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The colonisation of the colour pink: variation and change in Māori's colour lexicon

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Abstract: All languages exhibit basic colour terms that manifest how distinct linguistic systems categorise colour. Māori, the language of the indigenous people of New Zealand, demonstrates an instructive case where drastic innovations in colour terminology took place in response to environmental and cultural influences. We demonstrate how and when Māori accrued new colour terms to replace existing ones in its immediate ancestor, Proto-Eastern-Polynesian, and eventually coined new colour terms through borrowing from native words for nature to match the English colour categories that did not previously exist in Māori – except for the colour pink. While contemporary Māori is at the same stage as English (Stage VII) in Berlin and Kay's colour term hierarchy, the evidence is that Māori was at Stage IV pre-colonisation, possessing only five native colour categories. The evolution of Māori's colour categories thus illuminates how colonisation may impact the basic vocabulary of a language, both in the Māori settling a new land in the 13th century and in their subsequent language contact with English colonisers in the 19th century.

Keywords: language contact; contact-induced change; maori; Polynesian languages; Austronesian; colour Hierarchy

1 Introduction

Colonisation-induced language contact, with its clash of cultures, has been reported to impact the use of colour terms and colour understanding within a language

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(Grimm 2012; Heinrich 2007; Tornay 1978). We investigate the case of Māori (ISO 639-3 *mri*), the indigenous language of New Zealand spoken by the Polynesians who settled the islands 800 years ago. We frame our discussion around Berlin and Kay's theory of basic colour terms (Berlin and Kay 1969; Kay et al. 2010) using the 11 basic colour terms present in English as a framework in which to investigate colour terms in Māori (Section 2).

Māori constitutes an ideal case for studying the impact of migration and colonisation on the evolution of colour terms and colour categories. This is not only because rich comparative data are available for reconstructing the colour categories existing in Proto-Eastern-Polynesian (PEP), the immediate ancestor of Māori, as well as to higher-order proto-languages within the Austronesian family, but also that the split of Māori from PEP reflects a single step of inter-island migration from the Society Islands to New Zealand, where no human community pre-existed (Anderson 2017; Walworth 2014). Comparing colour terms available in Proto-Eastern-Polynesian and in pre-colonisation Māori would therefore reveal changes to the language's colour categories after the settlement of a new land. We investigate this period with the aid of comparative data from POLLEX – Polynesian Lexicon Project Online (Greenhill and Clark 2011), ACD – Austronesian Comparative Dictionary (Blust and Trussel 2013), and Branstetter (1977).

Māori's substantial contact with European languages is relatively recent (19th century). Although Māori had no written language prior to contact with Europeans, thanks to available written records created shortly after the European settlement of New Zealand, we are able to identify changes in Māori colour terms before and after English colonisation and track the development of its colour system in the past few decades.

We examine the colour terms and colour categories used in four different phases of the development of the language:

- (1) A. **Proto-Eastern-Polynesian**: the immediate ancestor of Māori prior to the settlement of New Zealand (Section 3).
- B. **Pre-colonisation Māori**: documented principally in the first several editions of two Māori dictionaries: Williams (1844), Williams (1871), and Tregear (1891) (Section 4).
- C. **Late-20th-century Māori**: after decades of suppression, no longer having monolingual speakers; documented in Williams (1957) (Section 5.1) and in work published in the 1990s (Section 5.2).
- D. **Contemporary Māori after 2000**: after revitalisation, increasingly taught in pre-schools as well as primary and secondary schools of New Zealand; documented in recently published educational resources and online dictionaries (Section 5.3).

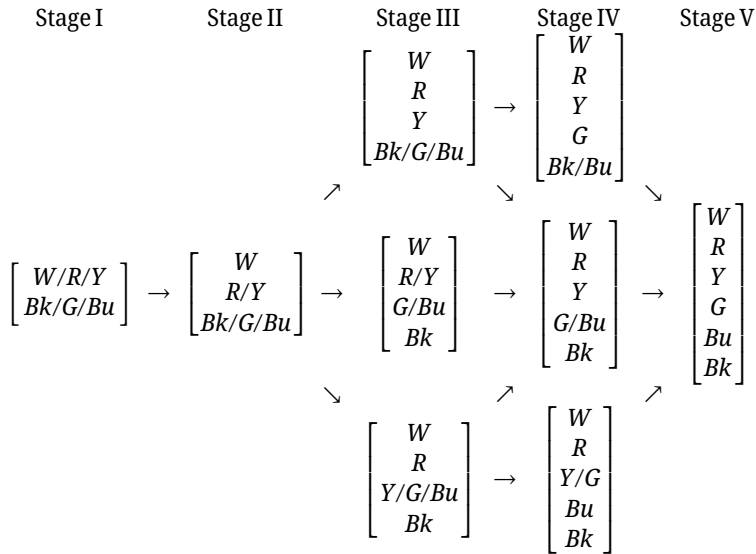
We show that late-20th-century and contemporary Māori adopted the 11 colour categories that pertain in English, although pre-colonisation Māori likely had only five native colour categories. All five native categories appear to have experienced dramatic changes in the colour terms used in the 500 years between Māori settlement of New Zealand and European colonisation.

2 Basic colour terms and colour categories

Basic colour terms play a significant role in how a culture collectively describes and understands colour space. Every language has a small set of basic colour terms, each of which encompasses part of the overall gamut of possible colours. For example, in English, blue is a basic colour term that encompasses azure, navy, cerulean, cyan, and many other shades. Basic colour terms are cultural: there needs to be general agreement amongst members of a society for these terms to be a useful communication and categorisation mechanism (Andrick and Tager-Flusberg 1986). Cross-cultural studies and computational research have clearly shown that the cultural milieu and prosocial group behaviour, mediated through language communication, are essential for colour lexicon creation and change over time (Lindsey and Brown 2021). The basic colour terms are the first colours that are taught to small children, who come to understand that, although all of these different blues appear differently to them, they are all encompassed by the overall term ‘blue’. Berlin and Kay (1969) were the first to define what is (and is not) a basic colour term. Among their criteria were that a basic colour term is (a) a single non-composite word; (b) not contained within any other term (e.g., not ‘azure’, which is contained within ‘blue’); and (c) must be in common usage and be applicable to the colour of anything (e.g., not ‘blonde’ which relates only to hair and wood) (Lindsey and Brown 2021).

Berlin and Kay (1969), based on data from 20 carefully studied languages and 78 others, posited that languages increase the number of basic colour terms in a set order. Their hypothesis was immediately challenged by anthropologists, on several grounds (Hardin 2023), and so Berlin and Kay, with new collaborators, set up the World Color Survey, in the late 1970s, to collect sufficient data to confirm, modify, or challenge the original conclusions. They now postulate (Kay et al. 2010) that colour categories are added to a language in the order shown in (2).

(2) Revised colour term hierarchy proposed by Kay et al. (2010)



Key: *W* White, *R* Red, *Y* Yellow, *Bk* Black, *G* Green, *Bu* Blue

How this plays out in the actual colour space is shown in Figure 1. For speakers of a Stage I language, the language divides colours into two categories: warm (white, red, yellow) and cool (blue, green, black). All warm colours on the Munsell chart (Figure 2) are WHITE¹ and all cool colours are BLACK. When introducing a third colour category (Stage II), that category is always RED, though this is a broad category that might incorporate what we would call in English reds, yellows, oranges, browns, and pinks. There are then several paths that a language can take as it develops further categories, which may include the concept of GRUE, a colour category encompassing green and blue. But, whatever path a language may take in its development, almost any language with six categories (Stage V) will have the six colour categories: white, red, yellow, green, blue, and black. All stages have regions that are ambiguous and do not fall neatly under a basic colour term. Beyond Stage V, there is increasing ambiguity. Stage VI is the introduction of a seventh colour, normally but not always brown. Stage VII is the introduction of further colour categories: pink, purple, grey and orange. There is no predictable order for their introduction. This leads to the 11 colour terms in English and other Western European languages. There is evidence that some languages have 12 colour categories, for example, Russian distinguishes

¹ Following Berlin and Kay (1969) we use all uppercase letters for a colour name where that name indicates a concept that is broader than the contemporary English meaning. In this case, WHITE incorporates a wide range of warm colours in addition to the contemporary white.

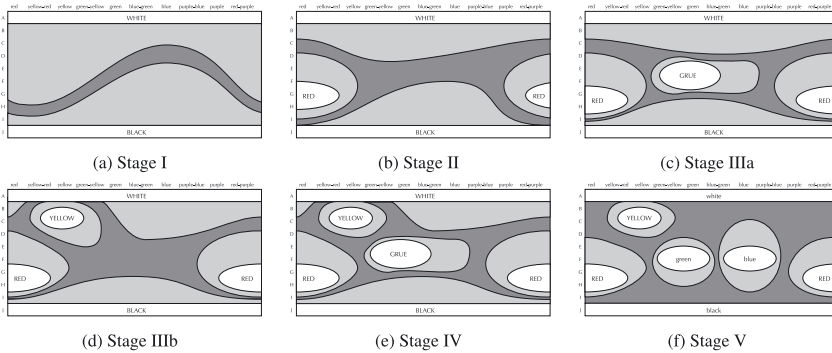


Figure 1: Six of Berlin and Kay’s stages in their initial 1969 proposal of how languages evolve colour terms. Refer to Figure 2 for the actual colours. The white areas show the focus of the category, the light grey areas show the presumed maximal extensions of the category, the dark grey areas show colours whose category affiliations, if any, are in doubt. Words in lower case match the standard English use of the word. Words in all caps represent concepts broader than the standard English use of the word. Redrawn from Berlin and Kay (1969).

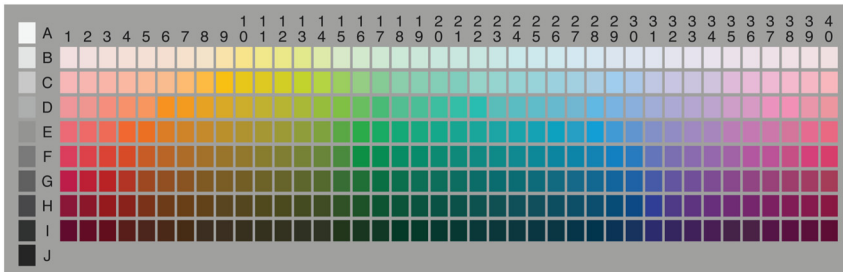


Figure 2: The colour chips used in experiments to determine colour names. Actual colour chips are precise colour: this printed figure is an approximation. The colour section wraps around from left to right. Used under a Creative Commons License (CC BY 4.0) from Vejdemo-Johansson et al. (2014).

goluboy ‘light blue’ and *siniy* ‘dark blue’ as distinct colour categories (Parnami 2005). While most languages conform to Berlin and Kay’s hierarchy, a small number of languages do not fit neatly into their model (Moss 1989; Stanlaw 2010).

Before proceeding to discuss colour in the Māori language, we need to highlight two limitations. Firstly, in Berlin and Kay’s process, the ‘basic colour terms’ for a language are determined by questioning native speakers, preferably monolingual speakers. This process is, of course, impossible for an historic language, so we cannot determine basic colour terms reliably for a language where there are no living native speakers. But there is also the challenge that the process would be

compromised if we attempted to do it for contemporary Māori because there are no adult speakers of the language who do not also speak English fluently. Given these challenges, rather than speaking of ‘basic colour terms’, we therefore speak of ‘colour categories’. That is, we aim to determine the categories into which these historic and contemporary versions of the language appear to group colour terms, given the evidence available.

Secondly, Berlin and Kay’s theory remains contentious, in that certain languages appear to have no concept of colour at all, instead referencing other visual properties (Wierzbicka 2008). Historic Māori may or may not have had the concept of colour: the modern word for colour, *tae*, is attested in the earliest dictionaries (Tregear 1891), but it was translated ‘a dye, colouring matter’ rather than the pure ‘colour’; the alternative modern word for colour, *kakano*, in historic Māori referred to the grain of wood, i.e., a texture rather than a colour. Given this context, we do need to be aware that our discussion of colour in Māori is through the lens of English colour categories and that the historic Māori understanding of the concept of ‘colour’ could be dramatically different to a modern English understanding.

3 Colour categories in Proto-Eastern-Polynesian (Phase A)

Māori is a relatively young language that split from its immediate ancestor, Proto-Eastern Polynesian, approximately 800 years ago. We begin by examining the colour terms available to this ancestral language.

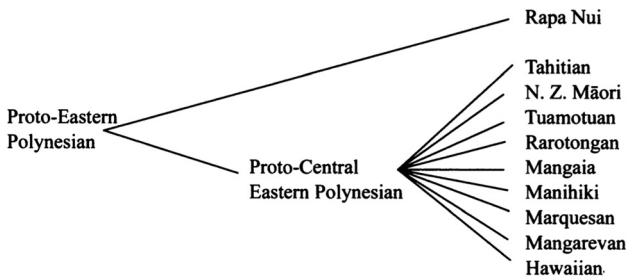
Latest archaeological and linguistic evidence indicates that all of the Polynesian islands outside of the Society Islands – the homeland of Proto-Eastern Polynesian – appear to have been settled in a rapid pulse of migration, spanning about 100 years between AD 1190 and 1293. This settlement period included the remote islands of Hawai’i, Easter Island, and New Zealand (Bunbury et al. 2022; Kirch and Green 2001; Walworth 2014; Wilmshurst et al. 2011). Figure 3 presents the migration routes indicated by the archaeological and linguistic evidence.

This model of rapid expansion yields the rake-like subgrouping tree in (3): the first-order division of Rapa Nui and the rest of the Eastern Polynesian languages (which form the Central Eastern Polynesian group) reflects Rapa Nui’s isolation after the settlement of Easter Island. The Central Eastern Polynesian languages developed out of continued waves of contact, excluding Rapa Nui (Walworth 2014: 268–69). We treat Proto-Eastern Polynesian as the immediate ancestor of Māori, with Proto-Central Eastern Polynesian as a hypothetical intermediate step.



Figure 3: The Austronesian diaspora in the Pacific. Polynesia is shown by the blue triangle. Map based on one drawn by David Eccles using data from Chambers (2013) and Clark (2021); used with permission under a CC-BY-4.0 license.

(3) Polynesian subgrouping (Walworth 2014)



Comparative data and existing reconstructions from POLLEX show that Proto-Eastern Polynesian (henceforth PEP) – the common ancestor of all Eastern Polynesian languages – already possessed a system with at least five basic colour categories: (i) WHITE, (ii) BLACK, (iii) RED, (iv) GRUE (green/blue), and (v) YELLOW.² Colour terms attested in this protolanguage are summarised below in (4). The table shows how PEP terms map to the English colour categories. Note, importantly, that there is often no direct mapping between a PEP term and an English term, as in all subsequent tables. Underlined lexical items in the table indicate PEP terms that map to more than one English colour category. For example, PEP **qusi* spans black, green, and blue (the dark colours in Stages I and II). A brief discussion of each colour category (Sections 3.1–3.2) follows the table.

(4) Proto-Eastern Polynesian colour terms mapped to English colour categories

white	black	red	green	yellow	blue	brown	grey	purple	pink	orange
<i>*tea</i>	<i>*pago</i>	<i>*kula</i>	<i>*namu</i>	<i>*felo</i>	<i>(*qui)</i>	<i>(*maatuke)</i>				<i>(*sega)</i>
<i>*muka</i>	<i>*siwa</i>	<i>*ula</i>	<i>*mata</i>	<i>*rega-rega</i>	<i>(*qusi)</i>	<i>(*melo)</i>				
	<i>*magu</i>	<i>*mea</i>	<i>*qusi</i>	<i>*sega</i>		<i>(*kefu)</i>				
	<i>*kele</i>	<i>*kefu</i>	<i>*qui</i>	<i>*koo-rega</i>						
	<i>*kiwa</i>	<i>*melo</i>								
	<i>*kalaa</i>	<i>*sega</i>								
	<i>*quli</i>									
	<i>*qusi</i>									
	<i>*maatuke</i>									

3.1 Stage I–IV categories (white, black, red, green, and yellow)

PEP ‘white’. PEP exhibited at least two words for WHITE: **tea* ‘white’ (< Proto-Central Pacific **tea*) and **muka* ‘white, light in colour’ (< Proto-Polynesian **muka*). In at least three Eastern Polynesian languages, PPN **qali* ‘bare, clearly visible, transparent (of water)’ has undergone semantic extension and is used as a colour term: Hawaiian *ali* ‘crystal clear, white’, Māori *ari* ‘white, visible’, and Tuamotu *ari* ‘visible, be white’ (POLLEX). Since all three languages are independent primary branches of PEP (Walworth 2014), it is possible that this semantic extension had been completed in PEP.

PEP ‘black’. No fewer than eight words for BLACK are reconstructable to PEP. Among these words, **pago* and **siwa* are only attested in Walworth’s Central Eastern Polynesian group, and not in Rapa Nui or any other Polynesian languages. This

² This conclusion is consistent with the Branstetter (1977) reconstruction of Proto-Polynesian colour categories, which draws on data from 24 Polynesian languages.

suggests that Central Eastern Polynesian languages have productively invented new words for this colour category. Four other words are inherited from Proto-Polynesian (PPn) – *kiwa ‘dark hue, black’, *kalaa ‘hard, black, volcanic stone’, *quli ‘black, dark in colour’, and *qusi ‘dark-coloured, including dark blues and greens’. Two other words, *kele ‘dark, black’ and *magu ‘black’, can be traced back to PEP.

PEP ‘red’. PEP had at least three terms for RED. *mea ‘reddish’, the oldest term of all, was inherited from Proto-Malayo-Polynesian *ma-qiReq ‘black’ (ACD). The words *ula ‘glow, red’ and *kula ‘red’ are both inherited from PPn. Three other PPn words – *kefu, *melo ‘red/brown’, and *sega – also deserve a note: all three are reconstructed with RED-related semantics, and the meaning of their reflexes in individual language vary among the concepts we call red, yellow, and brown in English: *kefu ‘light-coloured (blond, brown, reddish) especially of hair’, *melo ‘red/brown’, and *sega ‘yellow or yellowish-red; orange’. The ambiguity suggests that in the PEP stage, the colours called red and brown in English are within a single RED colour category (cf. [1], [2]).

PEP ‘green’. At least four words are reconstructable: *namu ‘green/blue’, (Branstetter 1977: evidenced by Tahitian *ninamu*, Māori *pounamu* ‘greenstone, green’, and Tumotu (*ni*)*namu* ‘blue’), *mata ‘raw, green, unripe’ (Branstetter 1977), *qui ‘blue, green, type of coconut’, and *qusi ‘dark-coloured, including dark blues and green’.³ Except for *mata and *namu, all these words are reconstructable to PPn. This suggests that the English colour categories green and blue were not distinguished in either PPn or PEP, with the boundary between the GRUE category and the BLACK category in PEP possibly cutting through the middle of the green and blue categories in English.

PEP ‘yellow’. At least two unambiguous words for YELLOW, *felo ‘yellow’ and *koo-rega ‘plant sp.; yellowish’ are reconstructable. This provides evidence that speakers of PEP already identified yellow as a distinct colour category. Two other words can also be traced back to PEP: *rega-rega ‘yellow’ and *sega ‘yellow or yellowish-red; orange’.

3.2 Absence of other categories (blue, brown, grey, purple, pink, and orange)

Categories that fall under later stages of Berlin and Kay’s hierarchy appear not to have been established in PEP.

³ The word *moto ‘unripe, green’ deserves a note: in most Polynesian languages it has the meaning of ‘unripe, immature’ and, only in a handful of languages, also denotes the meaning of green (e.g., Pukapuka *moto*, Samoan unripe, green [fruit and vegetables], Tuvalu ‘green, unripe’). It is unclear whether this word has been used as a genuine colour term in these languages; if yes, the use is clearly a semantic extension.

PEP ‘blue’. Comparative data from POLLEX shows that various Polynesian languages do not distinguish between green and blue, as evidenced by the PPn words *qui ‘blue, green; type of coconut’ and *quasi ‘dark-coloured, including dark blues and greens’. These words are likely to refer to GRUE in PEP.

PEP ‘brown’. It is unclear whether PEP speakers treated brown as a specific colour category. The ambiguous meaning of *maatuke ‘dark-brown’ and *melo ‘red/brown’, and *kefu ‘light-coloured (blond, brown, reddish) especially of hair’ suggests that the English category of brown is incorporated within one or two larger PEP categories, RED and/or BLACK.⁴

PEP ‘grey’. In some Polynesian languages, the reflex of Proto-Oceanic *sina ‘grey or white-haired’ refers to the colour category WHITE (e.g., East Uvea, Niue, Nuguria). Only in one language (Mori) does it refer to the colour grey. There is thus insufficient evidence to reconstruct this colour to PEP. It is likely that *sina refers to the specific instance of grey hair rather than being generalised to refer to the colour itself.

3.3 Interim conclusion

There is strong comparative evidence for five colour categories (BLACK, WHITE, RED, YELLOW, GRUE), meaning that PEP, the immediate ancestor of Māori, was at Stage IV of Berlin and Kay’s hierarchy.

A central question for reconstructing colour categories in a protolanguage that is no longer spoken is whether there was likely to be a basic colour term attached to the category – that is, a word that refers to the colour itself in general rather than to any particular type of coloured object. If so, there is a further challenge of determining *which* of the attested words is the word that would have been used for the colour category and which were subsidiary words. For example, in English, the words green, emerald, chartreuse, and jade all represent greens but only one of those words is used for the overall category, with the others representing particular shades of green and/or particular green-colour objects. For PEP, we are so far removed in time that it is not possible to make this determination with any certainty.

In summary, PEP was mostly likely a language at Stage IV of the Berlin and Kay hierarchy with BLACK, WHITE, RED, YELLOW, and GRUE colour categories. The English blue was not a colour category. English blues were in either the GRUE or BLACK category. The comparative data from POLLEX also shows that PCEP, the hypothetical daughter language of PEP excluding Rapa Nui, had a colour system

⁴ Reflexes of *maatuke ‘dark-brown; dark in colour’ are attested in Marquesas, Hawaiian, and East Uvea (POLLEX). Accordingly, this word is reconstructable to Proto-East-Polynesian under Walworth’s subgrouping, as are *melo and *kefu (Walworth 2014).

identical with that of PEP in having a Stage IV system. Thus we can assume that both immediate ancestors of Māori were Stage IV languages.

4 Colour categories in pre-colonisation Māori (Phase B)

We turn now to the colour system of pre-colonisation Māori, that is prior to any significant contact with English or other Western European languages. Once a language has terms for colours, we would expect them to change over time (Haynie and Bower 2016) and there is substantial modern evidence of languages changing colour terms in response to internal and external pressures (Forbes 1979; Griber et al. 2021; Stanlaw 2010). Our goal is to identify innovations within the first 500 years of Māori settlement of New Zealand, when the community had little contact with non-Austronesian people.

To determine when contact with English is likely to have started to affect Māori's colour lexicon, a brief summary of the history of New Zealand's colonisation follows. The first European contact with New Zealand was Abel Tasman's short visit in 1642. After James Cook's 'rediscovery' of the islands in 1769, the first Europeans to settle temporarily in New Zealand were whalers and sealers, in small numbers. Sustained language contact did not take place until the early 19th century (Duval and Kuiper 2001: 244). The first British missionaries arrived in New Zealand in the early years of the 19th century, which marked the start of any coherent attempt to document the Māori language with the intention of translating the Christian Bible into the local language, though few Europeans were fluent in Māori before the 1830s (Belich 2001: 145). The Treaty of Waitangi/Te Tiriti o Waitangi was signed in 1840 between the Māori chiefs and the British Crown. At this point, the Māori population was around 80,000, with the European population around 2,000 (Pool 2015: 204). By the 1850s there would have been few Māori who had not had some contact with Europeans, if only through the goods that they had imported (Belich 2001: 148). By 1858 the number of Europeans had grown to equal the number of Māori. The 1901 census reports the Māori population having declined to 45,549, with the European population swelling to 770,313. This gives some idea of the likelihood of European influence on the development of the Māori language over the course of the 19th century.

The two earliest dictionaries are those of Williams (1844) and Tregear (1891). Williams's dictionary comprises a relatively small lexicon and was captured when there were a large number of native monolingual speakers and relatively limited opportunity for contact with English speakers. Tregear, compiled later, has a much larger lexicon. Its compiler nevertheless attempted to avoid any loan words when compiling the dictionary (Ka'ai and Moorfield 2009: 6), so we make the assumption that it is a reliable source from

which to work. We also consider Williams (1871), the third edition of Williams's dictionary, which is considerably larger than the first edition, but does include occasional loan words. Data from these sources thus enable a close investigation of whether Māori was at a different stage in Berlin and Kay's theory of language development when compared to PEP (4) from which it had split several centuries earlier.

At first sight, our investigation of Williams (1844), Williams (1871), and Tregear (1891) reveals that pre-colonisation Māori had colour terms that were mapped by translators to eight of the 11 English colour categories: white, black, red, yellow, green, blue, brown, and purple. However, the evidence for blue, grey, and brown is weak, and the only term for purple (*paapura*) is an English loan, so this initial pass through the dictionaries indicates that the 19th-century Māori colour system had anywhere between five and eight categories. The table below (5) outlines the terms reported in the two early editions of William's dictionary. A handful of colour terms available in Tregear (1891) are not found in either edition of Williams.⁵ These terms are listed in (6). Items in square brackets are words that may not be a genuine colour term.

(5) Colour terms in pre-colonisation Māori⁶ (Williams 1844, 1871)

white	black	red	green	yellow	blue	brown	grey	purple	pink	orange
maa (< *maqa)	pango (< *pago)	kura (< *kula)	mata (< *mata)	pungapunga [kahurangi]	pākā			paapura		
tea (< *tea)	mangu (< *magu)	whero (< *melo)	kākāriki			ura (< *ula)				
taitea	pouri (< *uri)	pākā	ota							
	pokere (< *kele)	pakaka	torouka							
	hiwa (< *siwa)	ngangana								

(6) Words reported in Tregear (1891) that are not found in either Williams (1844) or Williams (1871)

white	black	red	green	yellow	blue	brown	grey	purple	pink	orange
taurei	aniwaniwa	waiarangi	pounamu	kowhai				[hina]		
koma (pale)	kupara	mataura (< *ula)	para							
	kunikuni (dark)	pakurakura	renga (< *rega-rega)							
	potangotango (dark)	reperere								
	kanapanapa (dark)									
	pokeke (dark)									

An important observation from the two tables is the absence of the reflex of a large number of PEP colour terms (4). These terms, which may have been lost in Māori at this stage (approximately 500 years after the Māori's settlement of New Zealand), are indicated in (7).

⁵ It is likely that *mataura* 'red' reported in Tregear (1891) has *ura* (a regular reflex of PEP *ula 'red') as its root. The exact meaning of *mata* (possibly from *matā* 'lava') in this term awaits future investigation.

⁶ Modern Māori uses a macron to indicate a long vowel. Early works did not, either using a doubled vowel or providing no indication of vowel length. Thus *mā*, *maa*, and *ma* can all be the same word. We have used the form presented in the source rather than attempt to reconcile them to modern forms.

- (7) Proto-Eastern Polynesian colour terms (4) not attested in Tregear (1891) and Williams (1844, 1871)

white	black	red	green	yellow	blue	brown	grey	purple	pink	orange
*muka	*maatuke	*sega	*namu	*felo	*qui	*maatuke				*sega
*ari	*kalaa	*kefu	*qusi	*sega	*qusi	*melo				
	*qusi	*mea	*qui	*koo-rega		*kefu				
	*kiwa									

Important observations informed by these early dictionaries is summarised below.

4.1 Stage I colours (white and black)

Māori in the 19th century, like every language, has words for BLACK and WHITE. At least seven Stage I colour terms are retained from PEP; five others (i.e., *muka and *ari for WHITE; *kalaa, *qusi, and *kiwa for BLACK) are not reported and may have been lost. Nine native Stage I colour terms are documented in Tregear (1891), which have no clear etymology linked to PEP. It is unclear whether these terms were simply not included in Williams's dictionary or emerged after the publication of Williams (1871). At the very least, we may conclude that all these novel terms were developed within 500 years – after the Māori left the Society Islands and settled New Zealand (13th century) and before English started to impact the Māori language (19th century). It is also possible that these additional terms documented by Tregear (1891) (6) already existed in the early 1800s but were not documented by Williams. We remain agnostic about the chronology of these terms.

4.2 Stage II colour (red)

The category of RED also accrued a series of new words. Three PEP terms had been lost; five terms reported in Tregear (1891) (*waiarangi*, *mataura*, *reperepe*, *matahanahana*, *tututupo*) are not attested in Williams's first and third editions. Tregear (1891) also contains a wide range of terms that contain the basic terms listed in (5) as the root. For example: *towhero* 'red', *kurawhero* 'red', *puwherowhero* 'reddish-brown'.

4.3 Stage III/IV colours (green and yellow)

Green. Surprisingly, none of the four PEP words for GRUE leaves a reflex in Williams (1844) or Tregear (1891). Instead, three lexical innovations (8) are attested:

- (8) Terms reported in Tregear (1891)
- a. *kākāriki* – green; a parrot; a lizard; a shrub; a melon (Tregear 1891; Williams 1844)
 - b. *matomato* – green; cool; to bud (Tregear 1891; Williams 1844)
 - c. *pounamu* – greenstone; green (resembling greenstone in colour); blue; a variety of kumura (Tregear 1891)

As with the discussion of blue and grey (4.4 and 4.5), *pounamu* is a situation where the colour of a specific object is sometimes used to describe the colour of other things of a similar shade. Note that *pounamu* can also mean blue, which would indicate that Māori had not yet reached a point at which blue and green were distinguished.

Kākāriki and *matomato* both are clearly defined as being the colour green. *Matomato* could possibly derive from PEP *moto but *kākāriki* appears to have no PEP precursor. *Kākāriki*, in addition to being a word for green, describes four different objects that are green. The word literally means little parrot (*kākā* ‘parrot’, *riki*, ‘little’). The parrot in question is endemic to New Zealand so Māori would have not seen it prior to settling that land. Given this, it is possible that the name was first given to the parrot, then later attached to the colour category, and finally the colour word became attached to the lizard, shrub, and melon.

Yellow. In the English-Māori section, Tregear (1891) gives three words: *punga-punga*, *kowhai*, *para*. In the Māori-English section, we find that all three are plausible words for the colour category and that there is a fourth word, *renga*, which is related to words in other Polynesian languages.

- (9) Terms reported in Tregear (1891)
- a. *kowhai* – a tree; yellow (from the colour of the flowers of the tree)
 - b. *para* – turned yellow
 - c. *pungapunga* – yellow in colour; pumice stone, a potato, pollen from raupo; the ankle
 - d. *renga* – 1. mealy, a term applied to good fern-root. 2. Yellow (a doubtful word). 3. A secretion of the eye. 4. Meal made from hinau berries, when properly prepared and sifted, for making bread. 5. The edible pollen of the raupo, when collected for bread-making.

Of these options, the modern educational resources all agree that *kōwhai* is today the accepted word for yellow. However, it is *renga* that is a direct descendent of the PEP term for YELLOW, *rega-rega. What is important here is the status of the word *renga* in Tregear’s dictionary. While Tregear is clear that *renga* is a word for four specific yellow-coloured things, he is doubtful that *renga* represents the colour yellow. The implication is that the brightly coloured *kōwhai* flower was such a compelling exemplar of the colour yellow that its name was adopted for the colour itself,

supplanting the PEP-derived colour term *renga*. Māori is the only descendent of PEP to do this. All other languages that trace back to PEP have a derivative from PEP *rega-rega; Tregear explicitly notes that Samoan *lega*, Tahitian *rea*, Hawaiian *lena*, Tongan *ega*, Rarotongan *renga*, and Mangarevan *rega* all mean yellow. The transition from PEP *rega-rega to Māori *kōwhai* demonstrates a typical case of replacement innovation.

4.4 Stage V colour (blue)

Although blue is considered an early colour term in Berlin and Kay's theory, there is no entry for blue in Williams (1871) or Tregear (1891). This indicates that, at the time of developing these dictionaries, Māori did not have a universally agreed word to describe what would be the English category of blue.

Finally, it is noteworthy that there are several compounds for the blue sky in the Māori-English part of Tregear (1891): *kikorangi* 'the blue sky'; *te kahu-o-te-rangi* 'the blue sky'; *kahuraki* 'blue sky'. Given that Māori *rangi* is a regular reflex of Proto-Austronesian *langiC 'sky', *kiko* and *kahu* could be colour-related adjectives used in compound words such as 'blue sky'. However, *Rangi-nui* is the name of the sky god in Māori mythology and the modern meanings of *kiko* (skin, flesh) and *kahu* (clothing, cloak) give these compound words the descriptive translations 'the flesh of the sky god' and 'the cloak of the sky god', both of which suggest that these words are describing the blue sky and not the more abstract concept of the colour blue.

Tregear (1891) lists three other words that can be translated blue but these refer only to dark blue and put the English concept of dark blue in the Māori BLACK colour category:

- (10) a. *pako* – (related to *pango*) black but can mean dark blue
- b. *pango* – black, dark-coloured
- c. *uriuri* – black, dark, but also dark blue, dark coloured as the sea

We thus see that Tregear's words for the English blue either are referring to the Māori GRUE or BLACK category or are words for a specific blue-coloured object (the sky). The fact that Williams (1871) does not have any entry for blue supports this conclusion. There is thus no evidence that Māori had reached Stage V.

4.5 Beyond Stage V (brown, purple, orange, grey, pink)

Williams (1844) reports no terms for brown. The third edition of the dictionary (Williams 1871) and Tregear (1891) both list two words: *ura* and *pākā*, deriving from the homophonous word 'dry' listed in Williams (1844).

It is important to note that both words are ambiguous between the English categories of brown and red (POLLEX), as seen in (5). We can thus infer that these two colour categories were not distinct in pre-colonisation Māori, whereby the English brown is part of the Māori RED. We can thus discount Māori as having developed a separate colour category for the English brown.

No entries for orange, pink, or purple are attested in Williams or Tregear, except for *paapura* ‘purple’ (Williams 1844), which is clearly an English loanword. The word *tawa* – modern Māori purple (Moorfield 2011) – is present purely as the name of a tree (Williams 1844), as is *karaka* – modern Māori orange (Tregear 1891).

The modern Māori words for pink – *māwhero* and *kuratea* – also do not appear in Williams and Tregear. *Hina*, a reflex of Proto-Oceanic *sina ‘grey hair’, is given as the translation for grey in Tregear’s English-Māori section. However, in the Māori-English section, *hina* is given as ‘grey or white-haired’ rather than the colour grey. Williams (1844) also translated the word as ‘grey-headed’ rather than a colour term. The evidence is therefore that Māori, like Proto-Oceanic and PEP, had no word for grey per se, rather there is perhaps the hint that a word used to mean a specific coloured thing (grey hair) could have begun to be adopted to mean any thing of that colour.

4.6 Interim conclusion: changes in colour terms between Phases A and B

A comparison of the colour systems in Proto-Eastern-Polynesian and pre-colonisation Māori reveals a few major generalisations, (11a–c).

- (11)
 - a. Māori had accrued new colour terms after splitting off from PEP, but did not advance in Berlin and Kay’s hierarchy. Both PEP and pre-colonisation Māori were at Stage IV.
 - b. A wide range of new terms were invented within 500 years, which may be a natural consequence of settling a new land.
 - c. Many PEP colour terms appear to have been lost by 1891.

The evidence above indicates that pre-colonisation Māori had words for the colour categories: BLACK, WHITE, RED, YELLOW, and GRUE. It is not completely clear whether *kōwhai* had made the jump from being the name of a particular colour of flower to being a general colour term: the fact that *whero* could mean yellow could indicate that Māori was in a transition. It is thus remotely possible that Māori had reverted⁷ to four colour

⁷ While Berlin and Kay originally suggested that colour categories, once formed, could not be lost, the loss of colour categories is attested in the Pama-Nyungan language group (Haynie and Bowers 2016).

categories, with words for only BLACK, WHITE, RED, and GRUE, but the existence of the historic *renga* indicates that it is far more likely that *kōwhai* had supplanted *renga*. It is also not clear whether *kākāriki* had made the jump to being a generic term for the colour, but the existence of four different things all named *kākāriki* would indicate that it is likely that it had. It is fairly clear that there was, at the time, no generally accepted word for the English colour term blue. None of the other English basic colour categories has an unambiguous (or indeed any) equivalent in Māori.

On balance, the evidence is that the Māori of the mid-19th century had five basic colour terms. This makes it a Stage IV language in Berlin and Kay's (1969) classification.

5 Colour categories in two stages of contemporary Māori: before and after 2000 (Phases C–D)

We turn now to colour terms used in contemporary Māori. Colour terms are conventions within a speech community: they are generally agreed, within that community, to refer to a consistent colour or set of similar colours (Andrick and Tager-Flusberg 1986). In the 19th century, the English convention of 11 colour categories met the Māori convention that had five colour categories. Initially, we assume that Māori would have considered an English basic colour term, such as brown, to be a shade within a Māori colour category, in this case the Māori RED. This would be similar to the situation where Mabi and Bulu speakers, in Cameroon, appear to hold two colour systems at the same time, one local and one colonial (Grimm 2012: 41), or the situation where an English-speaker would consider the two Russian basic colour terms *sinij* and *goluboj* to be shades of the single English colour category blue (Paramei 2005). Such a situation could persist so long as Māori children were raised in a largely monolingual Māori culture.

However, the historic repression of the Māori language in the early 20th century led to there being essentially no monolingual speakers of Māori and to what could be regarded as the colonisation of the English cultural concept of 11 basic colour categories. The question then is how the Māori language developed its own names for those coloniser colour categories. The evidence indicates that speakers of Māori initially adopted loan words but more recently have deliberately repurposed pre-existing native words through common strategies of colour-naming, such as semantic extension.

5.1 Māori colour terms as of 1950s (Phase Ca)

The table below (12) lists all of the colour terms reported in Williams (1957), which we assume to reflect Māori's colour system as of the 1950s.⁸ This system features two major developments: the drastic expansion of Māori's colour categories from five to 11 and the emergence of compound words for colours belonging to the less basic colour categories. It can first be seen that all Stage I–IV categories obtain new words. Surprisingly, between the 1890s and 1950s there was no further innovation for blue despite extensive contact with English. This suggests that there was a straightforward generalisation from the words for 'blue sky' to the colour concept 'blue'.

(12) Māori colour terms reported in Williams (1957)

white	black	red	green	yellow	blue	brown	grey	purple	pink	orange
mā	āniwaniwa	hiwerawera	hangongi	kaho	kahurangi	hāura	hāmā	pāpura	kuratea	ārangi
tea	hiva	kaho	horepara	kowhai	kikorangi	hawera	hina		māwhero	para-karaka
teatea	hiwahiwa	kehu	kākāriki	mangaeka		kākaka	karei			whero
taitea	karatiwha	uru-kehu	kākanapa	parā		kākarawera	kiwikiwi			
ahoaho	kiwa	makehu	kārearea	parā-karaka		kehu	korora			
ari (< PMP *qali)	kikiwa	kura	torouka	punga		koka	pūmā			
korako	kiwakiwa	ukura	karera	pungapunga		mangaeka				
reko	kororiko	tūākura	māota	renga		parāone				
	kōpuni	mākurakura	mata			rauwhero				
	maka-uri	kuratea	rearea			tuākura				
	tawauri	kākaramea	matomato			ura				
	mangu	matakā	pounamu			whero				
	mā-mangu	matakakā	uri			whakamā pau				
	mangumangu	pākā	whakarae							
	niwaniwa	pākākā								
	parawera	pākurakura								
	pango	mawera								
	pokere	mea								
	pōporo	mōrea								
	tawauri	mumura								
		nganangana								
		nonokura								
		whero								
		waituhi								
		pūwhero								
		tōwhero								
		tūtutupo								
		ura (< PPn *ura)								
		waiārangi								
		waipti								
		whakamāpau								

⁸ Williams (1957), the 6th edition of the historically important dictionary, is the last major update to be undertaken. The most recent 7th edition (Williams 1971) has only typographical differences from the 6th.

A second major observation is that Māori had developed words to describe all 11 English colour categories, accompanied by the emergence of a series of English loans – *parāone* ‘brown’, *karei* ‘grey’, *pāpura* ‘purple’, *ārangi* ‘orange’ – and innovated compound words. Specifically, the category of pink is finally distinguished through the use of compounding strategy, combining existing colour terms for naming a less basic colour that is nonnative to Māori: *kuratea* as *kura* ‘red’ + *tea* ‘white’; *māwhero* as *mā* ‘white’ + *whero* ‘red’. This category, which does not exist in most East Polynesian languages, therefore demonstrates an interesting case: its establishment is clearly due to English influence, but not formed through an English loan.

It is important to note that many colour terms remain that refer to the pre-colonisation colour categories. This is seen in the apparent multi-functionality of several colour terms. For example, *ura* can refer to both English red and English brown; *whero* can refer to English red, yellow, or orange. Similarly, *uri* remains as a root for *maka-uri* ‘black’ and is also the form for green. This reveals that the language’s colour system had not yet conformed to English’s.

The increasing number of compound words and reduplications at this stage is also noteworthy. Many of the emerging terms for less basic colour categories, such as brown, grey, pink and in compound forms could be seen as evidence of these terms representing more basic categories, such as in *tūā* ‘somewhat’ + *kura* ‘red/brown’ for English brown, and *mā* ‘white’ + *whero* ‘red’ for English pink. See Section 6.2 for a discussion of various types of compound strategies attested in Phase C and later stages.

5.2 Māori colour terms as of 1990s (Phase Cb)

Language materials published around the 1990s reveal the beginning of levelling in Māori’s colour terminology. Ryan’s dictionary (first published in 1995), for example, provides evidence of how colour terms in Māori had developed in the half-century since Williams (1957). While there is as wide a range of colour words as in Williams, Ryan chooses to list selected colour names in a separate table at the start of the book (Ryan 2012: 16), which we assume, from context, indicates his understanding that these are the commonly used basic colour terms at the time of compiling the dictionary. Here, for example, in contrast to Williams (1957), *whero* is forced into the role of the English red, with other Māori words being given for the English concepts of brown and orange.

- (13) Colour terms in Contemporary Māori (Ryan 2012), as listed in Ryan's 1995 table of colour words

white	black	red	green	yellow	blue	brown	grey	orange	pink	purple
mā	mangu	whero	kirīni	kōwhai	kikorangi 'sky blue'	parāone	pūmā	parakaraka	-	-
	pango				purū 'blue'		kerei	ārani		

Of these, *kirīni*, *purū*, *parāone*, *kerei*, and *ārani* are all loan words from English. Ryan uses the loan word *kirīni* for green rather than *kākāriki*, although the latter is in his dictionary with the same range of meanings as in Tregear. That could indicate one of two things: that his sources are not confident that *kākāriki* represents all greens or that his sources felt that *kākāriki* represented something broader than the English concept of green, stretching into the English concept of blue (i.e., *kākāriki* was GRUE), thereby needing a different word, *kirīni*, that is limited to the English concept.

Bauer (1997) gives a slightly different list in her contemporaneous work (14), where the 11 English basic colour terms are mapped to Māori words. Here we see that she has assigned Māori terms for all colours up to Stage V, then loan words or compounds for brown, grey, orange, pink, and purple. This again indicates support for Māori incorporating loan words for concepts that were not present in historic Māori culture.

- (14) Colour terms in late 20th-century Māori (Bauer 1997)

white	black	red	green	yellow	blue	brown	grey	orange	pink	purple
mā	pango	whero	kākāriki	kōwhai	kikorangi	parāone	kerei	ārani	māwhero	pāpura
	mangu				kahurangi (loan)	(loan)	(loan)	(loan)	(compound)	(loan)

5.3 Māori colour terms after 2000 (Phase D)

The early 1970s onwards saw a bottom-up community attempt to revitalise the Māori language, after decades of severe decline (Kerttula 2018). After a slow beginning, this movement gained substantial traction in the 1980s and '90s, with the development of *kohanga reo* (lit. language nests, Māori-language pre-schools) and then primary schools where Māori was the primary language (May and Hill 2018; Smith 2000).

The table below outlines colour terms reported in Biggs (2012), Moorfield (2011), and Tauroa (2006), and the *Te Aka* Māori Dictionary (<https://maoridictionary.co.nz/>), an ongoing dictionary project that complements the series of four textbooks and related resources in the *Te Whanake* series for learning Māori.

(15)

Māori colour terms reported in works published after 2000

white	black	red	green	yellow	blue	brown	grey	purple	pink	orange
ahoaho	āniwaniwa	hiiwera	horepara	kōhai	kahurangi	hāura	hina	māhoe	kuratea	ārani
ari	hiwahiwa	kaho	kākāriki	kōwhai	kikorangi	hāuratea	hinahina	pāpura	māwhero	karakatea
mā	karatiwha	kākarama	kākanapa	mangaeka	ōrangi	hāurauri	māhinahina	poroporo	mākurakura	pākākā
kooreko	kiwa	kākarama	kahurangi	para karaka	pukepoto	hiwera	mōhinahina	waioporoporo	māwhero	para-karaka
	kikiwa	kehu	kākāriki	pungapunga	purū	kākaka	pūhina	tawa	pūwhero	
	kiwakiwa	urukehu	karera	pūnganangana	purū-pōuri	kehu	kiwikiwi		pūwhero-mā	
	kōpuni	kōkōwai	kārerarera	renga		koka	kiwitea		pūwherowhero	
	kororiko	kura	kāriki			pākā	kororā			
	māmangu	kuratea	kōwhaikāri			pākākā	mā kupangopango			
	makauri	mākura	kiōrangi			parauri	pūmā			
	mangu	matakā	kārikitea			pōuriuri	tārekoreko			
	mangumangu	mataura	pāpango			rauwhero				
	niwaniwa	matawhero	pounamu			ura				
	pango	maukoroa	uri			whakamāpau				
	pokere	mawera	uriuri							
	pōporo	mea								
	tawari	mōrea								
	tiwha	nganangana								
		nonokura								
		pākā								
		pākura								
		pākurakura								
		papakura								
		pawhero								
		pūwhero								
		pōnini								
		punawaru								
		tōwhero								
		tūtutupō								
		ura								
		waiipū								
		waituhi								
		whakamāpau								
		whero								

The sheer number of variants reported for more primary colour categories deserves a note. According to available descriptions in the dictionary, some of these terms denote a specific subtype of the category. For example, *karera* and *horepara* refer to light green, and *uri* refers to dark green, whereas *kaakanapa* is translated as ‘green, as deep water’; the differences among several variants of, for example, white and brown are also documented: *ahoaho* ‘pure white’, *mā* ‘white, pale, clean, faded’, *hāura* ‘brown’, *hiwera* ‘brown or red, as if burnt’, *kākaka* ‘brown, rusty coloured’, and *mangaeka* ‘pale brown.’ However, the exact difference between some variants – especially those reported in earlier dictionaries – remains unclear and awaits future investigation.

A key question crucial for understanding the development of Māori’s colour lexicon following the national revitalisation efforts is how colours are taught in the Māori language, as this will influence how future speakers of Māori think and speak about colour. We thus compiled colour names from 16 different educational resources provided for pre-school and primary school use. These are tabulated in (16). The official

resources from the New Zealand Ministry of Education (entry 15 in the table) have ten colour categories that match all the English categories other than grey.

(16) Colour names in 16 different educational resources

English	Māori	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
White	mā	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	15
Black	pango	x	x	x	x	x	x	x	x	x		x	x	x		x	x	14
	mangu					x		x		x		x	x		x		x	7
Red	whero	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
Yellow	kōwhai	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
Green	kākāriki	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	15
light green	kārerarera						x											1
Blue	kahurangi	x	x		x	x			x	x			x		x			8
	kikorangi			x	x	x	x			x		x	x		x			9
	kikurangi							x										1
light blue	kikorangi									x				x				2
dark blue	kahurangi										x							1
Orange	karaka	x	x	x	x	x	x		x	x	x	x		x	x	x		13
	parakaraka																x	1
	karakaraka							x										1
Purple	waiporoporo					x	x		x	x		x	x	x				7
	poroporo	x		x	x						x							4
	tawa		x													x		2
	pāpura										x							1
	māhoe										x							1
Brown	paraauri		x	x	x	x	x		x	x	x	x	x		x			11
	parāone	x									x							2
	pākākā							x						x		x	x	4
Pink	māwhero	x	x	x	x	x		x	x	x	x		x		x		11	
Grey	kiwikiwi	x		x	x	x					x	x	x	x				8

Sources: 1. Creative Classrooms Ltd; 2. Teacher Talk; 3. Suzanne Welch Teaching Resources; 4. Edsports @ The School Shop; 5. Top Teaching Tasks; 6. TES; 7. EduChoice; 8. The te reo Māori classroom; 9. Help me learn, explicitly says that it has used maoridictionary.co.nz as its translation source; 10. Blackboard Jungle; 11. curiouslittlekiwi via Etsy; 12. MāoriLanguage.net; 13. Kupu (Māori language website); 14. Learning Toolbox via Squoodles or CreativeClassrooms; 15. Ministry of Education teaching resource; 16. Ministry of Education song.

The first point to note is the rejection of English loans. Following the revitalisation efforts starting in the 1970s, there has been a strong push in the community to adopt words that are historically attested, though those words were not historically used for the colours. These words are taken from the names of plants or animals that are distinctively of that colour.

As seen above, for most basic colour categories, there is general consensus about what word should be taught to children. The major exceptions are brown and purple. For purple, the educational resources generally agree on *poroporo* or *waiporoporo* (variations on the same root) but disagree with the Ministry of Education's *tawa*. Poroporo and tawa are plants with purple flowers and purple fruit respectively. For brown, we have disagreement between the loan word *parāone*, the compound *parauri* (lit. dark yellow), and *pākākā* (scorched, reddish brown).

The other notable point is that there is general agreement that there are two equally valid words for black, *pango* and *mangu*, and two equally valid words for blue, *kahurangi* and *kikorangi*. This could be considered parallel to the French use of two words, *brun* and *marron*, for one particular English colour category, 'brown' (Forbes 1979). We note that two of the resources use the existence of two words for blue to distinguish between dark and light blue, as in Russian, but we can find no independent scholarly source to justify this distinction.

6 Implications

Much of the existing literature on colour terminology has focused on the universality of basic colour terms and the comparison of colour systems across languages. However, changes in colour systems also constitute an ideal domain for investigating the effects of language contact. In this section, we highlight how the evolution of Māori's colour lexicon has not only provided an example of the development of colour categorisation and colour terminology but has also lent novel support to recent generalisations of loanword typology as a case of colonisation-induced language contact. We begin with a review of the evolutionary pattern attested with the language's colour lexicon. We then discuss how the pattern situates within the larger landscape of the evolutionary pathways of colour lexicons (Section 6.1) and highlight several important implications (Section 6.2).

6.1 The evolution of Māori's colour system: how does Māori correspond to Berlin and Kay's theory?

Examining Māori's colour system over time (Sections 3, 4, and 5, see also a comprehensive list of colour terms reported in each phase in the Appendix) reveals two overarching themes in how colour naming developed. The first is the lack of progression on Berlin and Kay's hierarchy during the first 500 years of settlement of

New Zealand. Although there was a wide range of replacement innovations of existing PEP colour terms, Māori remained in Stage IV. This is potentially due to the absence of linguistic and cultural stimulation following the settlement of New Zealand, which had no prior human habitation, that is, there was no pressure to add new categories. Some of the replacements are clear cases of semantic extension, many of which derive from floral and faunal terms native to New Zealand. The table below outlines a few representative cases.

(17) Colour terms formed through semantic extension

white	green	yellow	blue	brown	grey	purple	orange
kōreko (< ‘dazzle’)	kākāriki (a bird)	kōwhai (a flower)	pukepoto (< ‘earth’)	parauri (< ‘person with dark skin’)	kiwikiwi (a bird)	waiporoporo (a flower)	karaka (a berry)
	karerarera (a water plant)					tawa (a berry)	
	pounamu (greenstone)					māhoe (a berry)	

It is noteworthy how fluid the colour terms are from PEP to pre-colonisation to modern use. Over the same period of time in which the most basic colour terms of English merely changed spelling (*hwit/white*, *blæc/black*, *réod/red*, *geolu/yellow*, *groene/green*), Māori basic colour names underwent considerable change. Consider these four examples:

1. PEP *rega-rega ‘yellow’ clearly led to Māori *renga* ‘yellow’ but, by the 19th century, *renga* was no longer the generally accepted term for the colour. We have already discussed the idea that *kōwhai* could have replaced *renga* because the *kōwhai* flower was such a fine exemplar of the colour and would, therefore, have been useful in teaching children the colour.
2. Similarly, the endemic little green parrot *kākāriki* gave its name to the colour green supplanting whatever PEP word had been in use prior to the settlement of New Zealand.
3. PEP *kula ‘red’ clearly led to Māori *kura*. The two early Māori dictionaries both have *kura* and *whero* as red. It is not clear how and when *whero* ‘red’ became universally accepted as the word for RED, but the evidence is that the transition had already begun in the early 19th century and was definitely completed by the late 20th century.
4. PEP *tea is identical to Māori *tea*, which meant both white and pale in pre-colonisation Māori. However, today the agreed word for white is *mā*, with *tea* retaining its use as an alternative for white, but also meaning light in colour, and being a suffix to indicate lightness, for example in *ōrangitea* (light blue).

The second overarching theme concerns changes following the extensive interaction with English and Māori’s recent grass-roots revitalisation. This has caused the language to move from Stage IV pre-colonisation to a position where it has repurposed existing

Māori words to represent those English colour categories that did not previously exist in Māori's native categories. The evidence from Ryan (2012) and Bauer (1997) is that this repurposing is a very recent phenomenon. It is possible that the introduction of *kohanga reo* (Māori language pre-schools) led to a desire for teaching resources for young children; this led to a direct translation of English language training materials, with their inherent assumption about basic colour terms and the boundaries between different colour categories. This, combined with there being no adult monolingual speakers of Māori, could mean that learners of Māori adopt English's colour categories. Further research would be needed to ascertain whether there remains, amongst speakers of Māori, the vestiges of the pre-colonisation colour categories.

The educational resources indicate the following colour terms (18) are the current consensus in the educational community for each of the English colour categories. This indicates that the Māori colour categories now match English's categories, if *kikorangi* and *kahurangi* both represent English blue. An expected outcome in the near future is that children taught with these educational resources would not be aware of the significantly different nuances in the meanings of traditional Māori colour terminology.

(18) Māori equivalents to English basic colour terms in contemporary Māori educational resources (2022)

white	black	red	green	yellow	blue	brown	grey	orange	pink	purple
mā	pango	whero	kākāriki	kōwhai	kikorangi	parāone	kiwikiwi	karaka	māwhero	waiporoporo
	mangu				kahurangi	parauri				poroporo
						pākākā				tawa

Three of the modern terms for the colours are based on historic usage, six are based on the colours of particular natural objects, with two of those having been adopted prior to colonisation (*kowhai* 'yellow' [a flower] and *kākāriki* 'green' [a bird]). Two categories (black, blue) each have two equally valid Māori words, two categories (brown, purple) are not settled, each with three variants included. *Māwhero* 'pink' is one of two terms that is not monolexic, something we discuss in Section 6.2. *Parauri* 'brown', the other term that is not monolexic, is literally dark yellow (*para-uri*). This is intriguing in that one might have expected the word for brown to be more closely related to red than yellow. It also appears that this is a colour where the community has not yet settled on the term that will end up dominating the space, with various sources selecting different terms: *parāone*, *parauri*, *pākākā*. *Parauri* appears more often in the educational resources than the other two options. The situation for brown differs from the situation that pertains with *mangu/pango* 'black' or *kikorangi/kahurangi* 'blue'. In those two cases, most sources have both competing names as equally valid, whereas all but one source states only a single word for brown, they just do not agree on what that single word should be.

The evolution of Māori's colour system thus demonstrates how colonisation with and without language contact may impact the basic vocabulary of a language differently – both in the Māori settling a new land (no prior human habitation, with

lexical innovations but no expansion in colour categories) and in their subsequent contact with English (extensive language contact, resulting in drastic expansion of colour categories). This pattern of progression in colour categories under colonisation-induced contact demonstrates a strikingly similar case with Bulu (Bantu), the colour system of which has expanded from three to six with lexical borrowings from French, the colonial language (Grimm 2012). See also Huisman et al. (2022) for a similar case of categorial expansion in colour lexicon under sociocultural pressure observed in the Japonic family. Notably, New Zealand Sign Language has also undergone a similar developmental pathway in line with Berlin and Kay's hierarchy, expanding its colour system from Stage I (the colour black and a generic colour sign) to Stage VII (11 colours) following extensive contact with Australian Signed Language via Australasian Signed English in deaf education from 1979 and ongoing language contact between the two countries (McKee 2016).

6.2 Borrowability, basicness, and word-formation strategies used for forming less basic colour terms

An important observation from the development of Māori's colour lexicon is that none of its five native categories – BLACK, WHITE, RED, YELLOW, and GRUE (Section 5) – adopted any loans throughout Māori's contact history with English. This is in contrast to the other colour categories that rank later in Berlin and Kay's hierarchy, all of which have accrued various English loans, except pink (19). Note that there are loan words for blue *purū* and green *kirīni*, which indicates that the Māori category GRUE did not correspond neatly to either of those two English categories. All the words for the category GRUE became attached to the new category green, with the word for blue sky repurposed for the colour category blue. Similarly, the Māori words in the category RED incorporated English concepts of red, brown, and orange, but it is the brown and orange that accrued loans and new words following the contact, whereas red did not.

- (19) English loans attested in each category
- a. BLACK, WHITE, RED, yellow, GRUE (Stages I–III): N/A
 - b. green (Stage IV): *kirīni*
 - c. blue (Stage V): *purū*
 - d. brown (Stage VI): *parāone*
 - e. grey (Stage VII): *karei*
 - f. pink (Stage VII): N/A
 - g. orange (Stage VII): *ārangi*
 - h. purple (Stage VII): *pāpura*

This observation follows from the well-established generalisation that basic vocabulary are more resistant to borrowing (Thomason and Kaufman 2001: *inter alia*). The basicness of these terms is not only suggested by Berlin and Kay's hierarchy, but also by the fact that all five are included in the Swadesh 100 list (Swadesh 1971), ranked from 87 to 91 (in the order of red – green – yellow – white – black). Notably, colour terms under these five categories also demonstrate high derivational productivity, which has been argued to be a major criterion for basicness (Kerttula 2007).

It is also noteworthy that the extensive loans attested in Stages VI and VII follow consistently from Thomason and Kaufman (2001)'s generalisation that borrowing of "nonbasic" vocabulary usually commences when a language reaches Stage 3 of the five-point scale of intensity of contact (20), by which Māori has undoubtedly passed Stage 3 following European colonisation.

- (20) Degree of intensity of contact (Thomason and Kaufman 2001)
1. casual contact
 2. slightly more intense contact
 3. more intense contact
 4. strong cultural pressure
 5. very strong cultural pressure

Beyond cases of English loans, the word-formation strategies attested with terms associated with categories nonnative to Māori also deserve a note. Anishchanka (2007) discusses seven cross-linguistically common strategies for forming non-basic colour terms (21):

- (21)
- a. Non-basic monolexemic colour adjectives
 - b. Derived adjectives with affix (e.g., *-ish* describing insufficient quality)
 - c. Compound adjectives with two colour-adjective stems
 - d. Compound adjectives with a basic-colour stem combined with an achromatic modifier
 - e. Compound adjectives with a noun and a colour-adjective stem
 - f. Compound adjectives with the component *-coloured*
 - g. Denominal words where the noun-stem implies characteristic colour of an object

Four of the seven strategies are attested in Māori, alongside the frequent use of reduplication to form variants under the same colour category (e.g., *teatea* 'white', *hiwahiwa* 'black', *pungapunga* 'yellow', *kiwikiwi* 'grey'. Some examples are presented in the table in (22).

(22) Word-formation strategies attested with Māori colour terms

		Examples	
1. Compound adjectives with two colour adjective stems	<i>māwhero</i>	‘pink’	(white <i>mā</i> + red <i>whero</i>)
	<i>kuratea</i>	‘pink’	(red <i>kura</i> + white <i>tea</i>)
	<i>parauri</i>	‘brown’	(yellow <i>para</i> + black <i>uri</i>)
2. Compound adjectives with a basic colour stem with an achromatic modifier	<i>pūwhero</i>	‘red’	(intensifier <i>pū</i> + red)
	<i>pūhina</i>	‘grey’	(intensifier <i>pū</i> + grey)
	<i>mōhinahina</i>	‘grey’	(particle <i>mō</i> + grey)
	<i>mākurakura</i>	‘red’	(particle <i>mā</i> + pink)
	<i>māmangu</i>	‘black’	(particle <i>mā</i> + black)
3. Compound adjectives with a noun and a colour-adjective stem	<i>rauwhero</i>	‘brown’	(leaf <i>rau</i> + red <i>whero</i>)
	<i>waiporoporo</i>	‘purple’	(liquid <i>wai</i> + purple <i>poroporo</i>)
	<i>pōuriuri</i>	‘brown’	(night <i>pō</i> + black <i>uriuri</i>)
4. Denominal words where the noun stem implies characteristics colour of an object	<i>karaka</i>	‘orange’	(a berry)
	<i>kōwhai</i>	‘yellow’	(a flower)
	<i>tawa</i>	‘purple’	(a berry)
	<i>kiwikiwi</i>	‘grey’	(a bird)
	<i>pukepoto</i>	‘blue’	(earth)
	<i>kākāriki</i>	‘green’	(a bird)

The emergence of various types of compound words following intensive contact with English, such as *māwhero* ‘pink’ and *parauri* ‘brown’, clearly demonstrate that these colour categories have been grafted into Māori culture rather than developing naturally. Among these cases, the words for pink deserve a special note: while pink is definitely a basic colour term in English, the word *māwhero* should clearly not be a basic colour term under Berlin and Kay’s rules, because it is not monolexemic. There is, indeed, no historically attested word for pink reconstructable to any proto-level within the Austronesian family (ACD, POLLEX). Further evidence for the colonisation of the concept of the colour category pink comes from the list of words translated pink in *Te Aka* dictionary: *kuratea* (red + white), *māwhero* (white + red), *mākurakura* (white + red + reduplication), *māwhero* (white + red + white), *pūwhero* (intensifier + red), *pūwhero mā* (intensifier + red + white), *pūwhero* (intensifier + red + reduplication), all of which are a compound of two or three of white/pale (*mā*, *tea*), red (*whero*, *kura*), and an intensifier (*pū*).

7 Conclusion

The evidence is that PEP, the immediate ancestor of Māori, had five colour categories and that Māori also had five colour categories pre-colonisation, both being at Stage IV in Berlin and Kay’s staging. There is strong evidence that, over the 500 years between

settlement and colonisation, Māori adopted completely new dominant words in two colour categories (*kākāriki* ‘green’ and *kōwhai* ‘yellow’) in response to the environment of their new homeland. Post-colonisation, Māori gradually adopted the 11 English language colour categories, first by using loan words to describe these foreign concepts, and very recently (within the last 25 years) by deliberately repurposing native words to fit the English colour categories.

Given that there is already considerable consensus in the educational resources as to the ‘correct’ Māori names for these English colour categories, it is likely to take only one or two generations before these names and categories become embedded in Māori, owing to the staying power of concepts learnt at an early age (Dodgson 2019).

It is left open whether there will be any pushback from speakers of Māori about the educational resources used with their children. There is anecdotal evidence that there is not consensus amongst older speakers about the ‘correct’ names for colour categories, that colour naming differs across different dialects, that brown is clearly not yet settled, and that the words commonly used for the English purple (*waiporoporo/poroporo*) are in contradiction with that recommended by the country’s Ministry of Education (*tawa*).

With regard to the two colour categories that have two different accepted words: speakers of Māori may eventually choose one of *mangu/pango* ‘black’ or one of *kikorangi/kahurangi* ‘blue’ to be the basic colour term for the respective category, although note that such ambiguity can be held by a culture for decades (Forbes 1979). There is also the potential that Māori may evolve usage over the next decades so that *kikorangi* and *kahurangi* become two distinct basic colour categories as in Russian, one for light and one for dark blue.

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Ethics statement: Hereby, we consciously assure that for the manuscript “The colonisation of the colour pink: Colour terms in historic and modern Māori” the following is fulfilled: 1) This material is the authors’ own original work, which has not been previously published elsewhere. 2) The paper is not currently being considered for publication elsewhere. 3) The paper reflects the authors’ own research and analysis in a truthful and complete manner. 4) The paper properly credits the meaningful contributions of co-authors and co-researchers. 5) The results are appropriately placed in the context of prior and existing research. 6) All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference. 7) All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

Appendix: Combined table of all phases

	White	Black	Red	Green	Yellow	Blue	Brown	Purple	Pink	Grey	Orange
Proto-Eastern Polynesian (Phase A)	*tea *muka	*pago *siwa *magu *kele *kiwa *kalaa *quli *qusi *maatuke	*kula *ula *mea *kefu *melo *sega	*namu *mata *qusi *qui	*felo *rega-rega *sega *koo-rega	(*qui) (*qusi)	(*maatuke) (*melo) (*kefu)	-	-	-	(*sega)
Pre-colonisation Māori (Phase B)	maa (<*maq) tea (<*tea) taitea taurei koma (pale)	pango (<*pago) mangu (<*magu) pourī (<*uri) pokere (<*kele) hiwa (<*siwa) aniwaniwa kupara kunikuni potangotango kanapanapa pokeke	kura (<*kula) whero (<*melo) paka pakaka ngangana waiarangi mataura (<*ula) pakurakura reperepe	mata (<*mata) kākāriki ota torouka pounamu	pungapunga kowhai para renga (<*rega-rega)	(kahurangi)	paakaa ura (<*ula)	paapura	-	(hina)	-
Māori as of 1957 Phase C	mā tea teatea taitea ahoaho ari (<PMP *qali) korako reko	hiwa hiwahiwa karatiwha kiwa kikiwa kiwakiwa kororiko kōpuni	h kaho kehu uru-kehu makehu kura ukura tūākura mākurakura	hangongi horepara kākāriki kākānapa karakā kārearea torouka karera māota	kaho kowhai mangaeka parā parā-karaka punga pungapunga renga	kahurangi kikorangi	hāura hawera kākaka kākārawera kehu koka mangaeka parāone rauwhero	pāpura	kuratea māwhero	ha mā hina karei kiwikiwi korora pūmā	ārangi para-kar- aka whero

(continued)

White	Black	Red	Green	Yellow	Blue	Brown	Purple	Pink	Grey	Orange
	maka-uri	kuratea	mata			tuākura				
	tawauri	kākaramea	rearea			ura				
	mangu	matakā	matomato			whero				
	mā-mangu	matakakā	pounamu			whakamā				
	mangumangu	pākā	uri			pau				
	niwaniwa	pākākā	whakarae							
	parawera	pākurakura								
	pango	mauera								
	pokere	mea								
	pōporo	mōrea								
	tawauri	mumura								
		nganangana								
		nonokura								
		whero								
		waituhi								
		pūwhero								
		tōwhero								
		tūtutupo								
		ura (<PPh *ura)								
		waiarangi								
		waipu								
		whakamapau								
	āniwaniwa	hiwera	horepara	kōhai	kahurangi	hāura	māhoe	kuratea	hina	ārani
Terms reported in	hiwahiwa	kaho	kākāriki	kōwhai	kikorangi	hāuratea	pāpura	māwhero	hinahina	karakatea
works published	karatiwha	kākarama	kaākanapa	mangaeka	ōrangi	hāurauri	poroporo	mākurakura	māhinahina	pākākā
after 2000	kiwa	kākaramea	kahurangi	para	pukepoto	hiwera	waiporoporo	māwhero	mōhinahina	para-
(Phase D)	kikiwa	kehu	kākāriki	karaka	purū	kākaka	tawa	pūwhero	pūhina	karaka
	kiwakiwa	urukehu	karera	pungapunga	purū-pōuri	kehu		pūwhero-mā	kiwikiwi	
	kōpuni	kōkōwai	kārerarera	pūnganangana		koka		pūwhero	kiwitea	
	kororiko	kura	kāriki	renga		pākā		kororā		

(continued)

	White	Black	Red	Green	Yellow	Blue	Brown	Purple	Pink	Grey	Orange
Terms explicitly listed as equivalents of English colours in the 1990s (Phase C)	mā	mangu pango	whero	kirini kākāriki	kōwhai	kikorangi kahurangi purū	parāone	pāpura	māwhero	pūmā kerei	ārani parakaraka
Terms explicitly used in educational material after 2000 (Phase D)	mā	pango mangu	whero	kākāriki	kōwhai	kikorangi kahurangi	parāone parauri pākākā	waiporoporo poroporo tawa	māwhero	kiwikiwi	karaka

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