

Quantification in Australian languages

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I Introduction

A number of volumes have shed light on the diversity of quantificational systems cross-linguistically (Keenan & Paperno 2017, 2012; Matthewson 2008, Bach et al. 1995). However, with the exception of a relatively small number of publications (see especially Bowler 2017, Bowern & Zentz 2012, Alpher 2001, Bittner & Hale 1995, Evans 1995, Laughren 1981), the quantificational systems of Australian languages remain relatively under-studied. This chapter aims to make some progress towards filling this gap. In this chapter, we give a typological overview of quantificational expressions in Australia based on data from 125 languages.

We do not assume a theoretical definition of quantifiers in this chapter (i.e., Heim & Kratzer 1998); rather, we are generally concerned with lexical items that refer to quantities. This includes terms referring to vague quantities (translational equivalents to English *many, few, several...*), properties of sets (*all, some, no...*), cardinalities (*one, two, three...*), Wh-words referring to quantities (*how many, how much*), indefinite pronouns (*someone, something...*), and terms referring to “quantities” of times (or “cases,” in Lewis’s (1975) terminology) (*always, sometimes...*). We do not discuss number marking in agreement systems (see Brody this volume), non-pronominal (in)definiteness, or other lexical items that have been theoretically argued to include quantifiers in their semantic denotations, e.g. modals, tenses (see Bednall this volume) or degree expressions.

I.1 Our data

We aim to have a sample that is genetically and areally balanced as possible. Our sample includes data from 71 Pama-Nyungan languages from 21 subgroups and 49 non-Pama-Nyungan languages from 18 families, as well as 7 language isolates (sometimes

categorized within Pama-Nyungan or non-Pama-Nyungan) and two mixed languages. We include language data from all of the Australian states save Tasmania and the Australian Capital Territory.

Our sample of 125 Australian languages is drawn from 124 published grammars, grammatical sketches, and dictionaries, as well as personal communications with some language experts. We generally present data as it is given in the original sources; in a small number of instances, we standardize some interlinear glosses and orthographies.

When we report that a language “has” a quantifier, we mean that the sources that we consulted on the language document this quantifier.¹ We restrain from making strong claims about languages lacking certain quantificational expressions, since there may be gaps in the collected data, particularly in older sources. To make our generalizations as strong as possible, we typically present the frequency of a given quantificational expression as a proportion of the total number of languages in our sample that have it, i.e., for a given expression, we note how many languages have it out of a total of 125.

2 General morphosyntactic properties of quantificational expressions

A frequent morphosyntactic distinction made in the quantifier literature is between D-quantifiers and A-quantifiers (Partee 1995). The former (‘D’ standing for ‘determiner’) build expressions that are arguments (or parts of arguments) of predicates. Morphosyntactically, D-quantifiers are associated with nouns (e.g. English *every cat, some dogs*). Conversely, A-quantifiers (‘A’ standing for adverbs, auxiliaries, affixes, argument-structure adjusters, and so on) are used directly to build predicates (cf. Keenan 2017). Adverbs of quantification (e.g. English *usually, seldom*) are a paradigm example of A-quantifiers.

We refer to this distinction to describe some of the morphosyntactic properties of quantificational expressions in Australian languages. We find that basic, set-describing quantifiers (i.e., translational equivalents of English *all, many*, and so on) are frequently realized as nouns. We diagnose a lexical item as a noun by its ability to host case marking and/or trigger agreement marking, as in (1)–(2),² or if it appears within noun

¹All of the sources we consulted were written in English, and almost all data in our sample appears to have been collected using English as a metalanguage. As a result, we occasionally encountered challenges working with English translations of Australian language data. For instance, we often encountered English glosses containing quantificational expressions that did not occur in the target language data (e.g. plural nouns translated into English using *many*).

²The abbreviations used in examples are: 1 = first person, 2 = second person, 3 = third person, A = agent, ABL = ablative, ABS = absolutive, ACC = accusative, ALL = allative, ANIM = animate, APPL = applicative, ASP = aspectual marker, AUG = augmented, AUX = auxiliary, CARD = cardinality, CAUS = causative, CIRC = circumstantive, CON = contemporary tense, CONJ = conjunction, CONT = continuous, DAT = dative, DEM = demonstrative, DET = determiner, DISTR = distributive, DU = dual, DUB = dubitative, ERG = ergative, EXCL = exclusive, F = feminine, FUT = future, GEN = genitive, HAB = habitual, HUM = human, I = class I, IGNOR = ignorative, II = class II, IMM = immediate, IMPF = imperfective, IMPV = imperfective, INCL = inclusive, INDET = indeterminate,

phrases.³ As such, D-quantifiers are relatively widespread in Australian languages.

These nominal quantifiers can typically stand alone as arguments, without any other associated noun, as in (1)–(2). These quantifiers are also frequently documented in discontinuous NPs, as in (3) (cf. Louagie & Verstraete 2016: 51–52, who observe that quantifiers are the most frequent type of modifier to occur discontinuously in Australian languages).⁴

- (1) BARDI (NPN: NYULNYULAN) (Bowern 2012: 272)
 Nyalaboo i-ng-arr-ala-n **boonyja-nim.**
 there 3-PST-AUG-SEE-RPST all-ERG
 ‘Everyone saw him.’
- (2) WARLPIRI (PN: NGUMPIN-YAPA) (Bowler 2017: 967)
Panu-ngku = lu karlaja yunkaranyi-ki.
 many-ERG=3PL.S dig.PST honey.ant-DAT
 ‘Many [people] dug for honey ants.’
- (3) MATNGELE (NPN: EASTERN DALY) (Zandvoort 1999: 54)
Nembiyu ardiminek **binya jawk.**
 one IMINS.do.PST fish black.nailfish
 ‘I got one black nailfish.’

In addition to these D-quantifiers, many languages in our survey also have A-quantifiers. These languages express quantificational concepts through verbal modifiers such as free adverbs (4), preverbs/coverbs (5), and verbal affixes (6).

- (4) GARADJARI (PN: MARRNGU) (Sands 1989: 54)
wiridjardu nga-njari-djinja.
 completely eat-CONT-3PL.P
 ‘He ate them all up.’
- (5) WARLPIRI (PN: NGUMPIN-YAPA) (Bowler 2017: 975)
 Karnta = lu **muku** yanu Nyirrpi-kirra.
 woman=3PL.S all/completely go.PST Nyirrpi-ALL
 ‘All the women went to Nyirrpi.’

INDF = indefinite, IRR = irrealis, IV = class IV, LIM = limitative, LOC = locative, M = masculine, MA = masculine class, MED = medial, MIN = minimal, NEG = negative, NEUT = neuter class, NF = non-future, NFUT = non-future, NOM = nominative, NP = non-past, OBJ = object, P = patient, PAUC = paucal, PCON = past continuous, PL = plural, POSS = possessive, PP = past perfective, PRECON = precontemporary, PRIV = privative, PRM = prominence marker, PROG = progressive, PROH = prohibitive, PRS = present, PST = past, PURP = purposive, RCGN = recognitional, RDP = reduplication, REFL = reflexive, REFR = referential, REP = repetitive, RPST = remote past, RR = reflexive/reciprocal, s = argument of intransitive verb, SBJ = subject, SEL = selective enclitic, SG = singular, SUB = subordinate marker, TOP = topic, UA = unit augmented, VEG = vegetable class.

³Many Australian languages are described as lacking adjectives as a lexical category distinguished from nouns with respect to their morphosyntactic properties (Dixon 2002: 67–68, Nordlinger 2014: 237–8, Louagie n.d.: §3.1).

⁴Some of these examples of discontinuous nominal quantifiers may be instances of quantifier float (i.e., stranding of quantifiers by syntactic movement). However, in the absence of syntactic tests showing that examples like (3) are instances of quantifier float, we remain agnostic as to their source.

- (6) MAYALI (NPN: GUNWINYGUAN) (Evans 1995: 221)
 Gunj barri-**bebbe**-yame-ng.
 kangaroo 3.AUG-DISTR-spear-PP
 ‘They each killed a kangaroo.’
 ([they]_{key} [kangaroo-spear-bebbeh]_{share}, i.e. one kangaroo-killing per man)

A small number of quantifiers in our sample ($n < 10$) are restricted to modifying absolutive arguments. This property is primarily described of A-quantifiers, as in (7) (and (5) above). However, Harvey 1992 describes one D-quantifier in Gaagudju, *geegirr*, that is preferred (but not required) in combination with absolutive arguments (8). (We note that this property does not extend to all of the quantifiers within a given language; for instance, Warlpiri has other (D-)quantifiers that are not restricted to modifying absolutive arguments.)

- (7) MAYALI (NPN: GUNWINYGUAN) (Evans 1995: 233)
 Aban-**djangged**-bukka-ng.
 I>3PL-bunch-show-PP
 ‘I showed them the whole lot.’
- (8) GAAGUDJU (NPN: ISOLATE) (Harvey 1992: 307)
 ba-’ree-ng-ga = mba **geegirr** ma’ree-ya = mba **geegirr**.
 2.ABS-I.ERG-FUT-take=AUG all I.INCL.ABS-GO.FUT=AUG all
 ‘I will take all of you. We will all go.’

Finally, none of the languages in our survey appear to only use A-quantifiers; we find that A-quantifiers always occur in addition to D-quantifiers. This is interesting due to the important typological generalization made by e.g. Bach et al. 1995 that while languages can lack D-quantifiers, no language has been found to lack A-quantifiers. Our study tentatively suggests that Australian languages conform to this generalization. However, the nature of our data precludes strong theoretical conclusions about the absence of A-quantifiers in any given language. We believe that Australian languages present an important descriptive lacuna in this area, and could potentially represent typologically unattested quantifier systems.

3 Semantic findings

In the following sections, we discuss the prevalence of particular quantificational expressions in the languages in our survey, and review the morphosyntactic strategies that the languages use to encode them.

3.1 Expressing ‘many’/‘much’

Nearly all of the languages in our survey (109/125) have a lexical item that contributes a meaning like English *many*, i.e., that the cardinality of a set exceeds some contextual

standard.⁵ We frequently find that languages have more than one lexical item used to express ‘many,’ as demonstrated in (9).

- (9) YUGAMBEH (PN: NGUMPIN-YAPA) (Sharpe 1998)
- a. *kamaybu* ‘lots of,’ ‘plenty,’ ‘beyond four’
 - b. *karal* ‘more,’ ‘many,’ ‘a lot,’ ‘all,’ ‘plenty’
 - c. *walal* ‘many’

Australian languages typically do not lexically distinguish between quantification over count nouns versus mass nouns, i.e., the distinction between English *many* and *much*. In fact, to the best of our knowledge, there is no published account of the mass/count distinction for *nouns* in any Australian language, and several of our colleagues in personal communication have expressed doubts about relevance of this category for Australian languages altogether. Admittedly, this is as instructive as it is anecdotal. For want of a study of the phenomenon, in this section we talk about countability of the nominal lexemes as if they were English ones. At the same time, notice that the idea about absence of the countability distinction in Australian languages is corroborated by the fact that in all surveyed languages, one lexical item can modify both (alleged) count and mass nouns, as in (10).

- (10) BIRI (PN: MARIC) (Terrill 1998: 54)
- a. *yara dhalgari mari wuna-lba-dhana*
there many men-ABS lie-CONT-PST-3PL.S/A
‘Many men used to live here.’
 - b. *dhalgari gamu wara-mba-li gunhami gamu yinda-lbana-la*
much water-ABS be-CAUS-PST that-ABS water-ABS rise-CONT-PRS-3SG.S/A
‘Much rain made the river rise.’

An exception to this is the use of lexical items for ‘big’ to express a quantity meaning akin to English *much*. (At least) 12/109 languages in our sample permit their lexical item for ‘big’ to refer to ‘a large quantity of [noun].’ This almost always occurs in combination with mass nouns, as in (11).⁶ (We suspect that the actual number of languages that permit a quantity reading of ‘big’ is significantly higher than this; most language descriptions do not include ‘big’ in their discussion of quantifier systems, as its primary

⁵Only one language in our survey, the Gooniyandi mother-in-law language, is explicitly described as lacking a word for ‘many’ (McGregor 1989: 636).

⁶Louagie & Verstraete (2016: 37) assert that in Gooniyandi, prenominal ‘big’ functions as a quantifier, whereas postnominal ‘big’ has an adjectival meaning:

- (11) GOONIYANDI (NPN: BUNUBAN) (McGregor 1990)
- | | |
|--|---|
| <ol style="list-style-type: none"> a. <i>nyamani gamba</i>
 big water
 ‘a lot of water’ | <ol style="list-style-type: none"> b. <i>yoowooloo nyamani</i>
 man big
 ‘a big man’ |
|--|---|

use is not quantificational.) Only one of these 12 languages (Garrwa) is described as permitting ‘big’ to combine with count nouns under a quantity reading, as in (12).^{7,8}

- (11) WAGIMAN (NPN: WAGIMAN/WARDAMAN) (Wilson 2006: 67)
 wahan **buluman** ga-di-n ginkin-na.
 water big 3SG-COME-PRS roar-ASP
 ‘A lot of rain came roaring here.’
- (12) GARRWA (NPN: GARRWAN) (Mushin 2012: 80)
 Baki kuyu nurr = i waw~, daru-muku yalu-nya kula-ni,
 and bring we.EXCL.NOM=PST uninitiated.boys-PL they-ACC south-ABL
 wawarra, **balalanyi-muku** nayi-muku.
 child big-PL this-PL
 ‘We also brought young boys from the south, child(ren), **this big mob.**’

We note that a small number of languages in our survey have lexical items that can be interpreted as either ‘many’/‘much’ or ‘all’/‘every’, i.e. they are compatible with both existential and universal quantificational force. We discuss these data further in §3.2.

3.2 Expressing ‘all’/‘every’

Approximately half of the languages in our survey (64/125) have at least one strategy for expressing universal quantification over individuals.⁹ We describe three primary strategies for this purpose, in the order of their frequency: (i) having a unique lexical item with universal force; (ii) having a single lexical item that is compatible with readings of both existential and universal force (i.e., both ‘many’ and ‘all’/‘every’); and (iii) morphologically deriving ‘all’/‘every’ from ‘many’.¹⁰

⁷In Miriwoong, the lexical item *ngerreguwung* ‘big’ can undergo partial reduplication to result in *ngerregungerreguwung* ‘a very large number’/‘very many’ (Kofod 1978: 43).

⁸In one language, Murrinh-Patha, ‘big’ can be used to express universal quantificational force. It is capable of both mass and wholistic quantificational readings. Notice the use of the root *ngala* in both the qualifier and quantifier functions:

- (1) MURRINH-PATHA (NPN: SOUTHERN DALY) (John Mansfield, p.c.)
 Me-Ngala mup-ka **ngala** kanam-ka-wat-nime.
 foot-big people-TOP big be.3SG.NFUT-PAUC.S-frequent-PAUC.M
 ‘The whole Big Foot mob come here regularly.’

⁹In this section, we primarily discuss expressions that convey collective universal quantification. Overall, relatively few sources in our sample described distributive universal quantifiers like English *each*. For now, we simply note two trends that we observe in translational equivalents of *each*. The first is reduplication; in Djambarrpuyngu (Wilkinson 1991: 469) and Miriwoong (Kofod 1978: 43), ‘each’ can be expressed by reduplicating ‘one,’ (e.g. Miriwoong *djerrawidjerrawiyang* ‘each’ < *djerrawiyang* ‘one’). The second trend is the use of adverbials that invoke notions of spatial distribution (e.g. Warlpiri *jarnku* ‘each’/‘separately’; Bowler 2017). Alpher (2001) makes similar observations.

¹⁰An additional, uncommon strategy for encoding universal force appears to be the use of morphology encoding something like set closure; this gives rise to an exhaustive interpretation of the plural noun it combines with, resulting in a reading of universal quantification. We find possible set closure suffixes in only 3/64 languages in our sample. We note that the Warlpiri suffix *-patu* in (1) is also used to

The majority of these languages (~45/64) have unique lexical items with universal force; this is by far the most common of the three strategies. These are primarily free lexical items. However, a very small number of (non-Pama-Nyungan) languages (~5/64) encode universal quantification through affixes (as in (15)). We give examples of quantifiers with strictly universal force in (13)–(15).

- (13) ARRERNTE (PN: ARANDIC) (Wilkins 1989: 132)
 Alertekwenhe pmere **ingkirreke** artwe-kenhe, artwe-kenhe pmere.
 there place all man-POSS man-POSS place
 ‘That there (pointing to a particular site) was a place for all men, a men’s site.’
- (14) GARADJARI (PN: MARRNGU) (Sands 1989: 48)
Djarin-dja barda-ngka yilba-gu-djinja.
 every-LOC sun-LOC throw-FUT-3PL
 ‘Every day he threw them [the people].’
- (15) NGALAKGAN (NPN: GUNWINYGUAN) (Baker 2008: 160)
 miɰppara-**kappul** ŋu-pu-woʔwo jir-∅-ŋowij
 child-all ISG.S-3PL.OBJ-give.PP IPL.S-3.OBJ-eat.PCON
 ‘I gave it [food] to all the children, and we ate.’

The two other primary strategies for expressing universal quantification involve lexical items for ‘many’. A small number of languages (~10/64) have quantifiers that appear to be ambiguous between existential and universal force, as in Kokatha *muɰga* in (16). A single lexical item can therefore be interpreted as ‘many’ or ‘all’/‘every’, depending on the context.¹¹ At present, we speculate that these lexical items have an underlying meaning of ‘many’ that can be strengthened to ‘all’/‘every’ in some contexts, perhaps pragmatically; however, much further fieldwork is needed to determine how and when this strengthening occurs.¹²

express ‘several’/‘a small number;’ however, in examples like (1), it can be used to mark set closure regardless of the cardinality of the plural noun.

- (1) WARLPIRI (PN: NGUMPIN-YAPA) (Bowler 2017: 974)
 Yapa-**patu** = ju, pina kulpaja = lu.
 person-PATU=TOP again return.PST=3PL.S
 ‘[All] the people, they went back.’
- (2) WAMBAYA (NPN: MIRNDI) (Nordlinger 1998: 80)
 Yarru irr-aji alaji-**rdarra**.
 go 3PL.S-HAB.PST boy.I-GROUP(NOM)
 ‘All the boys used to go.’

¹¹In Ngaliwuru, a single lexical item, *mulu*, is glossed as both ‘all’ and ‘three’ (Bolt, Hoddinott & Kofod 1971: 77). This is the only language in our sample in which we observe this polysemy. However, Platt 1972 notes that the lexical item *mangur* ‘all’ in Kokatha is historically derived from ‘three.’

¹²Bittner & Hale 1995 give a semantic account of a Warlpiri quantifier, *panu*, which can be variably interpreted as either ‘many’ or ‘all’/‘every.’ They propose that in its existential strength reading, *panu* is of the same semantic type as common nouns in Warlpiri (i.e., $\langle e, t \rangle$). They derive its universal strength reading through a semantic type-shifting operation in which it can be interpreted definitely (i.e., as something of type e).

- (I6) KOKATHA (PN: WATI) (Platt 1972: 56–65)
- a. badu ɲurbara **muɟa** djiŋɖu galaɭa ɲina:djinj.
man strange many/all midday sit.down
'A lot of strangers sat down at midday.'
 - b. uɭa ambuɖa **muɟa** ɲur-ɲga
boy small many/all camp-LOC
'All the boys are at camp.'

A still smaller number of languages morphologically derive their universal force quantifier from 'many'; we observe this strategy in only 6/64 languages in our sample.¹³ Languages accomplish this through a number of morphological strategies, primarily (i) the addition of a lexical item meaning 'only' or 'still,' as in (I7); and (ii) partial or total reduplication of 'many,' as in (I8). Interestingly, we note that languages that morphologically derive their universal quantifiers from 'many' (as their primary strategy for universal quantification) tend to be non-Pama-Nyungan.

- (I7) MATNGELE (NPN: EASTERN DALY) (Zandvoort 1999)
- a. woerrens **mutjurr** lerr-ma-burrudak-awa
mosquito many bite-IMPf-3AUG.S.STAND.PST-IMIN.OBJ
'Lots of mosquitoes were biting me.' (ex. 353)
 - b. mi ngarru-ma-errerr **mutjurr-ayu-rnung**
tucker 1AUG-PRM-INCL many-only-PURP
'This tucker belongs to all of us.' (ex. 305)
- (I8) GARRWA (NPN: GARRWAN) (Mushin 2012: 54)
- a. *kaja* 'many'
 - b. *kajawaja* 'all,' 'every' [lit. *many*~RDP]

Like in §3.1, we find that Australian languages do not lexically distinguish between universal quantification over count nouns versus mass nouns, as in (I9). (We take *gaarra* 'salt water' in (I9b) to be a mass noun.)

- (I9) BARDI (NPN: NYULNYULAN) (Bower 2012: 272, 710)
- a. **Boonyja** = gid ambooriny **boonyja** lagal~lagal i-nga-rr-ganyi-n-an
all=THEN people all climb~RDP 3-PST-AUG-climb-CONT-RPST
barda.
away
'Then all the people were climbing up [to get away from the rising water].'

¹³Interestingly, we find evidence for the opposite pattern in Yir Yoront. In this language, reduplicating the monomorphemic lexical item *moq* 'all' yields the (existential force) value judgment quantifier 'quite a few':

- (I) YIR YORONT (PN: PAMAN) (Alpher 1973: 375)
moqmor 'quite a few' <**moqo* 'all'

- b. I-ny-joordi-na gaarra **boonyja**.
 3M-PST-dry.up-RPST salt.water all
 ‘The sea all dried up.’

Furthermore, Australian languages do not lexically distinguish between universal quantification over subparts of a singular count noun versus universal quantification over sets of individuals or mass nouns, as in (20). (We take *walaalu* ‘country’ to be a singular count noun in (20a), as suggested by the definite gloss.)

- (20) GAAGUDJU (NPN: ISOLATE) (Harvey 1992: 307)
- a. *walaalu* ∅-naana **geegirr**.
 country IV-burn.PP all
 ‘The country is all burnt.’
- b. *djirriingi njinggooduwa yaa-bu = mba geegirr*.
 man woman 3I-went=AUG all
 ‘The men and women have all gone.’

The languages in our sample also generally do not appear to lexically distinguish between universal quantifiers that combine with morphosyntactically singular nouns versus plural nouns, akin to the English contrast between *every* and *all*. However, there are data from Kunbarlang that suggest the possibility of a morphosyntactically singular (distributive) universal quantifier, as in (21).

- (21) KUNBARLANG (NPN: GUNWINGUAN) (Kapitonov, field notes)
- Na-kudji~kudji** ka-warre.
 I-RDP~one 3SG.NFUT-move.NP
 ‘Everyone is walking by themselves.’

3.3 Expressing ‘several’/‘a small amount’

Approximately half of the languages in our sample (63/125) have a strategy for expressing ‘several’ or ‘a small amount’.¹⁴ We describe four primary strategies for expressing ‘several’: (i) having a lexical item that uniquely encodes ‘several’; (ii) having a lexical item that is polysemous between expressions of cardinality (e.g. *two*, *three*) and ‘several’; (iii) morphologically deriving ‘several’ from expressions of cardinality, typically through reduplication; and (iv) using a lexical item for ‘small’ to express ‘a small amount.’

Of the languages in our sample with a strategy for expressing ‘several,’ almost two thirds of them (41/63) have a unique lexical item with this meaning.¹⁵ We give examples

¹⁴We note that related quantifiers like English *few* have an associated value judgment that the cardinality of the set they quantify over is below some contextually established expectation (Keenan 2017). For the purpose of this chapter, we do not distinguish between quantificational expressions that do or do not have this value judgment. Overall, very few of our sources describe such a value judgment.

¹⁵For the purpose of this count, we attempted to include only lexical items for ‘several’ that are not explicitly described as being synchronically polysemous with/morphologically derived from numerals. However, due to gaps in the descriptions of these languages, we suspect that a number of the lexical items included in this tally are in fact related to numerals.

of two such lexical items in (22)–(23).

- (22) WARLPIRI (PN: NGUMPIN-YAPA) (Bowler 2017: 970)
 Napaljarri-rli karlaja **wirrkardu**.
 Napaljarri-ERG dig.PST few
 ‘Napaljarri dug few [honey ants].’¹⁶
- (23) AWABAKAL (PN: YUIN-KURIC) (Lissarrague 2006: ex. 176)
waraya kuri
 few:ABS men:ABS
 ‘few men’

A smaller number of languages (~15/63) have lexical items that are polysemous between readings of cardinality (i.e., numerals) and vague readings of small quantity. We find that the numerals used in these expressions range from one to four, as in (24)–(27). ‘One’ has a vague use in only one language in our sample, Mangarayi; Merlan (1989: 93) notes that *wumbawa* ‘one’ can have a vague interpretation only in combination with inanimate nouns in Mangarayi.¹⁷ (Since Australian counting systems have already been discussed at length in Bower & Zentz 2012, we refer readers to their paper for discussion specifically on numerals. The findings of our study generally accord with their conclusions; for instance, they describe similar vague uses of numerals in their data.)

- (24) MANGARAYI (NPN) (Merlan 1989: 93)
wumbawa ‘one,’ ‘a small number,’ ‘few’ [only with inanimates]
- (25) DJINANG (PN: YOLNGU) (Waters 1983: 9)
bilawili ‘two,’ ‘a few’
- (26) GOONIYANDI (NPN: BUNABAN) (McGregor 1990: 149)
ngarlloodoo ‘three,’ ‘a few’
- (27) KUUKU YA’U (PN: PAMAN) (Thompson 1988: 27,82)
mangku ‘four,’ ‘a few’

A still smaller number of languages (<10/63) morphologically derive their lexical item for ‘several’ from numerals. This morphological derivation is typically accomplished through reduplication, as in (28). Conversely, Alpher (1973: 51) argues that in Yir Yoront, *wapayər* ‘three’ is morphologically derived from *wap* ‘few,’ ‘some.’

- (28) DJABUGAY (PN: PAMAN) (Patz 1991: 87)
 a. *mulu* ‘two’
 b. *mulumulu* ‘a few’ [lit. *TWO*~RDP]

Finally, ~5/63 languages in our sample use a lexical item meaning ‘small’ as a primary strategy for indicating a small amount. This parallels the use of ‘big’ to express ‘much’, as described in §3.1. We find no examples of ‘small’ being used in combination with

¹⁶Historically, *wirrkardu* was used to mean ‘three’ as well as ‘several.’

¹⁷Bower & Zentz (2012: 143) also describe Warlmanpa as permitting a vague interpretation of ‘one.’ However, we do not currently include Warlmanpa in our language sample.

count nouns to express ‘several’; rather, ‘small’ is used to refer to small amounts of a mass quantity, e.g. *kikakkin* ‘meat’ in (29).

- (29) KUNBARLANG (NPN: GUNWINGUAN) (Kapitonov 2019: 276, 133)
- a. Kikka ngorro ka-rninganj **ki-wanjak**, ngadda-karmeng.
 she DEM.MED.IV 3SG.NF-sit.PST II-little IPL.EXCL.NF-get.PST
 ‘She was little [when] we got her.’
- b. Kadda-djarrang **na-wanjak** nayi kikakkin.
 3PL.NFUT-eat.PST I-small DET.I meat
 ‘They ate a little bit of the meat [but didn’t finish it all].’

Interestingly, we find that expressions for ‘several’ tend to co-occur primarily with count nouns and do not co-occur with mass nouns (unlike the behavior of lexical items for ‘many’/‘much’ in §3.1 and ‘all’ in §3.2). In the absence of significant cross-linguistic negative data, we are unable to make a strong claim with respect to this point. However, we tentatively observe that this generalization appears to hold.

We also observe that there are clear historical links between numerals and expressions for ‘several’ in many of the languages in our sample. This includes synchronic polysemies (as in (24)–(27)) as well as historical relationships between ‘several’ and numerals (as in Warlpiri *wirrkardu* (22)). This is documented across both Pama-Nyungan and non-Pama-Nyungan languages, suggesting that it is relatively widespread across Australia.

3.4 Expressing partitive ‘some’

In this section we address translational equivalents for the English partitive quantifier *some*. This lexical item is used to denote a proportion of a total, as in the English expression *Some (of the) cats are black*.¹⁸

Approximately a quarter (~35/125) of the languages in our sample are described as having a quantificational expression akin to partitive *some*. These languages use two main strategies for expressing *some*: (i) having a dedicated lexical item to express partitive *some*, and (ii) having a single lexical item that is polysemous between ‘some’ and ‘other’ or ‘different’. Half of these languages ($n = 18$) use a dedicated lexical item to express partitive ‘some’, as in (30)–(31).

¹⁸In English, partitive *some* is homophonous with an existential/indefinite lexical item *some*, which we do not discuss. (This latter *some* occurs in existential expressions like *Some bananas are on the table*, and can be phonologically reduced to [səm].) If our source on a given lexical item did not comment on its semantics, it was often not possible to tell with certainty whether we were dealing with a partitive or existential/indefinite ‘some.’ The decision was hard to make in many such cases. Since definiteness is not typically overtly marked in Australian languages, we normally gave these borderline cases the benefit of the doubt and counted them as partitives.

We would like to underscore that we are not suggesting an Anglocentric point of view where all lexical items for *some* are necessarily at risk of such partitive/existential ambiguity; rather, our concern stems from the fact that our sources are all in English. Whenever the English translation/gloss was all the information we had on a given lexical item, this uncertainty arose due to the ambiguity in English.

- (30) AWABAKAL (PN: YUIN-KURI) (Lissarrague 2006: ex. 177)
 Anti = pu **winta** kuri.
 here = EXCL some.ABS men.ABS
 ‘Some of the men are here.’
- (31) KUNBARLANG (NPN: GUNWINYGUAN) (Kapitonov, field notes)
 Ngunda ki-kala ngob nayi barbung la **na-yika**
 not 3SG.IRR.PST-get.IRR.PST all DET.I fish CONJ I-some
 ka-(rnak)-kalng.
 3SG.NFUT-LIM-get.PST
 ‘S/he didn’t get all the fish, but only got some.’

Less than half of these languages ($n = 14$) use a lexical item that can also express ‘other’/‘different’, as in (32)–(33). When ‘other’ is used as a translational equivalent of partitive ‘some,’ it can be repeated more than once within the expression, as in (32b) and (33).

- (32) BURARRA (NPN: MANINGRIDA) (Green 1987)
 a. Abirri-ny = **yerranga** marnnga jiny-bunggiya- \emptyset jiny-yorkiya- \emptyset
 3UA-F=other sun 3MIN-fall-CON 3MIN-do.always-CON
 abirri-ny-bamu-na.
 3UA-F-go.along-PRECON
 ‘The other two women went (to where) the sun sets.’
 b. an-**nerranga** an-mola rrapa an-**nerranga** an-bachirra.
 3.MIN-other 3MIN-good and 3MIN-other 3MIN-wild
 ‘Some are friendly and some are the angry kind.’
- (33) NYANGUMARTA (PN: MARNGU) (Sharp 2004: 258)
 mungka wupartu mayi-rrangu kurrngal **jinta** juri **jinta** kari.
 tree small vegetable.food-PL many other sweet other bitter
 ‘The small tree/bush has lots of fruit [pilirta], some are sweet and some are sour.’

We speculate that the partitive reading of these expressions could arise from the presuppositions associated with ‘other’. In an English assertion like *Other boys ran*, there seems to be a presupposition that some boys in the discourse context did not run.¹⁹ This in turn leads to a partitive reading of the predicate in which it is true when evaluated against some of the individuals in the discourse context, and false when evaluated against others.

Theories of English *some* typically attribute its partitive reading to pragmatic competition with the universal force quantifiers *all/every*. This competition results in a scalar

¹⁹We note that the acceptability of this sentence is degraded when it occurs outside of a larger discourse context. Our goal is not to give a semantics of English *other*; however, we note simply that English *other* could be subject to some discourse anaphoric requirement that the lexical items for ‘other’ in Australian languages are not necessarily subject to. We note that this observation seems in line with von Stechow & Matthewson’s (2008) suggestion that some languages have the kind of presuppositions which do not impose felicity conditions on the context or common ground.

implicature associated with *some* that leads to the reading ‘some but not all’ (Horn 1972). This scalar implicature is the most reliable characteristic of partitive ‘some’ (as opposed to the indefinite ‘some’); however, this implicature is a fine semantic judgment that requires careful testing in context. The presence of this implicature is confirmed explicitly for lexical items in only a handful of languages in our sample ($n < 10$), as in e.g. the Kunbarlang example in (31).

We presently hypothesize that when partitive ‘some’ is expressed by ‘other’, this partitive meaning could be encoded as a presupposition (as described above), rather than a scalar implicature. However, understanding the semantics of ‘some’ and ‘other’ in these languages requires much further research.

3.5 Constituent (nominal) negation

For a complete survey of negation in Australian languages, we refer the reader to Phillips (this volume). In this section, we focus solely on expressions of constituent (nominal) negation, e.g. English *no dogs*. We find that approximately two thirds of the languages in our sample (84/125) have a strategy for uniquely or primarily expressing constituent negation. We identify two primary morphosyntactic strategies for this purpose: (i) using free, uninflected lexical items, and (ii) using privative nominal suffixes. (Some languages use both strategies.)

Free lexical items are the most common strategy that languages use to express constituent negation; they are described in 51 languages in our sample. Pama-Nyungan and non-Pama-Nyungan languages are represented roughly equally among these 51 languages. We find examples of negative particles occurring prenominally (34) as well as postnominally (35)–(36).

- (34) GARRWA (NPN: GARRWAN) (Furby & Furby 1977: 37)
migu-yadji mama-nji walgura- \emptyset η awamba bayaga \mathring{a} - \emptyset
 nothing food-REFR big-NOM only small-NOM
 ‘There are no big (watermelons) to eat—only small ones.’
- (35) MATNGELE (NPN: EASTERN DALY) (Zandvoort 1999: 102)
 Yim **dakayu** jawungu ngutjyende-ma.
 fire NEG today morning-PRM
 ‘We had no fire this morning.’
- (36) WARRONGO (PN: MARIC) (Tsunoda 2011: 660)
 Banggorro- \emptyset **nyawa**.
 freshwater.turtle-NOM NEG
 ‘There is no turtle (meat).’

33 languages in our sample use privative nominal suffixes to express constituent negation, as in (37)–(39). Privatives typically express *without N* or *lacking N*; as a result, these suffixes often occur in expressions describing (a lack of) possession, as

in (38)–(39).²⁰ Interestingly, we find that privative suffixes are primarily a feature of Pama-Nyungan languages. Only a small number of non-Pama-Nyungan languages in our sample ($n < 10$) are described as having privative suffixes.

- (37) NHANDA (PN: KARTU) (Blevins 2001: 64)
 wilu-nggu apa-nyida.
 river-LOC water-PRIV
 ‘There’s no water in the river.’
- (38) BILINARRA (PN: NGUMPIN) (Nordlinger 1990: 122)
 tarnku-mulung-pa-ja ya-ni Yarralin-jirri.
 tucker-PRIV-#-IDU.EXCL.S go-PST Yarralin-ALL
 ‘We had no tucker (so) we went to Yarralin.’
- (39) WAGIMAN (NPN: WAGIMAN/WARDAMAN) (Wilson 2006: 150)
 ga’an dyilimakun warren-ne’en
 that woman child-PRIV
 ‘That woman has no children.’

Finally, we note that a few languages in our sample use specific case frames in constituent negation constructions. For example, in Alawa (40), the negative particle *madi* co-occurs with genitive case marking on the relevant noun. Similar data is described in Wambaya (nPN: Mirndi) with dative case marking (Nordlinger 1998: 204). Languages that use these morphosyntactically complex strategies are primarily non-Pama-Nyungan; however, we note that these strategies are uncommon overall (described in fewer than five languages).

- (40) ALAWA (NPN: MIRNDI) (Sharpe 1972: 63)
 nida madi ŋuku-yi
 this no water-GEN
 ‘There is no water here.’

3.6 Indefinite pronouns

Indefinite pronouns (e.g. *someone*, *nothing*, *anywhere*, *whoever*) are often directly associated with existential and universal quantifiers in semantic analyses, and are a prime tool for the study of scope ambiguities and quantifier interaction. However, we do not find much dedicated discussion of these expressions in current descriptive literature

²⁰Since property concepts like *tall*, *short*, etc. are typically encoded as nouns in Australian languages, privative suffixes can sometimes also be used to express the absence of a given property, as in (1).

- (1) WARLPURI (PN: NGUMPIN-YAPA) (Hale et al. n.d.)
 Wita, ngula = ji yangka wiri-wangu.
 small that = TOP that big-PRIV
 ‘Wita [small] is something that is not big.’

on Australian languages. Translational equivalents of English indefinite pronouns are described in approximately one third (43/125) of the languages in our sample.²¹

For the purpose of this overview, we considered all items that were translated with the English indefinites; however, further classification was usually impossible. For instance, the available data were usually insufficient to distinguish between existential and free choice indefinites, for which the primary difference would be that of scope (i.e. the English *someone* vs. *anyone*; however, see §3.9).²²

In the vast majority of these languages (36/43), the indefinite pronouns are related to the interrogatives (i.e., Wh-words). These languages can be further divided into two groups:

- (i) Languages in which the indefinite pronouns are identical in form to Wh-words, i.e. one form is ambiguous between interrogative and indefinite readings (25/36 languages)
- (ii) Languages in which a morphological operation (either optional or obligatory) derives indefinites from Wh-words (at least 11/36 languages)

A lexical item that is ambiguous between the interrogative and the indefinite readings is exemplified in (41).

- (41) BILINARRA (PN: NGUMPIN-YAPA) (Nordlinger 1990: 37)
Ngantu-rlu-nga pa-ni.
who-ERG-DUB hit-PST
(1) ‘Who hit him?’
(2) ‘Maybe someone hit him.’

This frequent functional duality of the same form is the subject of a (smaller scale) typological study by Mushin (1995). She suggests that their epistemological contribution is the basis for such functional development, and coins the term *epistememe* for the forms that serve as ontological categorization of discourse referents and that may take on interrogative, indefinite, hesitation and complementizing functions. We further find that the identical forms will often have different distributional tendencies, e.g. when used as interrogatives these pronouns will appear clause-initially (42a), but enjoy more freedom of placement when used as indefinites (42b).

²¹Ignoratives (e.g. English *whatchamacallit*) are also described in a significant number of languages in our sample; like indefinite pronouns, ignoratives have to do with the existence of an individual without providing the identity of that individual. They are used as genuine hesitation markers, but also very frequently as a speech strategy to avoid direct naming of people or objects, which can be chosen for various reasons, including stylistic.

²²We do not find any robustly grammaticalized distinctions between specific and non-specific indefinite pronouns (as in e.g. the lexical distinction in Russian between *koe-kto* ‘specific someone who the speaker knows but does not reveal to the addressee’ and *kto-nibud* ‘non-specific someone [appropriate in conditionals and modal contexts]’). However, very few sources in our sample discuss the kinds of contexts that would uniquely license specific versus non-specific indefinites. Due to this lack of data, we do not claim that Australian languages lack this grammatical distinction; we note simply that we do not find strong cross-linguistic evidence for it.

- (42) BININJ KUN-WOK (NPN: GUNWINGUAN) (Evans 2003: 280–1)
- a. **Njale** bene-boken kabene-h-na-n?
 what 3.UA-two 3.UA-IMM-see-NP
 ‘What are they two looking at?’
- b. bu **njale** ngarri-ma-ng...
 SUB what I.AUG-get-NP
 ‘and if we get something...’

We find a range of morphological strategies that are used (either optionally or obligatorily) to derive the indefinites from the interrogatives. These strategies include using indefinite, ignorative, or dubitative affixes/particles (43) and reduplication (44).

- (43) DJAMBARRPUYŊU (PN: YOLŊU) (Wilkinson 1991: 393)
- Ga djäma nhe dhu ga-a yindi nhe dhu ga djäma **ŋula nhämunha**
 and work you FUT IMPV-I big you FUT IMPV-I work INDF2 how.many
 dhunġarra ŋurraka+m
 year throw+I
 ‘And you are working, you are working (on something) big, lasting for an indefinite amount of time.’
- (44) ARABANA-WANGKANGURRU (PN: KARNIC) (Hercus 1994: 129)
- Thiyara~thiyara** yuka-ka **minha~minha** mapi-rnda, partyarna ngawi-lhiku
 RDP~which.way go-PST RDP~what do-PRS all hear-PURP
 waya-rnda.
 wish-PRS
 ‘Wherever he went and whatever he did, I want to hear it all.’

Besides this major strategy of forming indefinites from interrogatives, there are two other minor trends. One is using generic nouns or classifiers (as in (45)–(46)) to fulfil the function of indefinite pronouns. We find this strategy in 6/43 languages in our sample. (Languages may use these strategies in addition to deriving indefinites from Wh-words.)

- (45) WARLPIRI (PN: NGUMPIN-YAPA) (Hale et al. n.d.)
- Yapa** ka ya-ni-rni.
 person AUX.PRS go-NP-hither
 ‘Someone is coming.’
- (46) BURARRA (NPN: MANINGRIDA) (Green 1987: 9)
- an = gata **ana = nga** joborr gu-rrumu-rra
 3MIN = that.RCGN 3MINHUM = INDET law 3MIN > 3MIN-break-PRECON
 abu-bu-na aburr-workiya-na.
 3AUG > 3MIN-hit-PRECON 3AUG-do:always-PRECON
 ‘When someone breaks the law, they always hit him.’ [translation ours—MB&IK]

The other option is for a language to have dedicated lexical items for indefinite pronouns. We have identified 8/43 languages that have such items.

- (47) KALKATUNGU (PN: KALKATUNGIC) (Blake 1979: 104–5)
 a. *nani* ‘who’; *naka* ‘what’
 b. “The interrogatives are not used as indefinites... *narpa* is the indefinite ‘some creature’... *miṇanara* is ‘something’”

Expressions with translational equivalents of negative indefinites (e.g. *nobody*, *nothing*) also often involve Wh-words. These expressions are typically derived by adding a negative particle to the relevant Wh-word (e.g. “not who” for ‘nobody’ in (48)).

- (48) MURRINH-PATHA (NPN: SOUTHERN DALY) (John Mansfield, p.c.)
Mere nangkal nge-ma-nham.
 NEG who pierce.RR.ISG.IRR-APPL-fear
 ‘I’m not afraid of anyone.’

A recurring analytical problem with such constructions is determining whether they form a genuine negative indefinite series in a given language or rather are existential quantifiers (i.e., plain indefinites) occurring in the scope of negation. Relevant properties that could help decide between the two options include (un)usual word order of the negation marker; for instance, in Kunbarlang, the negative particle typically immediately precedes the verb, but in clauses with such indefinites it precedes the Wh-word. Another relevant property could be the optionality/obligatoriness of the negative particle; if the negative particle may be omitted, because the verb sufficiently encodes the negative semantics, this may be considered optional negative concord rather than a series of negative indefinites.

3.7 Temporal quantifiers

Temporal quantifiers count or measure time intervals, or more broadly, cases (i.e. instantiations of particular event types; Lewis 1975). Examples of English temporal quantifiers include *often*, *sometimes*, *always*, *never*, and so on. Sources on nearly half of the languages in our sample (54/125) contain descriptions or at least mentions of temporal quantifiers.

In terms of their morphosyntax, the vast majority of Australian temporal quantifiers are free adverbs (49) and other kinds of A-quantifiers. These A-quantifiers include clitics (Alyawarra = *antiya* ‘still’/ ‘always’), verbal affixes (50), nominal affixes (56), and even verbal roots ((51); see also Pintupi (Hansen & Hansen 1977: 148) and Yugambeh (Sharpe 1998: 171)). Although most temporal quantifiers are A-quantifiers, we notice that they are often morphologically derived from D-quantifiers. This is in line with the observations in Gil 1993 and Keenan & Paperno 2017.

- (49) GOONIYANDI (NPN: BUNABAN) (McGregor 1990: 462)
 Nganyi nyagginboowoo **ngambiddi**-nyali.
 I he:will:spear:me again-REP
 ‘I might be speared again (not necessarily by the same person).’

(50) NHIRRPI (PN: KARNIC) (Bowern & Wurm 2005: S23)
 Malkirri nhulu-Ru mandri-parapara-rla.
 many 3SG.ERG-deictic catch-often-PRS.PROG
 ‘He often catches a lot of them.’

(51) BURARRA (NPN: MANINGRIDA) (Green 1987: 87)
 Nguburr-barmgumu-rra wupa ni-pa a-yu-ma a-workiya-ø.
 I>2AUG-enter-PRECON inside 3MIN-s/he 3MIN-lie-CON 3MIN-do:always-CON
 ‘We went in to where he sleeps [lit. always lies].’

The most frequently described temporal quantifiers have universal force (i.e., ‘always’ (51), ‘forever’ (52), and so on). These universal force temporal quantifiers are described in 39/125 languages in our sample. Temporal quantifiers with existential force are described in 12/125 languages; these express meanings like ‘sometimes’ (53), ‘often’ (50) or ‘few times’. Three sources mention a negative temporal quantifier ‘never’ (54).

(52) YIR YORONT (PN: PAMAN) (Alpher 1973: 343)
 ṅáwəṛ **monlân**+ar mál̩l̩əl, t̩ol wâl+áwɾəṅ.
 that forever-SEL hand-NP-it shell that-SUB
 ‘That one will stick on forever, that spearthrower-shell.’

(53) MAWNG (NPN: IWAIDJAN) (Singer et al. 2015)
Yara k-aw-a-ø k-ampu-ma-ø mata merrk.
 some PRS-3PL-go-NP PRS-3PL>3VEG-get-NP VEG leaves
 ‘Sometimes they go and get leaves.’

(54) WEMBA WEMBA (PN: KULIN) (Hercus 1992: 47)
wembakən ‘never’ < **wemba* ‘no, not’

At least four languages in our sample (Djinang, Kunbarlang, Mawng and Yir Yoront) exhibit an interesting polysemy with respect to their existential temporal quantifiers. These quantifiers are able to range either over individuals (‘some’) or over times (‘sometimes’); in other words, they alternate between functioning as A- and D-quantifiers. Thus, the Mawng lexical item *yara* in (53) means ‘sometimes’ and is a temporal adverbial, but in (55) means ‘some’ and is a modifier for the nominal *ja kiyap* ‘MA fish’.²³ (We note that this polysemy does not correlate with a weak distinction between adjectives and adverbs in a language; for instance, in Kunbarlang, adjectives and adverbs are distinct categories.)

(55) MAWNG (NPN: IWAIDJAN) (Singer et al. 2015)
Yara ja kiyap k-i-w-ø.
 some MA fish PRS-3SGMA-lie-NP
 ‘There is some fish.’

A notable number of languages in our sample (24/125) have a strategy to encode the meaning ‘*n* many times’. We refer to these expressions as ‘times’-adverbials. We identify

²³We have confirmed with both Kunbarlang and Mawng speakers that a single expression including such an existential quantifier may be ambiguous between both A- and D-quantifier readings, i.e., (53) can also mean ‘Some of them go and get leaves.’

three major strategies that languages use to express these adverbials: (i) combining a D-quantifier with a specialized ‘times’ affix; (ii) combining a D-quantifier with a non-specialized affix; and (iii) combining a D-quantifier with a lexical item meaning ‘arm’ or ‘finger’.²⁴ In the majority of languages with these adverbials (14/24), they are built with a specialized ‘times’-affix.²⁵ This affix attaches to a (D-)quantifier—typically a cardinal numeral—to form a ‘times’-adverbial, as in (56).

- (56) KALKATUNGU (PN: KALKATUNGIC) (Blake 1979: 152)
maḷṭa-ṇujan ṇai iṅka-ṇa pa-uṇa
 much-times I go-PST there-ALL
 ‘I went there lots of times.’

The other two major patterns are also derivational. Five languages derive their ‘times’-adverbial from a D-quantifier by a non-specialized affix such as limitative affix or a case marker, as in (57).

- (57) WARLPIRI (PN: NGUMPIN-YAPA) (Bowler 2017: 969)
Rdaka-pala-ku = rna yanu Willowra-kurra.
 five-CARD-DAT=ISG.SBJ go.PST Willowra-ALL
 ‘I went to Willowra five times.’

In four languages, the noun meaning ‘arm’ (in Yir Yoront, ‘finger’) combined with a D-quantifier yields a ‘times’-adverbial construction, as in (58).

- (58) KUNBARLANG (NPN: GUNWINGUAN) (Kapitonov, field notes)
 Ka-mankang **kaburrk bala na-kudji burru = rnungu.**
 3SG.NFUT-fall.PST two and I-one arm=he.GEN
 ‘He fell down three times.’

Finally, in Waluwara we find an example of the causative/verbaliser *-ma* attaching to the numeral *kutja* ‘two,’ resulting in the verb *kutjama* ‘to do something twice’ (Breen 1971: 113).

3.8 Expressing ‘how many’/‘how much’

Over half of the languages in our sample (65/125) have an expression that is used to ask ‘how many’ or ‘how much.’ Australian languages are frequently described as having “simple” counting systems (e.g. Dixon 2002: 67); for this reason, we find the prevalence of lexicalization for ‘how many’ to be especially noteworthy. This suggests to us that the concept of quantity and cardinality may be more salient in Australian languages than previous descriptions have proposed. Overall, we find that expressions for ‘how many’ are features of both Pama-Nyungan and non-Pama-Nyungan languages.

²⁴We find a morphologically simple ‘times’-adverbial in only one language in our sample; Yir Yoront has the lexical item *thonolt* ‘once’ (although the formative *thon-* is found in other combinations).

²⁵Djabugay (Patz 1991) and Djinang (Waters 1983) have a free ‘times’ lexical item for this purpose, rather than an affix.

We identify four main strategies used by languages to express ‘how many’: (i) having a unique lexical item for ‘how many’; (ii) using a Wh-word that is polysemous between quantity and other categories; (iii) morphologically deriving ‘how many’ from another Wh-word; and (iv) expressing ‘how many’ periphrastically. These latter three strategies are relatively uncommon, and are described in only ~15/65 languages.

Over two thirds of these 65 languages ($n = 44$) have a unique lexical item used to inquire ‘how many’ or ‘how much,’ as in (59)–(60).

(59) UMBUGARLA (NPN: UMBUGARLIC) (Davies 1989: 57)
 walalg **djugamərr** ga-rar?
 child how.many 2SG-got
 ‘How many kids have you got?’

(60) MARTUTHUNIRA (PN: NGAYARTA) (Dench 1995: 190)
Nhamintha ngula? Kayarra jina, kayarra juwayu wirra-ngara wiyaa.
 how.many IGNOR two foot two hand boomerang-PL maybe
 ‘How many were there? Maybe twenty boomerangs [lit. two hands and two feet of boomerangs].’

A small number of languages in our sample express ‘how many’ using a Wh-word that is polysemous with other Wh-meanings, as in MalakMalak *amaneli* ‘what’/‘how many.’ (See also Bittner & Hale 1995: 15–16 for a discussion of Warlpiri *nyajangu* ‘how many’/‘which ones.’)

(61) MALAKMALAK (NPN: NORTHERN DALY) (Lindsay et al. 2017: 3)
 a. **amaneli** yi-de?
 what 3SG.M-go/be.PRS
 ‘What person is that? What kind of person?’
 b. **dunyu-warra amaneli** nuen-de?
 raintime-in what 2SG-go/be.PRS
 ‘How old are you?’ [lit. ‘How many rainy seasons have you been in?’]

Other languages morphologically derive their expression for ‘how many’ from other Wh-words. These source Wh-words include *what* (62), *where* (63), and *how* (Kuuku Ya’u; Thompson 1988). We do not have enough tokens to make strong generalizations about morphemes that are typically used to derive ‘how many’; however, we have found several instances of a ‘quantity’ suffix and two instances of Wh-word reduplication (Mara *gangugangu* ‘how many’ > *gangu* ‘what’ (Heath 1981: 174); Kuuku Ya’u *wantawantalu* ‘how many’ > *wantantu* ‘how’ (Thompson 1988: 91)).

(62) NGIYAMBAA (PN: CENTRAL NSW) (Donaldson 1980: 267)
minja-ŋalmaynj-dji-wa: = ndu giyanhdha-nha
 what-QUANTITY-CIRC-EXCL=2NOM fear-PRS
 ‘How many (of them) are you afraid of?’

(63) MATNGELE (NPN: EASTERN DALY) (Zandvoort 1999: 51)

- a. **ngun an-yin** buy-burrayn
 there where-ALL go-3AUGSBJ.GO.IMPV
 ‘Where’s that lot going?’
- b. **nida an-buwaja** wari-mi-anyang
 brother where-BUWAJA have-IMPV-2MINSBJ.PRS
 ‘How many brothers do you have?’²⁶

Finally, a small number of languages encode ‘how many’ through periphrastic constructions, as in (64).

- (64) KUNBARLANG (NPN: GUNWINGUAN) (Kapitonov, field notes)
Birlinj ka-ngunjje ki-karrme nakarrken?
 how 3SG.NFUT-perform.NP 2SG.NFUT-hold.NP dog
 ‘How many dogs do you have?’

In line with the weak distinction between mass and count nouns noted in §3.1 and §3.2, we find that in a number of languages the same expression for ‘how many’ can be used with both count nouns (to express ‘how many’) (65a) and mass nouns (to express ‘how much’) (65b). We have not found any descriptions of quantity Wh-terms that select specifically for count or mass nouns.

- (65) YANYUWA (PN: NGARLA) (Kirton & Charlie 1996: 27)
- a. **Li-ngandarrangu** kal-inyamba-minmirra ambuliyalu?
 PL-how.many they-REFL-be.sick before
 ‘How many people were sick before [with flu like this]?’
- b. **Ma-ngandarrangu** ma-kijululu kuwu-rduma-la?
 FD-how.much FD-money it.FD.you.SG-get-FUT
 ‘How much money will you get?’
- (66) GAAGUDJU (NPN: ISOLATE) (Harvey 1992: 232)
- a. **yama = da = ’geegirr** ga’djaalnga Ø-nee-ma
 how many turtle 3.I.ABS-2.ERG-get.PP
 ‘How many turtles did you get?’²⁷
- b. **yama = da = ’geegirr** djaarli Ø-naa-garra-y
 how much meat 3.I.ABS-2.ERG-get.PRS
 ‘How much meat do you have?’

3.9 Quantifier interaction

The interpretation of multiple quantifiers in a single expression is a classic topic in the theoretical literature on quantification (e.g. Szabolcsi 1997). Quantifiers are described

²⁶Zandvoort 1999 does not provide an interlinear gloss for *buwaja*.

²⁷This Wh-term is morphologically complex. Harvey (1992: 232) proposes that the initial component of the expression is related to the *yaana*- ‘where’ determiner, where *geegirr* is the universal quantifier ‘all’ (discussed previously in §3.2, example (20)).

as “scoping” over one another; an example of such a quantifier scope interaction is as in the English sentence *Some student loves every teacher*. This expression has two possible readings: (i) a single student is such that they love every teacher, and (ii) every teacher is such that they are loved by some (potentially different) student. A standard account of this ambiguity states that the existential quantifier *some* can take scope above the universal quantifier *every*, or vice versa. Another example of quantifier interaction is building complex quantifiers from simpler ones via, for instance, boolean compounding (as in the English expression *not more than five*).

The description of these topics in Australian languages is in its infancy, with very few examples found in the literature. The majority of the relevant examples address the interpretation of quantifiers with respect to negation. Quantificational expressions, in particular the ones with existential force, are typically found to scope under negation. A small number of languages are described as having codified expressions including negation and quantifiers, e.g. the Mangarayi expression in (67), where the negated meaning is that of value judgement.

- (67) MANGARAYI (NPN: GUNWINYGUAN) (Merlan 1989: 37–38)
ŋiñjag guyban ga-ŋa-nidba
 PROH little.bit 3-ISG>3SG-have
 ‘I have not a little bit,’ i.e., ‘I have a lot.’

In Wubuy, bare common nouns scope under or above negation depending on the presence or absence of a class prefix, respectively. In (68a), the bare noun scopes under negation, whereas in (68b), the noun scopes above negation. (Baker 2008) analyses these class prefixes as topic markers, serving to indicate the scope of clausal operators.)

- (68) WUBUY (NPN: GUNWINYGUAN) (Baker 2008: 145)
- a. **waaɟi** ŋa-ŋu-kuɟaŋi ***(ana-)ŋucica**
 nothing ISG.S-NEUT-catch.PCON NEUT.TOP-fish
 ‘I didn’t get any fish.’ [¬ > ∃]
- b. **waaɟi** ŋan-tani **ŋucica**
 nothing ISG.S>ANIM-spear.PCON fish
 ‘I didn’t spear a fish (one in particular).’ [∃ > ¬]

Some data from Kunbarlang suggest that word order may also change the scopal properties of an existential. Example (69) shows that when the NP with the numeral ‘one’ follows the negative particle, it can only scope below negation (69a), but when it precedes the negative particle, there is a scope ambiguity (69b).

- (69) KUNBARLANG (NPN: GUNWINYGUAN) (Kapitonov, field notes)
- a. **Ngunda** ki-kala **na-kudji** (nayi) barbung.
 not 3SG.IRR.PST-get.IRR.PST I-one DET.I fish
 ‘S/he didn’t get a single fish.’ [¬ > ∃]
 * ‘S/he didn’t get one fish.’ * [∃ > ¬]

- b. Nayi **na-kudji** barbung **ngunda** ki-kala.
 DET.I I-one fish not 3SG.IRR.PST-get.IRR.PST
 ‘S/he didn’t get a single fish.’ [¬ > ∃]
 ‘S/he didn’t get one fish.’ [∃ > ¬]

Wilkins (1989: §3.5.4) reports that in Arrernte, it is possible to combine two quantifiers within one NP (70), and possibly even with scope effects. However, the data are insufficient to make any more specific conclusions.

- (70) ARRERNTE (PN: ARANDIC) (Wilkins 1989: 110)
 kngwelye atningke ingkirreke
 dog many all
 ‘all of the many dogs’

We take these findings to indicate an uncovered richness of data to explore in the course of future fieldwork on Australian languages. However, fieldwork on these concepts is notoriously difficult and requires carefully constructed scenarios, typically with illustrations alongside, to ensure the correct understanding of the truth conditions of every example by both the consultant and the linguist.

3.10 Lexical item for ‘to count’

Although it is not a quantifier itself, we are interested in the prevalence of the verb ‘to count’ in Australian languages. In our current sample, only 9/125 languages are described as having a verb ‘to count’. However, we suspect that the actual number of languages with this verb is somewhat higher, since only a subset of our sources include extensive wordlists, and besides this meaning might have been overlooked in the survey because of an unpredictable gloss.²⁸

- (71) PINTUPI (PN: WATI) (Summer Institute of Linguistics 1977: 179)
yiltijirripungu ‘to count’/‘to mark the ground’
 (used to describe the marking of the ground with parallel marks for the purpose of counting)
- (72) WUBUY (NPN: GUNWINYGUAN) (Heath 1982)
 a. *ngunymaa* ‘to examine a pile of objects’/‘to count’
 b. *munduwa* ‘to examine closely and divide into piles’

Interestingly, several of the verbs for ‘to count’ explicitly describe physically manipulating objects or tallies for the purpose of counting.

²⁸Pitjantjatjara is described as having a verb *kautamilani* ‘to count’ that has been borrowed from English (Goddard 1992: 36).

4 Conclusion and future directions

We provided an overview of quantificational expressions in 125 Australian languages. We showed that Australian languages have equivalent expressions for all of the cross-linguistically commonly documented quantifiers, e.g. existential force expressions like *many* and *some*, and universal force expressions like *all*. We showed that Australian languages typically do not lexically distinguish between quantification over mass versus count nouns, as in §3.1 on ‘many’/‘much’. In terms of derivational relations, Australian languages show some robust cross-linguistic tendencies, such as formation of indefinites from interrogatives (§3.6) and derivation of A-quantifiers from D-quantifiers (§3.7).

In this chapter, we have focused exclusively on quantificational expressions that are commonly documented cross-linguistically and which theoretical analyses of quantification primarily address. However, while writing this chapter, we encountered a number of quantificational expressions that do not conform to our general understanding of what basic quantifiers can express.

These lexical items can encode fairly intricate meanings related to quantification. For instance, in Yidiñ, the nominal human suffix *-ba* indicates that the individual it attaches to is one of a group of other individuals for which the predicate also holds (73). It appears to further contribute that the relevant individual is unique in some respect when compared to other members of the group. (We find similar meanings encoded by Dyirbal *-gara* ‘one of a pair’ and *-mangan* ‘one of many’ (Dixon 1972: 230–231).)

- (73) YIDIÑ (PN: PAMAN) (Dixon 1977: 146)
yɪŋu buɲa:-ba gali-ŋ
this woman-BA go-PRES
‘This woman and one (or more) other people (who are not women) are going.’

Another case in point is Evans’s (1995) description of affixal quantifiers in Mayali, many of which have spatial connotations, such as ‘dispersed’ or ‘together in a bunch’. Again, these meanings lie outside of the familiar scope of quantificational expressions.

In conclusion, we believe that the quantificational systems of Australian languages are of significant typological and theoretical interest. It is our hope that linguists will continue to produce descriptive and theoretical work within this area. Particular topics that we believe are in need of research include the availability of scalar implicatures for existential force quantifiers (i.e., ‘some but not all’); the semantics of ‘other’ expressions that are used as translational equivalents of partitive ‘some’; the ability of quantifiers to interact scopally and form morphosyntactically complex expressions (e.g. ‘not many’); and the prevalence and semantics of “non-standard” quantificational expressions (as in (73)).

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