguments even less, possibly because almost two thirds of them are humans. The observed phenomena which are consistent with the complementarity hypothesis, notably the low number of overt A arguments, are likely better explained by the typical discourse effects of animacy, rather than the speakers' wish to reduce ambiguity. The present study shows that Mian provides little evidence that gender agreement, contrary to what is sometimes claimed and assumed in the literature, serves a major function in reference tracking in discourse.

Abbreviations

3 - third person, AN - animate, BEN - benefactive, DECL - declarative, DEF - definiteness, F - feminine, GPST - general past, IPFV - imperfective, M - masculine, MED - medial verb, N1 - neuter 1, OBJ - object, PFV - perfective, PL - plural, PN - proper name, PRS - present, R - recipient, REAL - realis, SBJ - subject, SEQ - sequential, SG - singular.

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