Colexification of 'enough', 'able' and 'until' in Tok Pisin and Papapana: independent or contact-induced change?

Abstract

Considerable research has concerned the influence of Papua New Guinea's Oceanic languages on the development of the pidgin/creole Tok Pisin but little research has considered linguistic influence in the opposite direction. This paper adds to both bodies of research by investigating whether the colexification of 'enough', 'able' and 'until' in Papapana (Oceanic) and Tok Pisin results from internal or contact-induced change. Such a colexification is unattested/rare cross-linguistically therefore I argue that language contact is responsible. The Tok Pisin verb *inap* 'enough, able' grammaticalised as the preposition/subordinator 'until' because of semantic extensions by Oceanic language speakers whose languages demonstrate overlapping polysemies. The Papapana verb *eangoi* colexifies 'enough' and 'able' (common cross-linguistically) but the colexification with the lexicalised adverb *eangoiena* 'able' and grammaticalised preposition/subordinator *eangoiena* 'until' is pattern replication modelled on Tok Pisin. Based on areal data, I propose a tentative semantic map for ENOUGH, contributing to research on cross-linguistic colexification.

Key words: colexification, contact-induced change, Oceanic, Papapana, Tok Pisin

1 Introduction

Papua New Guinea (PNG) is one of the most linguistically diverse countries in the world: over 850 languages are spoken by over 8 million people. Of PNG's languages, around 230 belong to the Oceanic subgroup of the Austronesian family (§2.1) while the remaining 600 odd languages are non-Austronesian and usually given the cover term "Papuan". Language contact is pervasive in PNG and many Oceanic languages have undergone contact-induced change because of contact between Oceanic and Papuan language speakers (see Bugenhagen, 1994; Dutton, 1994; Evans and Palmer, 2011; Lincoln, 1976; Ross, 2008; Thurston, 1982; inter alia). Change has involved "matter replication", that is "direct replication of morphemes and phonological shapes from a source language" (Matras and Sakel 2007: 829) and/or "pattern replication" whereby "the patterns of distribution, of grammatical and semantic meaning, and of formal-syntactic arrangement… are modelled on an external source" (Matras and Sakel 2007: 829-830). Another consequence of language contact in PNG is the development, during the colonial era, of the English-based pidgin/creole Tok Pisin (TP), now one of the country's official languages and its national lingua franca. While there has been significant research into the influence of Oceanic "substrate" languages on the development of TP (§2.2), very little research has considered the increasing influence in the opposite direction: not only are many Oceanic and Papuan language speakers shifting to TP (§2.3) but there is some evidence of contact-induced change in indigenous languages due to TP (§2.4).

This paper addresses this scarcity in research by investigating possible contact-induced change due to TP in Papapana, a Northwest Solomonic (Oceanic) language (§2.1), spoken in Teperoi and five nearby villages on Bougainville island. The Papapana community is historically multilingual and the language displays a partial shift from left-headedness to right-headedness because of Papuan contact (Smith, 2016a). While contact with local languages has not led to language shift, the acquisition of and exposure to TP has led to shift, and Papapana is consequently endangered (Smith, 2016b) (§2.3). Another consequence of TP contact is matter replication, with Papapana borrowing many TP words from various word classes; however, this paper focuses on evidence of pattern replication.

The Papapana verb *eangoi* denotes 'be enough' and 'be able, be allowed' (§3.1) and has lexicalised as an adverb *eangoiena* expressing ability and permission (§3.2). *Eangoiena* has further grammaticalised as a preposition and subordinator 'until' (§3.3-§3.4). Meanwhile, the TP verb *inap* denotes 'be enough' and 'be able, be possible' (§4.2) and has grammaticalised as a preposition and subordinator *inap* 'until' (§4.3-§4.5). Both *eangoi(ena)* and *inap* can express "participant-internal possibility" (Kuteva et al. 2019: 32), where the agent can carry out the action expressed by the main verb because of their inherent characteristics, and "circumstantial possibility" where the agent can carry out the action due to external circumstances (Kuteva et al. 2019: 31-32). Papapana *eangoi(ena)* also expresses "deontic possibility" where the agent is allowed to do the action (Kuteva et al. 2019: 32).[1] In both languages, there is "colexification", i.e. two or more functionally distinct senses are lexified by the same lexeme in synchrony (François 2008: 170-171), with "functionally distinct senses" identified as senses that are expressed by different lexemes in other languages.[2] More specifically in Papapana there is "loose colexification" (François 2008: 171) because *eangoiena* is derived from *eangoi*. But is the colexification of 'enough', 'able' and 'until' in TP and Papapana due to internal, independent innovations or is it contact-induced? To answer this, I firstly investigate whether colexification of these notions is widespread cross-linguistically outside (§5.1), as well as within the South Pacific region and PNG (§5.2), and secondly consider which language(s) might have influenced the development of the colexification, when, how and why (§6). This paper therefore also fills a gap in the TP literature by considering how *inap* (from English *enough*) gained the additional senses 'able' and 'until'.

The TP data come from secondary sources and the analysis is principally based on Mihalic's (1971) dictionary and grammar, Verhaar's (1995) grammar and Baing et al.'s (2008) dictionary. The Papapana data come from a corpus of data I collected for a documentation and description project, involving 12 months fieldwork in the Papapana community (2011-2013). I collected 51 hours of recorded elicitation sessions and 10.5 hours of recorded 'text' sessions, which included observed communicative events (e.g. traditional narratives) and staged communicative events (e.g. procedural descriptions). The analysis is exemplified as much as possible by spontaneously produced utterances from text recordings (indicated by *T* in the data reference), but elicited data have been used (indicated by *E*) when that was not possible or when they more clearly exemplify the analysis. All data, including annotations and metadata are archived with The Endangered Language Archive (ELAR).[3]

2 Oceanic languages and Tok Pisin

2.1 Oceanic languages

Speakers of Oceanic languages occupy the regions of Micronesia, Polynesia and Melanesia. Melanesia encompasses Vanuatu, New Caledonia, and Fiji in the southeast, to the Solomon Islands, the Bismarck Archipelago (New Britain, New Ireland and the Admiralties) and New Guinea in the northwest (FIGURE 1). The Oceanic group includes over 500 languages and has ten first order subgroups, of which three are found in PNG: Admiralty Islands (31 languages), St. Matthias (2 languages) and Western Oceanic (237 languages) (Hammarström, Forkel, Haspelmath and Bank, 2021). Western Oceanic is split into three linkages including the Meso-Melanesian linkage (FIGURE

[1] I use Kuteva et al.'s (2019) distinctions to allow clearer comparison in §5 with the cross-linguistic grammaticalisation pathways they identify.

[2] François' (2008) term "colexification" is intended as purely descriptive and neutral with respect to semantic or historical interpretations.

[3] The collection can be accessed freely by any registered ELAR user from http://hdl.handle.net/2196/00-0000-0000-000E-D155-4. The annotations require further work to make the orthography and word boundaries more consistent, and the translations more accurate. Examples in this article have been amended in these areas.

2). Within the Meso-Melanesian linkage is the New Ireland/Northwest Solomonic (NI-NWS) linkage which contains the St. George linkage, which contains the Northwest Solomonic (NWS) linkage, to which Papapana belongs. Although Ross (1988) placed Papapana in the Nehan-North Bougainville subgroup of NWS, containing the languages of northern Bougainville and Buka (and including Teop, discussed later), there are similarities in lexicon and syntax which raise the possibility that Papapana is related more closely to the NWS languages Uruava, Mono and Torau. This is further supported by evidence of similar Papuan-induced grammatical change in Papapana (Smith, 2016) and Mono, Torau and Uruava (Evans and Palmer, 2011) and by Papapana migration patterns (Smith-Dennis 2020: 42-46). Papapana ancestors migrated from southern Bougainville in the mid-19th century, settling first around Kieta and Arawa (the once Uruava-speaking area), before moving north to the contemporary Papapana-speaking area, Teperoi, then moving south again, with a possible halt in Vito (a contemporary Torau-speaking village), and finally settling in Teperoi in the late-19th century. Subsequently, immigrants arrived from north Bougainville and Buka, including Teop speakers.

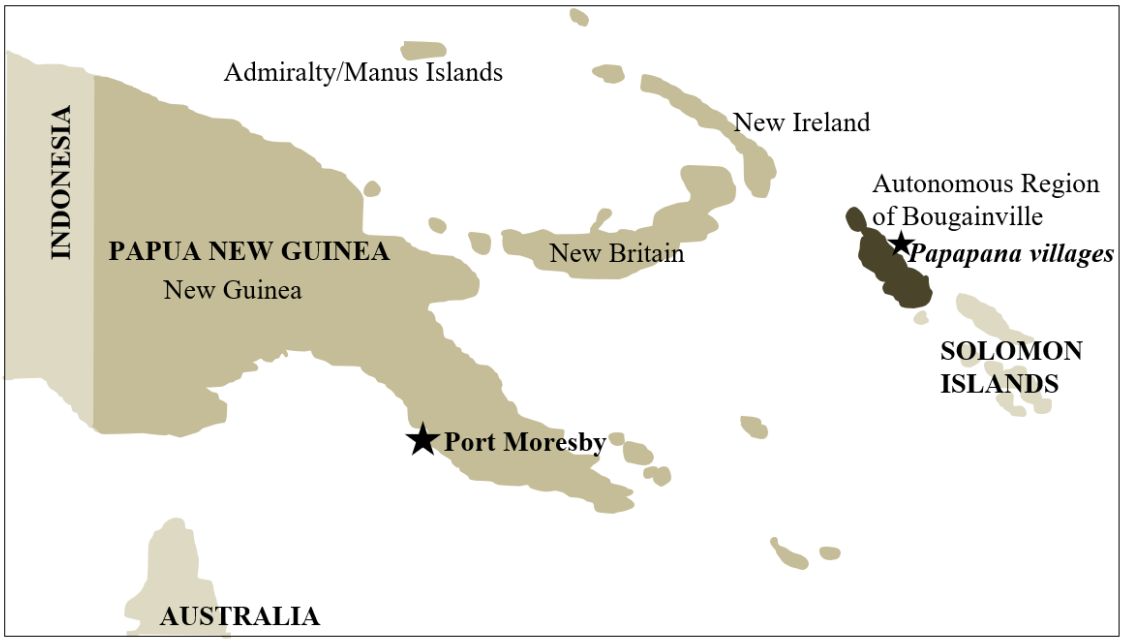

FIGURE 1 Papapana in Papua New Guinea

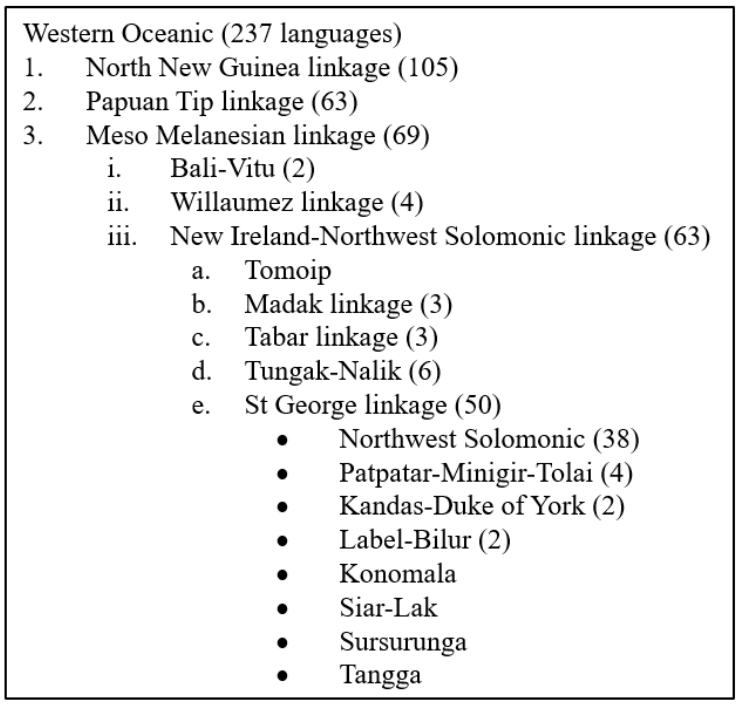

FIGURE 2 Western Oceanic subgroups and number of languages in each (adapted from Hammarström et al. 2021)

2.2 Tok Pisin and the Oceanic substrate

TP is a variety of Melanesian Pidgin English (MPE), a pidgin which developed on the European-owned plantations established in Queensland (Australia), Samoa and other Pacific islands from the early 1860s. MPE arrived in the German-controlled Bismarck Archipelago when labourers returned from these plantations from the 1880s (Mühlhäusler 1976: 124-125). Meanwhile, other labourers returned to the Solomon Islands and the New Hebrides (Vanuatu). In each of these countries, MPE served as a lingua franca, and stabilized and changed under the influence of local indigenous languages, in a more typologically homogeneous linguistic environment (Siegel 1998: 350). Consequently, three major varieties developed: TP, Solomons Pijin and Bislama.

There is no consensus on the exact date that TP developed as a distinct language: Romaine (1989: 6) suggests circa 1880, Mühlhäusler (1985: 44) pinpoints 1884 while (Keesing 1988: 58) states that TP had a largely separate history after 1890. What is indisputable is that the superstrate language, English, was no longer accessible as a model because from 1884 the north-eastern part of the New Guinea mainland, and the Bismarck Archipelago (and from 1886, Bougainville and Buka) were part of German New Guinea and labour trade from these areas to most Pacific plantations ceased (Mühlhäusler 1985: 44). Consequently, TP developed under the influence of German and the Oceanic and Papuan languages of the Bismarck Archipelago (Keesing 1988: 61), where German-owned plantations were located and where many of the returning labourers originated (Siegel 1998: 351).

In the internal plantations of the Bismarck Archipelago (and later the New Guinea coast), use of MPE was reactivated as many labourers had already worked in overseas plantations (Siegel 1998: 351), while elsewhere TP became the lingua franca in the civil authorities, the cash economy, and many missions (Sankoff 1984: 105). The main “substrate” languages in TP’s development are therefore Meso-Melanesian languages, especially those of New Ireland and the Rabaul area of East New Britain (Siegel 2011: 534) which belong to NI-NWS. The languages identified as particularly

influential belong to the Patpatar-Minigir-Tolai and Kandas-Duke of York subgroups of the St. George linkage (Siegel 1998: 367).

Oceanic substrate influence on MPE and its varieties has been the subject of much research (see Crowley, 1990; Keesing, 1988; Meyerhoff, 2000; Meyerhoff, 2002; inter alia). Oceanic languages have influenced TP phonology (Goulden 1990: 42-55, Mosel 1980: 42-55) and lexicon (Mosel 1980: 23-64, Ross 1992) with Mihalic (1971: 56) estimating that 15% of TP lexicon derives from Tolai and related New Ireland languages. Meanwhile, TP and/or MPE grammatical features which can be attributed to substrate influence include locative verbs to express progressive or durative aspect, the pronominal system and the transitive suffix (Goulden 1990: 56-117), the extension of a place adverb to a deictic/demonstrative and relativiser (Sankoff and Brown, 1976) and the grammaticalisation of (in)alienability in the determiner system (Sankoff and Mazzie, 1991). None of the literature discusses whether the colexification of 'enough', 'able' and 'until' can be attributed to substrate influence and Mosel (1980: 127) even identifies the expression of competence, ability, and permission as being one of the differences between TP and Tolai. It is only Lindström (2003: 230) who mentions that the colexification of 'enough' and 'able' found in TP *inap* is also found in Notsi, Madak and Kuot, spoken in New Ireland (§5.2.2-5.2.3).

2.3 The spread of and shift to Tok Pisin

In the 1900s, TP developed into an expanded pidgin, as it became linguistically more complex and was used in an increasing number of functions, reaching the Highlands of New Guinea in the 1930s (Smith and Siegel, 2013). After World War I, German New Guinea became the Mandated Territory of New Guinea, governed by Australia. Australia had also governed the southern half of New Guinea since 1906. After World War II, Australia established joint administration over both territories, the Territory of Papua and New Guinea. Despite this, English played a minor role in the country and exercised little social influence as there were very few native English speakers and few Papua New Guineans with a good command of English (Wurm 2003: 25-26). Instead, TP was used as a lingua franca between members of the colonial administration and locals, and between Papua New Guineans without a common language (Wurm 2003: 25).

After Papua New Guinea's independence in 1975, TP became one of its national languages, and educational policies were more supportive of its use in schools (Jenkins 2005: 8-10). By the end of the 1980s, TP was being acquired by some children as their first language. It now has an estimated 3-5 million speakers including up to 500,000 first language speakers (Smith and Siegel, 2013). Given its greater functional and grammatical expansion and that it is now a first language for many speakers, TP is arguably a creole, though others argue that it is still a pidgin because 90% of its speakers have a different first language.

By the beginning of the twenty-first century, language shift to TP was "proceeding in many communities at an alarming pace" (Dobrin 2005: 42). This shift is partly attributable to pride in local languages as symbols of ethnicity weakening after 1975 independence (see e.g. Kulick, 1992). Other factors include increased mobility to population centres, increased frequency of intermarriage, varying educational policies, and the increased role and importance of electronic media (Wurm 2003: 25-26). Shift to TP is taking place across the nation, among Oceanic and Papuan language communities (see Barlow, 2018; Dye and Dye, 2012: 25-30; Jenkins, 2005: 35-40; Kulick 1992; Sato, 2013: 20-30 inter alia).

The spread of TP has also led to considerable language shift in the Papapana community, resulting in Papapana being highly endangered: there are 99 fluent speakers (17% of the community population), intergenerational transmission has ceased and TP is the dominant language of all domains (Smith, 2016). This shift has been caused by an increase in contact brought about by increased intermarriage, increased migration into the community (over twenty languages are represented) and increased movement out of the community. The Papapana community has been particularly susceptible to language contact due to its coastal location. During the colonial era, many

plantations and missions were located along the coast: the first commercial plantation in Bougainville was established at Kieta (70km south of Teperoi) in 1908 (Sack 2005: 88, 93) and the Numanuma plantation (7km north of Teperoi) had been established by 1912 (Laracy 2005: 140). Later, during the Bougainville Crisis (civil war) (1989-1997), the Papapana community was more vulnerable to invasion and resulting displacement than mountain-dwellers. Given that the youngest fluent Papapana speakers were born in the early to mid-1980s, it seems likely that intergenerational transmission was interrupted due to the Bougainville Crisis.

2.4 Tok Pisin and language change

Research into contact-induced change in PNG's indigenous languages due to pressure from TP is limited. Exceptions include Ross (1985), Jenkins (2005) and Schokkin (2017) and to some extent Chowning (1983) and Laycock (1966). Chowning (1983) reports on loans (matter replication) and loan translations (pattern replication) from TP in Nakanai, Sengseng and Kove (Oceanic; West New Britain), while Laycock (1966: 46) reports TP loans in Abelam (Papuan; East Sepik Province). Ross (1985) surveys ten languages in West Sepik Province, East Sepik Province and West New Britain, and finds "grammatical transference" (loans from a closed word class) from TP, including *inap* 'be physically able to' (Ross 1985: 544-545). Lakurumau (Oceanic; New Ireland) has also borrowed *inap*: *naaf* denotes 'enough', 'able' and 'until' (Mazzitelli, pers.comm. 06/01/2021). In Tigak (Oceanic; New Ireland), there has been pattern replication under the influence of TP (Jenkins 2005: 186-206) including phonological changes, an adposition phrase grammaticalising as a subordinator, and loss of semantic distinctions in several areas of the grammar. Paluai (Oceanic; Manus Province) also demonstrates matter replication, and semantic change and structural borrowing (pattern replication) induced by TP and/or English (Schokkin, 2017). The TP verb *inap* 'be enough, be able, be possible' has been borrowed but, unlike TP, Paluai makes a formal distinction between ability and possibility (Schokkin 2017: 84-86). While the Paluai form *sa* can fulfil the same functions as *inap*, in affirmative clauses it has apprehensive overtones, which are absent from and could thus be motivating the use of *inap*. Paluai uses a dummy subject construction with *inap*, which it does not do with other verbs, therefore a new syntactic construction has also entered Paluai (Schokkin 2017: 82).

3 Papapana colexification of 'enough', 'able' and 'until'

The Papapana verb *eangoi* colexifies the senses 'enough' and 'able, allowed' (§3.1), while *eangoiena* colexifies 'able, allowed' as an adverb (§3.2) and 'until' as a preposition/subordinator (§3.3).[4] There is thus "loose colexification" (François 2008: 171) of these notions because *eangoiena* derives from *eangoi*, having undergone lexicalisation then grammaticalisation (§3.4).

3.1 Verb eangoi

The verb *eangoi* denotes 'be enough' (§3.1.1) or 'be able, allowed' (§3.1.2) and heads the "verb complex" (VC).[5] The Papapana VC begins with an obligatory subject-indexing proclitic and has various optional preverbal and postverbal modifiers including tense, aspect and mood (TAM) markers, negative markers and adverbs (Smith-Dennis 2020: 228-231). Among the TAM markers are postverbal subject-indexing (PSI) enclitics, which can combine with other TAM markers to express imperfective aspect, optative mood or proximative aspect (Smith-Dennis 2020: 315-318). Both subject-VC-object (SVO) and subject-object-VC (SOV) clause orders are prevalent, though often overt arguments are absent (Smith-Dennis 2020: 237-241, 391-392).

[4] I have chosen to use English glosses (rather than more abstract, language-independent descriptors) to make the Papapana analysis more comparable with the other languages discussed, for which the authors provide English glosses.

[5] This term is a descriptive device used in Oceanic research to capture the structural relationship between the verbal head and its accompanying modifiers.

3.1.1 *eangoi* ‘enough’

The verb *eangoi* denotes ‘enough’ (1)-(3). The subject is third person in all eight examples in the corpus. Example (3) shows that *eangoi* can be negated and can head a main clause which is followed by an adverbial clause expressing the purpose for which the subject suffices.

(1) *O=to* *amunu* *vowa* *iai* *avosia* ***e=to*** ***eangoi,***
2SG.SBJ=EMPH look be.like PROX SUBR 3SG.SBJ=EMPH be.enough

o=depana=i=a=i.
2SG.SBJ=shell=TR=3SG.OBJ=IRR
‘When you see that it [the banana mixture] is [smooth] enough, you remove it.’
(1-T036-8)

(2) ***E=eangoi=ma,*** *e=tosi=ma.*
3SG.SBJ=enough=ma 3SG.SBJ=finish=ma[6]
‘That’s enough, it [the story] is finished.’
(1-T044)

(3) *Enai* *avosia* ***i=to*** ***ae*** ***eangoi=ma*** *tena* *vei* *atu~atunu=ami.*
DEM2 SUBR 3PL.SBJ=EMPH NEG be.enough=ma SUBR R/R RD~attack=1EXCL.OBJ
‘[They were using a helicopter to chase us]. Because there were not enough [of them] to fight us.’
(1-T034)

3.1.2 *eangoi* ‘able, allowed’

When the verb *eangoi* expresses ability or permission, it is always marked by PSI enclitics and it requires a clausal complement which may be finite and linked asydentically to the matrix clause (4a) or non-finite (thus lacking a subject-indexing proclitic) and introduced by the subordinator *tena* (4b).

(4) a. *Ani* ***o=eangoi=omu*** ***o=nao*** ***Wakunai?***
2SG 2SG.SBJ=be.able=2SG.IPFV 2SG.SBJ=go Wakunai
‘Are you able to go to Wakunai?’
(2-E028-2)

b. *Ani* ***o=eangoi=omu*** ***tena*** ***nao*** ***Wakunai?***
2SG 2SG.SBJ=be.able=2SG.IPFV SUBR go Wakunai
‘Are you able to go to Wakunai?’
(2-E028-2)

The sentences in (4) suggest there is no grammatical motivation for the choice of complement; however, the choice appears to be motivated by polarity. Although in elicited data, both affirmative and negative matrix clauses can have either finite or non-finite complements, in the text data, negated *eangoi* always takes a finite complement (5), whereas affirmative *eangoi* always takes a non-finite complement (6).

(5) *Si=mate=i=a=era* *na=umunu* *na=mata,*
1INCL.SBJ=like=TR=3SG.OBJ=1INCL.IPFV SPEC[CLI]=sit SPEC[CLI]=good

i-nima-ira *e=po=na.*

[6] =*ma* attaches to all word classes and may be a discourse marker.

LOC-hand-1INCL.PSSR 3SG.SBJ=stay=3SG.IPFV

Ta=vena *merei* *reareana* ***e=ae*** ***eangoi=ena***
NSPEC[CLI]=individual ATTRIB far 3SG.SBJ=NEG be.able=3SG.IPFV

e=naomai ***enai*** ***e=atu=a=i*** ***na=umunu*** ***mama.***
3SG.SBJ=come after 3SG.SBJ=make=3SG.OBJ=IRR SPEC[CLI]=sit DEM1
'If we want a good life, it rests in our hands. Someone from far away is not able to come and make this life [for us].'
(1-T089)

(6) *U=taraim* *u=raso=ina=i* *ta* *iai*
1SG.SBJ=try 1SG.SBJ=be.used.to=3PL.OBJ=IRR and PROX

u=eangoi=ou ***tena*** ***me-na*** ***po.***
1SG.SBJ=be.able=1SG.IPFV SUBR COM-PL stay
'I tried to get used to them so I was able to stay with them.'
(1-T088)

In examples (4)-(6) *eangoi* expresses ability. In an utterance such as (6) *eangoi* expresses participant-internal possibility because the agent can only carry out the action because of factors for which they are responsible. Conversely, in other utterances, it is unclear whether *eangoi* expresses participant-internal possibility or circumstantial possibility (where the enabling factors are external to the agent). Examples (7)-(8) could also be interpreted as expressing permission, i.e. deontic possibility.

(7) *Anau* ***u=ae*** ***eangoi=ou*** ***u=nao=i*** ***tagena*** ***abata.***
1SG 1SG.SBJ=NEG be.able=1SG.IPFV 1SG.SBJ=go=IRR near bachelor.house
'I cannot go near a bachelor (traditional male initiation) house.'
(2-E017)

(8) *John* ***e=eangoi=ena*** ***tena*** ***nao*** ***tae*** ***te=na=ereere.***
John 3SG.SBJ=be.able=3SG.IPFV SUBR go up OBL=SPEC[CLI]=mountain
'John can go up to the mountain.'
(2-E007-1)

3.2 Modal adverb eangoiena

Eangoiena is a clause-level modal adverb that expresses ability and sometimes permission. *Eangoiena* usually immediately precedes the VC but sometimes other constituents intervene. Usually it is clause-initial but sometimes a preverbal argument noun phrase (NP) or adjunct begin the clause. Unlike some clause-level adverbs, *eangoiena* cannot operate at the clause-level as well as inside the VC, nor does it occur clause finally (Smith-Dennis 2020: 386-390)

The clauses in (9)-(13) are formally and semantically affirmative, and have a first (9), second (10)-(11) or third (12)-(13) person subject. These examples express ability, specifically circumstantial possibility in (9) and (12) (where the external enabling factors are the prior information and the possession of a canoe), but with the other examples it is ambiguous whether *eangoiena* expresses participant-internal or circumstantial possibility. Examples (10) and (13) could also be interpreted as expressing permission, while (11) could be seen as a request.

(9) *Aia* *e=to* *awa* *eri* *a'ade'e=au* *enai,*

3SG 3SG.SBJ=EMPH COND CF narrate=1SG.OBJ DEM2

eangoiena *u=eri varona avosia taramina iai avosia.*
POSSIB 1SG.SBJ=CF know SUBR thing PROX like
'If he had told me that, I would have been able to know that this thing was like [that].'
(1-T088)

(10) *Enai=ma i=wa=au "ta ani avoa avosia,*
after=ma 3PL.SBJ=say=1SG.OBJ and 2SG how like

eangoiena *o=me-a nao=ami?".*
POSSIB 2SG.SBJ=COM-SG.OBJ go=1EXCL.OBJ
'Then they said to me "and how about you, can you go with us?".'
(1-T042)

(11) *"**Eangoiena** o=no va-ruv=i=au Vakonaia te=na vamamatau?"*
POSSIB 2SG.SBJ=go.SEQ CAUS-put=TR=1SG.OBJ Wakunai OBL=SPEC[CLI] teach
'"Can you take me to Wakunai to school?"'
(1-T042)

(12) *Te:a pea obutu-na **eangoiena** na=iana a'aisi*
who possession canoe-3SG.PSSR POSSIB SPEC[CLI]=fish many

e=me-a tua tae nao=i i-namana papanusu
3SG.SBJ=COM-SG.OBJ paddle up thither=IRR LOC-ocean INTS

e=no de na=iana a'aisi.
3SG.SBJ=go.SEQ take SPEC[CLI]=fish many
'Whoever has a canoe can paddle out with it, to the deep ocean and go catch lots of fish.'
(1-T099)

(13) *Jerry **eangoiena** e=atun=i=a=i nu=boro.*
Jerry POSSIB 3SG.SBJ=attack=TR=3SG.OBJ=IRR SPEC.CLII=pig
'Jerry can attack the pig.'
(2-E007-1)

Curiously, *eangoiena* usually has a negative interpretation, despite there being no formal negative marking nor other distinguishing grammatical features.[7] The omission of negative *ae* could be a feature of casual speech: when I repeated utterances such as (18) to a consultant, she translated them as affirmative. In (14) *eangoiena* expresses participant-internal possibility because the agent lacks knowledge to enable the action, in (16) *eangoiena* expresses circumstantial possibility because the enabling factor is distance, while (15), (17) and (18) seem to express (lack of) permission. The VC may have a first (14)-(15), second (16) or third (17)-(18) person subject.

(14) *U=pei wa=ina=i avosia*
1SG.SBJ=PST.IPFV say=3PL.OBJ=IRR SUBR

[7] The negative interpretation was provided by Papapana research assistants in their translations and given it is unexpected, I subsequently checked the interpretation of such utterances with other Papapana speakers.

"anau *iai* *u=ae* *varona=u* *amiu=au* *tue*
1SG PROX 1SG.SBJ=NEG know=1SG.IPFV 2PL=CLII language

tau ***eangoiena*** *u=mei* *me-na* *po=amu.".*
and POSSIB 1SG.SBJ=come.SEQ COM-PL stay=2PL
'I used to say to them like "I don't know your language so I am not able to come and stay with you.".'[8]
(1-T088)

(15) *...si=atutusi=a=i,* ***eangoiena*** *nua* *vanua* *si=atutusi=ina=i,*
1INCL.SBJ=chase=3SG.OBJ=IRR POSSIB two people 1INCL.SBJ=chase=3PL.OBJ=IRR

'aria *vena* *ora.*
one individual only
'…if we follow him [God], we cannot follow two, only one.'
(1-T097)

(16) *"E* *ta* ***eangoiena*** *o=tu'u=i=a=i* *na=maria* *iai,*
eh and POSSIB 2SG.SBJ=meet=TR=3SG.OBJ=IRR SPEC[CLI]=thing PROX

iai *reareana* *poto."*
PROX far INTS
'"Eh but you are not able to meet this thing, it's far away."'
(1-T091)

(17) *Ta=vena=re* ***eangoiena*** *e=mei* *va-tobitobi=ira=i,*
NSPEC[CLI]=individual=REP POSSIB 3SG.SBJ=come.SEQ CAUS-be.straight=1INCL.OBJ=IRR

arira *tobi* *si=vei* *va-tobitobi.*
1INCL EMPH 1INCL.SBJ=R/R CAUS-be.straight
'Another one cannot come and sort us out, we have to sort ourselves out.'
(1-T089)

(18) *"Aina* ***eangoiena*** *i=vae* *nao* *dini* *nani."*
3PL POSSIB 3PL.SBJ=REP go down there
'"They cannot go down there again."'
(1-T071)

In the corpus there are five examples where the clause-level adverb *eangoiena* expresses ability and is negated by *ae*, the negator used in declarative VCs. *Eangoiena* expresses circumstantial possibility in (19)-(21), where the subject is first (19), second (20) or third (21) person.

(19) *...i=tua* *asi=au* *nao* *ta=poana.*
3PL.SBJ=paddle leave=1SG.OBJ thither NSPEC[CLI]=village

Ae ***eangoiena*** *u=manene=i* *i-poana,*

[8] The negative marker *ae* only has scope over the VC which it is part of, so it negates only the first clause headed by *varona* 'know', not the second clause containing *eangoiena*.

NEG POSSIB 1SG.SBJ=return=IRR LOC-village

avoa *u=tua* *vewa=i?"*
how 1SG.SBJ=paddle be.like=IRR
'"…they paddled off somewhere. I was not able to go back to the village, how would I paddle?"'
(1-T101)

(20) *Tau* *na='usia* *i-poana* ***ae*** ***eangoiena*** *o=nongono=ina=i*
and SPEC[CLI]=child LOC-village NEG POSSIB 2SG.SBJ=hear=3PL.OBJ=IRR

i=vei *tue-ni* *Papapana=ina.*
3PL.SBJ=R/R language-CONST Papapana=3PL.IPFV
'And the children in the village, you are not able to hear them speaking Papapana.'
(1-T083)

(21) *Va:gi* *aruai,* ***ae*** ***eangoiena*** *na='usia* *merei* *va:gi*
today no NEG POSSIB SPEC[CLI]=child ATTRIB today

i=rorosi=a=i *taramina* *mama.*
3PL.SBJ=see=3SG.OBJ=IRR thing DEM1
'Today no, the youth of today are not able to see this thing.'
(1-T076)

3.3 Preposition and subordinator eangoiena 'until'

Eangoiena is a temporal preposition denoting 'until, for' and a temporal subordinator denoting 'until'. Papapana's other adpositions are a nascent comitative postposition, and the prepositions *te* (expressing a wide range of semantic roles including temporal location), *avosia* 'like' and attributive *merei* (Smith-Dennis 2020: 373-386). Like *eangoiena*, *tena*, *merei* and *avosia* are also subordinators introducing adverbial clauses and/or complement clauses (Smith-Dennis 2020: 467-507).

As a preposition, *eangoiena* indicates temporal limitation or duration and has a NP complement. When the NP is headed by a noun expressing a point in time relative to the time of speaking (22)-(23), *eangoiena* is translated as 'until' or 'up to'. When the NP is headed by an enumerated noun expressing a unit of time (24), *eangoiena* is translated as 'for'.

(22) ***Eangoiena*** ***va:gi*** *iai* *i=me-na* *po* *roro=ami=ina.*
until now PROX 3PL.SBJ=COM-PL.OBJ stay still=1EXCL.OBJ=3PL.IPFV
'Until now they are still staying with us.'
(1-T090)

(23) *Aia* *e=aputu=i* ***eangoiena*** ***natui.***
3SG 3SG.SBJ=sleep=IRR until tomorrow
'He will sleep until tomorrow.'
(2-E019)

(24) ***Eangoiena*** ***numanoa*** ***ta*** ***na='aria*** ***yia*** *iai* *u=vamamatau=ou=ma.*
until ten and SPEC[CLI]=one year PROX 1SG.SBJ=teach=1SG.IPFV=ma
'For eleven years I've been teaching here.'
(1-T042-2)

Eangoiena may also be a subordinator denoting 'until' and introduce an adverbial clause that describes another event which is the end point in time for the event described in the main clause:

(25) *mi=pei* *po~po=mani* *nao=i,*
1EXCL.SBJ=PST.IPFV RD~stay=1EXCL.IPFV thither=IRR

eangoiena ***e=no*** ***va-boto*** ***au=maunu.***
until 3SG.SBJ=go.SEQ CAUS-be.born 1SG.PSSR[CLI]=woman
'…we stayed until my wife gave birth.'
(1-T042-2)

3.4 Lexicalisation and grammaticalisation

It is likely that *eangoiena* has lexicalised from the verb *eangoi* and the 3SG PSI enclitic *=ena* and has retained the meanings 'able' and 'allowed' but lost the sense 'enough', which is not as widely attested in the corpus anyhow. The adverb *eangoiena* is not synchronically segmentable because it is compatible with first, second and third person subjects (§3.2). So how did this lexicalisation happen? It is possible that when *eangoi* took a clausal complement, the subject-indexing proclitic marking *eangoi* was omitted in casual speech, or because the PSI enclitic rendered the subject-indexing proclitic redundant. *Eangoi* retained the PSI enclitic, and negative *ae*. Having lost the subject-indexing proclitic, *eangoi* no longer functioned inside the VC and instead moved out of the VC to become an adverb and the former complement clause became the matrix clause. Then there was extension from 3SG to all persons.

An interesting aspect of clauses with the adverb *eangoiena* is that when they are formally affirmative, they can be semantically affirmative or negative. Meanwhile there are some examples where *eangoiena* is negated by *ae*. Why is there this variation? It could be that *ae eangoiena* operates at the clause level and there is phonological reduction to *eangoiena* in casual speech. Alternatively, there is semantic shift and *eangoiena* is assumed to be negative; after all, in the text data, when *eangoi* has a finite complement, *eangoi* is negated (§3.1.2).

Finally, *eangoiena* has grammaticalised from an adverb to a preposition and subordinator, and there has been semantic change from 'able, allowed' to 'until', indicating temporal limitation.

Without historical data, it is impossible to identify when these changes happened. Nor is there any apparent time variation to provide a clue: both younger and older speakers (and men and women) used *eangoi* as a verb denoting 'enough', 'able' and 'allowed', an adverb expressing ability or permission, a preposition, and a subordinator. Yet evidently there has been a change in Papapana, both syntactically and semantically, in the use of *eangoi.* Sections 5-6 will explore whether this change happened independently or was contact-induced, or both.

4 Tok Pisin colexification of 'enough', 'able' and 'until'

TP *inap* derives from English *enough* with regard to the lexical material and one of its senses, 'enough'. Siegel (1998: 362) suggests that *inap* probably dates to at least the 1880s, since it is found in TP, and in Solomons Pijin and Bislama (where it is realised as *naf*) and thus must have existed in MPE. *Inap* is a determiner 'enough' (§4.1) and a verb denoting 'enough, sufficient' (§4.2.1). However, it has developed further senses that English *enough* does not have: *inap* is a modal verb denoting 'able, possible' (§4.2.2), a preposition 'until, up to, for' (§4.3) and a subordinator 'until' or 'so' (§4.4). Section §4.5 discusses the semantic extension and grammaticalisation responsible for this colexification.

4.1 Determiner inap 'enough'

In TP dictionaries and grammars, *inap* is not described as a determiner but there are some examples, such as (26), which suggest it can be a determiner in a NP. This analysis is supported by the fact that *inap* refers to quantity and is prenominal: most determiners are prenominal in TP (see Mihalic 1971: 11-13, 41-42, Verhaar 1995: 159-207 for TP NPs).

(26) *Sapos yu gat* ***inap mani,*** *yu ken baim.*
if 2SG have enough money 2SG can buy[9]
'If you have got enough money, you can [buy].'
(Mühlhäusler 1985: 266)

4.2 Verb inap

The verb *inap* can denote 'be enough, sufficient' (§4.2.1) or 'be able, possible' (§4.2.2) and function as a predicate. TP clauses have SVO order and are often divided into subject and predicate by the particle *i*, which is usually referred to as the "predicate marker", but also has other syntactic positions and functions (Mihalic 1971: 23-24, Smith 2002: 115-124, Verhaar 1995: 70-80). The presence of *i* with *inap* is discussed below. Verhaar (1995: 135-149, 322-330) refers to *inap* 'able' as a verb or "modal auxiliary". Similarly, abilitative *inap* is described as a "modal particle" (Smith 2002: 135-137), along with *mas* which can be epistemic or express obligation, and *ken* which expresses permission. For further information on TP TAM marking, see Mihalic (1971: 28-32), Smith (2002: 124-142) and Verhaar (1995: 311-337).

4.2.1 *inap* 'enough, sufficient'

Both Mihalic's (1971: 100) and Baing et al.'s (2008: 28) dictionaries list *inap*'s first sense as 'be enough, sufficient'. In this sense, *inap* is followed by a preposition phrase (PP) (27) or adverbial clause (28) introduced by *long* and identifying the purpose for which the subject suffices. The presence of the predicate marker *i* before *inap* in (28) is rare (Verhaar 1995: 138) and could be motivated here by rhythm as this utterance is from the translation of an English bawdy ballad.

(27) *Dispela wok em* ***inap*** *long tripela de.*[10]
DEM work 3SG enough PREP three day
'This is three day's work.'
(Mihalic 1971: 100)

(28) *Em* ***i inap*** *long pakim ol.*
3SG PRED enough PREP fuck 3PL
'It is enough to fuck you all.'
(Mühlhäusler, Dutton and Romaine 2003: 153)

In the dictionaries, the second sense listed for *inap* is 'to fit, to be the right size/age,' (Baing et al. 2008: 28, Mihalic 1971: 100) as in (29)-(30). As with (27), *inap* is followed by a PP.

(29) *Dispela klos* ***inap*** *long mi.*
DEM clothes enough PREP 1SG
'This dress fits me.'
(Mihalic 1971: 100)

[9] I glossed all Tok Pisin data based on the dictionaries and grammars referenced herein.
[10] In (27), (30) and (32) *em* is a "resumptive pronoun", that is, the subject is repeated as a pronoun before the verb (Verhaar 1995: 30).

(30) *Dispela boi em* ***inap*** *long skul.*
DEM boy 3SG enough PREP school
'This boy is old enough to go to school.'
(Mihalic 1971: 100)

4.2.2 *inap* 'able, possible'

The third sense listed for *inap* in the dictionaries is 'to be suited for, to be fit for, suitable, capable, able' (Mihalic 1971: 100) and 'to be suited for, able' (Baing et al. 2008: 28). I focus on ability here since the other senses are arguably better associated with 'to fit…' (§4.2.1).

Inap is described as expressing "physical capability" (Smith 2002: 137) and "capability… derived from requisite strength or knowledge" (Siegel 1998: 368), i.e. participant-internal possibility, as in (31). Conversely, Verhaar (1995: 323) describes *inap* as signifying "an ability based on something outside the control of the person who is able to do this or that (or nonhuman that is capable of effecting something)", i.e. circumstantial possibility, as in (32).

(31) *Ol* ***inap*** ***swim.***
3PL be.able swim
'They can swim.'
(Siegel 1998: 362)

(32) *San em* ***inap*** ***bagarapim*** *poteto kwik.*
sun 3SG be.able damage potato quick
'The [heat of the] sun can destroy the potatoes fast.'
(Verhaar 1995: 324)

Verhaar (1995: 142) contrasts the use of *inap* as a "personal verb ('can, be able to')" as in (31)-(32) and an "impersonal verb ('to be possible')" as in (33). Verhaar (1995: 142) acknowledges that semantically it is difficult to distinguish between personal and impersonal uses, but syntactically impersonal *inap* is identifiable because it does not have a subject; in (33) *yu* 'you' is not the subject because subjects never follow their predicates in TP.

(33) *Taim pikinini kabis i kamap olsem foa ins samting,*
time baby cabbage PRED appear like four inch something

orait, nau ***inap*** ***yu*** ***planim*** *long gaden.*
all.right now be.able 2SG plant PREP garden
'When the new cabbages [in the nursery] measure about four inches, then you can/it is possible that you plant them in the field.'
(Verhaar 1995: 142)

Inap is followed by the core constituent (usually a verb) either immediately (34) or with the predicate marker *i* (35) or preposition *long* (36) intervening (Verhaar 1995: 138). The presence of the predicate marker after *inap* is lexically determined and is optional with most verbs (Verhaar 1995: 140), while no "notable difference is involved in using or not using *long* after *inap*" (Verhaar 1995: 144). However, all the examples Verhaar presents are either negative or relative clauses, so perhaps there is a syntactic motivation. While *inap* is rarely preceded by the predicate marker in affirmative clauses, it is always preceded by *i* in negative clauses (37) (Verhaar 1995: 138). Examples (34)-(37) demonstrate the use of *inap* as a "personal verb" as the subject precedes *inap*. In many of the examples, it is not clear whether *inap* expresses participant-internal possibility or circumstantial

possibility, but in (36) *inap* expresses participant-internal possibility because the enabling factor is inherent to the agent.

(34) *Bai yupela **inap** **kisim** graun bilong ol.*
FUT 2PL be.able get ground POSS 3PL
'You [pl.] will be able to get their land.'
(Verhaar 1995: 138)

(35) *...mipela **inap** **i** **go** **na** **kam** **bek** tupela taim pinis.*
1EXCL.PL be.able PRED go and come back two time COMPL
'…we would have been able to go and come back twice.'
(Verhaar 1995: 140)

(36) *Nilpis tu i gat nil **inap** **long** **sutim** man.*
scorpion.fish too PRED have nail be.able PREP shoot man
'Scorpion fish, too, has a sting that can sting a person.'
(Verhaar 1995: 144)

(37) *Ol birua bai **i** **no** **inap** **i** **kam** klostu.*
PL enemy FUT PRED NEG be.able PRED come near
'The enemies will not be able to come very near.'
(Verhaar 1995: 140)

4.3 Preposition inap (long) 'until, up to, for'

Inap is a preposition denoting 'as far as' and 'until, till, up to, about' (Mihalic 1971: 39, 100) in both temporal (38) and spatial (39) senses. *Inap* can also be translated as 'for' when the NP complement is an enumerated noun expressing a unit of time (40). Mihalic (1971: 39) describes *inap* as an adverb used as a preposition, while Verhaar (1995: 247) describes *inap* as forming a "complex preposition" with *long* to express 'until' (41), 'up to, as far as' (42).

(38) *...na **inap** **dis** **yia** mi wok yet.*
and until DEM year 1SG work still
'…and up to this year I work still.'
(Mühlhäusler, Dutton and Romaine 2003: 199, 205)

(39) *Yu kam **inap** **hia.***
2SG come until here
'Come up to here.'
(Mihalic 1971: 40)

(40) *Mi sik **inap** **tripela** **de.***
1SG sick until three day
'I was sick for three days.' up to three days/three days long
(Mihalic 1971: 100)

(41) *Em i kamap long Mande, i go **inap** **long** **Fraide.***
3SG PRED appear PREP Monday PRED go until PREP Friday
'It starts on Monday and goes until Friday.'
(Baing et al. 2008: 28)

(42) *Rot i go* ***inap long solwara.***
road PRED go until PREP ocean
'The road reaches the ocean.' goes up to the ocean
(Mihalic 1971: 100)

Inap and *inap long* also precede NPs that denote other units such as currency (43), temperature and speed (Mühlhäusler, Dutton and Romaine 2003: 160-161, 169-170).

(43) ***inap long K10,000***
until PREP K10,000
'not exceeding K10,000'
(Verhaar 1995: 247)

4.4 Subordinator inap

TP adverbial clauses can be introduced by a range of subordinators, including "simple conjunctions" such as *taim* 'when', *sapos* 'if', purposive *bilong,* and *olsem* 'like, so', and "complex conjunctions" including *inap long* (Verhaar 1995: 425-446), which may have temporal (§4.4.1) or purposive (§4.4.2) senses.

4.4.1 *inap, inap long (taim)* 'until'

Inap, inap long, or *inap long taim* can be a "conjunction" (Mihalic 1971: 41) or "complex conjunction" (Verhaar 1995: 427) denoting 'until' and introducing a temporal adverbial clause as in (44)-(46).

(44) *...na mi no inap lus ting long tupela* ***inap mi dai.***
and 1SG NEG be.able be.lost thought PREP 2DU until 1SG die
'…and I won't forget you two until I die.'
(Mühlhäusler, Dutton and Romaine 2003: 222-223)

(45) *Wet* ***inap long dram i kol pinis.***
wait until PREP drum PRED cold COMPL
'Wait until the drum has cooled off.'
(Verhaar 1995: 429)

(46) *Mi laik stap* ***yu inap long taim yu kam bek.***
1SG like stay 2SG until PREP time 2SG come back
'I want to stay until you come back.'
(Mihalic 1971: 41)

4.4.2 *inap long* 'so'

Inap long may also be a "purposive conjunction" (Verhaar 1995: 437) denoting 'so' as in (47). Verhaar (1995: 143) suggests that the purposive conjunction derives from the impersonal ('to be possible') use of the verb *inap* (§4.2.2) as (48) demonstrates.

(47) *Man i mas i gat spes,*
man PRED must PRED have space

inap long em i ken i stap bilong em yet.
so PRED 3SG PRED can PRED stay of 3SG self
'A man needs space, so he can have privacy.'

(Verhaar 1995: 439)

(48) *Na tu em i katim longpela klos bilong ol i go sot tru,*
and also 3SG PRED cut long clothes POSS 3PL PRED go short very

inap ol arapela man i ken lukim as bilong ol…
so PL other man PRED can see bottom POSS 3PL
'Also, he cut their long robes very short, it is possible/so that the other people could see their buttocks…'
(Verhaar 1995: 143)

4.5 Grammaticalisation

As a verb denoting 'be enough, sufficient' *inap* is followed by a PP headed by *long* or an adverbial clause introduced by *long*. As a modal verb, preposition, and subordinator, *inap* is sometimes followed by *long* but the variation has not been accounted for. Perhaps the collocation of *inap* with *long* when *inap* means 'be enough' has carried over to the senses 'be able' and 'until' and *inap* is a reduction, attributable to casual speech.

Ultimately, *inap* with/without *long* has three main senses, 'be enough', 'be able' and 'until', and belongs to several word classes including verb, preposition, and subordinator. This is clearly a development from its English source *enough*, which cannot be used to indicate ability or temporal/spatial limitations. It is also likely to be a development from MPE: in Solomons Pijin *naf ~ nap* denotes 'enough', 'suitable' and 'able, capable' (Jourdan and Maebiru 2002: 143) and in Bislama, *naf* denotes 'enough, sufficient' and 'capable' (Crowley 2003: 174) while *kasem* has several senses including 'reach, arrive at', 'until' and 'as far as, up to' (Crowley 2003: 127, Jourdan and Maebiru 2002: 93). Meanwhile, *save* is a verb 'to know' and a habitual aspect marker in all three MPE varieties, and it is additionally an ability marker in Pijin and Bislama but not in TP (Siegel 1998: 361). Assuming the original meaning of *inap* was 'enough', there has clearly been semantic change, resulting in the additional meaning 'be able', followed by grammaticalisation to a preposition and subordinator denoting 'until'. The co-opting of an English lexical item as a grammatical marker in TP is by no means exclusive to *inap*, and is the result of the initial acquisition of English content words to the exclusion of many function words (Goulden 1990: 121). Later, as the communicative usefulness of the lingua franca grew, the content words were used to mark syntactic relationships and took on the semantic content of Austronesian grammatical morphemes (Goulden 1990: 121). The next section will Sections 5-6 explore whether this change is likely to have occurred independently or was induced by contact, or both.

5 Cross-linguistic colexification of 'enough', 'able' and 'until'

In Papapana and TP, there is colexification of 'enough', 'able' and 'until', resulting from lexicalisation in Papapana, and semantic change and grammaticalisation in both languages. To determine whether these innovations developed independently or whether they were contact-induced, it is necessary to examine whether colexification of these notions is widespread cross-linguistically outside (§5.1), as well as within the South Pacific region (§5.2), particularly PNG.

5.1 Languages beyond the South Pacific

Kuteva et al. (2019) report several grammaticalisation pathways ending with 'ability' or 'until'. The first is ARRIVE ('ARRIVE AT', 'REACH') > PARTICIPANT-INTERNAL POSSIBILITY (ABILITY), found, for example, in Koranko (Niger-Congo; Sierra-Leone, Guinea) (Kuteva et al. 2019: 63). The second is ARRIVE ('ARRIVE AT', 'REACH') > UNTIL (TEMPORAL), found in Khmer (Austroasiatic; Cambodia, Thailand, Vietnam), Kra-Dai and Sino-Tibetan languages in China and three Niger-Congo languages

(Kuteva et al. 2019: 63-64). There are also languages, such as Mandarin Chinese (Sino-Tibetan; China) where verbs denoting 'arrive' grammaticalise as both ability markers and prepositions denoting 'until' (Kuteva et al. 2019: 63).

The third grammaticalisation pathway is SUITABLE ('TO BE SUFFICIENT, ENOUGH', 'TO BE FITTING', 'TO BE SUITABLE') > PARTICIPANT-INTERNAL POSSIBILITY (ABILITY), found, for example, in Classical Chinese and two Niger-Congo languages (Kuteva et al. 2019: 415-416). However, Kuteva et al. (2019) do not report languages where 'until' derives from 'be suitable, be sufficient, be enough', nor is colexification of 'enough', 'able' and/or 'until' represented in the Database of Cross-Linguistic Colexifications (CLICS) (List, Rzymski, Tresoldi, Greenhill and Forkel, 2019), nor The Catalogue of Semantic Shifts (CSSh) (Zalizniak, 2020).

Finally, it can be noted that although English *enough* does not colexify 'enough', 'able' and/or 'until', *up to* does colexify ability and 'until': the prepositional verb *be up to* denotes 'capable of' as in *I am up to the task,* while the complex preposition *up to* denotes 'until' with either a temporal (*I have been working up to now*) or spatial end point (*Cycle up to the traffic lights*).

5.2 Oceanic and Papuan languages

Oceanic and Papuan languages frequently colexify 'arrive, reach', 'able' and/or 'until' (§5.2.1), or 'enough' and 'able' (§5.2.2), while colexification of 'enough', 'able' and 'until' is only attested/reported in PNG (§5.2.3).

5.2.1 Colexification of 'arrive, reach', 'able' and/or 'until'

Colexification of 'arrive, reach' and 'able' and/or 'until' is attested in the Pacific region. In Nalögo (Oceanic; Santa-Cruz, Solomon Islands) the verb *klë* colexifies 'know' and 'can/able' and in a core serialisation, *klë* 'reach, arrive' marks spatial and temporal limits, denoting 'until, up to' (Alfarano 2021: 379, 330, 281-282). In Teanu (Oceanic; Vanikoro, Solomon Islands) the verb *vagasi* denotes 'go as far as, reach' and can occur in an impersonal construction to denote that something is done 'until (specific moment)' (François, 2021). Similarly, in some Oceanic languages in Vanuatu such as Vatlongos (Ridge 2019: 270), Unua (Pearce 2015: 151) and Big Nambas (Fox 1979: 111), the temporal limits of a situation can be expressed by a verb denoting 'reach'. In all these Oceanic languages, there has been no grammaticalisation and temporal limits are expressed by verbs. However, in Motuna (Papuan; Bougainville, PNG), the particle *patak-ah* 'till/up to' functions adverbially in combination with NPs and is derived from the verb *patak-* 'to arrive' (Onishi 1994: 497). Meanwhile, *kasem* in Solomons Pijin and Bislama is a verb denoting 'reach' or a preposition 'until' (Crowley 2003: 127, Jourdan and Maebiru 2002: 93).

5.2.2 Colexification of two of the senses 'enough', 'able', 'until'

Colexification of 'enough' and 'able' is widely attested in the Pacific region. For example, in Daakaka (Oceanic; Ambrym, Vanuatu) the verb *wese* denotes 'enough, be able to' (von Prince, 2017), while in Solomons Pijin and Bislama, *naf* denotes 'enough' and 'able, capable' (Crowley, 2003: 174; Jourdan and Maebiru, 2002: 143). The following Papuan languages in PNG also colexify 'enough' and 'able':

1. Awtuw (Sandaun Province) - *yirin* 'enough' has grammaticalised as an ability marker (Kuteva et al. 2019: 415)
2. Nen (Western Province) - *pitas* is an adjective with various senses including 'enough', and an auxiliary denoting 'can, be able, be allowed to, is possible' (Evans, 2019).
3. Mauwake (Madang Province) - *pepek* 'enough' is an adverb (Berghäll 2015: 196) while ability can be expressed by i) a nominalized clause followed by the adverb *pepek* 'enough, able' or ii) the adverb *pepek* 'enough, able' as a non-verbal predicate (Berghäll 2015: 277, 282).

4. Pele-Ata (West New Britain Province) - the verb *momomo* colexifies ‘be enough’ and ‘be able to’ (Hashimoto 2008: 22).
5. Sulka (West New Britain Province) - *iis* denotes ‘enough’ and ‘able’ (Reesink 2005: 150).

Oceanic languages in PNG also colexify ‘enough’ and ‘able’. The following languages are Western Oceanic but belong to different subgroups (see FIGURE 2):

1. Kove (North New Guinea; West New Britain) - the verb *kahanga* expresses ‘enough’, but with the preposition/complementizer *nga*, it expresses ability or permission (Sato 2013: 396-397).
2. Nakanai (Meso-Melanesian, Willaumez; New Britain) - *koramuli* denotes ‘suitable’, ‘enough, sufficient’, ‘adequate’ and ‘able’ (Chowning and Goodenough 2016: 82, Johnston 1980: 83, 228). Interestingly, *kora,* related to *koramuli*, also denotes ‘suitable, good’, ‘enough, sufficient’ as well as ‘stop, leave it’ (Chowning and Goodenough 2016: 82), while the verb *kara* means ‘as far as, until’ and can occur as an independent verb, or a prepositional verb in a serial construction, with an optional preposition *te* (Johnston 1980: 190). *Kara* is not identified as being related to *kora* but perhaps there is a connection given the phonological similarity.
3. Notsi (Meso-Melanesian, NI-NWS, Tabar; New Ireland) - *pupua* means ‘enough’ and ‘able’ (Lindström 2003: 230)
4. Madak (Meso-Melanesian, NI-NWS, Madak; New Ireland) - the verb *epovo* denotes ‘enough’ and ‘able’ (Lindström 2003: 230).
5. Usen dialect of Barok (Meso-Melanesian, NI-NWS, Madak; New Ireland) - the verb *öt* ‘be sufficient, enough’ expresses ability when it is followed by a purposive construction introduced by the purposive preposition (Du 2010: 224). Interestingly, the formally similar *ot* denotes ‘arrive’ (Du 2010: 273).
6. Tigak (Meso-Melanesian, NI-NWS, Tungak-Nalik; New Ireland) - the adjective *kaskas* denotes ‘able, enough’ (Beaumont 1979: 142).
7. Tolai (Meso-Melanesian, NI-NWS, St. George; East New Britain) - the verbs *ongor* ‘be strong (enough)’ and *tale* ‘suit’ can express ability but the verbs *nunure* and *la* also colexify ‘know’ and ability (Mosel 1980: 126).

Colexification of ‘able’ and ‘until’ is found in Kara-Lemakot (Meso-Melanesian, NI-NWS, Tungak-Nalik; New Ireland): the verb *fexaxaas* ‘able’ takes a complement clause introduced by the preposition *sena* (Dryer 2013: 249-250) while the preposition *fefexaxaas* denotes ‘as far as’ spatially, or ‘until’ temporally (Dryer 2013: 134-136, 167). *Fefexaxaas* is also a subordinator denoting ‘until’ temporally (Dryer 2013: 238, 242). In Lakurumau (Meso-Melanesian, NI-NWS, Tungak-Nalik; New Ireland) the verb *vavexaas* ‘be enough’ (49) can also head a temporal clause (50) (Mazzitelli, pers.comm. 06/01/2021). Mazzitelli suspects *vavexaas* also denotes ‘able’ but was unable to find supporting data; however, given that until recently, Lakurumau was considered a variety of Kara-Lemakot and *fexaxaas* and *vavexaas* appear to be cognates, it seems likely that Mazzitelli’s suspicions are not unfounded.

(49)

Taadi	*roxin*	*mon*	*a*	*vanganan*	***a***	***vavexaas***
1DU.INCL	have	only	ART	food	3SG.SBJ	be.enough

pan=a	*yaan*	*a*	*zaxaa.*
OBL=ART	day	3SG.SBJ	be.one

‘We only have enough food for one day.’

(Mazzitelli, pers.comm. 06/01/2021)

(50)	*Nam*	*Oripa*	*xas*	*ka*	*u-mitaau*	*lo*	*mit-dira*
	ART	Oripa	still	3SG.SBJ	DUR-stay	LOC	hands-1PL.INCL

	aay	***a***	***vavexaas***	*Naan*	*ka*	*daa*	*wut.*
	and	3SG.SBJ	until	3SG	3SG.SBJ	IRR	come

'Oripa stays in our hands until He (God) will arrive.'
(Mazzitelli, pers.comm. 06/01/2021)

5.2.3 Colexification of 'enough', 'able' and 'until'

Significantly, colexification of all three concepts, 'enough', 'able' and 'until' is only attested/reported in PNG. Firstly in Loniu (Oceanic, Admiralty Islands; Manus Province), the verb *weney*, as a main verb, denotes 'be sufficient' or 'be able' but can also occur in a co-verb construction with the meaning 'up to, until, as far as' when followed by a NP (Hamel 1994: 169).

Secondly, in Kuot (Papuan; New Ireland) the verb *puo*, when intransitive, denotes '(to be) enough' (Lindström pers.comm. 05/01/2021), 'until' and 'reach' (Lindström 2002: 192) and 'be able to' (Lindström 2002: 14). Lindström (pers.comm. 08/01/2021) believes that some of the meaning range for *puo* may have arisen from contact with speakers of Oceanic languages such as Notsi, Kara-Lemakot and Mussau, though colexification of all three concepts is not attested in the first two (§5.2.2). Furthermore, she has not observed much, if any, direct influence of TP on Kuot in her informants' generation of speakers.

Thirdly, in Mussau (Oceanic, St. Matthias; New Ireland) the modal verb *roo* 'be able, be possible' takes a complement clause (Brownie and Brownie 2007: 196, 202) but also denotes 'suffice' (Brownie and Brownie 2007: 23) and can head a temporal VP (Brownie and Brownie 2007: 140).

Fourthly, in Mandara (Western Oceanic, Meso-Melanesian, NI-NWS, Tabar; New Ireland), the modal verb *oit* 'be able' takes a complement clause headed by the purpose "preposition" *nia*, and it can also mean 'be possible' (Hong and Hong 2003: 79-80). *Oit* has also grammaticalised as a preposition and subordinator 'until' (Hong and Hong 2003: 31, 51). *Oit* is not described as having other meanings, but in one example, it is glossed and translated as 'enough' (Hong and Hong 2003: 103) which suggests there is actually colexification of all three concepts.

Finally, there is possibly colexification of 'enough', 'able' and 'until' in Teop ((Western Oceanic, Meso-Melanesian, NI-NWS, St. George; Bougainville). In its first sense, the verb *antee* can be transitive or intransitive, and denotes 'stop', 'be enough for something/for a certain time' (51), 'need/consist of (a certain amount of something)' (Mosel, 2019) and 'reach (a certain amount)' with regard to length or height (Mosel 2019, Mosel and Thiesen 2007: 64). In its second sense, as a transitive verb, *antee* denotes 'can' (52) and has a complement clause linked by *tea* (Mosel and Thiesen 2007: 136).

(51)	*A*	*kanono*	*toro*	***antee***	*bona*	*buaku*	*a*	*kave.*
	ART	string	TAM	be.enough	ART	two	ART	net[11]

'The strings must be enough for two nets.'
(Mosel, 2019)

(52)	*Bara,*	*eara*	***antee***	*vai*	***tea***	***paku***	***a***	***taba-an.***
	well	1INCL	can	now	COMPL	make	ART	thing-eat

[11] I have glossed all Teop data from Mosel (2019) based on that dictionary and on Mosel and Thiesen's (2007) sketch grammar.

‘Alright, we can now make the food.’
(Mosel and Thiesen 2007: 136)

While there is clearly colexification of ‘enough’ and ‘able’ in Teop, further colexification with ‘until’ is debatable. In Mosel’s (2019) dictionary, included in the first meaning is ‘until’ but *antee* only means ‘until’ when it occurs in verb constructions: *antee be* ‘until something happens’ (glossed as ‘stop when’) and *beera antee* ‘(of plants) grow until something happens’ (glossed as ‘big stop’) both precede temporal adverbial clauses. *Ihuana antee* ‘wait until’ is glossed as ‘wait until’ but could arguably be glossed as ‘wait stop’, and this construction precedes what appears to be a PP (53). In all these constructions, *antee* is a verb meaning ‘stop’, which combines with a conjunction *be* ‘when’ or an adjective *beera* ‘big’ or it follows another verb and precedes a PP or complement clause. Meanwhile *ore antee* ‘until’ is transitive and glossed as ‘3SG=CONSEC enough.for’. Therefore, while *antee* can be interpreted as ‘until’, this meaning is arguably not the core meaning of *antee.*

(53)

Murinae	*a=re*	*paa*	***ihuana***	***antee***	***te=a***	***tauravi.***
after.that	1PL.IN.PRON=CONSEC	TAM3	wait	stop	PREP=ART	afternoon

‘After that, we’ll wait till the afternoon.’
(Mosel, 2019)

(54)

Eara	*na*	*tasu*	*va-tamee*	*ae*	*va-muraka*	*ni*	*rara*	*o*	*iobo,*
1INCL	TAM	beat	CAUS-flexible	and	CAUS-soft	APPL	IPFV	ART	sea.sausage

o=re	***antee***	*bona*	*koto*	*ae*	*a*	*an*	*te=ara*
3SG=CONSEC	be.enough	ART	bite	and	ART	eat	PREP=1INCL

‘We beat the sea-sausage flexible and soft until we can bite and eat it (lit. so that it is enough for the biting and our eating)…’
(Mosel, 2019)

6 Independent or contact-induced change?

Cross-linguistically, in languages outside the South Pacific, the grammaticalisation pathway from ‘enough’ to ‘able’ is common, but the grammaticalisation of either of these senses to ‘until’, or the colexification of all three senses is not, to the best of my knowledge, attested/reported (§5.1). Therefore, while possible, it seems unlikely that this colexification in TP and Papapana developed independently in both languages and instead language contact should be considered as a potential explanation.

6.1 Tok Pisin

Since TP *inap* and Solomons Pijin and Bislama *naf* each colexify ‘enough’ and ‘able’, this colexification presumably existed in MPE. Speakers of languages which colexify ‘enough’ and ‘able’ extended the meaning of *inap* ‘enough’ to ‘able’, thus replicating the pattern found in their languages. Speakers may have done this knowingly, perhaps because MPE lacked an ability marker, or they may have misinterpreted English *enough* as “being congruent with structures of the [Oceanic] substrate because of a related function or meaning” (Siegel 1999: 36). Then *inap* developed the sense ‘until’ after the 1880s, when TP developed as a distinct language under the influence of German and the Oceanic and Papuan languages of the Bismarck Archipelago and New Guinea coast (§2.2). The question is: could any of these languages have influenced the development of *inap* ‘until’ or did the change occur later, after TP had spread around PNG?

Firstly, I will discount the hypothesis that German influenced this semantic change in TP because in German, *genug* denotes 'enough', *können* denotes 'be able' and *bis* 'until' (Clark and Thyen, 2009). Secondly, I will discount the hypothesis that Oceanic and/or Papuan languages have influenced this semantic change more recently, after TP had developed as a distinct language. For this to be true, either the colexification of 'enough', 'able' and 'until' would need to be a widespread feature in PNG so that TP was influenced in the same way in different locations, or the colexification would need to be a feature of an influential variety, leading to its spread. The first hypothesis is unsupported, as shown in §5.2.3. The second hypothesis is undermined by the fact that the sense 'until' is listed in Mihalic's (1971) dictionary yet TP has spread more since the country's independence in 1975. Furthermore, in 1969, the variety of TP spoken along the north coast of mainland New Guinea was chosen as the standard (Romaine 1989: 8), yet this colexification is not attested/reported there. Instead it is only attested in Loniu, spoken by 450-500 speakers (Hamel 1994: 1), in Kuot with 1500 speakers (Lindström 2002: 1), Mussau with 5000 speakers (Brownie and Brownie 2007: 6), Mandara with 3000 speakers (Hong and Hong 2003: 8), Teop with 5000 speakers (Mosel, 2019) and Papapana with 99 speakers. None of these languages have particularly large numbers of speakers so it also seems unlikely that they would have influenced TP.

Instead, it is more likely that the colexification is substratum influence in TP's formative years, but which languages were involved? We can rule out Papapana and Teop because their speakers probably first encountered TP speakers in the first decade of the 20th century when missions and plantations were established in Bougainville (§2.3). We can probably discount Loniu, Mussau and Kuot too because in these languages, the three senses are expressed by verbs, and there has been no grammaticalisation to prepositions and/or subordinators. Nor are these languages identified as "substrate" languages of TP, that is, languages belonging to the NI-NWS linkage (particularly the St. George linkage subgroup) and spoken in New Ireland and East New Britain (§2.2). Mandara is actually a NI-NWS language, spoken on the Tabar Islands, the most northeasterly islands off New Ireland, but it is not a St. George language. While Mandara shows the same grammaticalisation as TP, the sense 'enough' is only attested once in Hong and Hong (2003) and not described, so this sense and its frequency need verification. Furthermore, it is possible that Mandara has been influenced by TP. Therefore I am reluctant to suggest Mandara influenced TP and indeed, Goulden (1990: 127) criticises substratum studies where there is an "implication that a single substrate language… has a direct effect on the syntax of Tok Pisin". Instead, Goulden (1989: 148) argues that substrate studies "could be viable if… they recognize the existence of areal substrate features".

The colexification of 'enough', 'able' and 'until' is not a particularly widespread areal feature, but overlapping colexifications/polysemies among Western Oceanic (including NI-NWS) languages of New Ireland and New Britain are, as shown in FIGURE 3.

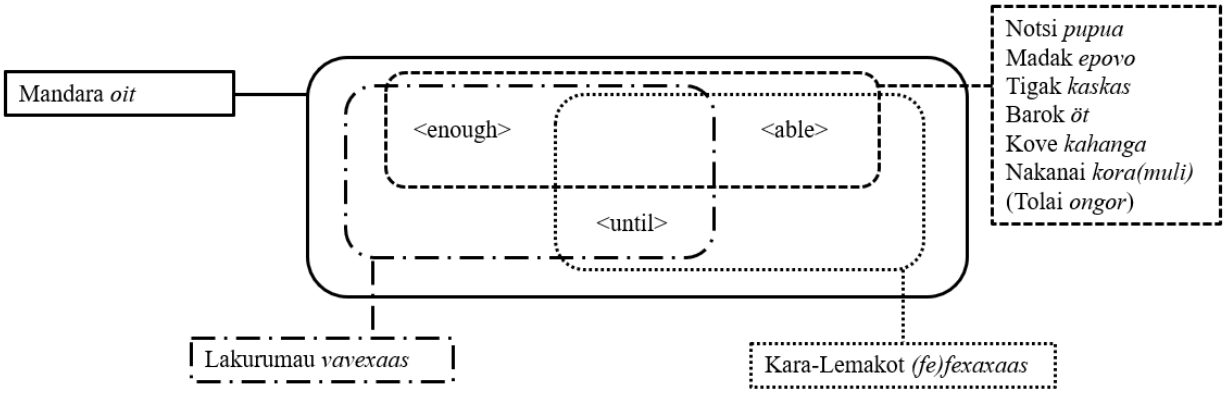

FIGURE 3 Overlapping polysemies in NI-NWS languages of New Ireland and New Britain

Therefore, it is possible that there were multiple, overlapping semantic extensions of TP *inap* by speakers of different, though similar, linguistic backgrounds when they came into contact with one another in the internal plantations of German New Guinea. One way this could have happened is as follows. Firstly, the colexification of 'enough' and 'able' present in MPE would have been reinforced by speakers of Language Type A, who had a lexeme that colexified 'enough' and 'able'. Secondly, Language Type B had a lexeme that colexified 'able' and 'until', so speakers extended *inap* from 'enough' and 'able' to 'until'. Meanwhile, speakers of Language Type C did the same but because they had a lexeme colexifiying 'enough' and 'until'. A speaker of Language Type B or C might use this pattern replication when conversing in TP with Language Type A speakers. If the addressee understood this innovation, they might then use it themselves, and so the innovation spread and was adopted by Language Type A speakers until eventually the colexification of 'enough', 'able' and 'until' stabilised. This process of producing and/or interpreting pattern replications would have been aided by the fact that most Melanesians were multilingual and "thus already had a linguistic repertoire of two or more Melanesian languages to draw on, making the task of learning constructions different from their first languages less onerous" (Goulden 1990: 30).

Finally, this colexification could have been reinforced when speakers conversed in TP with speakers of Language Type D, those like Loniu, Mussau, Mandara and Teop. This final stage rests on two assumptions: i) if colexification of all three senses is found in these four languages that are geographically spread out and belong to different first order subgroups of Oceanic, then it is quite possible that there are other languages in PNG where the colexification occurs, and ii) this colexification pre-existed in these four languages and is not the result of later contact with TP.

It seems then that the Oceanic languages of the Bismarck Archipelago could have collectively influenced the development of *inap* 'until' in TP. It remains to be seen how *inap* grammaticalised as a preposition and subordinator when, in all the languages discussed, except Kara-Lemakot and Mandara, 'until' is expressed by a verb. One possible explanation is that *inap* began as serial verb (see Verhaar 1995: 97-118 for TP serial constructions) and was reanalysed as an adposition: such a change is common in Oceanic languages when a serial construction becomes unstable (Durie 1988: 3). Whatever the explanation, it does not detract from there being a common semantic core shared by many of these Oceanic languages "as part of an areal substratum" (Goulden 1990: 3) and it being these semantic relationships that are encoded in TP.

6.2 Papapana

The Papapana verb *eangoi* denotes 'enough' and 'able' and this colexification is common cross-linguistically and among Oceanic languages, especially NI-NWS languages. The colexification of 'enough', 'able' and 'until' found in Papapana is not typically Oceanic though so I argue that this is an innovation in Papapana. Further evidence for this comes from the transparent lexicalisation from the modal verb *eangoi* to the modal adverb *eangoiena,* and subsequent grammaticalisation from modal adverb to temporal preposition or subordinator (§3.4). The question is, if this was not internal change, which language(s) influenced Papapana speakers to make this innovation?

There are two main contenders for a source language: TP and Teop. Papapana speakers have been in contact with Teop speakers longer than they have with TP speakers (§2.1). However, Teop first language speakers only account for 0.2% of the current population of Papapana villages (Smith-Dennis 2020: 57-58) and while speakers may be multilingual in Papapana and Teop, there is no shift to Teop. Conversely, TP contact has increased rapidly since the 1980s and has caused significant shift: 66% of the Papapana community speak TP as their first language and Papapana is highly endangered because of this shift. TP is therefore more likely to be the source language from a sociolinguistic perspective as it has been in contact with Papapana since at least the first decade of the 19th century and the contact situation is intense.

When trying to lend plausibility to the idea that change is contact-induced, it is necessary to show that "the proposed interference features did not exist in the receiving language before it came into contact with the source language" (Thomason 2008: 49). This is not possible because there is no earlier grammatical documentation of Papapana. Instead, it is necessary to derive this knowledge from comparative evidence and determine whether this colexification can be reconstructed for a common parent language. Teop is closely related to Papapana (§2.1) so perhaps this feature could be reconstructed for a common parent language, but to the best of my knowledge, there are no other St. George linkage languages, let alone NWS languages, which have this feature. More importantly, it is clearly an innovation in Papapana (§3.4). Furthermore, from a syntactic perspective, *eangoi* 'be enough, be able' is a verb, like TP *inap,* and *eangoiena* 'until' is a preposition and subordinator like TP *inap,* whereas in Teop, *antee* is a verb meaning 'stop', 'reach', 'be enough for...' and 'can' and when it is interpreted as 'until', *antee* is a still verb whose 'until' interpretation is arguably rendered by its combination with other morphemes.

Finally, to lend further plausibility to the argument that change is contact-induced, we would ideally show that the colexification was not present in the source language before contact with Papapana (Thomason 2008: 49). With Teop, this is not possible to demonstrate: Papapana and Teop speakers most likely first came into contact in the mid to late 19th century (§2.1) but there are no historical records of Teop from this time. With Tok Pisin, there is a bit more evidence: the colexification of 'enough', 'able' and 'until' was definitely present in TP by the 1980s as Mihalic's (1971: 100) dictionary entry for *inap* lists all three meanings, and intense contact between Papapana and TP speakers occurred from the 1980s when intergenerational transmission of Papapana was interrupted and significant shift to TP began (§2.3).

Overall TP is more likely to be the source language from a sociolinguistic perspective and from a syntactic perspective as in both TP and Papapana, an ability marker has grammaticalised as a preposition and subordinator denoting 'until, up to'. Papapana therefore seems to have undergone pattern replication, specifically, "contact-induced grammaticalisation", that is, "a grammaticalization process that is due to the influence of one language on another" (Heine and Kuteva 2003: 533). Heine and Kuteva (2003) distinguish between "ordinary grammaticalisation" and "replica grammaticalisation". Common to both is that speakers of the replica (R) language notice that in the model (M) language there is a grammatical category and they develop an equivalent category, using material available in their own language and grammaticalising one construction to another (Heine and Kuteva 2003: 533, 539). In the former, speakers draw on universal strategies of grammaticalisation using one of their constructions to develop another (Heine and Kuteva 2003: 533). In the latter, "speakers replicate a grammaticalization process they assume to have taken place in language M" (Heine and Kuteva 2003: 539). The grammaticalisation seen in TP, from modal verb *inap* to temporal preposition/subordinator *inap* is arguably an instance of ordinary grammaticalisation, because in all the Oceanic languages discussed, except Kara-Lemakot and Mandara, 'until' is expressed by a verb so the model languages do not provide a process of developing the category. In Papapana though, the grammaticalisation is arguably replica grammaticalisation, because there already existed a model for the process and the grammaticalisation in Papapana mirrors the TP process. I recognise though that this "attributes a considerable amount of linguistic meta-knowledge to natural language users, including knowledge of diachronic developments" (Gast and van der Auwera 2012: 382). An alternative analysis is "polysemy copying", where speakers have "used a shortcut by simply copying the initial and the final stages of the process" (Heine and Kuteva 2003: 555). Polysemy copying is closely related to replica grammaticalisation, but in the grammaticalisation process there is an intermediate stage of ambiguity. There is no such ambiguity with Papapana *eangoiena.* Furthermore, replica grammaticalisation requires extends over long periods of time (Heine and Kuteva 2003: 555); the grammaticalisation of TP *inap* had already been completed before there was significant contact

between Papapana and TP speakers and it is more likely that Papapana speakers simply observed and copied a polysemy pattern, motivated perhaps by the lack of a preposition denoting 'until' in Papapana and a desire to specify relations which were otherwise implicit.

7 Conclusion

This paper has investigated whether the colexification of 'enough', 'able' and 'until' in Papapana and TP results from internal or contact-induced change. Such a colexification is not (to the best of my knowledge) attested cross-linguistically outside PNG, therefore while it is possible that this innovation just happened to develop in both languages independently, it seems more likely that language contact is at least partly, if not wholly, responsible.

I argued that the verb *inap* 'enough' gained the sense 'able, possible' in MPE then grammaticalised as a preposition and subordinator denoting 'until' when TP developed as a distinct language in PNG. Although the colexification of 'enough', 'able' and 'until' is not a widespread areal feature, overlapping polysemies among Western Oceanic (including NI-NWS) languages of New Ireland and New Britain are. Therefore, I argue that *inap* gained the sense 'until' because there were multiple, overlapping semantic extensions by speakers of similar linguistic backgrounds when they interacted in German New Guinea plantations. It is only Kara-Lemakot and Mandara where 'until' is expressed by a preposition/subordinator so perhaps the syntax, i.e. the grammaticalisation of *inap* as a preposition and subordinator, was an internal innovation; potentially *inap* was a serial verb reanalysed as an adposition.

The Papapana verb *eangoi* colexifies 'enough' and 'able, allowed', a colexification common cross-linguistically and among Oceanic languages. However, the colexification of these senses and 'until' is not typically Oceanic and is attested in only one other St. George linkage language, the closely related NWS language Teop. While this feature could be reconstructed for a common parent language, I argue that it is clearly an innovation in Papapana given the transparent lexicalisation from *eangoi* to the modal adverb *eangoiena* and subsequent grammaticalisation to the preposition and subordinator *eangoiena* 'until'. There has been shift to TP but not Teop, and in Teop *antee* is a verb meaning 'stop', 'reach', 'enough' and 'can', whose 'until' interpretation is arguably rendered by its combination with other morphemes, whereas TP *inap* 'until' is a preposition and subordinator, as in Papapana. Therefore, I argue that the colexification of 'enough', 'able' and 'until' in Papapana is pattern replication (either ordinary contact-induced grammaticalisation or polysemy copying), modelled on TP. This process may have been motivated by the absence of a preposition denoting 'until' in Papapana and a desire to specify relations which were otherwise implicit. This contrasts with other languages in PNG in which there has been matter replication and *inap* is a loanword.

In both TP and Papapana, the colexification of 'enough', 'able' and 'until' is a contact-induced change: the NI-NWS languages of New Ireland and New Britain influenced TP, which has later influenced Papapana. Thus, there has been "bilateral replication" (Heine and Kuteva 2005: 181) as TP has been both a replica language, replicating Oceanic semantic patterns, and a model language for Papapana, something which Jenkins (2005) also demonstrates for TP and Tigak (NI-NWS, Tungak-Nalik; New Ireland). This paper has also identified that TP and five other languages in Papua New Guinea colexify 'enough', 'able' and 'until' (albeit as verbs in four) but the question remains whether these languages hint at an areal colexification which TP replicated (i.e. there are other languages which demonstrate this colexification) or whether TP is the model language, as argued for Papapana.

More broadly, this paper has synthesised empirical evidence for overlapping colexifications in Papua New Guinea, consistent with one of the cross-linguistic grammaticalisation pathways identified by Kuteva et al. (2019: 415-416): SUITABLE ('TO BE SUFFICIENT, ENOUGH', 'TO BE FITTING', 'TO BE SUITABLE') > PARTICIPANT-INTERNAL POSSIBILITY (ABILITY). Kuteva et al. (2019: 415) comment that it is not always clear whether the supporting data involves circumstantial possibility

instead. Indeed, Kuot, Mussau and Mandara colexify ‘enough’, ‘able’, ‘until’ and ‘possible’ (like TP), Kove colexifies ‘enough’, ‘able’ and ‘allowed’ (like Papapana) while Nen colexifies all four senses (§5.2). It is not surprising that these senses are connected since they are all types of possibility: participant-internal (ability), circumstantial (root possibility), and deontic (permission) (Kuteva et al. 2019: 31-32). Lexemes that colexify ‘enough’ and/or ‘able’ and/or ‘until’, often colexify other senses as well, such as ‘correct’ in Nen (Evans, 2019), ‘correctly’ in Mauwake (Berghäll 2015: 204), ‘suitable’ in Nakanai *koramuli* and ‘good, suitable’ in Nakanai *kora* (Chowning and Goodenough 2016: 82). Such colexifications would also be compatible with the aforementioned grammaticalisation pathway. The same could be said for languages which colexify ‘enough’, ‘able’ and ‘be same’, as in Pele-Ata (Hashimoto 2008: 22) and Kuot (Lindström pers.comm. 05/01/2021): if something is ‘suitable’ it is ‘enough’ or is ‘fitting’, something that fits is compatible with or matches something else, and two things that match are the same. There is also cross-over between the SUITABLE > ABILITY pathway and the pathways that begin with ‘arrive at, reach’ and end in ability or ‘until’ (§5.1): Nalögo colexifies ‘able’, ‘until’, ‘reach’ and ‘know’, Kuot and Teop colexify ‘enough’, ‘able’, ‘until’ and ‘reach’ while Usen might loosely colexify ‘enough’, ‘able’ and ‘reach, arrive’ (§5.2). Teop *antee* and Nakanai *kora* also colexify ‘enough’ and ‘stop’. FIGURE 4 shows how these senses may all be connected in a very tentative “semantic map”, with ENOUGH as the “pivot notion” (François, 2008).

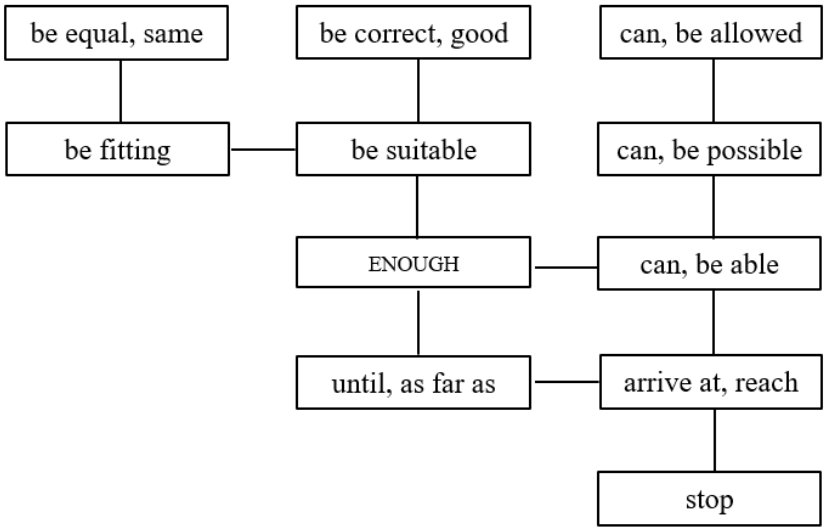

FIGURE 4 A tentative semantic map for ENOUGH

A grammaticalisation pathway not reported is that from ‘enough’ or ‘able’ to ‘until’. How has the human brain perceived these senses as semantically connected? Perhaps the answer is that they centre on the concept of CAPACITY. If an entity is sufficient or enough in some respect for a particular purpose, then it has reached its capacity or fulfilled its requirements. CAPACITY relates to the maximum amount an entity can contain or produce. PARTICIPANT-INTERNAL POSSIBILITY (ABILITY) also concerns what an entity can produce or do, because of their inherent ‘contents’ - the amount of strength, knowledge or skills they have. Furthermore, CAPACITY relates to maximum amounts and limits, and ‘until, up to’ indicate limits in time, space, temperature, currency etc. Alternatively, perhaps what all these senses have in common is ‘reaching a degree d on a scale’. ‘Until’ denotes an end point on a temporal or spatial scale. Meanwhile, ‘enough’ and ability imply that reaching degree d is a necessary condition for some consequence or consecutive action: we have to say ‘X is enough for Y’, and ability is often dependent on having ‘enough’ of something. These are tentative

explanations and further data (on the languages described as well as those yet to be described) might reveal more senses and suggest different semantic connections.

While questions remain about whether the colexification of 'enough', 'able' and 'until' in PNG is more widely attested and the direction of influence between other languages and TP, this paper has provided evidence of pattern replication in Papapana due to TP influence. As such, it has contributed to the under-researched area of TP contact-induced change in Oceanic languages, highlighting the increasing status of this pidgin/creole. Furthermore, it adds to the large body of research on the influence of Oceanic substrate languages by suggesting the origins and mechanisms by which *inap* grammaticalised as a temporal preposition and subordinator. This paper also contributes to our knowledge of cross-linguistic grammaticalisation pathways and colexification, proposing a tentative semantic map which is open to further elaboration.

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Abbreviations

1	first person
2	second person
3	third person
APPL	applicative
ART	article
ATTRIB	attributive
CAUS	causative
CF	counterfactual
CLI	Noun class I
CLII	Noun class II
CLF	classifier
COM	comitative
COMPL	completive
COND	conditional
CONSEC	consecutive
CONST	construct morpheme
DEM	demonstrative
DEM1	demonstrative 1
DEM2	demonstrative 2
DU	dual
DUR	durative
EMPH	emphatic
EXCL	exclusive
FUT	future

INCL	inclusive
INTS	intensifier
IPFV	imperfective
IRR	irrealis
LOC	locative
NEG	negative
NSPEC	nonspecific
OBJ	object
OBL	oblique
PL	plural
POSS	possessive
POSSIB	modal possibility
PRED	predicate marker
PREP	preposition
PROX	proximal
PSSR	possessor
PST	past
RD	reduplicant
REP	repetitive
R/R	reciprocal/reflexive
SBJ	subject
SEQ	sequential
SG	singular
SPEC	specific
SUBR	subordinator
TAM	tense, aspect, mood
TR	transitive

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