Understanding contemporary Māori demographic fertility patterns and trends in Aotearoa New Zealand

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ABSTRACT

This thesis re-examines demographic studies of contemporary Māori fertility patterns and trends. Analysing fertility is a core undertaking in demography, and in studies that include Māori fertility, most have been undertaken by non-Māori demographers who instinctively draw on Western-based frameworks to analyse and interpret these trends. Consequently, Māori perspectives are virtually invisible. Incorporating Māori perspectives are needed because despite a convergence of fertility similar to Pākehā, important fertility patterns persist. Notably, Māori women bear their babies earlier and over a longer period. Fertility studies of other Indigenous peoples in settler-colonial states share striking similarities. While demographic and economic factors are important in fertility outcomes, this thesis primarily explores the potential influence of culture, which has received little attention. Hence, this doctoral study asks: *To what extent does culture influence contemporary Māori fertility patterns?*

This thesis draws on Kaupapa Māori and Mana Wahine frameworks, along with the tools of demography, to deploy a mixed methods design of statistical techniques – using secondary data from the 2013 Aotearoa NZ Census and the 1995 New Zealand Women: Family, Employment, and Education Survey – and thematic analysis of interviews with nine Māori women. While acknowledging the limitations of the analyses, the empirical results suggest that 'cultural identity' is an important factor in Māori fertility, and that 'whakapapa' and 'whānau' are at the heart of fertility decisions. These findings broadly imply that taken-for-granted demographic theories and analytical practices need to incorporate Indigenous-centred frameworks and perspectives for a better understanding of Indigenous fertility and population change.

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There were many times when I felt very overwhelmed on this journey. One particular day I was feeling a little dejected and frustrated because the words were not flowing. I pushed myself away from my workstation and at the same time turn my head towards my bookshelf. The spine of a large red book – *Tangata Whenua* – was sticking out, and with a little sigh I said, "One day I must read that book". However, I felt an urge to look at it right then and there. So, I pulled it off the shelf, and it happened to open on page two. Right in front of me was a photo of **Nanny Te Onewhero,** with our other Ngāi Tūhoe nannies. That was the moment that snapped me out of my low. Thank you, nanny, for 'turning up' when it mattered the most. Your example has inspired me to carry on.

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nā, Moana
Rongomaiwahine, Ngāti Kahungunu, Ngāti Rakaipaaka, Tūhoe, Ngāti Whare, Te Upokorehe, Whakatōhea

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This glossary has been compiled to help the reader understand the Māori terms used in this thesis. The list of translations provided here are not definitive, as there are many meanings depending on the context. For accessible translations I have used the online source Te Aka Māori Dictionary (maoridictionary.co.nz). In the main text of this thesis, I provide a brief translation in brackets after the first use of the Māori word, phrase, or name. However, another translation may be provided in a latter part of the thesis to reflect the context that it is used e.g., I may discuss whānau to mean 'family' but in another context to mean 'to birth'.

Key: n = noun; v = verb; st = stative

aitanga	(n) descent, progeny, offspring
aroha	(n & v) love, affection
atua	(n) god, deity
atua wāhine	(n) Māori female deity
awhi rito	(n) Metaphor used to refer to the supporting leaves of the centre leaf/blade of the flax bush (harakeke)
hapū	(n) kinship group, tribe, to be pregnant
harakeke	(n) NZ flax bush
Hineahuone	Māori female deity and the first woman formed from clay by Tāne
ingoa tangata	Phrase meaning 'personal name'
iwi	(n) extended kinship group, tribe, bone
kaitiaki	(n) guardian, custodian, steward, caregiver
kairangahau Māori	(n) Māori researcher(s)
karakia	(n & v) prayer, chant
kaupapa	(n) topic, subject, agenda, programme,
Kaupapa Māori	I use this term in the context of a theoretical and methodological approach to research
kia tūpato	(v) Phrase meaning to 'be careful' or 'to exercise care' or 'to tread carefully'
kōrero	(n) story, narrative
kōrero tuku iho	(n) oral histories
kuia	(n) elderly Māori woman
Mana Wahine	I use this term in the context of a theoretical, methodological and analytical approach in

	reference to Māori womens discourses
matau	(n) fishhook
mātauranga Māori	Refers to Māori knowledge systems
mātauranga wāhine	Refers to the Māori womens knowledge systems
matua/mātua	(n) parent/parents
mokopuna	(n) grandchildren
ngaro	(st) lost, extinct
Pākehā	(n) New Zealander of European descent
Papatūānuku	Māori female deity. Known as earth mother and wife of Ranginui
pepi/pēpi	(n) baby/babies
pūrākau	(n) stories, narratives
rangahau Māori	(n) Māori research
rangatahi	(n) younger generation; young people
rangatira	(n) chief
Ranginui	Māori male deity. Known as the God of the sky and husband of Papatūānuku
rau	(n) leaves/blades of the flax bush (harakeke)
rito	(n) young centre shoot/blade of the flax bush (harakeke)
taiohi	(n) young person/people; youth
tamaiti/tamariki	(n) child/children
Tāne	A child of Ranginui and Papatūānuku; formed or created the first woman from clay - Hineahuone
tangata whenua	The literal translation of the term is ‘people of the land’ but generally refers to the Māori Indigenous peoples
tapu	(st) sacredness; be sacred; set apart
Te Tiriti o Waitangi	(n) The Treaty of Waitangi
te ao Māori	(n) Phrase meaning ‘the Māori world’
te reo Māori	(n) Phrase meaning ‘the Māori language’
te taiao	(n) Phrase meaning ‘the environment’ or ‘the natural world’
tino rangatiratanga	(n) self-determination, sovereignty, autonomy
tikanga	(n) Māori customs, practices, protocols

toi	(n) art
tohutō	(n) macron – a symbol to indicate long vowels
tupuna/tūpuna; tipuna/tīpuna	(n) grandparent/grandparents
uri	(n) offspring, descendant, kin
wahine/wāhine	(n) woman/women
waiata	(n) song; (v) to sing
wairuatanga	(n) spirituality
waka	(n) canoe
whaikōrero	(n) oration, speech
whakapapa	(n) genealogy
whakataukī	(n) Māori proverbs/proverbial sayings
whakawhanaunga	(v) establish a relationship
whakawhiti kōrero	(n) Refers to the method of interviewing or conversation that I use to gather narratives from the wāhine participants.
whānau	(n) family; (v) to give birth
whānau whānui	(n) Phrase meaning or referring to the 'extended/wider family'
whānautanga	(n) birth
whanaungatanga	(n) relationship, kinship, sense of family connection; social connectedness
whāngai	(n & v) refers to the customary practice of raising a child as one's own; similar to fostering or adopting
whare ngaro	(n) Phrase that refers to having no offspring or no issue
whare tangata	(n) Phrase that literally means 'house of humanity' and generally refers to the reproductive potential (fertility) of women
whenua	(n) land; placenta or afterbirth

‘Hapu in red dress’ by artist and copyright owner Robyn Kahukiwa.

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CHAPTER ONE: RETHINKING OUR APPROACH TO THEORISING AND UNDERSTANDING MĀORI FERTILITY

1.1 Introduction: Setting the context

The women were aghast! An air of utter disbelief had filled the room. The kuia had disrupted the prevailing discourse. However, she was defiant because to her it was about the survival of her whakapapa.

About twenty years ago, an incident unfolded before me that left an indelible impression. It occurred at my church in Rotorua[1] where I attended one of the weekly Sunday School meetings - a religious instruction class for women aged 18 years and older. I sat at the back of the crowded room observing and listening. I cannot recall the main topic of discussion, but I do remember the moment when the dialogue had somehow diverted to teenage pregnancy. The responses from a handful of women clearly signalled their disapproval towards young mums, especially young solo mums. I was not surprised given that this exchange occurred within an institution that values, promotes, teaches, and encourages procreation but only within the respectable bonds of matrimony. However, a lone voice of a kuia (elderly Māori woman) disrupted their dominant discourse. Unashamedly and defiantly, the kuia pronounced that she encouraged her young mokopuna (grandchildren) to start bearing children early. Immediately, a very distinct audible sound of astonishment filled the air. The other women were obviously stunned.

I have often reflected on that incident, mostly because I admire the kuia for her courage in the face of dominant thought, and also the enactment of that thought in place. Her view could be deemed unpopular in today's society that mostly facilitates and favours delayed childbearing and smaller families. Furthermore, teenage pregnancy, including Māori teenage pregnancy, is generally looked upon with disapproval and is still viewed as problematic (Green, 2012; Pihama, 2011; Ware et al., 2018; Ware, 2020), even though teenage fertility rates have declined since the early 1970s and has remained relatively low since then[2]. The view of the kuia is influential because, for her, encouraging her mokopuna to start early was about the survival of her whakapapa (genealogy[3]) through the rite of birth. And it makes sense. Not so long ago Pākehā (New Zealanders of European descent) colonists were predicting the extinction of the Māori 'race' (Stenhouse, 1996). In fact, the population recovery of Māori since the turn of the 20th

[1] Rotorua is a regional city in the Bay of Plenty of Aotearoa NZ.
[2] In Aotearoa NZ, the teenage (15-19yrs) fertility rate was 11.07 per 1000 (1.1%) in 2022 compared to 69.07 in 1972 (Stats NZ, n.d.-a).
[3] In this context, I am talking about the continuity of one's genealogy. The concept of whakapapa is discussed further in this thesis in *Chapter Four: The importance of whakapapa for understanding fertility*.

century has been nothing short of remarkable (Pool, 1991). Nevertheless, our survival as a people continues to fundamentally rest on natural increase – more births than deaths. Although the kuia was a lone voice on that day, the importance of whakapapa is a view that is shared and supported in te ao Māori (the Māori world). In a literal sense, whakapapa is key to the survival of humanity and Māori as a people. As Rimene et al. (1998) state:

> *The continuation of whakapapa, to continue the lineage of whanau [extended family] and hence the continuation of hapu [kinship group] and iwi [wider kinship group], is central not only to Maori way of life, but is central to the continuation of life itself. Not only is the creation of the next generation essential, but the links the new generation makes with other whanau, hapu and iwi are also important. Whakapapa is maintained and preserved in the process. It is the whakapapa that makes Māori identity unique. (p. 27)*[4]

The story of the kuia, and the ideological tensions about family formation that arose from the interaction between the women, is the main inspiration behind this thesis.

I situate this thesis in the discipline of demography because, as a wahine Māori[5] (Māori woman) demographer, I argue that Indigenous knowledges can make a substantive impact on how Indigenous fertility is studied and understood. Fertility, defined narrowly in the discipline as *actual* or *live* births, is a core demographic process, along with mortality and migration (Poston & Bouvier, 2010; Weeks, 2016). The focus therefore is not on the reproductive potential to have children, but on the output of reproduction (Weeks, 2016). Many demographers preoccupy themselves with the study of fertility for the purpose of understanding the broader dynamics of population change. Reviewing the demographic literature on the fertility of Indigenous peoples in settler-colonial states shows that Indigenous-centred views are virtually invisible. One of the reasons for this is that most of the studies have been conducted by non-Indigenous demographers, deploying Western (and often Eurocentric) perspectives, theories, and frameworks. John Taylor (2009) refers to this practice "mostly as a form of applied demography" (p. 115), and his sentiments are echoed by Andrew Taylor (2011):

> *The field of demographic research has largely failed to deviate from the application of Westernised notions of demographic change and consequently has been guilty of*

[4] In this thesis I have cited Māori terms that would normally have a macron (tohutō) as they have been published, and in this case, without the macron.
[5] I use the term 'wahine' = woman without a macron on the 'a' to signify the singular form and 'wāhine' = women with a macron to signify the plural form.

> *retro-fitting models to improve our understanding of how 'primitive societies' came to be or could become essentially reflections of capitalistic norms. (p. 158)*

This thesis addresses this issue by rethinking how we 'do' Indigenous demography in ways that foreground Indigenous perspectives in terms of our approach, analyses, and interpretations. That is not to say that I disregard the methods of demography because the discipline does have its merits. Rather it is the methodological approach that needs to change (Walter & Andersen, 2013). In this thesis, I demonstrate that demography can be reimagined, albeit in some small way, so that it responds more appropriately to the field of Indigenous demography.

As a specific case study, this study focuses on understanding the contemporary fertility trends and patterns of Māori, the tangata whenua (Indigenous people of the land) of Aotearoa New Zealand (Aotearoa). A review of the Māori fertility literature – and indeed Indigenous fertility more broadly (Johnstone, 2011a, 2011b) – reveals a startling lack of cultural depth and understanding from an Indigenous perspective. Applying a critical Indigenous lens in the field of demography is rare, and in terms of understanding Māori fertility, is almost entirely absent. There is also a growing acknowledgement in the field of the need for an "…Indigenous theory…that reflects social, economic, political, historical and cultural realities" (Johnstone, 2011b, p. 117). Much of the Māori fertility literature has covered the demographic, social, economic, political, and historical factors to help explain and contextualise Māori fertility trends and patterns (Douglas, 1977a, 1977b, 1981; Jackson et al., 1994; Pool, 1974, 1977, 1991; Statistics NZ, 2004[6]; Zodgekar, 1975). However, most of this scholarship barely scratches the surface in terms of exploring the Māori cultural influences on fertility, which is my primary focus.

For this study, I use the term 'culture' in a broad sense to encapsulate the ideas, customs, social behaviours, values, worldviews etc of a collective (Jenks, 2005; Ogburn, 1937). I consider the relationship between culture and fertility in the context of the fertility trends and patterns that have unfolded since the Māori fertility transition, which began around 1966 and ended in 1976. Since then, Māori fertility has gradually converged to a level similar to Pākehā women. In 2023 the annual-December total fertility rate (TFR) figures were 2.0 for Māori and 1.6 for all women in Aotearoa (Stats NZ, n.d.-b). However, important differences persist. Most notably, most Māori women bear their children at younger ages (20-24 years)[7] and over a longer period of time. Studies on Indigenous fertility in the CANZUS settler-colonial states of Canada, Australia, Aotearoa, and the United States, show

[6] Cited under its former name, but now known as Stats NZ.
[7] This has since shifted to 25-29 years in 2013/14 but still peaks earlier than Pākehā at 30-34 years.

similarities in terms of age-specific patterns and spacing (Johnstone, 2011b). Could there be common cultural factors at play? Could culture also help to explain these differences? With these queries in mind, my over-arching question is: *To what extent does culture influence contemporary Māori fertility patterns?* As already noted, the concept of whakapapa is central to Māori identity and reproduction (Glover & Rousseau, 2007; Hiroti, 2011; Mikaere, 2017; Rimene et al., 1998), and part of the motivation for this study is also to explore further the link between whakapapa, as a culturally based concept, and fertility.

In doing so I bring a mana wahine (Māori womens discourses) lens to the study. Despite there being several major studies of Māori fertility, very few have been led by or substantially involved wāhine Māori (Māori women). In population research, Indigenous peoples – and especially Indigenous women – are often seen as the subjects of research, rather than those with expertise. As a wahine Māori demographer situated in the academy, I feel a responsibility to make some ground in this space and, in the process, help dispel some of the misconceptions around Māori fertility. In seeking to understand and explain Māori fertility transitions and patterns, very few studies have given voice to wāhine Māori experiences, knowledges, and ways of knowing (mātauranga wāhine). Hence, part of my endeavour is to include wāhine Māori perspectives about their fertility, after all, it is their bodies, and their babies.

For the remainder of this chapter, I set the stage with a discussion of some of the key features of Indigenous demography generally and describe what the overall predisposition has been in the field – that it has mostly been in service of government needs and priorities. However, I will also highlight how recent critical scholarship is helping to redefine and redirect the field so that it responds to Indigenous aspirations. I then critique the dominant theoretical frameworks that have informed conventional demographic approaches and discuss why they are inadequate for understanding the demography of Indigenous peoples. I then describe what an Indigenous lens might bring to the study of Indigenous fertility, which helps sets the platform for my methodology and methods for this study. I then sketch my conceptual framework for the thesis and conclude with an outline of the remaining chapters of this thesis, including a brief overview of my empirical studies presented in Chapters Two to Four.

1.2 Indigenous demography

Generally referred to as Indigenous Demography, the demography of Indigenous peoples has mostly been a colonial undertaking (Kukutai, 2011a; Taylor, 2009; Walter & Andersen, 2013). The need for population data about Indigenous peoples has been integral to the State's political agenda of colonisation[8] and nation-building (Kertzer & Arel, 2001; Kukutai, 2011b; Taylor, 2009; Walter & Andersen, 2013). The

[8] In the main text of this thesis, I use the British-English spelling i.e., 'colonisation'. However, there are occasions when I retain the American-English i.e., 'colonization' spelling according to a citation.

different ways in which Indigenous peoples have been counted and classified over time and by territory, reveal common themes of exclusion and erasure (Andersen, 2008, 2014; Axelsson & Sköld, 2011; Huyser & Locklear, 2023; Kukutai, 2011a; Lujan, 2014; Mullane-Ronaki, 2017; Peters, 2011; Ramirez, 2023; Small-Rodriguez, 2020; Small-Rodriguez & Beardall, 2023). Axelsson and Sköld's (2011) edited book cover this subject extensively, citing examples from across the world of the historical construction of Indigenous peoples in official statistical instruments. They found significant variation in the way "in which states or territories enumerate, categorise and differentiate Indigenous peoples" (Axelsson & Sköld, 2011, p. 1). In Sweden, for example, the government does not explicitly identify Indigenous peoples in its data collections, whereas in Aotearoa, Canada, and Australia they do (Axelsson & Sköld, 2011). In Australia, it was once thought that the Aboriginal peoples would 'disappear', and so they were counted for the purpose of statistical exclusion or reclassified pursuant to a "deliberate policy of cultural assimilation into mainstream society" (Taylor, 2009, p. 116). Furthermore, the classifying of Indigenous peoples in official statistics, especially into a single category, does not necessarily reflect Indigenous socio-cultural realities nor account for heterogeneity (Axelsson & Sköld, 2011; Kukutai & Pool, 2014; Walter & Andersen, 2013). Taylor (2009) refers to this practice by official enumerators as being 'population' focused not 'people' focused. Put simply, demography is a discipline that is done 'to' or 'about' Indigenous Peoples not 'with' nor 'for' Indigenous peoples. Again, the practice raises the issue that ignores the "intercultural world in which many Indigenous peoples exist and operate" (Taylor, 2009, p. 115). This very process of over-simplifying complex realities into State-determined categories is what Scott (1998) described as the "state's attempt to make a society legible" (p. 2), and consequently, peoples or populations are viewed or understood via the categories in which they are assigned. Kertzer & Arel (2001) argue that "Once these [categorization of populations] are made, it is in the interest of state authorities that people be understandable through the categories in which they fall" (p. 2).

How Indigenous peoples are counted and classified is just one concern. Another is the way in which data from Indigenous peoples are analysed and interpreted. Walter (2016) states that dominant ideas, norms and values, and racial understandings determine statistical constructions and interpretations but that the "accepted persona of statistics on indigenous peoples operates to conceal what is excluded: the culture, interests, perspectives and alternative narratives of those they purport to represent – indigenous peoples" (p. 80)[9]. In surveying the top 10 Google results of 'Indigenous Statistics for Aboriginal and Torres Strait Islander peoples', Walter (2016) found that all data were deficit focused – which she summarises as the '5D data' on Indigenous people: "disparity, deprivation, disadvantage, dysfunction and difference" (p. 80). There is also the continued widespread use of a binary Indigenous/non-Indigenous approach for

[9] Throughout this thesis I have capitalised the initial of 'Indigenous', unless cited or published without a capital.

'inter'-group comparisons. In reference to the CANZUS countries, Kukutai and Pool (2014) note that "policy and research involving Indigenous populations often has a comparative focus, with indigenous outcomes assessed in relation to the 'mainstream'" (p. 441). The binary approach also promotes a unidimensional representation of populations that are inherently diverse (Johnstone, 2011b; Kukutai, 2011a, Kukutai & Pool, 2014; Taylor, 2009), and consequently, key 'intra'-group differences in fertility outcomes are overlooked. Again, the concern with this approach is that it promotes – even if unintentionally – a deficit-based view of Indigenous peoples (see Fogarty et al., 2018; The Lowitja Institute & The Australian National University, 2018). For example, Taylor (2009) points out that demography has been fundamental to Australia's Indigenous Affairs policy of 'closing the gaps' in socio-economic status between Indigenous and other Australians. However, it was developed around a "discourse of policy failure and deficit" instigated by the work of demographers and social scientists with their construction of a "demography of disadvantage" (Taylor, 2009, p. 117).

So how do we progress from a demography 'of' Indigenous 'populations' to a demography that is 'for' Indigenous 'peoples'? There is momentum for change from within the academy, led by a small contingent of Indigenous scholars with support from non-Indigenous colleagues and allies. A growing body of research critiques the power structures within the field and offers alternatives to how Indigenous populations are studied. Much of the work has focused on the statistical construction of Indigenous peoples in State data collection instruments, such as censuses, and the impact these have on public policies (Andersen, 2008, 2014; Kukutai, 2001, 2004, 2011a, 2012; Kukutai & Pool, 2014; Small-Rodriguez, 2020; Small-Rodriguez & Beardall, 2023; Walter, 2016; Walter & Andersen, 2013). It makes sense to start at the source of demography – statistical data – given that quantitative data are the 'bread-and-butter' of demography. Further impetus for change in the last decade has come from the Indigenous data sovereignty (IDSov) movement. Both a scholarly field and a global social movement, IDSov refers to "the inherent and inalienable rights and interests of indigenous peoples relating to the collection, ownership and application of data about their people, lifeways and territories" (Kukutai & Taylor, 2016, p. 2). To date, we have seen a growing collection of formative works emerge in the field (Carroll et al., 2019; Hudson et al., 2020; Kukutai & Taylor, 2016; Rainie et al., 2019; Walter et al., 2020; Walter et al., 2021). The literature not only critiques the data practices of the State, but also offers pathways forward on how to exercise IDSov in a variety of contexts. For example, Walter and Suina (2019) give an example of how a US health organisation worked in partnership with Indigenous tribal communities in New Mexico to access meaningful data. The health organisation used their unique position to serve as an intermediary between federal and state government to supply tribal specific data directly to tribes through data sharing agreements. Another example is where the same health organisation, along with their tribal partners, used an interactive team building exercise to identify and conceptualise Indigenous determinants

of health that go beyond western constructions of physical wellness. Aotearoa's Māori Data Sovereignty Network – Te Mana Raraunga – have developed a set of key principles for the "ethical use of data to enhance the wellbeing of our [Māori] people, language and culture" (Te Mana Raraunga Māori Data Sovereignty Network, 2018, para. 2). In addition, Kukutai et al. (2023) have recently produced a Māori Data Governance model to provide guidance, especially for Aotearoa's public service, for the system-wide governance of Māori data that is consistent with the Government's responsibilities under Te Tiriti o Waitangi (The Treaty of Waitangi).

Indigenous scholars have also contributed to Indigenous demographic scholarship through research that looks at how to better analyse Indigenous data. Māori social scientist Tahu Kukutai (2001, 2004, 2007, 2011a, 2012) has published widely on Māori demography and ethnic identity and is internationally recognised for her groundbreaking work on state practices of ethnic and racial classification and census-taking. Her work on ethnic and racial classification includes developing a 'core-periphery' model to examine the potential associations between socio-economic status and ties to Māori identity in the Aotearoa census (Kukutai, 2011a; see also Kukutai & Pool, 2014). The model serves as a useful way to construct proxy indicators of Māori identity that reflects a more culturally diverse population – something I extend on in this study. Palwa scholar Maggie Walter and Metis scholar Chris Andersen (Walter & Andersen, 2013) have also produced a groundbreaking book - Indigenous Statistics - that dismantles the positivist approach typically found in population research and provides a fresh approach to Indigenous quantitative methods.

The tide is turning, albeit slowly, from a field that has primarily been Indigenous 'populations' centred to one that is Indigenous 'peoples' centred. By that, I mean a movement away from objectifying and pigeon-holing Indigenous peoples into 'categories' for State purposes, towards an agenda that better responds to the "self-determination aspirations of indigenous peoples" (Kukutai & Taylor, 2016, p. 2). This does not entail an outright rejection of demography. Although demography has served as a tool of colonisation (Ittmann et al., 2010), and its epistemological roots stem from Western theories (e.g., modernisation), the discipline has aspects that are useful. Demography is more than a study of population change, size, and composition. It can also tell us what the social, economic, political, and environmental implications and consequences are of population change. What matters is 'how' one uses the tools of demography. In this study I advocate for its repurposing for the benefit of Indigenous peoples. The key is rethinking how we approach Indigenous demography, especially when it comes to Indigenous peoples' interests. By 'rethinking', I mean to reconsider or reassess with a view to changing the way we theorise and perform demography. In a sense, it is a way of 'indigenizing' the field – that is, deploying demography in a way that is self-determining and meaningful for Indigenous peoples' aspirations.

However, I am mindful that we are reliant on data that is not always appropriate, accessible, or even available. This is where the IDSov movement is critical to advocating for better quality data and protocols. Furthermore, the frameworks employed in the field are limited to and generally privilege Western and Eurocentric views. The most influential theoretical framework has been the Demographic Transition Model.

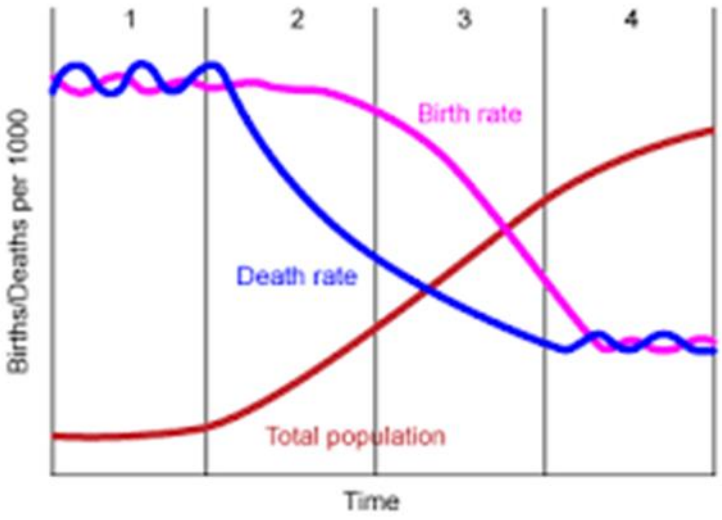
1.3 The Demographic Transition Model and its underlying theory

One of the criticisms of demography is that it tends to adopt positivism as its dominant approach (Greenhalgh, 1996; Kertzer & Fricke, 1997; Petit, 2013). Positivism is the dominant approach of the natural sciences where there is a preference towards quantitative data, experiments, surveys, and statistics: "Positivist researchers…seek rigorous, exact measures and "objective" research, and they test hypotheses by carefully analyzing numbers from the measures" (Neuman, 2003, p. 71). It is important, therefore, to discuss the theoretical and methodological frameworks that underpin demography because it is these very frameworks that determine how demography is applied, and therefore, how Indigenous peoples' demography is understood. I begin with a discussion of the Demographic Transition Model because it is the dominant theoretical framework for understanding demographic transitions, including fertility transitions. More recent demographic phenomena, notably sub-replacement fertility, have seen the development of the Second Demographic Transition model, which I also briefly describe. I also discuss some of the more recent theories for understanding current fertility trends, particularly low fertility.

1.3.1 Demographic Transition model

The Demographic Transition Model (DTM) is the theoretical framework that has dominated modern demography. The model initially emerged as a description of observed demographic changes in more developed countries, mostly located in North-Western Europe (Weeks, 2016) but has become an influential model for understanding population change globally (Malmberg & Lindh, 2006). In its basic form, the demographic transition represents a shift from a population regime of both high mortality (deaths) and fertility (births) to a regime of both low mortality and fertility rates (Casterline, 2003; Dyson, 2010; Kirk, 1996; Siegel & Swanson, 2008; van de Kaa, 2008). Depending on the level of detail that is presented, there are several representations of the DTM, which can range from three to six progressive stages. However, regardless of how many stages, they all illustrate the same key principle – a shift from one population state to another. Figure 1.1 represents a simple depiction of the classical DTM based on a four-stage model produced by Chorley and Clarke (2015).

Figure 1.1: Depiction of the demographic transition model



Source: Chorley & Clarke (2015)

The authors refer to stage one as the 'pre-transition' phase, which is characterised by high birth rates and high fluctuating death rates. As a result, population growth is low. During stage two, which they refer to as the 'early transition' period, death rates begin to fall while birth rates remain high, and the population grows rapidly. Eventually, in stage three, the 'late transition' phase, birth rates start to decline, and population growth decelerates. Stage four, the 'post-transition' period, is characterised by low birth rates and low death rates, and low population growth, although the population has the potential to decline further.

The DTM has since evolved into a theoretical framework, with many of the piecemeal explanations pointing to 'modernisation theory' as the underlying explanation for why countries or societies experience a transition (Weeks, 2016). Demeny (1972) states it matter-of-factly: "In traditional societies, fertility and mortality are high. In modern societies, fertility and mortality are low. In between, there is the demographic transition" (p. 153). Hence, the DTM not only models the population dynamics between birth and death rates but is inextricably linked to changing socio-economic conditions (Hanks & Stadler, 2011). In a nutshell, modernisation theory refers to the progression from a 'traditional' society to a 'modern' society. With industrialisation as the primary catalyst, the theory implies that traditional societies will transform by adapting their social behaviours to adopt more 'modern' practices (Weeks, 2016). An underlying assumption too is that as mortality declines, and the survival of children (and their parents) is secured, then people will eventually desire smaller families (Weeks, 2016).

Sequential changes in population (i.e., mortality, fertility, and population growth), depend on and/or coincide with different stages of economic development. For example, in traditional/low-income societies both mortality and fertility rates are high. As the standard of living improves (via technological advances), both mortality and fertility shift downwards during the transitional stage(s), with mortality levels falling first, followed by fertility. By the end of the transition, fertility and mortality rates are low, which is typically found in wealthier societies. Essentially, the DTM promotes this idea that macro-level economic changes precipitates demographic change. In other words, people adjust their demographic behaviours, such as fertility choices, in response to broader changes in economic infrastructure and social institutions (Weeks, 2016).

While the DTM is an empirically sound framework for understanding broader population change, it has its limitations. First, the model is rooted in ethnocentrism, that is, it assumes that the Western European experience is always generalised to all populations and places. When the DTM is applied to understanding demographic transitions in other parts of the globe, the notion of modernisation does not necessarily apply, particularly in less developed countries. Greenhalgh (1995) was particularly critical of demographic transition theory, citing that modernisation theory "created universal theories that were beyond time and place, and that focused on social and economic forces of change, to the exclusion of political and cultural ones" (p. 5). She further points out that the theorising of reproduction in demography demonstrates a narrow view, a lingering of Eurocentrism, and the absence of any critical perspectives in the field. Second, while the DTM positions economic transformation as the important macro-level determinant, it fails to take adequate account of the complex and more nuanced factors influencing fertility rates. For example, religious or socio-cultural beliefs may keep birth rates high despite falling mortality rates, such as in Sub-Saharan Africa (see Caldwell, 1982), although further research has to some extent weakened the socio-cultural argument (see Gould & Brown, 1996). Third, an obvious omission from the DTM is that migration is not accounted for, and the wider impact that this would have on the age structure, and hence, fertility rates. Fourth, early iterations of the DTM assumed that the modern state would end with a stable population – comprised of an older stationary population with life expectancies higher than 70 years, a corresponding level of replacement fertility[10], and zero population growth (Lesthaeghe, 2014). In recent decades, however, many more developed countries are experiencing sub-replacement fertility and population ageing[11], many of which are on the brink of negative population growth. For example, the United Nations (2015a) reported that several countries are

[10] Replacement fertility refers to the theoretical level of fertility required to replace a population. In this regard, it is just over two children per woman on average i.e., a total fertility rate of 2.1.
[11] Refers to the age structure or composition of a population. Population ageing is where there is a higher proportion of older persons (age 65+) than younger persons/children (age 0-14).

expected to experience population decline of more than 15 percent by 2050, including Japan and Hungary. In a very recent report, deaths outnumbered births in China (Wojnar, 2023). The situation in Aotearoa is also concerning. In 2023, there were 19,071 more births than deaths, the lowest annual natural increase since 1943, and had the lowest number of registered births (56,955) in 20 years (Stats NZ, 2024). Fifth, the DTM does not take into consideration the unique impacts on Indigenous populations in settler-colonial states (Johnstone, 2011b; Pool, 2015). For example, in her observation of early Indigenous childbearing across all CANZUS states, Johnstone (2011b) noted that colonisation was an "explicit and pervasive influence on all exogenous drivers of the proximate determinants of fertility" (p. 117) but has been largely missing from demographic theory. Furthermore, the concept of 'very low fertility' is not yet the current experience of Indigenous populations in CANZUS.

In response to these more recent demographic phenomena, especially in more developed countries, the Second Demographic Transition model was developed.

1.3.2 Second Demographic Transition model

The Second Demographic Transition model (SDTM) was developed by Ron Lesthaeghe and Dirk van de Kaa in 1986 to explain the demographic phenomena that emerged from the1970s (Lesthaeghe, 2014). In a nutshell, the model recognises: sustained levels of sub-replacement fertility, various living arrangements other than marriage, the separation between marriage and childbearing, no stationary population, a declining population size (unless supplemented by new migrants), an older age structure because of lower fertility, and gains in longevity (Lesthaeghe, 2014). The development of the SDTM was predominantly motivated by two paradigm shifts, particularly in relation to understanding the declining fertility rates in the West (Lesthaeghe, 2014). The first paradigm shift pertains to 'self-actualization' – the idea that an individual pursues their full potential as proposed by Maslow's hierarchy of needs theory (Maslow, 1943). Within this paradigm, parenthood is considered as one option amongst many. The second paradigm shift pertains to the idea that sub-replacement fertility would be a long-term structural feature, and that economic and socio-cultural effects would be self-reinforcing (Lesthaeghe, 2014). Like the DTM, the SDTM recognises the impact of macro-levels factors on demographic phenomenon but, in contrast to the economic focus of the DTM, also takes account of social and cultural factors (Lesthaeghe, 2014).

1.3.3 Fertility transition and fertility theories

This section focuses specifically on the fertility transition. Once the mortality transition[12] started in Western European countries, it took approximately 100 years for the fertility transition to begin, with birth rates falling around the 1870s. By the 1930s, birth rates reached the intergenerational replacement level of 2.1 births per woman. At that point it was considered that the fertility was complete, but many Western countries subsequently experienced a 'baby boom' – marked by a temporary return to higher fertility after World War II. However, attitudes toward marriage and childbearing were changing. For example, partnering, and hence childbearing, was delayed, and fewer people married. The debate about fertility transitions led to some demographers claiming that there were two distinct fertility transitions – the first where birth rates dropped because of the use of modern contraception, and the second where marriage, and therefore childbearing, became one option among many (Weeks, 2016). In essence, the 'fertility transition' refers to the "shift from high fertility, characterized by only minimal individual deliberate control, to low – perhaps very low – fertility, which is entirely under a woman's (or more generally a couple's) control" (Weeks, 2016, p. 190). Based on this definition, the key concept here is exercising 'control' or 'agency' over one's fertility, that is, decisions around when to have children (timing), including spacing, and how many children to have (parity). The first fertility transition (1870s-1970s) was instigated by people gaining greater control over fertility through knowledge and access to effective contraception. Toward the end of the period the age of childbearing became younger as the baby boom commenced in wealthy countries. This coincided with the return of armed forces from World War II and the recuperation of delayed marriages and births. In more recent times, the second fertility transition (1970s onwards) was characterised by fewer people partnering or having children, delayed childbearing for those who did have children, and more people divorcing and remaining single. The link between marriage and childbearing became increasingly separated (likewise between sex and childbearing), with many older couples seeking assisted reproductive methods (e.g., in-vitro fertilisation). These recent trends, especially in more developed countries, including CANZUS, strongly indicate that low fertility, including sub-replacement, is the long-term norm. As a result, several theories have been advanced to understand these recent phenomena.

Closely linked to the SDTM, is the theory 'Post-Materialism', which is the idea that changes in demographic behaviour are driven by a rise in the values of "individual self-realisation, satisfaction of personal preferences, liberalism and freedom from traditional forces of authority, particularly religion"

[12] The mortality transition, also known as the 'health and mortality transition' or 'epidemiological transition', refers to the "shift from deaths at younger ages due to communicable disease to deaths at older ages due to degenerative diseases" (Weeks, 2016, p. 92).

(McDonald, 2000, p. 16; see also Coleman, 2000; Lesthaeghe & Moors, 1995). In other words, individuals are presented with a variety of options that compete with childbearing/family formation. Other low fertility theories put forward include 'Rational Choice Theory' (Coleman, 2000; see also McDonald, 2000). This theory sees individuals/couples as 'rational' beings who have access to all the information they need to make a decision about having a child and weighing up the costs and benefits – whether monetary or psychologically. However, McDonald (2000) argues that the costs and benefits are largely unknown, and thus the decision making comes with some level of uncertainty. In his proposed theory of 'Risk Aversion', McDonald (2000; see also 1996), argues that if there is a perception of uncertainty in economic, social, intimate, or personal futures, then individuals or couples will err on the side of safety to minimise or avoid risk, and/or maximise security by investing in education. Another theory developed by Coleman (2000) and McDonald (2000) is 'Gender-Equity'. The main argument is that low fertility, especially in advanced countries, can be explained by an "incoherence between the levels of gender equity applying in different social institutions" (McDonald, 2000, p. 17; see also Coleman, 2000). In reference to the 'breadwinner' model that underpins family-oriented social institutions, McDonald (2000) postulates that if social institutions provide opportunities for women equivalent to men in the education or job market but women are severely hindered when having children, then women would restrict the number of children they have to the extent where it leaves fertility at precariously low levels. In other words, the "more traditional the society in regard to its family system, the greater is the level of incoherence between social institutions and the lower is fertility" (McDonald, 2000, p. 17). Another theory that helps to explain low levels of fertility is the 'Low Fertility Trap' hypothesis proposed by Lutz et al. (2006) where sustained exposure to small family size becomes a self-reinforcing mechanism by which fertility spirals downwards and/or remains low.

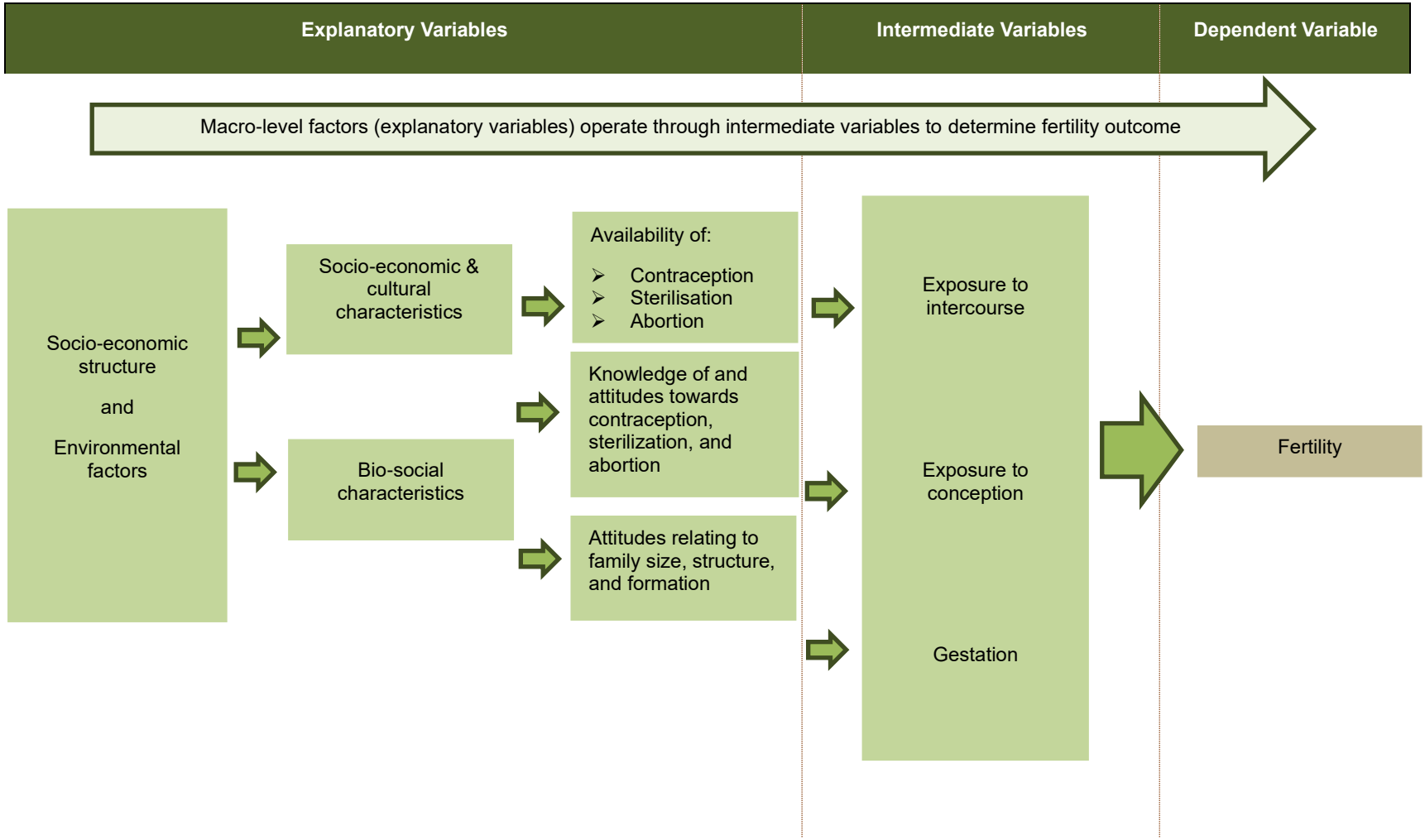
While there is no single theory (or model) that explains changes in fertility and fertility differentials, some fertility theories are more useful than others. However, all the major theories have their limitations. One obvious one is that they all focus on contexts where fertility levels are already low or at sub-replacement. However, some of the world's regions (e.g., Sub-Saharan Africa) still have high – albeit rapidly declining – levels of fertility (United Nations, 2015b). In the CANZUS states, these theories still dominate explanations for low fertility but do not necessarily reflect the fertility patterns or trends of Indigenous peoples there. For example, in Aotearoa the Māori fertility transition occurred nearly 100 years later than for Pākehā. The mechanisms for change were also different. For Pākehā the mechanism was delayed marriage and childbearing, and for Māori, the uptake of effective contraception. In Aotearoa, Māori fertility has generally hovered around replacement level for quite some time, and earlier births is still a key feature, which I expound on in Chapter 2 of this thesis. Fertility theories are also 'individualistic' in nature, with very little acknowledgement or focus on how socio-cultural relationships might play a role in

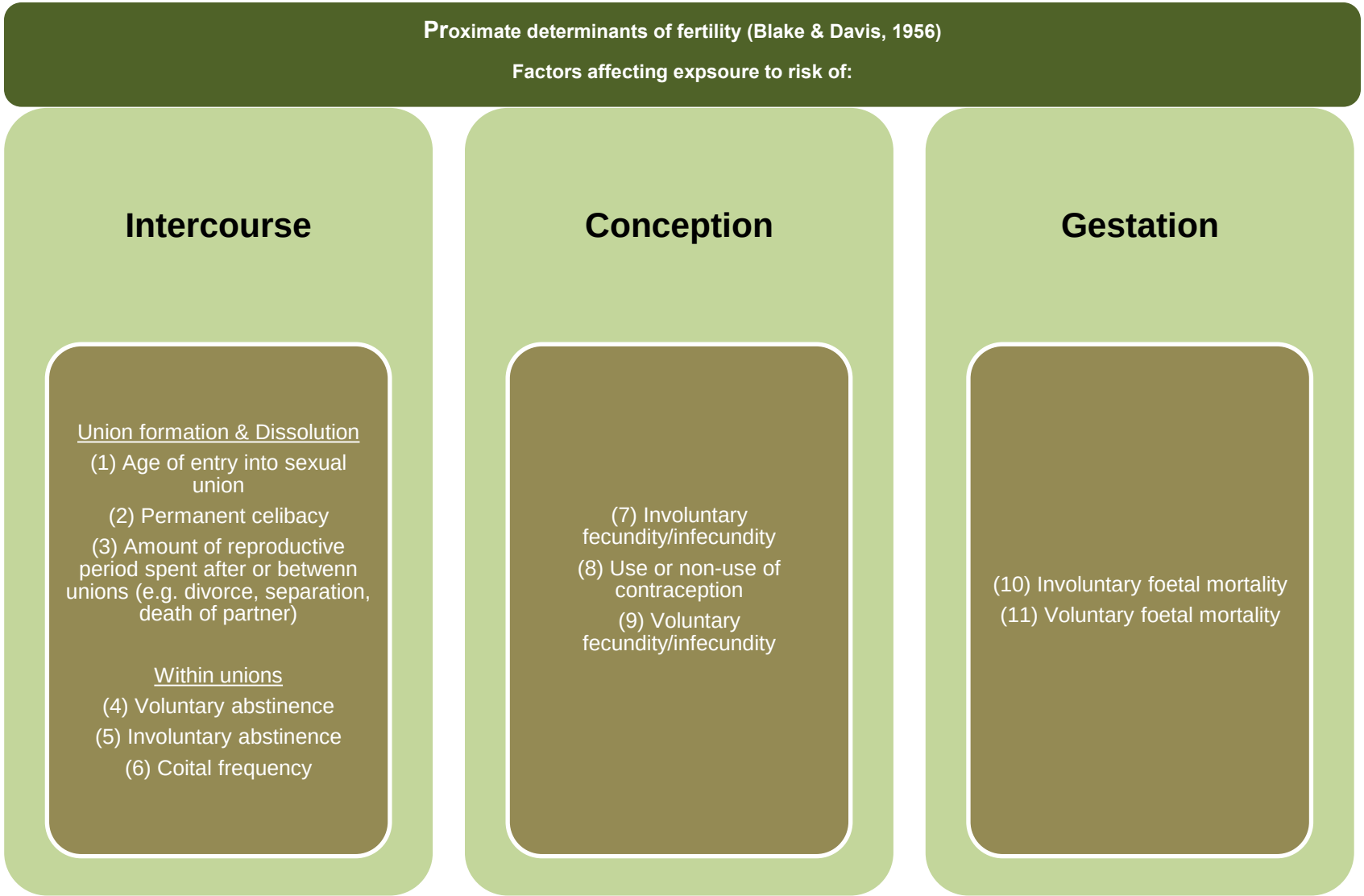
fertility behaviour and outcomes. However, there is one other model that can be useful in terms of linking external and/or proximate factors on fertility outcomes – the Davis-Blake/Bongaarts model.

1.3.4 Davis-Blake/Bongaarts model of proximate determinants of fertility

One model that has been influential for analysing fertility is the Davis-Blake model of the proximate determinants of fertility (Davis & Blake, 1956). The model was developed to enable a comparative analysis of the sociology of fertility to better understand variations in the levels of fertility between populations. It was later finetuned by the Dutch American demographer John Bongaarts (1978). Davis and Blake (1956) identified 11 intermediate variables through which macro-level (structural) indirect determinants (i.e., socio-economic, cultural, and environmental) operate to directly impact fertility. These 11 variables are grouped into three categories of the reproduction process: 1) intercourse, 2) conception, and 3) gestation/parturition, which I diagrammatically represent in two parts in Figure 1.2.

Figure 1.2: Diagrammatic representation of the Davis-Blake model (1956)




Proximate determinants of fertility (Blake & Davis, 1956)
Factors affecting expsoure to risk of:
Intercourse
Union formation & Dissolution
(1) Age of entry into sexual union
(2) Permanent celibacy
(3) Amount of reproductive period spent after or betwenn unions (e.g. divorce, separation, death of partner)
Within unions
(4) Voluntary abstinence
(5) Involuntary abstinence
(6) Coital frequency
Conception
(7) Involuntary fecundity/infecundity
(8) Use or non-use of contraception
(9) Voluntary fecundity/infecundity
Gestation
(10) Involuntary foetal mortality
(11) Voluntary foetal mortality

Bongaarts (1978) version of the Davis-Blake model attempted to quantify the impact of the intermediary variables on fertility, and to identify which factors were more important. In this case, he simplified the Davis-Blake model to eight variables:

I. Exposure factors

1. Proportion married (of all women of reproductive age)

II. Deliberate marital fertility control factors

2. Contraception (use and effectiveness)
3. Induced abortion

III. Natural marital fertility factors

4. Lactational infecundability
5. Frequency of intercourse
6. Sterility
7. Spontaneous intrauterine mortality
8. Duration of the fertile period

Bongaarts (1978) found that the most important determinants on fertility were: marriage, contraception, lactation, and abortion.

The Bongaarts model remains one of the most widely used models for analysing fertility and fertility change and is particularly valuable for identifying the key intermediate variables responsible for fertility differences among populations or sub-populations (Bongaarts, 1978). However, since 1978 more recent versions have modified the Davis-Blake/Bongaarts model to better reflect current socio-cultural conditions (e.g., sexual activity rather than marriage to indicate exposure to pregnancy, see, Stover, 1998). I draw on aspects of the Davis-Blake/Bongaarts model – specifically the idea of proximate determinants – to explore the link between culture (as a macro-level factor) and fertility, using Māori identity in the form of expressed identification as a proxy for culture. This is discussed in some detail in Chapters 2 and 3 of this thesis.

While the DTM is a useful starting point in terms of understanding broader population changes, and the SDTM is useful for highlighting the ideological shifts behind lower fertility levels, both models are rooted in Ethnocentrism (Lesthaeghe, 2014), and are limited in terms of understanding Indigenous

fertility patterns in settler-colonial states. As a way forward, I will propose what an Indigenous lens on fertility can bring to the field of demography.

1.4 An Indigenous lens on Indigenous fertility

An Indigenous lens brings to the foreground Indigenous peoples' perspectives and experiences about their own demographic experiences, which is lacking across the demographic literature. The demography of Indigenous peoples is intertwined with colonisation (Axelsson et al., 2016), therefore Indigenous demography ought to be understood within this broader context. In the CANZUS states, Indigenous minorities have shared colonial histories of dispossession, subjugation, and systemic racism which threatened their very survival, along with contemporary forms of exclusion in the form of over-representation on myriad of measures of socio-economic disadvantage (Anderson et al., 2016; Gracey & King, 2009; King et al., 2009). Not only did Indigenous peoples put to rest the colonial idea of the 'vanishing native', their population growth rates have for many decades surpassed those of the dominant settler populations due to higher fertility, a youthful age structure, and a resurgence of Indigenous identity (Andersen, 2008; Big Eagle & Guimond, 2009; Johnstone, 2011a; Nagel, 1995; Pool, 1991, 2015; Snipp, 1989; Taylor et al., 2020). Fundamentally, Indigenous population growth rests on natural increase rather than migration so understanding the causes and consequences of fertility trends, and what it means for the future, is critical.

The fertility transitions of Indigenous peoples in the individual CANZUS states are fairly well documented (see Cannon & Percheski, 2017; Haines, 1989; Haines & Steckel, 2000; Johnstone, 2011a, 2011b; Pool, 1991; Pool, Dharmalingham & Sceats, 2007; Sullivan, 2005). However, in observing the pattern of early Indigenous childbearing across all CANZUS countries, Johnstone (2011b) argued that colonisation was an explicit and pervasive factor on the external drivers of the proximate determinants of fertility[13] and has been largely missing from the dominant demographic theories and approaches. In a more recent analysis, Pool (2015) clearly illustrated the impact of colonisation on early Māori demography, but most importantly the enduring 'domino-effect' on other aspects of Māori society, including social, economic, and cultural:

> *For Maori, social economic and cultural development has been inseparable from interactions with Pakeha settlers. Too often, these contacts resulted in inequalities that have persisted until now, following 170 years first of British rule and then of*

[13] For example, refer to the Davis-Blake/Bongaarts model of proximate determinants of fertility.

> *political independence. Ethnic inequality is still a fact of life in New Zealand – on a global scale it may not be extreme, but it is a reality. (p.49)*

Because colonisation is a factor that is clearly missing from demographic theory and approaches, Johnstone (2011b) argued for the development of Indigenous-centred theories by Indigenous scholars:

> *The inherently political nature of indigenous demography indicates that an indigenous theory of demographic transition would not only offer insights into contemporary fertility patterns among minority, indigenous populations, but also reflect an indigenisation of demographic theory and research practices. (p. 118)*

An in-depth exploration of cultural influences on Indigenous fertility has also been lacking in the demographic literature. In trying to understand the Māori fertility transition, some of the reasons presented included: urbanisation, rising educational aspirations and achievements, changing mortality, and intermarriage with Pākehā (Khawaja & Rolleston, 1976; Pool, 1967, 1974, 1991; Zodgekar, 1975). While many of these conclusions are backed by empirical analyses, Pool (1991) hints that part of the answer for explaining different fertility patterns may be attributed to different cultural values:

> *The major socio-cultural difference between Maori and Pakeha is the degree of emphasis on family structure lineage and kinship as a central cultural trait, as against the simple desire for children (pro-natalism). For Pakeha pronatalist values are often reinforced by a stated need for family community. This seems to be a different cultural norm from whanautanga [birth], but it could 'owe much to the increasing interweaving of Polynesian values into the broader social fabric of New Zealand'. (p. 174)*

Other scholars have also suggested that Māori cultural factors may play a role in Māori population change but have not explored these in great detail. For example, Johnstone et al. (2001) noted, that despite high levels of interdependence, the different demographic transitions of Māori and Pākehā were "the result of the maintenance of Māori cultural traditions" (p. 3). Zodgekar (1975) also pointed to the "maintenance of a distinct cultural identity", "large family norms", and "retention of tribal, kinship and familial associations" (p. 346).

1.4.1 A Māori lens on Māori fertility

A Māori lens provides a cultural framework in which to understand Māori fertility. Drawing on personal observations, surveys, and interviews gathered from Māori communities, Māori demographer Edward Te Kohu Douglas (1977a) explored further the idea of culture (specifically norms and values) as a plausible

explanation for both high and declining Māori fertility. His analysis suggested that rural/village (tribal) society was particularly important for fostering a high fertility regime. In traditional tribal settings, maintaining whakapapa, valuing children, whanaungatanga (kinship), and being Māori were important values. In this context, marriage, including customary marriage and remarriage, was universal and strongly endogamous. Low age at first marriage and the absence of modern contraception were also common. Although contact with Pākehā was sporadic, inter-marriage was discouraged because it "meant rapid alienation from Maori ways and the eventual loss of descendants to the pakeha world" (Douglas, 1977a, p. 666).

In terms of understanding declining fertility, Douglas (1977a) suggested acculturation (assimilation) was a mediating factor for the Māori fertility transition. He cites policies of assimilation facilitated by urbanisation and Māori-Pākehā intermarriage as a means of 'civilising' and 'assimilating' Māori into Pākehā society. He notes:

> *Many Maoris, especially younger ones, have been so well acculturated that they accept pakeha ideals of what a good Maori should be. The desire for acceptance by pakeha mentors and peers has had further effects on changing the residual Maori values, especially in the area of family life. (Douglas, 1977a, pp. 677-678).*

Recent scholarship has explored how differences in Māori cultural identity are associated with different socio-economic and demographic characteristics and outcomes. Expressed Māori identification, as in the census, can provide insights into cultural differences in behaviour, living conditions, and outcomes (Kukutai, 2011a). However, because of intermarriage, ethnic diversification, changing ideologies around the nature of ethnicity, and what it means to be Māori (Kukutai, 2011a), the boundaries between Māori and Pākehā have become much more complex. I am mindful, however, that population data have its own challenges and limitations.

Data sources, like the census, do not capture or fully represent Māori identities in ways that reflect Māori concepts of identity. With that in mind, us Māori demographers, have to make the most of the data and categories that exist and find creative ways to get closer, conceptually, to what we are attempting to measure. For example, Kukutai (2010) explored the relationship between expressed ethnic identification and intra-group differences by combining Māori identity indicators (descent, ethnicity, iwi) in the census to construct a range of Māori sub-group categories. Referred to as a 'core-periphery' model, the idea helps to conceptualise Māori identification in more complex but realistic ways that go beyond the Māori-Pākehā binary (Kukutai, 2011a). Kukutai & Pool (2014) explain in greater depth the multiple boundaries of Māori identity that range from the 'core' – those persons who identify as Māori by descent, exclusive

ethnicity, and iwi – to the 'periphery' – those whose only tie to Māori is through ancestry. Their rationale for using non-exclusive groupings is to explore the benefits that may arise from analytically treating Māori identity, as captured in the Aotearoa census, as a continuous variable rather than as discrete categories of Māori (Kukutai & Pool, 2014). It is important, however, to bear in mind that "these sub-groups are statistical constructs based on aggregated individual-level responses to various identification options, rather than socially meaningful groups" (Kukutai & Pool, 2014, p. 458). The 'core' for example is just a construct, and a very imperfect one, but it is an attempt to get closer to the notion that some Māori, for whatever reason, will have multiple ties to te ao Māori, than others, and that this may change over their life course. However, work has been undertaken over the past decade or so on further developing measures of Māori cultural identity in surveys, and in the process, highlighting different conceptualisations and measurements of Māori identity.

Originally developed by Houkamau and Sibley (2010), and now updated (Houkamau & Sibley, 2015), the revised Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE2) presents a comprehensive model of identity experiences and cultural engagement for people to understand Māori identity in the face of growing diversity and complexity. The model can be used in statistical models to predict and understand outcomes of different aspects of identity for Māori.

In another study, Houkamau et al. (2023) used data from the NZ Attitudes and Values Study to underscore the role of 'ethnic identity affect' as an important dimension of Māori identity and wellbeing. In this dataset, ethnic identity is a multi-dimensional construct that includes self-categorization, feelings about their group membership, attachment, participation in cultural activities, and knowledge of shared culture. The authors tested the longitudinal effects of 'in-group warmth', a measure of ethnic identity affect, and 'ethnic identity centrality' on three important wellbeing measures for Māori – life satisfaction, self-esteem, and personal wellbeing. Although they found a strong relationship between 'positive affect' towards one's Indigenous ethnic group and wellbeing, the authors also noted that despite efforts of cultural recovery and restoration, enculturation and access to traditional cultural knowledge varied widely (Houkamau et al., 2023).

Other research by Houkamau (2010) looked at the role of socio-historical contexts in shaping Māori women's identity and found that commonalities and differences in women's life stories indicated how collective identities affect personal interpretations and affirm the importance of socio-historical contexts for individual perceptions of identity.

Greaves et al. (2015) tested a statistical model of six 'Māori identity signatures' – defined as "distinct combinations or patterns in the relative strength (low, moderate, high, etc.) of multiple and diverse aspects

of identity as Māori" (p. 541), and therefore, reflecting ways in which people may experience or express their identity.

Webber et al. (2013) examined self-identifications, feelings of connectedness and diverse content of adolescents' 'racial-ethnic' identities – the significance and meaning of both race and ethnicity to one's self-concept. They found racial-ethnic group membership was as an important aspect of adolescents' identity (see also Webber, 2012).

To reflect an Indigenous worldview in its development and content, Stats NZ produced *Te Kupenga*, a Māori wellbeing survey that collected information on a wide range of topics to give an overall picture of Māori wellbeing – social, cultural, and economic. To recognise practices and wellbeing outcomes that are specific to Māori culture, the survey covered four areas of Māori cultural wellbeing – wairuatanga (spirituality), tikanga (Māori customs and practices), te reo Māori (Māori language), and whanaungatanga (social connectedness), and included content such as connection to marae, and knowledge and use of te reo Māori.

Despite these surveys, which have more granular conceptualisations and measurements of Māori identity, none include fertility outcomes in their scope. Using expressed identification from data sources such as the census is just one dimension and aspect of cultural identity, which includes, ancestry, ethnicity, and tribal identity.

A key goal of this thesis is to present an Indigenous-centred theory and/or approach that can help us to better understand Māori fertility. As a way forward, I draw on Kaupapa Māori[14] and Mana Wahine[15] (Māori womens discourses), as a cultural framework that upholds mātauranga Māori knowledges, methods of knowledge creation, and ways of knowing that are specific to Māori women (Jahnke, 1997; Pihama, 2001; Simmonds, 2014; Smith, 1992; see also Pihama et al., 2022a, 2022b). Given the dominance of Western theories and methodological approaches in the scholarship on Indigenous and Māori fertility, Mana Wahine, in tandem with Kaupapa Māori, creates an empowering space for Māori women to articulate their own understandings of fertility from their own cultural standpoint.

1.5 Present study

This study has emerged because of the lack of cultural depth and understanding in studies of Indigenous fertility. While I specifically focus on Māori fertility, I envisage that this study, including the

[14] Here I am meaning a research framework that is based on Māori ideology, philosophies, or principles.
[15] I discuss the framework 'Mana Wahine' further in the next section. While a macron over the 'a' in 'wahine' changes the term to the plural form for 'women', in this case, the 'wahine' instinctively implies the collective 'women' without the need for a macron (see also Simmonds, 2014).

methodological approach, will have wider application to the field of Indigenous demography. I hope that the findings from this study will also help to extend theories in relation to Indigenous fertility. In this section, I explain my overall methodological and conceptual approach including a brief overview of the methods and data sources.

1.5.1 Methodology

Methodology is described as an approach or philosophy underpinning the study of social phenomena (Maxim, 1999). Burnam et al. (2004) clarifies methodology a little more as the underlying "principles and theories which guide the choice of method" (p. 4). These 'underlying principles and theories' are the lens through which one views the world, i.e., 'worldview lens', and thus, "methodology is the worldview-influenced lens through which the research is understood, designed and conducted" (Walter, 2019, p. 12). In this section I outline the lens, including the position from which I write, that determines my approach and choice of methods to undertake this study.

In her opening paragraph of *Decolonizing Methodologies: Research and Indigenous Peoples,* Smith (2021), who writes from the position of an Indigenous colonized wahine Māori, exclaims that the term 'research' is "one of the dirtiest words in the indigenous world's vocabulary" because it is "inextricably linked to European imperialism and colonialism" that "stirs up silence" and "conjures up bad memories" for Indigenous peoples (p. 1). Likewise, the history of the research 'of' Māori has shaped attitudes and feelings towards research, which has led some to reject 'all' theory and 'all' research (Smith, 2021). From the position of those who mistrust, they see research:

> *implicated in the production of Western knowledge, in the nature of academic work, in the production of theories that have dehumanized Māori and in practices that have continued to privilege Western ways of knowing, while denying the validity for Māori of Māori knowledge, language and culture (Smith, 2021, p. 239).*

With these challenges in mind, Smith (2021) advocates for Kaupapa Māori research approaches i.e., Kaupapa Māori Research, as a way forward for Māori researchers to undertake research involving Māori issues and interests.

1.5.1.1 Kaupapa Māori Research

Kaupapa Māori, which refers to the principles and philosophy of being Māori (Smith, 1997), has been applied across a wide range of contexts, including research. Much has been written about Kaupapa Māori as a research theory and methodology (Bishop, 1999; Pihama, 2010; Smith, 1997; Smith, 1996/2015, 2021; see also Pihama et al., 2015), and there are distinct elements that characterize Kaupapa Māori Research. As part of a wider Indigenous research agenda, Kaupapa Māori Research was developed in an

attempt to reclaim the research space that has been dominated by Western ideologies (Bishop, 1999; Smith, 1997; Smith, 2021) and in turn to push-back against the dominant theories and methodologies that have either ignored mātauranga Māori – Māori knowledge systems that encompasses Māori knowledge, Māori methods of knowledge creation, and Māori ways of knowing (Mercier & Jackson, 2019) – or have deemed as 'subordinate' (Bishop, 1994; Pihama, 2010; Smith, 1997; Smith, 2021).

Kaupapa Māori Research is a cultural framework in which to conduct research (Pihama, 2010; see also Pihama et al., 2015), and provides the way for "structuring assumptions, values, concepts, orientations and priorities in research" (Smith, 2021, p. 240) that is grounded in mātauranga Māori (Pihama, 2010). Thus, in addition to the broader critical theories of resistance and decolonisation (Pihama, 2010; Smith, 2021), Kaupapa Māori Research draws from a wellspring of Māori philosophies and values, which can be found in a variety of mediums including waiata (songs), karakia (prayers/chants), whaikōrero (orations), kōrero tuku iho (oral histories), pūrākau (stories), whakataukī (proverbs), toi (art) et cetera. Kaupapa Māori research can also be drawn from and "shaped by the knowledge and experiences of Māori" (Pihama, 2010, p. 5), and on that note, can also be gathered using methods such as whakawhiti kōrero (interviews) – which I use in this thesis.

Put simply, Kaupapa Māori Research is research that is "by Māori, for Māori and with Māori" (Smith, 1996/2015, p. 47). Hence, rather than being 'participants' in research or the 'subjects' of research, Kaupapa Māori research enables Māori to exercise control over the conceptualisation, design, methodology, and interpretation of research (Smith, 1996/2015). Pihama (2010) states that it is especially important for Māori to exercise self-determination in research to ensure that when analysing Māori issues cultural integrity is maintained. The condition that Māori exercise control over research is important to ensure that Kaupapa Māori research is "culturally relevant and appropriate while satisfying the rigour of research" (Smith, 2021, p. 240).

Several studies have demonstrated the potential of Kaupapa Māori research and has contributed significantly to its ongoing development (Pihama et al., 2015). Kaupapa Māori Research is a very fluid methodological framework that has the potential to be applied in a variety of spaces (Pihama, 2010; Smith, 1996/2015). The approach has moved beyond the boundaries of the academy and is recognised in implementation and delivery of health services and education (Haitana et al., 2020; Lawton et al., 2013; Oetzel et al., 2017; Simpson et al., 2022). I would also add that Kaupapa Māori Research has the potential to make an impact in demography. Douglas (1976) helped pave the way for Māori demography, and specifically Māori fertility, by employing methods of knowledge and understanding not only from population data, but also from personal observation, survey and discussions collected from "all seven

canoes and all four winds" (p. 665) i.e., Māori tribal communities. I use a similar approach for this study but specifically gather knowledges and experiences from wāhine Māori.

Although Kaupapa Māori Research has been a powerful paradigm in transforming the landscape of research, wāhine Māori scholars have identified a need for Kaupapa Māori Research to be extended to account for the specific experiences of wāhine Māori (Pihama et al., 2022a, 2022b; Simmonds, 2011). Unlike Pākehā feminists, Māori women have had to deal with both 'patriarchy' and 'colonisation' and more (Smith, 1992). Pihama (2001) clarifies this: "Racism, sexism and classism have combined with the agendas of capitalist imperialism on our land, and Māori women are experiencing the brunt of those forces" (p. 257). In addressing the unique position of Māori women, Mana Wahine as a research paradigm was developed.

1.5.1.2 Mana Wahine (Māori Womens discourses)

Like Kaupapa Māori Research, Mana Wahine privileges mātauranga Māori and challenges dominant Western frameworks but is specific to Māori women (Jahnke, 1997; Pihama, 2001; Simmonds, 2011; Smith, 1992; Te Awekotuku, 1999; see also Pihama et al., 2022a, 2022b). That is, Mana Wahine specifically "grows from, extends, and implores Kaupapa Māori to consider the complex intersections of being Māori and being a woman" (Simmonds, 2014, p. 40). Mana Wahine refers to the power and authority of women, with 'mana' meaning 'status', 'authority', 'prestige' or 'power', and 'wahine' generally translated as 'woman'[16]. Mana Wahine, in terms of female authority, has always existed but emerged as a theoretical, methodological approach in the 1980s/90s that was largely centred on Māori women's discourses (Pihama et al., 2022a, 2022b; Smith, 1992). It was primarily developed to respond to the impacts of colonisation on the mana of Māori women, and to reassert Māori women's identity through a process of [re]claiming and [re]presenting the mana of Māori women according to mātauranga wāhine (Māori womens knowledge systems) (Pihama et al., 2022a, 2022b). For example, several stories, values, beliefs, and practices that are unique to Māori women have been corrupted, ignored, or rewritten by colonial constructs to become "more conducive to colonial belief systems" (Pihama, 2001, p. 257). In her thorough critique of how atua wāhine (Māori female deity) are represented in historical records, Yates-Smith (1998) undertook the task of recentering Māori femininity and spirituality. Mikaere (2017) outlines very clearly the effects of colonisation on wāhine Māori roles, which she contrasts against wāhine Māori perspectives of their own roles in pre-colonial times. Murphy (2019) uses Mana Wahine as an emancipatory tool to examine the multiple ways in which Indigenous women reactivate feminine ceremonies and the recovery of the sacred relationships with female deities. In her groundbreaking thesis

[16] See Chapter 10 of Pihama (2001) who discusses the meaning of 'wahine' in more depth.

on Māori women's maternities, Simmonds (2014) uncovers how colonial and patriarchal discourses are embedded and embodied in the various spaces of childbirth and uses Mana Wahine to enable Māori women to [re]define and [re]present their own lived realities on their own terms. Thus, Mana Wahine is a powerful platform for Māori women to push back against colonial constructs that have 'othered' or defined Māori women based on patriarchal and colonial belief systems (Irwin, 1992; Pihama, 2001, 2020; Smith, 1992, Te Awekotuku, 1999). In this thesis, I use Mana Wahine to bring a Māori women's lens to an otherwise void demography of fertility and make "visible the narratives, experiences, in all of their diversity, of Māori women" (Simmonds, 2011, p. 11) through the method of whakawhiti kōrero.

Because this study focuses on Māori women's fertility it makes sense to employ a "theoretical and methodological approach that examines the intersection of being Māori and female" (Simmonds, 2011, p. 11). I, therefore, use both Kaupapa Māori and Mana Wahine as my main methodological lenses to determine the methods I use to undertake this study. I especially consider methods that align with the principles and philosophies of both frameworks. However, because I am exploring Māori fertility in demography, I also draw on the methods and materials of the field. Thus, it seems logical to adopt a Mixed Methods Approach (MMA) as the best strategy to achieve the aims of this study.

1.5.1.3 Method: Mixed Methods Approach

A Mixed Methods Approach (MMA) – also known as Mixed Methods Research – combines quantitative and qualitative research strategies within a single research project (Bryman, 2008). The approach has grown in popularity in matters of social inquiry, particularly where interdisciplinary, collaborative, and innovative research is encouraged (Archibald, 2023). MMA also allows researchers to explore multiple dimensions: 1) generality and particularity; 2) patterns of regularity and insights into variation and difference; and 3) results that convey magnitude and dimensionality and portrays contextual stories about lived experiences (Greene, 2008). Thus, an MMA is appropriate for this study as I use a mix of quantitative and qualitative methods that align with Kaupapa Māori, Mana Wahine, along with the tools of demography for a more comprehensive understanding of Māori fertility. Although demography often draws on theories and quantitative methodologies that are generally grounded in colonial approaches to research and science, Kaupapa Māori Research can be quantitative. For example, in epidemiology, a field closely associated to demography, Paine et al., (2021) outline how Kaupapa Māori epidemiology challenges interpretations of Māori health inequities to show that it is a "theoretically driven approach to undertaking quantitative health research that utilizes epidemiology as a tool to monitor Crown 'action and inaction'" (p. 193).

For my quantitative method, I draw on secondary sources of population-level data i.e., censuses/surveys that collect the type of information required i.e., fertility and demographic information such as Māori

identity, and other key variables such as education, to undertake this analysis i.e., explore patterns, trends, and differences by population groups. Thus, the quantitative component provides a general overview of fertility trends and patterns at a population-level. On the other hand, the qualitative component involved collecting the lived experiences of wāhine Māori through whakawhiti kōrero to add some insights and context to the quantitative analyses.

1.5.1.4 Data Sources

For the quantitative component of this research, I draw on two key sources of fertility data: *The New Zealand Census of Population and Dwellings,* administered by Stats NZ, Aotearoa's National Statistics Office, and the *1995 New Zealand Women: Family, Employment and Education Survey (NZWFEE),* which was administered by the former Population Studies Centre at The University of Waikato[17]. I also draw on other sources of fertility data to help contextualise my analysis. This includes total fertility and age-specific fertility rates from supplementary datasets supplied through Stats NZ's Infoshare database, and historical accounts of estimated Māori fertility rates from Ian Pool's (1991) book - *Te Iwi Māori.*

The Aotearoa census is the only regular, nationally representative data collection tool that collects fertility data along with demographic variables such as expressed identification. Using the census, I apply conventional methods and tools of demography by recounting trends, magnitudes, and patterns of Māori fertility change, compared to non-Māori (comprised mostly of NZ European/Pākehā). The purpose is to provide an overview of Māori fertility, especially since the Māori fertility transition (1966-1976), although I draw on earlier trends and patterns to provide a broader context. While partly explained by the limitations of the data sources, most of the Māori demographic literature employs the binary approach for inter-group comparisons - Māori and non-Māori/Pākehā. I take the analysis further by using Kukutai and Pool's (2014) 'core-periphery' model to construct proxy indicators of Māori identity to explore 'intra'-ethnic-group variations of fertility. The census collects information that represent ties to Māori cultural identity through expressed identification in three ways: descent, ethnicity, and iwi (see Table 1.1 in Section 1.5.3). Each is conceptually distinct by definition and yields different population sizes (Kukutai, 2011a). My method of analysis also involves simple counts and proportions (percentages and rates) to explore differences in fertility (parity) by ethnic identification groupings and socio-demographic characteristics e.g. education, age, location etc.

Acknowledging the limitations and constructs of the census, I use the 1995 NZWFEE to undertake more advanced analyses that explores the relationship between Māori cultural identity, birth timing, and the duration of birth intervals using piecewise exponential model and Kaplan-Meier estimates. The

[17] Now known as *Te Ngira: Institute for Population Research*

NZWFEE is Aotearoa's first and only national representative survey on fertility and family formation and collected a wide range and depth of questions such as: history of pregnancies and partnerships; number of children (live-born, adopted, step and foster); fertility regulation and contraceptive history; views on having children; educational history; work history, and major demographic and socio-economic characteristics of the respondents and to some extent their partner(s). Despite the age of the survey – nearly 30 years ago now – it is the only dataset available that allows for a more nuanced empirical analyses of the relationship between Māori identity and birth timing and spacing. The survey targeted Aotearoa women aged 20-59 years at the time of interview in 1995. Participants were selected through a random, proportionately stratified, cluster sampling method (Pool, 1999). A total of 3,017 women were interviewed from three sample groups: main sample (n = 2,057), Māori oversample (n = 180), and Midland Regional Health Authority[18] oversample (n = 330). The piecewise exponential model is one method of event history analysis (EHA) that explores the role of time in causal relationships – between an independent variable (explanatory) and a dependent variable (outcome) and can incorporate other mediating variables (control) that could potentially impact the timing of an events (Blossfeld et al., 2019; Mills, 2011). EHA is commonly used in fertility analyses (Van Hook & Altman, 2013), and in this study, I used EHA to explore the timing and duration until the occurrence of a birth and subsequent births, and how the timing of these births differed by expressed identification, while controlling for education, location (place of residency), and age. The piecewise exponential model was used as the preferred method to allow time to be divided into smaller periods, and to ensure that the hazard rate (risk of an event occurring) remains constant within a time period; although this can change between time periods (Mills, 2011). The piecewise model also allows flexibility to use time variant and time invariant variables, particularly where there are constraints in the survey data. For example, even though the NZWFEE tracked the birth histories of women over time (time variant), it did not track changes in residency or education (time invariant). I began with a descriptive analysis by exploring median time to each birth, and because of small numbers I grouped birth orders higher than six i.e., 6+ children. I used the Kaplan-Meier survival model for first, second, and third birth analyses, which estimates the proportion of women who remain i.e., survive across the time interval. In the case of first births, the Kaplan-Meier estimates the proportion of women who remain childless at the end of the observation

[18] In 1993 four Regional Health Authorities were established and were configured by areas with populations ranging between 750,000-1,000,000: Northern, Midland, Central, and Southern. They were funded by the Ministry of Health, and had the responsibility of monitoring the health needs of their populations, purchasing the appropriate health and disability services, and monitoring the performance of providers with whom they entered purchase agreements (New Zealand Parliamentary Library, 2009).

period. For the first birth analysis, I start observing the women from when they are aged 12[19]. All women are right-censored at the time of first birth or up to age 45 years or until the survey interview date[20], whichever occurs first. Again, ethnic identification is the primary explanatory variable, and categories are formed (see Table 1.2 in Section 1.5.3), to undertake intra-group comparisons but the number of categories were limited because of the size of the survey sample.

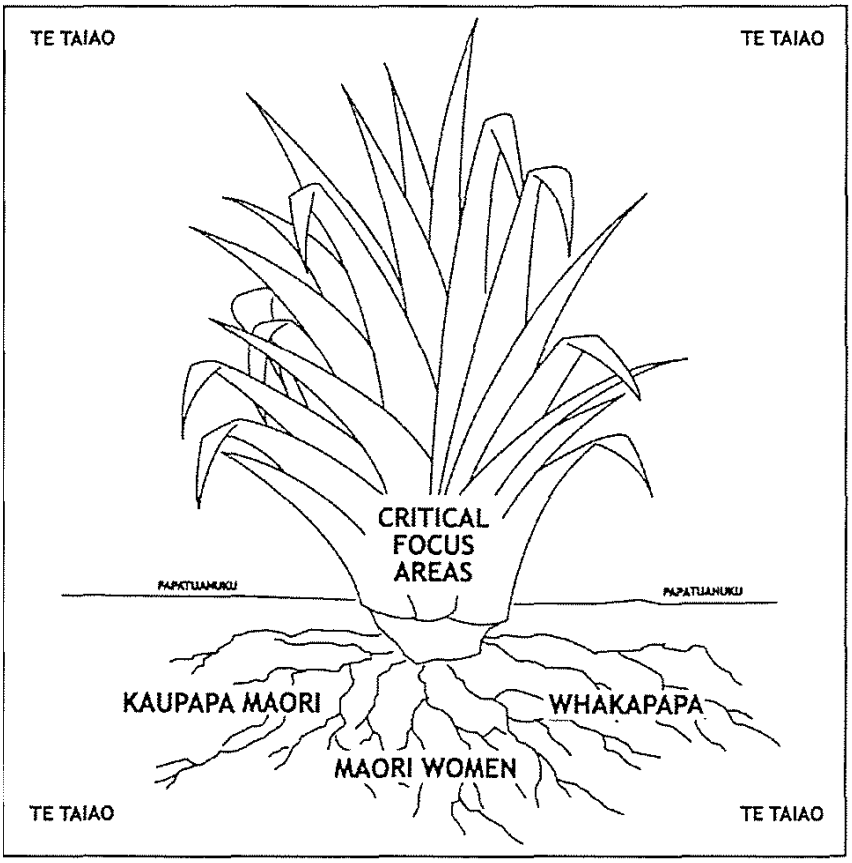
The qualitative component of this study involved the Kaupapa Māori method of whakawhiti kōrero, which is a form of conversation similar to semi-structured or unstructured interviews. To clarify further, Berryman (2013) describes it as the "responsive dialogic exchanges or discussions that occur in order to bring enlightenment to any given situation" (p. 271). The reason for using this method is to capture the perspectives of wāhine Māori about their own fertility through their own narratives. While an interview schedule was prepared (see Appendix A), the idea behind whakawhiti kōrero is for all participants to have a conversation where ideas can be exchanged and discussed. Whakawhiti kōrero provides the space for wāhine Māori to engage in an exchange where all participants, including the researcher, can whakawhanaunga (establish a relationship) and can share their views, thoughts, feelings, and/or stories in a culturally safe environment (Berryman, 2013). For example, the wāhine can choose to speak te reo Māori, and/or to have their whānau present, and/or choose the location of the kōrero. The method is flexible to allow for either one-on-one or small group conversations. With their consent, kōrero were audio-recorded, transcribed, and analysed thematically. Participants were given the opportunity to review and/or discuss their transcript, and to exercise their rights as per the information sheet and consent form (see Appendix A). In preparing the analysis, participants were given the opportunity by way of post-interview follow-up communication (by email or in person) to have input into discussing key themes and where appropriate to fill in any gaps in those themes.

1.5.2 Conceptual framework – Mana Wahine

To centre and elevate wāhine Māori and mātauranga Māori/mātauranga wahine in this study I draw on key elements of the mana wahine conceptual framework. Developed by Jessica Hutchings (2002, 2004) to challenge the dominance of science in the context of genetic modification (GM) in Aotearoa, the framework intentionally centres the experiences and expertise of Māori women and can be adapted for application to other kaupapa (topics/agendas) of relevance to wāhine Māori (Hutchings, 2002, 2004).

[19] I use this age as the starting point because it is the earliest age at which one woman in the sample birthed her first child.
[20] November 1995

Figure 1.3: Structure of Mana Wahine Conceptual framework developed by Jessica Hutchings (2004)



Note: Reproduced with permission from the creator - Dr Jessica Hutchings

Figure 1.3 represents the basic construction of the Mana Wahine conceptual framework. Its structure is likened to a harakeke (flax) growing upon Papatūānuku (earth mother) and interacting with te taiao (the environment) (Hutchings, 2002, 2004). 'Whakapapa', 'Kaupapa Māori', and 'Māori Women' are conceptualised as the roots, and represent the "foundation, continual life essence and energy of the conceptual framework" (Hutchings, 2004, p. 19), and she uses these three concepts to inform the Mana Wahine analysis of the framework (see Figure 1.4). Whakapapa is a core concept in te ao Māori and forms the foundation of mātauranga Māori (Taonui, 2011). Commonly translated as 'genealogy', whakapapa is a constellation of relationships that connects or binds "all animate and inanimate, known and unknown phenomena in the terrestrial and spiritual worlds" (Taonui, 2011, p.1). In terms of the framework, whakapapa identifies the position of Māori women as being one with Papatūānuku – intertwined and supported by Papatūānuku (Hutchings, 2004). Kaupapa Māori operates alongside whakapapa and Māori women as the Māori worldview lens through which analyses are conducted (Hutchings, 2004). Hutchings (2004) refers to Kaupapa Māori as the "fundamental principles and

philosophies capable of providing an explanation of all experience as Maori" and that it is "inherently about tino rangatiratanga [self-determination, sovereignty, autonomy]" (p. 24-25).

The leaves of the harakeke represent 'critical focus areas' that are important to the analysis. For example, based on Mana Wahine discourses, Indigenous and Māori peoples' concerns, and Māori womens' voices, Hutchings (2004) identified 'Te Tiriti of Waitangi', 'decolonisation', 'decision-making', 'intellectual property rights', 'tikanga', 'Papatūānuku', and 'kaitiaki' as critical focus areas for GM (see Figure 1.4).

Figure 1.4: Mana Wahine Conceptual Framework developed by Jessica Hutchings (2004)

Note: Reproduced with permission from the creator – Dr Jessica Hutchings

While these focus areas are pertinent to the analysis of GM and are broad enough to be applied across different projects, events, discourses, or situations, Hutchings (2002, 2004) also states that the framework or focus areas can be adapted so that those who engage with the framework can make it relevant and specific to their field. In this study, I slightly adapt the framework by recognising the 'leaves' as a representation of the whānau (family/birthing) or whānau whānui (extended family) with the three foundational concepts of 'whakapapa', 'wāhine Māori', and 'kaupapa Māori' as the critical elements to nurturing and strengthening the 'whānau'. The harakeke is a metaphor for whānau (see Pihama et al.,

2015). At the heart or centre of the harakeke are three rau (leaves/blades): the rito (young centre shoot) which represents the pepi (baby) and is supported by the awhi rito (surrounding leaves), which represent the mātua (parents/guardians). The outer rau represent the tūpuna/tīpuna (grandparents/ancestors) and add volume and strength to the harakeke. Tikanga (protocols/customary practices) is fundamental to the sustainability of the plant, especially around the harvesting and nourishment of the plant. For example, the rito and awhi rito are never harvested, only the outer rau. This ensures that the younger leaves can continue to propagate to help sustain the plant i.e., the whānau. The concept of 'whānau', as represented by the harakeke, is also appropriate within the context of this thesis because whānau also means 'birth' or to 'give birth'. I also view all four concepts – 'whakapapa', 'Māori women', 'kaupapa Māori', and 'whānau' – as inter-related, and are central to Māori fertility.

The harakeke is also an appropriate metaphor for this study because it reflects diversity. There are many varieties of harakeke, and it is a dynamic and vibrant plant that can thrive in different environments (see Lowe et al., 2010; Te Awekotuku, 1991; Te Kanawa, 2022). Its leaves and fibres can vary in texture and length and can be used for a variety of purposes such as clothing, baskets, mats, etc. Hutchings (2004) likens the harakeke and its many uses to the "diverse herstories, realities, and stories of Māori women" (p. 29). One of the aims of this thesis is to include wāhine Māori perspectives about their fertility. However, my intention is not to suggest that there is one single view that is representative of all wāhine Māori. Rather it is to acknowledge that there are diverse realities and experiences held by Māori women (see Simmonds, 2014).

1.5.3 Thesis structure and empirical studies

This doctoral study is presented as a 'PhD with Publication', which is a hybrid model of both published[21] and unpublished material. Chapters 1 and 5 form the bookends of the overall thesis – with Chapter 1 functioning as the 'introduction' and Chapter 5 as the 'conclusion'. The material presented in Chapters 2 to 4 form the empirical analyses, with each focusing on a particular aspect and a set of secondary questions but still contributing towards answering the overall research question – *To what extent does Māori cultural identity influence Māori birth patterns (earlier births)?* All three chapters have been published in peer reviewed academic journals and presented verbatim[22], with minor adjustments in formatting and style[23] for readability purposes and/or to meet the institutional regulatory requirements or submission standards for the thesis. Because each paper was designed to be published, each of the papers

[21] Papers may also be under review or ready for submission. Full citations are provided in the footnotes of the relevant chapter.
[22] This thesis uses APA 7th edition referencing style. However, I have retained the Chicago style in Chapter 3.
[23] A few minor corrections have also been made to any errors picked up after publishing e.g., spelling, word order. These have been noted in the relevant chapter.

do repeat material from sections of this Chapter to provide the intended audience with some context. However, each of the papers provide further details around the methods used, and their contribution and value resides in its focus of analysis.

Chapter 2 - *Understanding 'higher' Māori fertility in a 'low' fertility context: Does cultural identity make a difference?* – was the first empirical analysis undertaken for this thesis and was published in the *New Zealand Population Review* in 2018, an open access journal of population and demography that focuses on the New Zealand and Pacific region (Population Association of New Zealand, n.d.). The paper contributes to the study through its focus on the potential associations between cultural identity and number of children birthed (parity) of wāhine Māori, with non-Māori as another comparator. Using data from the 2013 Aotearoa Census[24], the analysis explores differences in 'rates of childlessness' and 'average number of children' across four reconfigured identity categories (see Table 1.1), which I conveniently labelled as: Core, Māori+, Descent only, and non-Māori. The analysis also looks at these differences in parity by age-groups, education level, and geography/spatial configurations.

Table 1.1: Configuration of expressed identification categories based on 2013 Census

Category label	Description of category
Core	Women who unambiguously identify as Māori on the basis of descent, iwi affiliation and exclusive Māori ethnicity
Māori+	Women who identify with two or more ethnic groups, one of which is Māori (and who may also report Māori descent and/or an iwi affiliation),
Descent only	Women who identify as Māori only by descent (not by ethnicity or iwi affiliation).
non-Māori	Women who did not identify Māori – by descent, ethnicity, nor iwi

In acknowledging the limitations of the census analyses, I undertook investigations using data from the 1995 NZWFEE survey for further validation. The results of the study were peer-reviewed and published in the Journal of Population Research in 2023 and has been reprinted in Chapter 3 - *Indigenous fertility in Aotearoa New Zealand: How does ethnic identity affect birth spacing and timing?*[25] The journal is international in scope, and publishes papers on demography and population-related issues, including

[24] 2006 data was also used but for background comparisons and further validation.
[25] This paper was submitted after the paper presented in Chapter Four – *'The importance of whakapapa for understanding fertility'*. So, there will be references made in Chapter Three to the research presented in Chapter Four, which will seem out of chronological order. However, I have placed this paper here as Chapter Three because it logically follows on from the census analysis in Chapter Two.

substantive empirical analyses, theoretical works, applied research, and methodologies (Springer Nature, n.d.). This paper contributes to the overall study by specifically exploring differences in birth timings (birth orders) and spacing (birth intervals) by cultural identity using more advanced statistical methods – the piecewise exponential model and Kaplan-Meier survival model. It made sense to explore birth timings because it is in the timing – earlier birth patterns – that has determined the key difference in Māori, and likewise Indigenous, fertility in settler-colonial states. The survey is also a key dataset because it collected more nuanced variables such as timing and birth histories of the survey participants – something not collected in the census. Here, I looked at the duration time (survival rate) until the occurrence of an event i.e., birth, and the duration time between births. Unlike the census however, the survey collected only ethnicity (no ancestry or iwi), as the proxy for cultural identity, although respondents were able to report more than one. On that note, Māori identity categories were constructed based on their responses to ethnicity and a question that allowed them to specify a 'main' ethnic group, but due to a much smaller population sample (total n = 3017), was limited to only three categories, which I labelled for convenience as: Mainly Māori, Mainly European, and non-Māori (see Table 1.2). I note here that these labels, including the identity categories constructed from the census, are not intended to make an evaluative judgement about 'strength' of identity in a quantitative sense, nor to invoke a feigned notion of blood quantum, but rather to make a qualitative distinction related to cultural orientation.

Table 1.2: Configuration of expressed identification categories based on 1995 NZWFEE survey

Category label	Description of category
Mainly Māori	Women who identified solely Māori + women who identified Māori plus one other ethnic group but specified Māori as their main ethnic group
Mainly European	Women who identified as Māori and one other ethnic group (including European) but specified European as main ethnic group + those who identified Māori and one other ethnic group (including European) but had no preference for main ethnic group
non-Māori	Women who identified solely European + those who identified as other ethnic group (excluding Māori)

To complement and enhance the findings from the quantitative analyses presented in Chapters 2 and 3, I employ whakawhiti kōrero as the most appropriate method to elevate Mana Wahine (mātauranga wahine) and wāhine Māori voices. An important feature of this method – whakawhiti kōrero is to allow wāhine

Māori, including the interviewer i.e., myself, to freely converse about fertility experiences, with the aim to delve into deeper meanings and motivations behind childbearing 'behaviour'. Hence, the value of this study is found in the cultural meanings of fertility in their narratives, and excerpts of their stories and analyses are presented in Chapter 4 - *The importance of whakapapa for understanding fertility*. This paper was published in the peer reviewed international journal *Genealogy* in 2022. The journal focuses on analyses of genealogical narratives and scholarship that uses genealogical theory and methodologies to examine historical processes (Genealogy MDPI, n.d.). The chapter unravels important cultural themes around childbearing and is particularly useful in terms of building more culturally-based understandings when interpreting population-level fertility patterns and trends.

To conclude this thesis, Chapter 5 reflects on the theoretical and empirical contribution of the analyses and findings. The chapter includes a reflection of Kaupapa Māori, Mana Wahine, as the main frameworks for approaching this thesis, along with the tools of demography. It also highlights the key limitations of the analyses, including the data sources, and what the implications are for future research.

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CHAPTER TWO: UNDERSTANDING "HIGHER" MĀORI FERTILITY IN A "LOW" FERTILITY CONTEXT: DOES CULTURAL IDENTITY MAKE A DIFFERENCE?

Moana Rarere*

2.1 Abstract

The Māori fertility transition brought an end to decades of very high fertility rates, and a convergence towards long-term fertility levels similar to Pākehā/New Zealand European women. However, important differences endure. The Māori total fertility rate (TFR) remains above replacement level, and Māori women have children earlier and over a longer period. All of this has and still is occurring in a society that facilitates and favours low fertility and small family sizes. Using births data and cultural identity markers in the New Zealand Census, this paper explores the influence of culture as a contributing factor to higher fertility outcomes amongst Māori women in a low-fertility society.

2.2 Introduction

Described as one of the most dramatic fertility transitions to occur in recent history (Pool, 1991; Wereta, 1994), Māori birth rates underwent a steep and rapid decline between 1966 and 1976, abruptly ending decades of very high fertility. Even more extraordinary is that this phenomenon occurred against a backdrop of a predominantly Pākehā population that had already been through a fertility transition nearly a century earlier (Pool, 1991; Pool, Dharmalingam, & Sceats, 2007). Not only did the timing of both transitions differ, but the mechanisms and determinants through which low fertility was achieved also differed. For Pākehā women, changing marriage patterns mostly facilitated their fertility transition during the latter part of the 19th century (Pool et al., 2007), while the uptake of more effective contraceptive methods and sterilisation were important factors that enabled the Māori fertility transition to occur (Pool, 1991). Pool (1991) describes this dichotomy within the relatively "tiny" nation: a nation that consists of two major populations whose histories have been very much intertwined since first contact, and yet two very distinct demographic histories have transpired, involving quite different fertility and family formation patterns (Pool et al., 2007).

Despite both populations experiencing quite different fertility transitions in timing and mechanisms, differences in fertility levels have diminished over time (Pool, 1991; Pool et al., 2007; Pool & Sceats,

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1981). If we compare total fertility rates (TFR), Māori fertility appears to be converging towards Pākehā fertility. For example, in 1977 the Māori TFR and New Zealand TFR was 3.0 and 2.3, respectively, and by 2017, it was 2.3 and 1.8, respectively (Stats NZ, 2017b). However, there are some important differences that endure. Māori TFR has consistently exceeded Pākehā TFR; never have the two rates intersected. Taking national TFR as a comparator, the smallest difference (between Total New Zealand TFR and Māori TFR) was in 1990, at 2.16 and 2.18, respectively, and the largest difference was in 1997, at 1.95 and 2.73, respectively (Stats NZ, 2017b). There are other features that challenge this notion of convergence. One key aspect is that Māori women have different age-specific fertility patterns, with peak childbearing at younger ages. From 2002 and 2012, age-specific fertility rates for Māori peaked at ages 20–24 years, only moving to 25–29 years in 2013 (Stats NZ, 2017a); the median age of mothers was 25.8 years in 2013 and has slowly shifted upwards to 27.0 in 2018 (Stats NZ, 2018). Indeed, rather than a simple pattern of fertility convergence, closer inspection of age-specific fertility patterns has uncovered a mix of converging, diverging and corresponding trends between Māori and Pākehā fertility (Didham & Boddington, 2011; Jackson, Pool, & Cheung, 1994). As explained by Jackson et al. (1994), general fertility trends have been similar, and both populations have also experienced falls in fertility at 15–19 and 20–24 years since the 1960s. However, since the 1980s, the two populations diverged at ages 25–44 years, where Māori fertility rates fell below non-Māori. At the same time, both populations have seen a rise in fertility at ages 25–39 years due to a "recuperation effect", as posited by Pool and Sceats (1981). Of course, the shift to older maternal ages are more marked for non-Māori and has increased the differentials between Māori and non-Māori (Jackson et al., 1994).

Taylor (2011) and Johnstone (2011) found similar patterns of earlier childbearing in other "neo-Europe" countries, notably Canada, Australia and the United States. Despite fertility declines during the latter years of the 20th century, indigenous fertility remains concentrated at younger ages – an observation that Pool (1991) noted for Māori 20 years earlier. From a global standpoint, it is a scenario that partly explains the irony of why New Zealand, being one of the "low fertility" countries, has one of the highest fertility rates in the developed world (McDonald & Moyle, 2010)[26].

While the demographic literature describes how historical Māori and indigenous fertility patterns have unfolded over time, less attention has been devoted to understanding the "why" (Douglas, 1977b; Pool, 1991). One of the key criticisms is that conventional demography practices tend to treat indigenous populations as a deficient group (Kukutai & Pool, 2014) that requires "fixing". This line of thinking underscores the common analytical approach to make inter-group comparisons in Aotearoa New Zealand.

[26] Of the OECD, only three countries had higher TFRs than New Zealand (1.9): Israel (3.1), Mexico (2.2), Turkey (2.1).

Up until recently, most analyses of Māori fertility have been approached and examined in relation to non-Māori fertility patterns. A further criticism of this approach is that it promotes a unidimensional representation of populations that are inherently multi-dimensional (Kukutai & Pool, 2014) because conventional categories and contexts do not necessarily reflect indigenous realities (Johnstone, 2011; Kukutai, 2011; Kukutai & Pool, 2014; J. Taylor, 2009). As a consequence, important intra-group differences are overlooked. Most of the fertility literature has primarily focused on demographic and socio-economic factors, while the possible influence of cultural factors has received less attention and articulation.

Using data from the New Zealand Census of Population and Dwellings, this paper explores how fertility varies between Māori women based on their expressed identification. In doing so, it aims to contribute a better understanding of how cultural factors might contribute to fertility outcomes amongst some Māori women in society. Here, we use the term "culture" quite loosely to encapsulate the ideas, customs, social behaviours, values, worldviews, etc. of a group of people (Jenks, 2005; Ogburn, 1937). The motivation to explore the cultural element stems from the dearth of literature on this subject in the field of demography, but more importantly, the need to include indigenous worldviews in the analysis of indigenous fertility. The Demographic Transition (DT) model has been the main framework for theorising and analysing indigenous fertility (Dyson & Murphy, 1985; Omran, 2005; Reher, 1999). Like Māori, other indigenous peoples in colonised nation states have also undergone significant fertility transitions "near-simultaneously" (Caldwell, 2006), and these have often been interpreted as evidence of a global convergence towards fertility behaviour (Johnstone, 2011). DT theory, and other dominant fertility theories (e.g. low-fertility theories based on rational choice and gender equity), are underpinned by Western-based experiences and worldviews (Kirk, 1996; van de Kaa, 2008). However, Johnstone (2011) points out that colonisation has affected indigenous populations. Pool (2015) clearly shows the impact of colonisation on early Māori demography, but most importantly the enduring domino effect on other aspects of Māori society, including social, economic and cultural. The problem is, as pointed out by Johnstone (2011), demographic theor[ies] do not serve well in understanding colonised indigenous populations fertility experiences because those theor[ies] "fail to account for the impacts of colonisation" (p. 116). Research in the indigenous demography space has highlighted the unique issues pertaining to the interpretation of indigenous population change (Johnstone, 2011; Kukutai, 2011; Kukutai & Pool, 2014; A. Taylor, 2011; J. Taylor, 2009) but more work is needed in developing theoretical frameworks that incorporate indigenous views. It is the intent of this research to weave into the study of Māori fertility interpretations that resonate with and are important to Māori.

The next section provides the historical context for Māori fertility and reviews some of the key arguments about Māori fertility patterns. Hypotheses regarding the variation of fertility based on expressed identification are tested using quantitative methods. The paper ends with a discussion of how the findings provide insight into the validity of cultural influences on Māori fertility outcomes.

2.3 Background: The persistence of 'higher' Māori fertility

The history of Māori fertility patterns in the field of demography has been well documented (Douglas, 1977a, 1977b, 1981; Pool, 1974, 1977, 1991; Zodgekar, 1975), and forms the basis of today's fertility patterns.

Throughout the post-colonial period until the Māori fertility transition, Māori birth rates were generally understood to be "high". Assumptions about Māori fertility prior to the 1900s were rather sketchy, making it challenging to fully substantiate whether they were "high" or "low" (see Chapter 4 in Pool, 1977). However, through the extrapolation of 1961 vitals data, estimates going as far back as 1844, clearly show how high Māori fertility was before the transitional decline. The estimated Māori fertility rates at various time points between 1844 to 1961 produced by Pool (1991) are replicated here in Table 2.1.

There was a general increase in fertility rates over the period but with particularly higher rates in the forty years (1921–1961) immediately preceding the Māori fertility transition. Higher rates of fertility just before a long-term decline was a feature shared with other countries. In moving towards an explanation for this general pattern over the period under scrutiny, Pool (1991) considers at least two explanations: (1) the natural history of venereal diseases, and (2) the natural history of reproduction before a fertility transition (see Chapter 5 in Pool, 1991). Sexually transmitted diseases (STDs), and exposure to diseases and malnutrition that affected fecundability and foetal survival were cited as major factors impacting on fertility levels around the mid-1800s (Pool, 1991). However, in explaining the increase in fertility from the 1880s and thereafter, it appears that "a degree of equilibrium" and "partial immunity" had lessened the severity of the disorders, and improved survivorship levels through better living conditions and nutrition (Pool, 1991). Other features of higher Māori fertility included high levels of early exposure to conception (15–19 year olds), even though there was only a small percentage of those who ever married, and there were few attempts to limit family size at older ages (Pool, 1977).

Table 2.1: Estimated Māori total fertility rates, 1844-1961

Year	Māori TFR (estimated)
1884	4.5
1857/8	4.9
1878	5.5
1886	6.1
1891	5.7
1896	5.7
1901	5.9
1911	5.7
1921	6.1
1926	6.7
1936	6.9
1945	6.5
1951	6.7
1956	6.9
1961	6.9

Source: Pool (1991), Tables 5.3 and 6.2.

In explaining high Māori fertility, Douglas (1977b) analysed some of the cultural responses deeply embedded within close-knit rural tribal communities. He defined cultural in terms of the "interdependence of economic, social and psychological factors in determining norms and values" (Douglas, 1977b, p. 663). In traditional Māori society, customary marriage, including remarriage, was universal, and although unions were mostly endogamous (i.e. to other Māori), inter-tribal marriage was frequent for the purpose of forming political and economic alliances (Biggs, 1960; Wanhalla, 2011). Intermarriage with Pākehā did exist, although it was not encouraged so as to prevent "rapid alienation from Māori ways and the eventual loss of descendants to the pakeha world" (Douglas, 1977b, p. 666). Children were also valued as an essential part of the social and economic functions of rural Māori society but were also important in sustaining whakapapa (genealogy), a key principle in whānau (family) formation (Douglas, 1977b).

The 1960s are generally observed as the turning point for the Māori fertility transition. Fertility rates began to decline quite sharply at the start of the decade, and then accelerated, with the greatest and most rapid decline occurring between 1971 and 1976 (see Table 2.2). This transition drew significant interest from a number of demographers because of the magnitude and speed of the shift, from decades of high levels of fertility to seemingly low levels of fertility similar to Pākehā rates.

Table 2.2: Māori total fertility rates, 1962-1986

Year	Māori TFR (estimated)
1962	6.2
1966	5.5
1971	5.1
1976	3.1
1981	2.5
1986	2.2

Source: Pool (1991), Table 8.2.

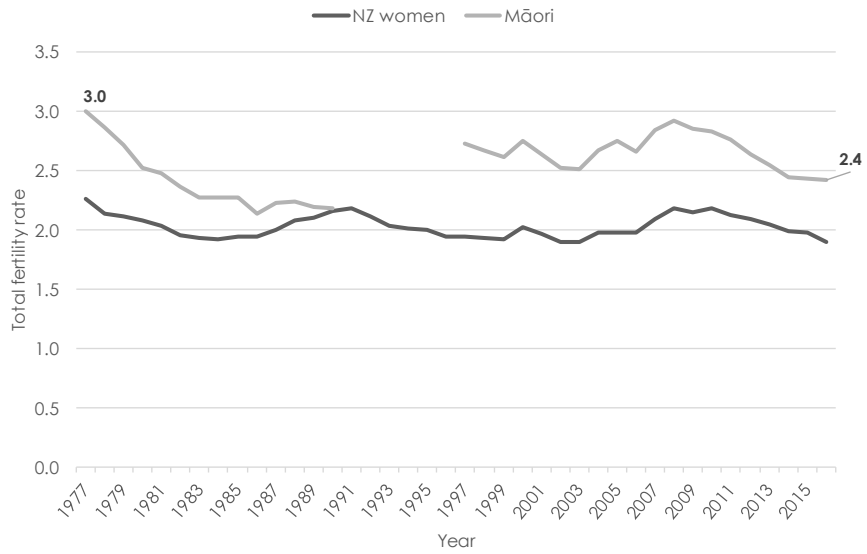
In explaining Māori fertility decline, some of the reasons presented included urbanisation, rising educational aspirations and achievements, changing mortality, and intermarriage with Pākehā (Pool, 1974, 1991). Douglas (1977b) applies the same cultural lens used in understanding a high fertility regime to understanding Māori fertility decline. He points out acculturation as an influencing factor facilitated by assimilation policies as a means of "civilising" and "assimilating" Māori into Pākehā society:

> *Many Maoris, especially younger ones, have been so well acculturated that they accept pakeha ideals of what a good Maori should be. The desire for acceptance by pakeha mentors and peers has had further effects on changing the residual Māori values, especially in the area of family life. (Douglas, 1977b, pp. 677–678)*

The days of high birth rates are now a distant memory. Since 1976, Māori TFRs have hardly exceeded three children per woman but still hover above the theoretical replacement level of 2.1 (see Figure 2.1).[27]

[27] It is important to note here the obvious "break" and "leap" in the Māori TFR data between 1990 and 1997. No figures were available for 1991 to 1996 (see footnotes in Stats NZ, 2017b). We suspect that the leap from 2.2 in 1990 to 2.7 in 1997 is an artefact resulting from broader changes in the collection of ethnicity-based data from "blood quantum" to self-identification during this period (see Kukutai, 2001, 2004, 2012). This change to self-identification was applied to birth registrations from 1995. We also note that since 1991, Māori TFRs are based on the ethnicity of the mother, and were previously based on the ethnicity of the child (see footnotes in Stats NZ, 2017b). This raises a separate question, requiring further examination, about the disjunction between the numerator (all births deemed to be Māori) linked to a denominator that excludes non-Māori mothers, and therefore, an over-estimation of the Māori TFRs. For further details, see Khawaja, Boddington, and Didham (2000).

Figure 2.1: Total fertility rates of Māori and New Zealand women, 1977-2016

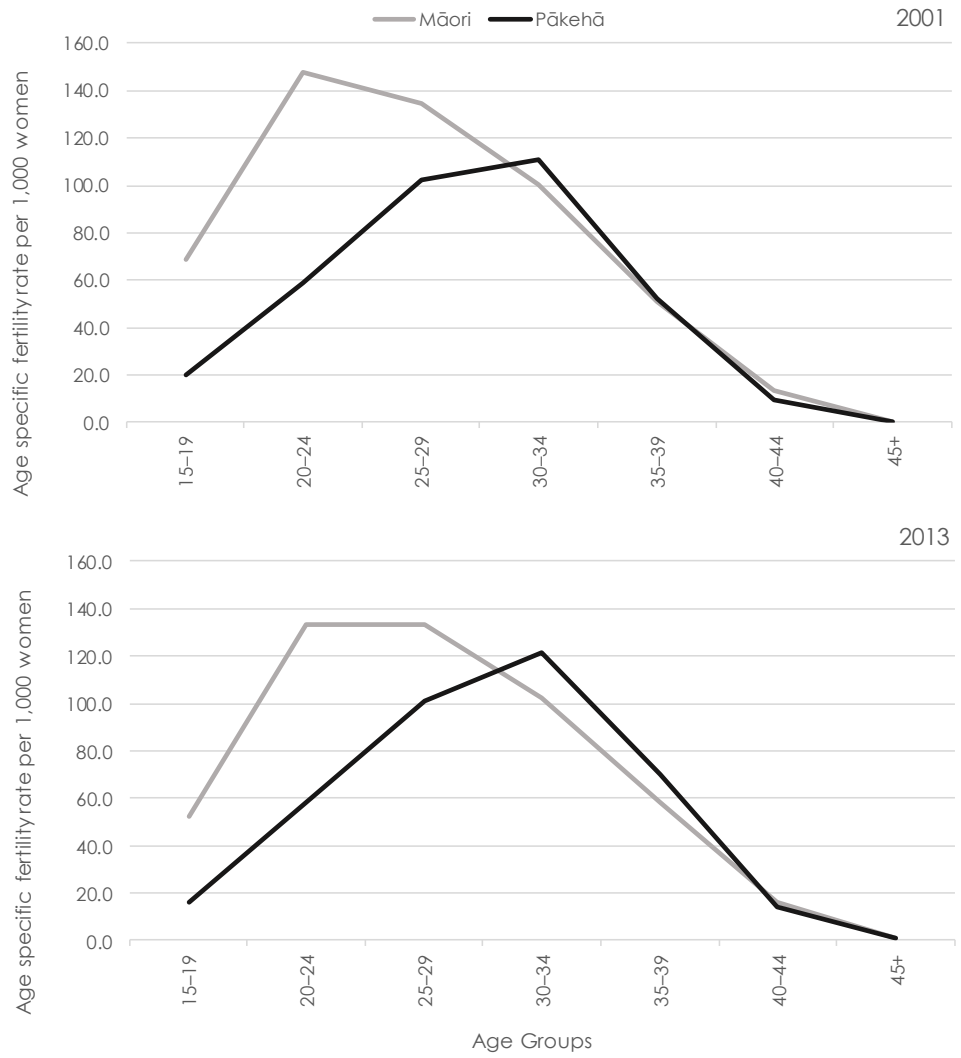


Source: Statistics New Zealand Infoshare Table DFM044AA (Annual June); last updated 17 November 2016

The shift has generally been interpreted to mean that Māori fertility levels have converged towards Pākehā levels. However, as Jackson et al. (1994), Johnstone (2011), and Didham and Boddington (2011) have pointed out, Māori and non-Māori women's fertility still differ at key reproductive ages, where the incidence of Māori births and age of first births are much more concentrated at younger ages (15–29 years) (Figure 2.2).

The peak ages at which Māori fertility is highest occurs between 20 and 29 years, the period during which formal tertiary education, training, and career opportunities are mostly undertaken. Education, in itself and as a proxy for human capital development, has been cited as the primary factor in delayed family formation (Bledsoe, Casterline, Johnson-Kuhn, & Haaga, 1999; Rindfuss, Bumpass, & St. John, 1980). What then, are some of the motivations for Māori women to start or continue bearing children at these young adult ages?

Figure 2.2: Age-specific fertility rates (per 1000 women) for Māori and Pākehā/New Zealand European women, 2001 and 2013



Source: Statistics New Zealand age-specific fertility

This study draws from the learnings framed by Douglas back in 1977. If acculturation was considered to be a factor in the decline in Māori fertility transition, then to what extent has the Māori renaissance, indigeneity, or decolonisation influenced Māori women's fertility aspirations since? Are there still some undercurrents of culture that influence the way in which Māori women think about family formation, the value of children, childbearing and rearing in terms of timing, spacing, and number of children, etc? One of the aims of colonisation is to displace indigenous identity. However, Māori identity is multi-faceted (Barcham, 1998; Borell, 2005; Durie, 1995, 1998; McIntosh, 2005; Walker, 1989; Webber, 2008), although at the heart of identity is whakapapa or shared descent.

The closest proxy to cultural identity in the census is expressed identification. The aim is to look at whether Māori women who have multiple unambiguous ties to Māori identity in terms of reporting Māori descent, at least one iwi, and singular Māori ethnicity have higher fertility (using indicators of childless, and average number of children) than women with fewer ties to Māori identity. It is not the intention here to make judgements about degrees of "Māoriness" (Barber, 2004). Rather, there are diverse expressions of Māori identity, and this study offers one way of being able to explore the nexus of culture and fertility for Māori.

2.3.1 Data and methods

This analysis uses data from the fertility question collected in the New Zealand Census of Population and Dwellings. The census asks each woman aged 15 years and over for "the number of children ever born alive" (Statistics New Zealand, 2013b). By this definition, it does not include foetal deaths, stillborn children, stepchildren, adopted children, foster children, nor wards of the State (Statistics New Zealand, 2013b). Data are classified by the number of children specified from 0 to 10+, and residual-type categories. Given the sensitivity surrounding the question, women can also tick "object to answering". The question was first asked in the 1981 Census, and repeated in the 1996, 2006 and 2013 Censuses.[28] This analysis compares the "average number of children per woman" and the "proportion childless" using the 2013 Census.

The census also collects information that can represent, in a very broad sense, ties to Māori cultural identity through expressed Māori identification.[29] There are three ways in which the census captures expressions of Māori identity: descent, ethnicity and iwi (Māori tribes). The definition for each is conceptually distinct and yields different population sizes (Kukutai, 2011). Māori descent is a biologically based concept that captures those people who have or claim Māori ancestry (Statistics New Zealand, n.d.–b). The question asks: "Are you descended from a Māori (that is, did you have a Māori birth parent, grandparent or great-grandparent, etc)?" The Māori descent population is the largest and most inclusive of the three Māori identity groupings (Kukutai, 2011).

Ethnicity in the census has a social and cultural foundation. It is statistically defined as:

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[28] The question has also been included in the 2018 Census.

[29] The New Zealand Census also collects information on te reo Māori. Although te reo is a distinctive and enduring marker of collective Māori identity (Ngaha, 2014), it did not make sense to include it as part of expressed Māori identification alongside ethnicity, descent and iwi. A separate analysis was also undertaken to explore fertility differences between Māori women te reo speakers and non-speakers. Preliminary results indicated that there was very little difference in fertility between speakers and non-speakers amongst the Māori Core grouping and Māori ethnic group. Although there were marked differences in other categories, the number of speakers were too small to make any robust conclusions.

> *...the ethnic group or groups that people identify with or feel they belong to. Ethnicity is a measure of cultural affiliation, as opposed to race, ancestry, nationality or citizenship. Ethnicity is self perceived and people can belong to more than one ethnic group. (Statistics New Zealand, n.d.–a, para.1)*

The Māori ethnic group (MEG) is the second largest of the Māori identity categories and is the primary reference group used in census tabulations, media and for administrative and policy purposes (Kukutai, 2011). Iwi affiliation provides yet another way of expressing Māori identity. The concept of iwi affiliation in the census is the closest approximation to a te ao Māori concept of whakapapa-based group membership (Kukutai, 2011).[30] Iwi data were collected in early colonial censuses but discontinued after 1901. The iwi question was reinstated in the 1991 Census, largely for the purposes of meeting the Government's statistical needs and obligations (Kukutai & Rarere, 2013; Walling, Small-Rodriguez, & Kukutai, 2009).

The relationships between all three categories is asymmetrical, meaning that, for various reasons, not all individuals who identify with one category identify with any of the others. For example, in the 2013 Census, 17 per cent (n = 110,928) of Māori descendants (n = 668,724) did not know their iwi, and 16 per cent (n =107,391) did not report Māori ethnicity (Statistics New Zealand, 2013a). Both the ethnicity and iwi questions provide for multiple responses.

The inclusion of three Māori identity markers in the census means that various kinds of categories can be delineated (Kukutai, 2004, 2011), some of which are set out in Table 2.3. This paper compares the fertility outcomes of Māori women in three mutually exclusive categories:

- a core group that comprises Māori women who unambiguously identify as Māori on the basis of descent, iwi affiliation and exclusive Māori ethnicity
- Māori+ which is women who identity with two or more ethnic groups, one of which is Māori (and who may also report Māori descent and/or an iwi affiliation), and
- women who identify as Māori only by descent (not by ethnicity or iwi affiliation).
- While the focus is on understanding within-Māori diversity, all of the analysis also includes a non-Māori comparator.

[30] Te ao Māori translates to the Māori world.

Table 2.3: Group configurations based on Māori categories in the census

Category label	Description of category configuration
Core	Māori descent **and** solely MEG and at least one iwi identified
Māori ethnic group (MEG)	Total MEG; i.e. sole MEG and MEG with another ethnic group(s)
Māori	MEG **and** any other ethnic group; i.e. excludes MEG
Māori descent	Total descent; i.e. descent only, descent with MEG, and descent with iwi identified
Descent only	Solely descent; i.e. no MEG **and** no iwi identified

A key advantage of using the census is that analyses can be cross-tabulated with other variables of interest. This study thus looks at fertility differences by Māori identification, taking account of differences in education level and Māori spatial population share.

2.4 Analysis: Intra-group fertility differences

This analysis begins with an overview of some key socio-demographic characteristics for each category of Māori women aged 15 years and older. Table 2.4 shows significant differences between the categories, reaffirming "cultural and socio-economic heterogeneity within indigenous populations" (Kukutai & Pool, 2014, p. 442).

In terms of group size, the largest in Table 2.4 is Māori+ (105,003). The number of Māori women identifying with at least two ethnic groups increased by 23 per cent, from 84,816 in 2006 to 105,003 in 2013, which exceeded the growth in the other two categories. The continuing growth in the number of Māori+ is a reflection of a "changing ethnic mosaic of New Zealand" (Khawaja et al., 2000, p. 4). Younger people are more likely to identify multiple ethnic groupings than their predecessors are, partly as a result of inter-ethnic marriage, and also changes in the "concept and understanding of ethnicity" (Khawaja et al., 2000, p. 15). Unsurprisingly, the age structure of the Māori+ grouping is also much younger, with higher proportions at the younger ages (15–24 years) and smaller proportions at the older ages (50+ years). Age structure differences would be even more marked if children were included in the analysis.

Table 2.4: Demographic and socio-economic profiles of women (15+) by category, 2013 Census

Indicator (based on 2013 Census)	Core	Maori+	Descent only	non-Maori
Number of women 15+	91,611	105,003	18,414	1,306,068
Age structure				
15–19	10.6	16.5	12.6	7.2
20–24	9.5	14.6	12.0	7.5
25–29	8.3	11.1	9.6	7.3
30–34	7.9	10.2	9.0	7.6
35–39	8.6	10.1	9.6	8.1
40–44	9.9	9.6	10.0	9.4
45–49	9.8	7.7	8.7	9.2
50–54	10.0	6.8	8.5	9.1
55–59	8.1	4.7	6.3	7.9
60–64	6.2	3.4	4.5	7.1
65+	11.2	5.3	9.1	19.7
Highest education level (%)				
None	36.2	22.3	24.4	18.5
Secondary	39.7	48.1	47.7	41.5
Diploma	13.5	14.6	14.3	16.2
Degree+	10.5	14.9	13.7	23.9
Labour force status (%)				
Employed	48.9	56.9	63.2	58.9
Unemployed	12.2	9.8	6.0	3.9
Not in the labour force	38.9	33.3	30.8	37.1
Occupation (%)				
Managerial and professional	44.2	47.9	45.7	54.2
Service and administration	34.3	39.3	40.8	35.2
Labour intensive	21.5	12.8	13.4	10.6
Can speak te reo (%)	37.0	13.2	1.7	0.6
Lives in a TA with at least 20% MEG (%)	48.7	30.9	24.4	15.7

By contrast, both the Core and Descent-only groupings declined in size between 2006 and 2013, at 0.6 and 3.6 per cent, respectively. The larger Core grouping has an older age structure than the other Māori groupings, with higher proportions at ages 40+ years but is still much more youthful than the non-Māori

category. The age structure of the Descent-only grouping is not as young as the Māori+, but is more so than the Core grouping.

Different age structures also have a flow-on effect on socio-economic status and fertility outcomes. It is generally understood that Māori have poorer outcomes than non-Māori across a number of socio-economic and health indicators (Ajwani, Blakely, Robson, Tobias, & Bonne, 2003; Robson & Harris, 2007). Māori also tend to be over-represented in occupations that are deemed lower skilled, lower paid, and more vulnerable to economic shocks. These inequities are also reflected in Table 2.4. However, intra-group differences are also clearly marked. Women with multiple ties to Māori identity are more disadvantaged than either women whose only tie to Māori identity is through descent or women who identify as Māori with at least one other ethnicity. For the majority of the latter, the other ethnicity is Pākehā/New Zealand European. Women in the Core category, while having richer ties to te ao Māori,[5] also seem to be disproportionately exposed to processes that are correlated with poor outcomes, including racial discrimination and fewer opportunities (Harris et al., 2012; Houkamau & Sibley, 2015; Kukutai & Pool, 2014; Pack, Tuffin, & Lyons, 2016; Robson & Harris, 2007).

Age composition also has important implications for this analysis. Fertility, which refers to the actual "reproductive performance rather than capacity" (United Nations, 2017), is affected by the fecundity and fecundability of the individual and/or couple. *Fecundity* is defined as the "capacity for a man, woman, or couple to participate in reproduction" (United Nations, 2017), whereas *fecundability* refers to the probability of a woman conceiving per menstrual cycle, excluding periods of pregnancy, anovulation, and practising contraception (Potter & Sakoda, 1967; United Nations, 2017). Over the reproductive span, of which the lower and upper parameters are set by menarche and menopause, respectively, fecundability varies by age generally as follows: increasing during teenage years, peaking at ages 20–29 years, and declining gradually thereafter (Pool & Sceats, 1981). With this in mind, we therefore restrict our analysis to the fertility outcomes of women aged 30–34 years old.[31] This is based on the premise that we are very unlikely to capture "completed fertility" for women under age 30 and that the probability of conceiving decreases markedly after age 35 (Weinstein, Wood, Stoto, & Greenfield, 1990).

The effects of age on fertility are illustrated in Table 2.5, which shows the age-specific rates of childlessness and the average number of children for each grouping. Obviously, as we progress through the age groups, proportions of childlessness become smaller. However, women who identified multiple unambiguous ties to Māori identity had significantly lower rates of childlessness than their peers at each age group over the key reproductive ages 15–34 years. Even if we focus on ages 30–34 years, intra-Māori

[31] For an example that confines an analysis to ages 30–34, see Menken (1985).

differences are still significant. Here we see a gradient where the Core grouping has lower rates of childlessness and higher average number of children per woman, and women who identified only by descent have higher rates of childlessness and lower average number of children. Although the Core grouping has a relatively older age structure, the rates of childlessness were notably lower amongst teenage women aged 15–19 years and young adults aged 20–24 years.

There are also marked differences in family size.[32] Figure 2.3 shows the proportion of women by the number of children specified.[33] We use two children as the mid-point for distinguishing between "small" (1–2 children) and "large" (3+) families. More than 43 per cent of women aged 30–34 (n = 2973) who unambiguously identified as Māori had large families, with nearly 13 per cent (n = 378) having more than six children. In contrast, the majority of the Māori+ and Descent-only groupings had smaller-sized families – 47 per cent and 48 per cent, respectively. Again, we see a gradient within the Māori groupings: women in the Core grouping have the lowest proportions of childlessness and highest proportions with large families, and women with "thinner" ties to Māori identity (i.e. Descent only) have highest proportions of childlessness and lowest proportions with large families. Nevertheless, Māori women are still different from New Zealand women who have no connection to Māori identity (i.e. non-Māori), who have the highest level of childlessness, 38.7 per cent, and lowest level of large families, 12.8 per cent.

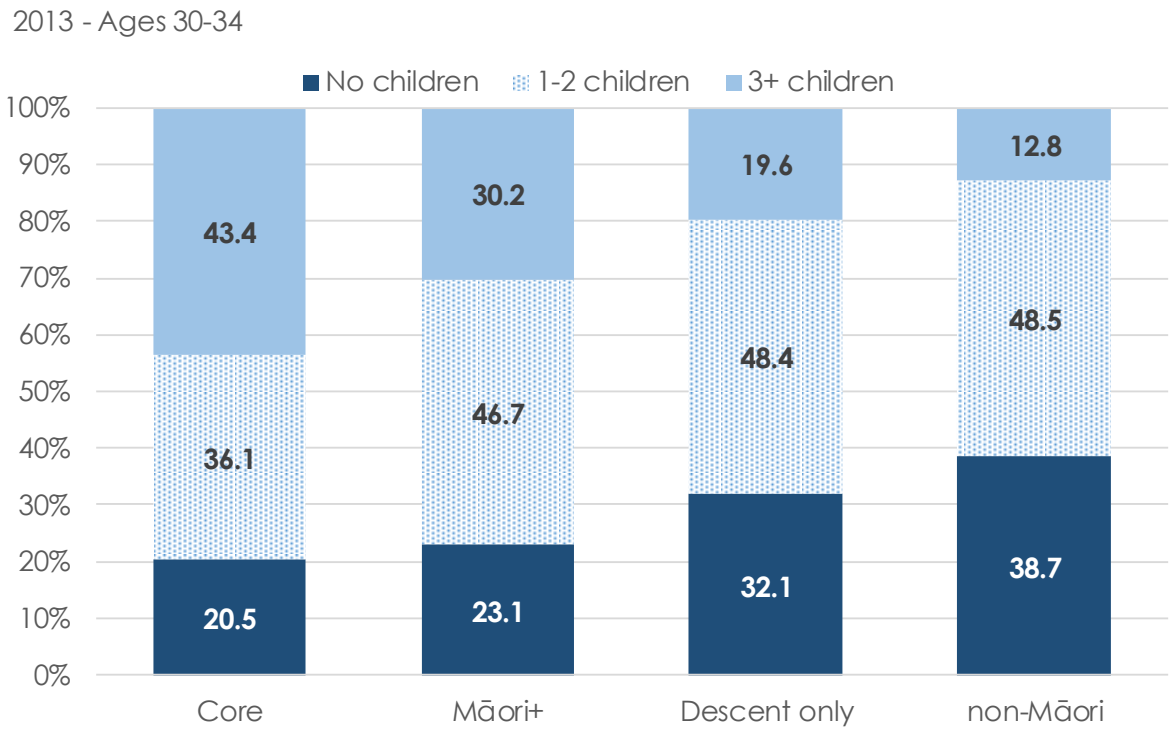
[32] Used here to mean the average number of children.
[33] Those women who "objected to answer" are excluded from the denominator.

Table 2.5: Average number of children per woman and percentage childless by age groups, 2013 Census

Category-bearing ages	Core		Māori+		Descent only		non- Māori+	
	Avg #	% childless	Avg #	% childless	Avg #	% childless	Avg #	% childless
15–19	0.1	90.9	0.1	94.1	0.0	96.9	0.0	98.1
20–24	0.8	52.1	0.6	61.8	0.4	73.3	0.2	84.8
25–29	1.7	29.0	1.3	36.8	0.9	50.9	0.6	63.7
30–34	2.3	20.5	1.9	23.1	1.5	32.1	1.2	38.5
35–39	2.7	15.1	2.2	15.3	1.8	20.4	1.7	22.1
40–44	2.8	13.7	2.4	12.5	2.0	17.3	1.9	16.9
45–49	2.9	12.7	2.5	11.8	2.1	15.3	2.0	16.0

Source: Statistics New Zealand customised data, 2013.

Figure 2.3: Proportion of women (ages 30-34) by family size, 2013 Census



Source: Statistics New Zealand customised data, 2013.

2.4.1 The roles that occupy women: Education and child-bearing

The inverse association between education and fertility is one of the most extensively and frequently observed relationships in empirical studies of fertility (Cochrane, 1979; Diamond, Newby, & Varle, 1999;

Michael, 1973). Women pursuing education tend to delay childbearing, and/or have fewer children (Bledsoe et al., 1999; Michael, 1975). Education is also considered to be a prime factor in conditioning women's roles because it imparts values, aspirations and skills that encourage or facilitate non-familial roles (Rindfuss et al., 1980). With these theories in mind, we look at the education and fertility patterns as shown in Table 2.6.

Table 2.6: Average number of children per woman and percentage childless of women aged 30-34 by highest education level, 2013

Highest qualification level	Core		Māori+		Descent only		non- Māori+	
	Avg #	% childless	Avg #	% childless	Avg #	% childless	Avg #	% childless
No qualification	2.8	17.4	2.6	14.0	2.2	18.2	1.9	21.8
School	2.3	19.5	1.9	20.7	1.5	30.9	1.4	30.3
Sub-degree	2.3	20.0	1.8	22.0	1.5	31.4	1.2	35.9
Degree+	1.6	30.8	1.3	36.2	0.9	49.4	0.9	48.8

Source: Statistics New Zealand customised data, 2013.

If we reflect on the major fertility differences across the identity categories, we see higher average number of children and lower rates of childless amongst women with no qualifications than those women with a degree or higher. Because of the strong correlation between socio-economic status (especially education) and fertility, it could be argued that fertility differences are driven by education rather than identity. However, looking at the different education levels, we still find major differences across the identification groupings but mostly at the higher education levels. Focusing on those 30–34-year-old women with a degree or higher, the Core grouping still has a higher average number of children per woman (1.6 per woman) and significantly lower rates of childlessness (30.8 per cent) than women categorised in Māori+ and Descent only. Notably, the differentials in childlessness within the Core grouping by education level are much smaller than the internal differences found in both Māori+ and Descent only. This suggests that the progression through higher levels education has less of an impact on childbearing for women who identify "thicker" ties to Māori identity than for women who identify singular Māori identify (i.e. Descent only).

2.4.2 Geographical differences in women's childbearing patterns

Global studies of fertility, particularly in Europe and South-East Asia, have highlighted the importance of geographical interpretations of fertility trends and issues. Boyle (2003) argues: "Geographical variations, or the lack of them, matter when we try to understand fertility variations, and place, or context, is important to fertility decision-making" (p. 616). He further highlights that individuals in similar social classes and occupations had very different fertility rates depending on where they lived. Szreter (1996)

also theorises the relevance of "communication communities" in shaping fertility behaviours. These are defined as "social networks through which persons acquire, reproduce and negotiate their social and gender identities" (see footnote in Szreter, 2011, p. 79). He also identified that communication communities were strongly related to the unique characteristics of specific towns and other geographical localities (Szreter, 1996, 2011; Szreter & Garrett, 2000). With this in mind, we make a bold assumption that the level of fertility would be higher in spatial areas where there is a greater chance of people being exposed or coming into contact with large communities or networks who share similar socio-cultural identities, and vice versa.

For this undertaking, we look at the fertility outcomes of women aged 30–34 in each grouping by territorial authorities (TAs). However, due to small numbers we have grouped the TAs into three spatial categories based on the population share of Māori (i.e. MEG) living in those areas in the 2013 Census:

- High – TAs with more than 20.0 per cent MEG
- Medium – TAs with 10.0–19.9 per cent MEG
- Low – TAs with less than 9.9 per cent MEG.

Table 2.7: Average number of children per woman and percentage childless of women aged 30-34 by territorial authorities (TAs) grouped by Māori population share, 2013 Census

TA Māori population share	Core		Māori+		Descent only		non- Māori+	
	Avg #	% childless	Avg #	% childless	Avg #	% childless	Avg #	% childless
High	2.5	17.7	2.2	16.6	1.7	26.3	1.5	28.4
Medium	2.2	22.5	1.8	24.9	1.4	32.9	1.2	38.6
Low	2.0	25.8	1.5	29.5	1.4	37.4	1.1	43.2
Total New Zealand	2.3	20.5	1.9	23.1	1.5	32.1	1.2	38.5

Source: Statistics New Zealand customised data, 2013.

The results in Table 2.7 reflect what we had expected. For every grouping, fertility was higher in areas where Māori comprise at least one fifth of the TA population. In high areas, there was very little difference in childlessness and average number of children between Core and Māori+ women. The effect of geography seemed more marked for Descent-only category, with a much wider range in childlessness than both the Core and Māori+ categories. Descent-only women also shared fertility outcomes similar to non-Māori.

2.5 Conclusion: Does cultural identity make a difference?

The Māori fertility transition brought an end to decades of very high fertility rates, and a convergence towards long-term fertility levels similar to Pākehā/New Zealand European women. However, as recent research has emphasised and re-emphasised, important differences endure. Age-specific data indicate that Māori women have children earlier and over a longer period. All of this has occurred within a low-fertility context that facilitates and favours low fertility and small families. We considered whether cultural factors might contribute to this phenomenon. As a starting point, we used fertility and Māori identity markers as proxies for culture from the New Zealand Census to test this hypothesis.

So, does cultural identity make a difference to Māori fertility outcomes? This analysis has shown compelling evidence that culture does matter. We found systematic differences in fertility outcomes by Māori cultural identity as measured by expressed identity in the context of the census. These differences were most evident when comparing Māori women with multiple ties to Māori identity markers, and those on the "fringes". These differences were mediated by education and geography. The main take-home point is that there was a consistent gradient, where at the core, fertility was highest and women had more children on average. In contrast, women who expressed singular Māori identity by descent had lowest fertility, fewer children on average, and higher rates of childlessness. Even so, Māori women still had higher fertility outcomes than New Zealand women with no connection to Māori identity.

This research shows that this focus on culture is an important and valid area of research. However, the data presented in this paper indicate that culture only matters to an extent. We acknowledge that this analysis is limited to the concepts, constructs and measures used in the New Zealand Census. In no way can these categories tell us what those cultural values or ideas are that inform attitudes about fertility, and/or shape behaviour. This requires further exploration via qualitative-based methods.

2.6 Acknowledgements

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CHAPTER THREE: INDIGENOUS FERTILITY IN AOTEAROA NEW ZEALAND: HOW DOES ETHNIC IDENTITY AFFECT BIRTH SPACING AND TIMING?

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3.1 Abstract

The survival of Indigenous peoples in the CANZUS states of Canada, Australia, Aotearoa New Zealand, and the United States is nothing short of remarkable. Not only have Indigenous peoples thwarted colonial tropes of the 'vanishing native' but, for decades, Indigenous population growth rates have significantly outpaced those of the dominant settler populations. The future survival of Indigenous peoples fundamentally rests on continued natural increase, and understanding the causes and consequences of fertility behaviour is critical. While total fertility rates for Indigenous women in CANZUS countries are relatively low, childbearing tends to be concentrated at younger ages, in contrast to the dominant white populations. The fertility transitions of both settler and Indigenous populations in the CANZUS states are well documented, however, a significant gap remains: how cultural factors shape contemporary Indigenous fertility behaviours. Using Aotearoa as a case study, we explore the relationship between Māori cultural identity, birth timing, and the duration of birth intervals. We use the 1995 New Zealand Women's Family, Employment and Education survey data to further test the impact of cultural identity on birth transition rates using the piecewise exponential model and Kaplan-Meier estimates. We find that Māori with thicker ties to cultural identity are at greater risk of bearing much earlier to first birth but not necessarily subsequent births. However, because of the earlier start, Māori have a longer reproductive window to bear more children, and at higher birth orders still bear earlier than non-Māori. The empirical evidence strengthens our case to suggest that cultural orientation has some influence on Indigenous fertility and contributes to the development of Indigenous-centred theories of fertility and demography more broadly.

3.2 Introduction

The survival of Indigenous peoples in the CANZUS states of Canada, Australia, Aotearoa New Zealand (Aotearoa), and the United States is an extraordinary feature of those countries' demographic histories. Indigenous minorities have shared colonial histories of dispossession, subjugation, and systemic racism, along with contemporary forms of exclusion manifesting in over-representation on myriad measures of socio-economic disadvantage (Anderson et al., 2016; Gracey & King, 2009; King, Smith & Gracey, 2009). Not only have Indigenous peoples put paid to colonial tropes of the *vanishing native* but, for decades, Indigenous population growth rates have significantly outpaced those of the dominant settler

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See Appendix B for co-authorship form.

populations due to a combination of youthful age structure, higher fertility, and a post-1970s resurgence of Indigenous identity (Andersen, 2008; Big Eagle & Guimond, 2009; Johnstone, 2011a; Nagel, 1995; Pool, 1991, 2015; Snipp, 1989; Taylor et al., 2020). Absent the option of migration-driven growth, the future survival of Indigenous peoples will fundamentally rest on continued natural increase. Understanding the causes and consequences of fertility behaviour, and what it portends for future trends, is critical.

The fertility transitions of both settler and Indigenous populations in the CANZUS states have been well documented (see, for example, Cannon & Percheski, 2017; Haines, 1989; Haines & Steckel, 2000; Johnstone, 2011a, 2011b; Pool, 1991; Pool, Dharmalingham & Sceats, 2007; Sullivan, 2005), but significant gaps remain. One understudied area is how cultural factors shape contemporary Indigenous fertility behaviours. By 'culture' we mean the ideas, customs, social behaviours, values, and worldviews associated with a collective (Jenks, 2005). While total fertility rates for Indigenous women in CANZUS countries are relatively low, childbearing tends to be concentrated at younger ages, in stark contrast to the deferred childbearing of women from the dominant white populations (Johnstone, 2011a). Observing a pattern of early Indigenous childbearing across all CANZSUS countries, Johnstone (2011a) argued that colonisation was an "explicit and pervasive influence on all exogenous drivers of the proximate determinants of fertility" but was largely erased from demographic theory and approaches (p. 117).

Taking Johnstone's challenge as a starting point, we focus on the fertility of Indigenous Māori women in Aotearoa and explore the relationship between Māori cultural identity, birth timing, and the duration of birth intervals. Using retrospective fertility data from Aotearoa's only nationally representative fertility survey, we examine whether Māori women who identify exclusively or primarily as Māori have an earlier first birth, and shorter birth duration than women who identify as Māori but see themselves primarily as European. The assumption is that how women ethnically identify themselves - or *expressed identification* (Kukutai, 2007, 2011a; Liebler & Kana'ianupuni, 2004; Roth, 2005; Saperstein, 2012) - is one facet of a deeper cultural orientation that is promotive of early childbearing. However, the coercive state policies of assimilation, the suppression of language and culture, and the alienation of land, has had intergenerational impacts on identity and knowledge of whakapapa (genealogy) (Barcham, 1998; Mahuika, 2019; Rarere, 2022; Te Rito, 2007a). We use expressed identification as a proxy for cultural orientation and try to unpack how it might be implicated in the persistence of earlier Māori childbearing.

We begin with a brief demographic history with a particular focus on how two very distinct fertility transitions have transpired in Aotearoa NZ, involving quite different fertility and family formation patterns (Pool et al., 2007). Conventional models and theories, such as the Demographic Transition, have been the default explanations for understanding Indigenous fertility. However, as a prelude to our

analysis, we attempt to move towards a more plausible explanation behind these distinct patterns by outlining the relationship between Indigenous identity and fertility. Central to this relationship is the impact of colonisation. We then outline our data source, methods, and the key variables that we use to test our premise - that ethnic identity affects birth timing and spacing. We then present the results of our analyses, and end with a discussion of what these results mean in the broader context of Indigenous identity and fertility.

3.3 Background

Aotearoa is a multi-ethnic settler-colonial state with an estimated population of 5.2 million (Stats NZ, 2023a).[34] In the 2018 census the dominant group of predominantly Anglo settler origins known as Pākehā or European[35] comprised 70.2 percent of the population, while Māori made up 16.5 percent, Asian peoples 15.1 percent and Pacific peoples 8.1 percent.[36] Colonisation has been instrumental in land confiscation, and the suppression of language, culture and institutions, and its legacy continues in Aotearoa today. One of the aims of colonisation has been to displace Indigenous identity. For example, the state has attempted to define and redefine who is Māori, as if they are a homogeneous group, in instruments such as the census (Kukutai, 2011a, 2011b; Pool, 1991; Kukutai & Pool, 2014). However, Māori identity is complex and multi-faceted (Barcham, 1998; Borell, 2005; Durie, 1995, 1998; McIntosh, 2005; Walker, 1989; Webber, 2008), and central to identity is whakapapa or shared descent (Mahuika, 2019; Taonui, 2011; Te Rito, 2007b). As a result of colonisation, contemporary intergenerational ethnic inequities persist (Ajwani et al., 2003; Callister & Blakely, 2004; Chapple, 2000). However, Te Tiriti o Waitangi (The Treaty of Waitangi) has been the over-arching convention for bringing the Crown to account for the colonial injustices of the past and addressing the enduring intergenerational effects on Māori. The Māori renaissance, which began in the 1970s, served as an important platform for the revival of te reo (the Māori language), culture, and identity, and many have taken this opportunity to reconnect with their cultural identity and their whakapapa. However, there is significant heterogeneity within the Māori population with regards to individual and familial access and connection to te ao Māori (Māori society) (Houkamau & Sibley, 2010).

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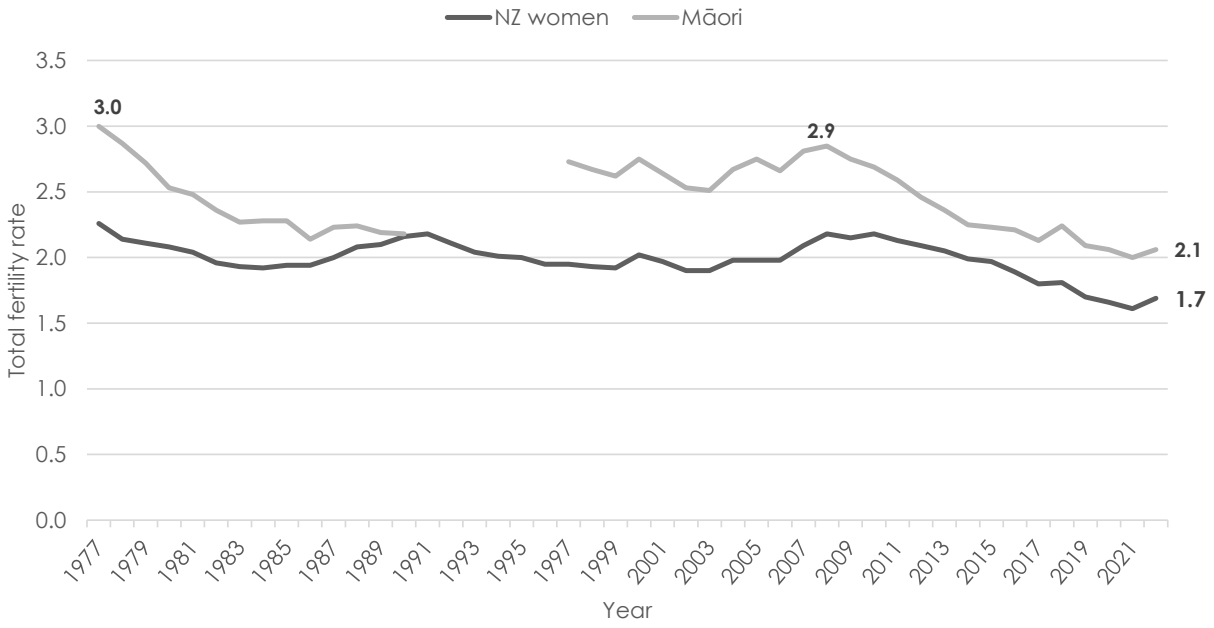
[34] As at 31 December 2022, according to Stats NZ update on 10 March 2023

[35] Pākehā is a popular colloquial term to describe the majority white population in Aotearoa (British settlers and their descendants) but "has not been institutionalised as a statistical term" (Kukutai, 2011, p.60). For example, in the census the majority group is labelled 'New Zealand European', and 'European' at Level 1 of the Statistical Standard for Ethnicity (Kukutai, 2011).

[36] Ethnicity in the census is a multiple-response variable, and hence the total sum of the ethnic groups exceeds 100%.

Māori and Pākehā demographic histories - including fertility and family formation patterns - have followed very different trajectories in terms of timing and mechanisms (Pool, 1991; Pool, Dharmalingham & Sceats, 2007). After decades of high birth rates, the Māori fertility transition occurred in the decade 1966 to 1976 and, up until that time, was one of the most rapid transitions observed anywhere in the world (Pool, 1991; Pool, Dharmalingham & Sceats, 2007). Pākehā fertility had declined about a century earlier, facilitated by later marriage, and was only temporarily disrupted by a prolonged post-war *baby boom* (Pool et al., 2007). By contrast, the utilization of more effective contraceptive methods was a key factor that facilitated the Māori fertility transition - between 1966 and 1976 the total fertility rate dropped from 5.5 to 3.1 (Pool, 1991). Although ethnic differences in fertility levels have diminished over time (Pool, 1991; Pool et al., 2007; Pool & Sceats, 1981), Māori birth rates have consistently exceeded Pākehā and have never intersected (Figure 3.1)[37].

Figure 3.1: Total fertility rates for Aotearoa NZ (all women) and Māori women, 1977-2022



Data source: Statistics NZ infoshare Table DFM044AA (Annual June), last updated 18 May 2023.
Note: No data available for Māori between 1991 and 1996.

While the average fertility of Māori is not much different to that of Pākehā women, important differences remain. One relates to peak childbearing ages, where Māori fertility has been concentrated at the younger ages. Since 1966, Māori teenage fertility has been relatively high (compared to all other groups), albeit declining over time. Māori age-specific fertility was highest at ages 20-24 years (Pool, 1991), until it

[37] There was no Māori data available between 1991 and 1996.

shifted upwards to 25-29 years in 2013 (Stats NZ, 2023b). In comparison, between 1966 and 1976, Pākehā age-specific births[38] peaked at ages 20-24 years ages, then shifted upward to 25-29 years between 1977 to 2001 and for the last two decades, has peaked at ages 30-34 (Stats NZ, 2023b). The shift to older maternal ages is more marked for Pākehā women and has somewhat widened the differentials with Māori. The median age of Māori mothers was 24.7 years in 1966 and has slowly shifted upwards to 27.7 in 2022 (Stats NZ, 2023c). For the same period, the median age of Pākehā mothers[39] was 25.3 and increased to 31.2 (Stats NZ, 2023c). Based on census data for 1981, 1996, and 2006, Aotearoa has also experienced increasing levels of childlessness (Boddington & Didham, 2009; Didham & Boddington, 2011), however the difference in levels of childlessness between Māori and European is profound. In 2006, the proportion of childless Māori women aged 40-44 was around 11 per cent, compared to 16 per cent for European women (Stats NZ, 2023d). In the 2018 Census, the proportion of childless Māori women aged 40-44 years (14 percent) was also significantly lower than for non-Māori (17 percent) (Stats NZ, 2023d).

The demographic transition model has often been the default framework for understanding fertility transitions, including Indigenous ones. However, in recent decades the second demographic transition (SDT) has been deployed to explain key post-1970s demographic changes in developed countries, notably: sustained sub-replacement fertility, multiple living arrangements other than marriage, the disconnection between marriage and procreation, depopulation, and aging populations (Lesthaeghe, 2014). A key criticism of the SDT is that it is a phenomenon typical of Northwestern Europe and mainly European populations of the CANZUS states, and is therefore less applicable to 'other cultures' (Lesthaeghe, 2014). Like its predecessor, the SDT also does not consider colonisation as a distal determinant of Indigenous fertility (Johnstone, 2011a), nor does the SDT take into consideration the relevance of Indigenous perspectives around family formation or fertility. As a way forward, we consider a more plausible explanation behind these distinct patterns by exploring the relationship between Indigenous identity and fertility.

3.3.1 The relationship between Indigenous identity and fertility

Studies of Māori fertility have typically focused on demographic and political-economic explanations for ethnic differences in fertility levels, parity, and birth timing (Jackson et al., 1994; Pool, 1974, 1977, 1991; Statistics NZ, 2004; Zodgekar, 1975). In particular, the Māori fertility transition, along with other

[38] This is age-specific data for all Aotearoa women. Data specifically for Pākehā women were not available but we can assume that the rates for the dominant Pākehā will be similar. For further analysis of age-specific fertility patterns and trends between Māori and non-Māori, see Jackson et al, 1994. The main point is that Māori age-specific fertility is younger than non-Māori women.

[39] This is median ages for all Aotearoa mothers. Data specifically for the dominant Pākehā women were not available but we can assume that the rates for the dominant Pākehā will be similar. The main point is that the median age of Māori mothers is younger than non-Māori mothers.

Indigenous populations in colonised nation states who have undergone notable fertility transitions, has been principally interpreted as further evidence of a *global convergence* of fertility behaviour (Johnstone, 2011; Taylor, 2011). Demographic transition theory, and other key low-fertility theories (e.g., rational choice and gender equity) have often been the default explanations for understanding these transitions. However, Johnstone (2011) points out that colonisation has played a unique and key role in Indigenous population change. Pool (2015) particularly shows the impact of colonisation on early Māori demography, and the enduring domino effect on other aspects of Māori society, including social, economic, and cultural. The point is that none of the dominant demographic theories have been well suited for understanding the fertility experiences of colonised Indigenous populations fertility because they do not account for the impacts of colonisation (Johnstone, 2011).

Another feature of demographic studies on Māori fertility is the tendency to bifurcate Māori and non-Māori fertility which serves to promote a unidimensional representation of Māori (Johnstone, 2011; Kukutai, 2011b; Kukutai & Pool, 2014; Taylor, 2009), and obscure important intra-group differences in fertility behaviour. Other research in the critical Indigenous demography space has emphasized unique issues pertaining to the interpretation of Indigenous population change (Didham & Boddington, 2011; Taylor, 2009; Taylor, 2011) but there is room to develop theoretical frameworks that incorporate Indigenous perspectives. Some strands of scholarship provide a useful starting point. Nearly fifty years ago Māori demographer Ted Kohu Douglas (1977) proposed a cultural explanation for the Māori fertility transition by analysing some of the cultural responses deeply embedded within close-knit rural tribal communities. Others have hinted at the potential of cultural factors playing a role in Māori demography but have not examined it in any depth. For example, Pool (1991) concluded that differences in family-formation patterns were "clearly affected by cultural difference in approaches to creating families" (p. 167). Johnstone et al. (2001) argued that, despite high levels of interdependence, the different demographic transitions of Māori and Europeans were "the result of the maintenance of Māori cultural traditions" (p. 3). Zodgekar (1975) mainly focused on socio-economic and demographic explanations behind the Māori fertility transition, but acknowledged the relevance of the "maintenance of a distinct cultural identity", "large family norms", and the "retention of tribal, kinship and familial associations" (p. 346).

Recent works have explored how differences in Māori cultural identity are associated with a range of socio-economic and demographic characteristics and outcomes, including fertility outcomes. Expressed Māori identification in data collection instruments, such as a census, can provide insights into cultural differences in behaviour, living conditions, and outcomes (Kukutai, 2011a). The boundaries between Māori and Pākehā have become more complex because of intermarriage, rapid ethnic diversification,

changing ideologies around the nature of ethnicity, and what it means to be Māori (Kukutai, 2011a). Kukutai (2010) explored the association between expressed ethnic identification and intra-group differences by combining census indicators to configure a range of Māori sub-group categories. Developed as a heuristic device, the *core-periphery* model, helped to conceptualise Māori identification in more complex ways beyond the Māori/Pākehā binary (Kukutai, 2011a). The spectrum ranged from those who identified *solely* based on ancestry (the *periphery*), to those who identified as Māori by ancestry, tribe, and exclusive ethnicity (the *core*). Her analysis showed compelling evidence of ethnic and socio-economic segmentation between Māori (Kukutai, 2010; Kukutai, 2011a). Empirical studies have also shown significant ethnic, cultural, and socio-economic differences between Māori, which suggest that those who strongly identified as Māori appeared to have the least favourable outcomes (Ajwani et al., 2003; Callister & Blakely, 2004; Chapple, 2000; Cunningham et al., 2002; Kukutai, 2004).

In a novel paper, Rarere (2018) asked whether there were "still some undercurrents of culture that influence the way in which Māori women think about family formation, the value of children, childbearing and rearing in terms of timing, spacing, and number of children" (p. 29). Using data from the 2013 New Zealand census, she explored the relationship between fertility outcomes (average number of children per woman and percentage childless) and expressed identification. The latter was a composite variable using responses to census questions on ethnic identity, iwi (tribal) affiliation and Māori descent, and is useful here because expressed identification involves a degree of choice rather than an actual reporting of parental ethnicities (Kukutai 2007). Her analysis showed that Māori women with multiple ties to Māori identity (i.e., those who identified exclusively as Māori by ethnicity and ancestry and had at least one tribal affiliation) had lower levels of childlessness and more children, on average, than women who identified as Māori solely based on ancestry. The relationship between *thicker* ties to Māori identity and higher fertility also held across all levels of education and geographic location. The compelling evidence suggested that *culture* does matter in Māori fertility outcomes, however, the analysis was limited to the concepts, constructs, and measures of the census. In a follow-up paper, Rarere (2022) explored the Māori concept of whakapapa (genealogy) as a potential factor underlying fertility patterns. She asked: What are the important influences that have sustained contemporary Māori fertility patterns? Drawing on the theoretical framework of Mana Wahine (Māori women discourses), she conducted semi-structured interviews with Māori women to foreground their lived experiences and perspectives of family formation and fertility. As a cultural framework, Mana Wahine harnesses and advances Māori womens' knowledges and theories, and foregrounds Māori perspectives of the position and status of Māori women (Jahnke 1997; Pihama, 2001; Simmonds, 2011; Simmonds, 2014; Smith, 1992). For example, wāhine are revered as *whare tangata* (womb) - the creators of life - past, present, and future generations (Higgins & Meredith, 2011; Mikaere, 2017). The research addressed a major gap in the Māori fertility literature

where there has been very little emphasis on Māori cultural understandings of fertility, and to move closer to a broader understanding of how Indigenous identity shapes the fertility choices of Māori women. She described this orientation as being whakapapa centred - that is, valuing the genealogical relationships and kinship structures that collectively cohere Māori as a people. She found that preserving whakapapa was a very important motivation for having children but the timing of having them needed to be considered in the wider socio-economic context. For example, some women encouraged their children to get an education and build a career first before starting a family.

This present paper builds on earlier research by specifically looking at the timing of births, and the duration of birth intervals. For quite some time, Māori age specific fertility rates were concentrated at the younger adult ages of 20-24 years, and the timing of births matters in relation to parity. Using the Kaplan-Meier estimates and piecewise exponential models we explore how the timing of fertility, and the duration of birth intervals vary by expressed identification. In doing so it aims to contribute to a fuller understanding of how cultural identity is associated with earlier childbearing among Māori women.

3.4 Data & Methods

3.4.1 New Zealand Women: Family, Employment and Education Survey

Our analysis draws on retrospective data from the New Zealand Women: Family, Employment and Education (NZWFEE) survey administered in October and November 1995 by the Population Studies Centre (PSC) at The University of Waikato[40][41] (Johnstone et al., 2001). This section provides an overview of the survey with more detail found in a technical report produced by Marsault et al. (1997).

NZWFEE was Aotearoa NZ's first and only nationally representative survey on fertility and family formation and was based on the questionnaire for *Promotion of Fertility and Family Surveys in ECE countries* (Marsault et al., 1997; Johnstone et al., 2001). NZWFEE collected a wide range and depth of fertility-related and family formation questions including: history of pregnancies and partnerships; number of children (live-born, adopted, step and foster); fertility regulation and contraceptive history; views on having children; educational history; work history; and major demographic and socio-economic characteristics of the respondents' current partner (Marsault et al., 1997). NZWFEE permits far more

[40] The Population Studies Centre, which was established in 1982, is now known as Te Ngira: Institute for Population Research at The University of Waikato (see https://tengira.waikato.ac.nz/about-us/history/population-studies-centre). The PSC researchers and administrators involved in the design and administration of the NZWFEE are no longer employed at The University. Data collection (fieldwork, coding, and data entry) was subcontracted to an external agency - Market Research Limited (Marsault et al., 1997).

[41] The electronic datasets are stored on a secure server at the PSC, University of Waikato, now known as Te Ngira: Institute for Population Research.

nuanced analyses of Māori fertility patterns than is possible using the national census (Rarere, 2018). For example, the census does not collect the time-specific variables required for event history analyses, nor does it collect other family and fertility-related variables for defining our risk-sets, such as relationships data. Although NZWFEE was conducted more than 30 years ago, it remains relevant because it is the only dataset that allows for a detailed empirical analysis on the relationship between Māori identity and the timing of birth and birth spacing. There is no other dataset in Aotearoa, including the census, that allows us to do this.

The survey targeted Aotearoa women aged 20-59 years at the time of interview. Those aged under 20 were excluded as they were more likely to be mobile or living with their parents, and therefore less likely to be available for an interview, and/or have less exposure to family formation events (Marsault et al., 1997). The upper age limit was extended to 59 years to allow for retrospective comparisons between the family formation behaviours of women aged 45-59 years, who were the first cohort to access modern contraception, with women aged under 45 (Marsault et al., 1997). Participants were selected through a random, proportionately stratified, cluster sampling method (Pool, 1999). A total of 3,017 women were interviewed from three sample groups: main sample (n=2,507), Māori oversample (n=180), and Midland Regional Health Authority (MRHA)[42] oversample (n=330) (see Table 3.1). Although the main sample is representative, a Māori oversample was needed to help boost numbers to conduct more detailed analyses with statistically valid results (Marsault et al., 1997). The PSC was also contracted by MRHA to oversample the Midland Health region so that the Authority could obtain sufficient numbers to derive statistically valid results at the regional level (Marsault et al., 1997). An added benefit of the Midland oversample was the increase in the number of Māori and rural women in the final sample because the region has a higher proportion of both Māori and rural populations (Marsault et al., 1997). For our analyses, weights have been applied to adjust for the oversampling of Māori respondents from the Māori and Midland samples. In effect, the number of Māori will be adjusted down, and the proportions are representative of the national population at the time of the 1991 NZ Census (see Table 3.1).

[42] Four Regional Health Authorities (RHAs) were established in 1993 and configured by areas with populations ranging between 750,000-1,000,000: Northern, Midland, Central, and Southern. The RHAs were funded by the central government's Ministry of Health, and had the responsibility of monitoring the health needs of their populations, purchasing the appropriate health and disability services, and monitoring the performance of providers with whom they entered purchase agreements (New Zealand Parliamentary Library, 2009)

Table 3.1: Number of NZWFEE respondents by sample and ethnic identification (weighted and unweighted)

Ethnic Identification	Main sample	Māori Oversample	Midlands Sample	Total	%
Māori	266	180	67	513	17.0
weighted[1]	183	125	51	360	11.9
European	2006	-	252	2258	74.8
weighted	2200	-	180	2380	78.9
Other	235	-	11	246	8.2
Weighted	269	-	8	277	9.2
Total (unweighted)	3017	180	330	3017	100.0

Source: NZWFEE

Notes: [1]Total not exact due to rounding from weight adjustment

3.4.1.1 Method

Event History Analysis (EHA) explores the role of time in causal explanations and can incorporate other mediating factors that potentially impact the timing of events (Blossfeld et al., 2019; Mills, 2011). Here we are not looking to demonstrate *causal* relationships per se but to establish further empirical evidence that serves as an important "link in a chain of reasoning about causal mechanisms" (Blossfeld et al., 2019, p. 22). EHA is commonly used in fertility analyses (Van Hook & Altman, 2013), and in our case, we use EHA to explore the timing and duration until the occurrence of a birth (including subsequent), and how these differ by ethnic identification, controlling for education, location and age. A piecewise exponential model is our preferred method of EHA where time is divided into smaller periods, and it is assumed that the hazard rate remains constant within these time periods but can change between periods (Mills, 2011). This is logical given that fertility (or fecundity) is sensitive to time/age. The piecewise model also gives us the flexibility to use time variant and time invariant variables, particularly within the constraints of the survey data. Because of the complex structure of our data, with multiple episodes and spells for each

woman, we had to manually create time spans of 24-month periods for episode splitting[43] using Stata (version 17).[44]

We begin with a descriptive analysis by exploring median time to each birth. Because of small numbers we have grouped birth orders higher than six. We then use the Kaplan-Meier survival model for first, second and third birth analyses, which estimates the proportion of women who remain across time. In the case of first births, however, the Kaplan-Meier estimates the proportion of women who remain childless at the end of the observation period. For our first birth analysis, we go against conventional demographic approaches to reproductive age (Coale & Trussell, 1974) by starting our process time at age 12 on the basis that it is the earliest age at which one woman from the sample birthed her first child, and this is generally regarded as the age of menarche. All women are either right- censored at time of first birth or up to age 45 years or until the survey interview date[45], whichever occurs first. For the transition to second birth, and likewise with subsequent births, the process time starts immediately after the date of previous birth. Again, the women are right-censored when they experience the birth event, age 45, or the survey interview date, whichever comes first. We convert and use time in terms of months rather than a calendar date.

3.4.1.2 Variables

Time to live birth is the dependent variable in this study. Women who did not give birth over the observation period (n=615) are treated as childless, even if they had adopted or fostered children or had stepchildren (n=63/615). To exclude the gestation period from the process time, we measure time to the conception of a live birth.[46] The conception date is derived by subtracting approximately nine months[47] from the birth date (months) of each child. For consistency throughout this paper, we use the term *birth(s)* to include conception time. Regardless of parity, twin (or multiple) children are removed from the analysis so that births are treated as a singleton.

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[43] We used this method rather than using the 'stsplit' function in Stata. For further information on data transformation and data management techniques in preparation for piecewise modelling, see Baron and Kruger, 2017.

[44] The original data was stored and managed in Statistica.

[45] November 1995

[46] Although the survey collected data on the womens' pregnancy and birth histories, we only consider live births in this analysis.

[47] The birth dates (year and date) are converted into 'months'. We then deduct approximately 9 months (40 weeks gestation period divided by 4.35 (the average number of weeks in a month) to get an estimated date of conception.

Ethnic identification is the primary explanatory variable[48]. The ethnic categories used in NZWFEE followed the Standard Classification of Ethnicity (Marsault et al., 1997), and allowed respondents to identify with up to 10 ethnic groups[49]. Respondents were presented with a showcard and then asked to identify: *Which ethnic group(s) do you belong to?* For those who reported more than one ethnicity, the survey prompted them to choose a *main* ethnic group. The options provided included: *more than one*, *don't know/no*, and *other*. The inclusion of multiple and main ethnicity questions enabled us to reconfigure three ethnic identification categories to explore the relationship between Māori identity and fertility (see Table 3.2). *Mainly Māori* includes women who identified exclusively as Māori as well as women who identified as Māori and at least one other ethnicity but prioritised Māori as their main affiliation. We combined these two groups of women because evidence has shown that they share similar socio-demographic characteristics (Kukutai, 2011b). The *Mainly European* category consists of women who identified as both Māori and at least one other ethnicity, including European, but reported European as their main ethnicity. This category includes a small number of Māori-European women who did not record a main ethnicity (n=28). We included them here because of the lack of preference to identify as Māori, but also to help boost numbers. The third category *non-Māori* includes all remaining women who reported an ethnicity other than Māori. Most of these women identified exclusively as European.

[48] Ethnicity is a key public policy variable in Aotearoa thus the collection of ethnicity data is standard practice across government and research.
[49] The maximum number of ethnic groups reported was four, which was reported by only one respondent.

Table 3.2: Reconfiguration of ethnic identification categories for analysis (weighted & unweighted)

Category label	Description of category	n Unweighted	% Unweighted	n Weighted	% Weighted
Mainly Māori	Women who identified solely Māori + women who identified Māori plus one other ethnic group but specified Māori as their main ethnic group.	390	12.9	276	9.1
Mainly European	Women who identified as Māori and one other ethnic group (including European) but specified European as their main ethnic group + those who identified Māori and one other ethnic group (including European) but had no preference for main ethnic group.	119	3.9	81	2.7
Non-Māori	Women who solely identified European + those who identified as other ethnic group (excluding Māori).	2508	83.1	2660	88.2

Data source: NZWFEE

We use *partnership status* to determine the time when the women are at-risk of conceiving. Partnership status is defined broadly to include all types of unions - legal marriage, social/de facto marriage living together. Traditionally, marriage signalled exposure to intercourse either before or immediately after pregnancy (Pool et al., 1998[50]). However, the link between marriage and exposure to intercourse has become increasingly separated, wherein an individual may have a number and various types of *unions* with different people throughout their life (McCluskey, 1999). In NZWFEE nearly 30 per cent of women reported having at least two relationships during the observation period.[51] To accommodate this, the data were structured to account for multiple partnerships and 'entry' and 'exit' times over the observation period. A binary variable (*in a relationship*) was constructed, to denote whether a respondent had been in a relationship over the observation period, regardless of current marital or union status. In other words, partnership status functions as a time variant, that is, it considers the fact that women enter and exit relationships throughout the observation period and defines them 'at risk' of experiencing conception (and later birth) during the time periods when they are partnered. A partner was defined as a man whom a woman had an intimate relationship with and who lived in the same household (Marsault et al, 1997). The only women that we exclude from the analysis are those that have no data at all on partnership status throughout the observation period.

Given the strong inverse association widely observed between education and childbearing (Cochrane, 1979; Diamond et al., 1999; Michael, 1973) *highest education* is included as a time-invariant control variable, with the categories: no qualifications, secondary qualifications, tertiary qualification other than university, and tertiary university qualification. The other control variables are *age group* (12-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-59) and *location* (main urban area, minor urban area, rural) as per the Department of Statistics (1992) statistical standard. Urban areas are statistically defined boundaries with no administrative or legal basis. Main urban areas are centred on a city or major urban centre with a minimum population of 30,000. Minor urban areas are urbanised settlements centred around smaller towns with a population of 1,000 - 9,999. Rural centres have a population between 300 and 999.

As NZWFEE is a retrospective longitudinal survey, it relied heavily on the women recalling specific calendar-event details about their employment, pregnancy, birth, and reproductive histories. As our analysis explores timing and duration, we did encounter missing dates for births and partnerships histories. The dates were arranged in their most basic units. For example, *month* and *year* were arranged as individual variables. However, there were cases that did not have complete information (e.g., year

[50] The link between marriage and exposure was at least amongst Pākehā/European. For Māori, the legitimation of unions was based more on community sanctions (social marriage) (see Pool et al., 1998; Pool, 1991)
[51] 63 percent (1,910) reported only ever having 1 partner; 7 percent (216) never had a partner.

specified but month missing or vice versa). We wanted to build a more complete calendar-event dataset, so we made some assumptions. For those records with missing months but non-missing years, we inputted the mid-year point (i.e., June as the month). Cases with missing years and non-missing months or coded as *residual-type* categories (e.g., don't know) were coded as missing. This method was applied to both births and partnerships (entry and exit) dates.

3.5 Results

3.5.1 Descriptive overview

We begin with a descriptive analysis of key indicators by ethnic identification for the total sample (n=3017) (see Table 3.3). There are marked differences by age groups, with the Mainly Māori group younger than their counterparts. The proportion of Māori young adults aged 20-29 years (39.4 percent) is significantly higher than non-Māori (22.4 percent) while the proportion of Mainly European young adults (34.2 percent) was closer to Mainly Māori. At the older ages, non-Māori had a much higher proportion of participants aged 40+ (46.6 per cent) compared to those who were Mainly Māori (28.4 percent), and Mainly European (29.7 percent).

There are also significant differences in education levels,[52] which partly reflects age differences. Nearly half (45.5 percent) of Mainly Māori women had no qualifications at the time of survey, but just over a quarter (25.6 percent) had a diploma. On the other hand, a third of non-Māori (33.3 percent) had a degree level qualification. The proportions of Mainly European were evenly spread across the different education levels, although most of them (26.9 percent) had no qualifications. Nearly a quarter (24.9 percent) of Mainly European had a degree, which was substantially higher than Mainly Māori women (12.9 percent).

Although most women across all ethnic groups were in a legal or consensual relationship at the time of survey, the share of partnered varied across groups. Nearly one third of Mainly Māori women (31.6 percent) were single at the time of the survey but had a previous relationship, compared to non-Māori (17.9 percent), and Mainly European (23.1 percent). A much smaller proportion of Mainly European (4.0 percent) had never been in a relationship, compared to Mainly Māori (10.4 percent), and non-Māori (7.0 percent).

For each ethnic group, most resided in main urban areas (pop. > 30,000) with nearly three quarters of non-Māori women (73.7 percent) living in the cities compared to 62.1 percent Mainly Māori. However, a quarter of Mainly Māori women (25.0 percent) lived in smaller towns (pop. 1,000-9,999), relative to 12.7

[52] Secondary (high school) is the minimum level of qualifications in Aotearoa NZ's education system.

percent of non-Māori. Similar proportions of Mainly European women lived in both small towns and rural areas (pop. 300-999), 16.0 percent and 17.3 percent respectively.

Despite a younger age profile, women who identified solely or mainly as Māori were far more likely than their non-Māori counterparts to have had at least three births (45.5 percent vs 33.3 percent). Similarly, 42.0 percent of Mainly European women had at least three births. On closer inspection (not shown here), Māori women had more children at higher birth orders with 16 percent of Mainly Māori having at least five children compared to 9.2 percent Mainly European and 4 percent non-Māori. As expected, non-Māori women had the highest share of childlessness (21.5 percent). However, we were surprised that a higher share of Mainly Māori women had never given birth compared to Mainly European women (18.4 percent vs 14.2 percent).

Table 3.3: Key indicators of total sample by ethnic identification (weighted)

Indicator (at time of survey)	Mainly Māori	Mainly European	Non-Māori
Number women (20-59 years)	276	81	2,660
Age groups (%)			
20-24 years	20.7	14.4	10.5
25-29 years	18.7	19.8	11.9
30-34 years	14.7	16.6	14.4
35-39 years	17.4	19.5	16.6
40-44 years	11.0	7.1	15.4
45-49 years	6.7	11.8	14.2
50-54 years	4.3	4.0	9.5
55-59 years	6.5	6.8	7.5
Median age (n)	32	34	38
Highest education level (%)			
None	45.5	26.9	22.7
Secondary	16.0	25.9	27.1
Diploma level	25.6	22.3	17.0
Degree+	12.9	24.9	33.3
Partnership status[1] (%)			
Never been in a	10.4	4.0	7.0
Formerly in a	31.6	23.1	17.9
In a relationship	57.0	72.8	74.7
Births (%)			
None	18.4	14.2	21.5
1 to 2	36.1	43.9	45.5
3 or more	45.5	42.0	33.0
Location (%)			
Main urban	62.1	66.7	73.7
Minor urban	25.0	16.0	12.7
Rural centre	12.9	17.3	13.6

Source: NZWFEE

Note: [1]Mainly Māori and non-Māori do not total 100% because numerator excludes those who refused to answer question i.e., Mainly Māori n=3 and non-Māori n=9.

To better understand the relationship between Māori identification and parity, we explore differences in the timing of births, measured in months, from age 12 (time zero). Consistent with our hypothesis, Table

3.4 shows that the median time to first birth was shortest for women who identified solely or mainly as Māori (59 months), followed by women who identified as Māori but perceived themselves mainly as European (63 months). The median time to first birth was considerably longer for non-Māori women (81 months). It is important to note here that the median times to first birth reflect cohort differences in fertility, particularly for non-Māori women. In an earlier analysis using NZWFEE data, Sceats (1999) noted that women who became mothers during the Baby Boom period started younger and had shorter birth intervals. Her analysis also showed that the median age at first birth successively increased for non-Māori birth cohorts. For example, the median age of first birth for women aged 55-59 years in 1995 was 23.7 years compared to 26.5 years for women aged 25-29 years. In contrast, there was little change in the median age of first birth (21.0 - 22.4 years) for Māori - younger cohorts followed the patterns of earlier generations (Sceats, 1999). As another indicator of timing, Sceats (1999) noted that the median interval between the commencement of sexual activity and first birth was shorter for all women born prior to 1960 (i.e., those aged 35-59 years). Thus, the median duration for women aged 55-59 years was only 2.3 years compared to 7.61 years for women aged 20-24 years.

Looking at the time to second birth, the median durations were much closer in proximity across the three ethnic categories. For non-Māori women the interval from first to second birth is just over a year, 14 months, followed by 16 months for Mainly Māori women and 19 months for Mainly European women, suggesting that women who delay the start of childbearing are more likely to have their second child in quick succession, and perhaps to achieve their desired family size before the end of their childbearing years.[53] The time to third birth is slightly longer for all groups than to second birth but both Mainly Māori and non-Māori had similar median times (18 months), with Mainly Pākehā only marginally later (23 months). Interestingly, the median interval times for Mainly Pākehā and non-Māori were shorter at the higher birth orders (4+) than Mainly Māori.

[53] See Sceats (1999) for more detailed analyses by birth cohorts (age groups).

Table 3.4: Kaplan-Meier estimates of median length (months) of birth intervals by ethnic identification (weighted)

Ethnic identification	Birth interval to					
	First	Second	Third	Fourth	Fifth	Sixth & above
Mainly Māori	59	16	18	17	24	21
Mainly European	63	19	23	15	20	16
Non-Māori	81	14	18	21	16	15

Source: NZWFEE

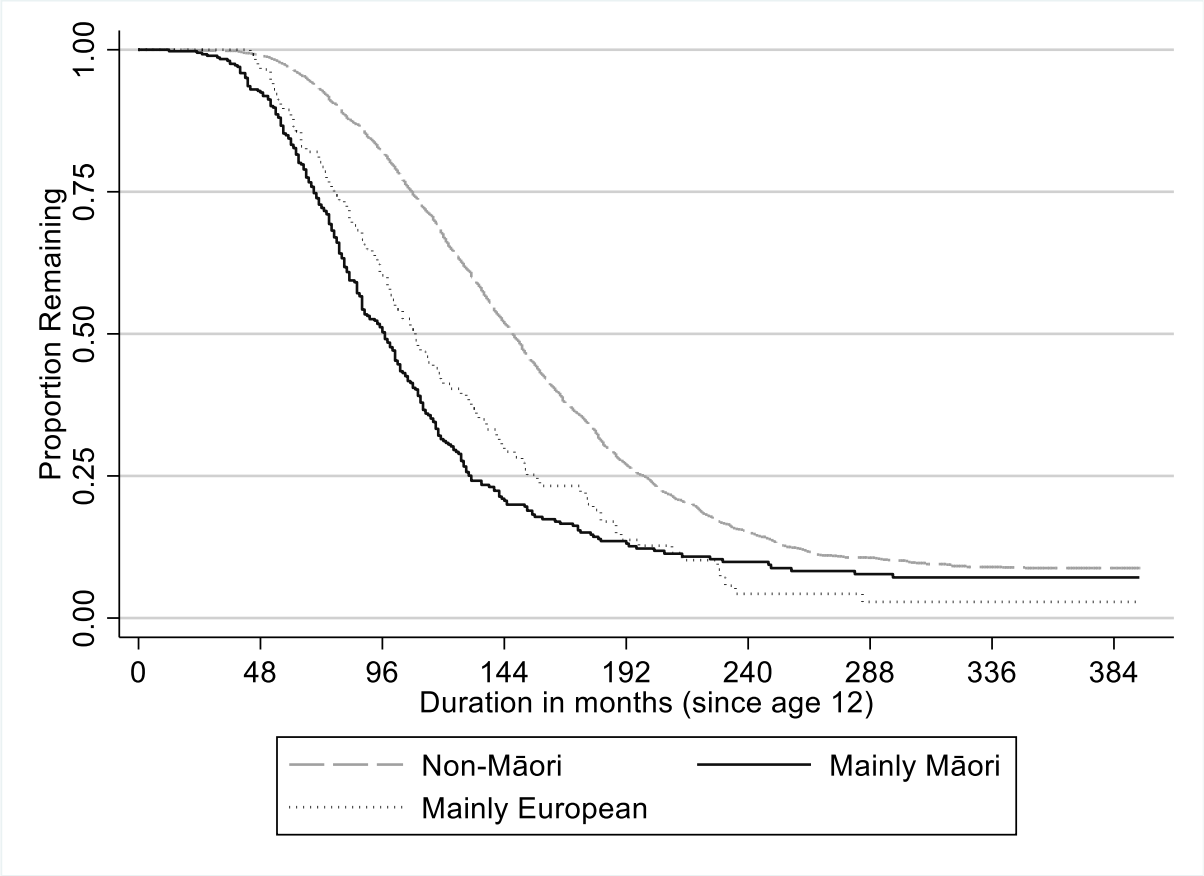
3.5.1.1 Transition to first birth

Focusing on the transition to first birth, we limited the sample to those women who ever had a partnership and observed their birth histories from age 12 (time zero) to age 45 years (540 months). After setting these parameters, we end up with a total sample size of n = 2,799, thus excluding 218 women from the original sample. We also note that this also excludes a relatively small proportion of those who may have a history of births but no record of a partnership, including those who had an incomplete partnership history.

Figure 3.2 shows the Kaplan-Meier survival estimates by ethnic identification for transition to first birth. As expected, Mainly Māori women had their first child much earlier than non-Māori women, with about 80 per cent having their first birth by age 24 (144 months duration). This was somewhat higher than Mainly European women[54], and much higher than non-Māori women - for the latter group, approximately half had still not had a baby by age 24. At around age 30 (214 months), we see a crossover where Mainly European women have their first birth earlier than Mainly Māori women for the remainder of the period. The share of women who remain childless also varies by ethnic identification. By the end of the observation period, 431 women remained childless of which 7.4 percent (n=32) were Mainly Māori, 90.7 percent (n= 391) were non-Māori women, and 1.9 percent (n=8) were Mainly European.

[54] For robustness, we conducted a likelihood ratio test (log-rank test). The difference in survival functions between Mainly Māori and Mainly European was statistically significant, p=0.0000.

Figure 3.2: Kaplan-Meier survival estimates for transition to first birth by ethnic identification (weighted)



We now look at the hazard ratios by ethnic identification (Table 3.5). Although our focus is on exploring the role of ethnic identification, as a proxy for cultural orientation, on birth timing, we also include key variables that are also recognised as having an important influence on fertility. Thus, we estimate the effects of ethnic identification on the timing of births, while also controlling for education, age, and residential location. For comparison purposes, our reference group are non-Māori women aged 30-34 years with a university level qualification living in a main urban area.

After controlling for the other variables, the risk of first birth for Mainly Māori women was 69 percent higher (1.69) than non-Māori women. Likewise, the probability of a first birth for Mainly European women was 52 percent (1.52) higher than non-Māori[55]. Overall, this means that women who identified as Māori, whether sole or mixed, were more likely to have their first child earlier than non-Māori women and is consistent with the median interval lengths shown previously in Table 3.4.

The hazard rates were significant for all levels of education, and we also note a gradient where the rates decreased by education level, which is consistent with the literature on fertility studies where it is frequently observed that education and fertility have an inverse relationship (Cochrane, 1979;

[55] As noted previously, the difference in survival functions between Mainly Māori and Mainly European was statistically significant, p=0.0000.

Diamond et al., 1999; Michael, 1973). In this case, women with no qualifications have a 99 percent (1.99) chance of conceiving their first child earlier than women with a university qualification.

Compared to all the age groups, the probability of a first birth was considerably higher for women aged 30-34 years, which is consistent with delayed childbearing. This is unsurprising given that the age-specific fertility trends since the 1960s in Aotearoa has seen a general shift of childbearing to older ages (Stats NZ, 2023b).

Women who live in small-town settlements were 30 percent (1.30) more likely to conceive their first child compared to women living in cities.

Overall, no education was the strongest predictor of timing to first birth, followed by Māori identification, then women living in small towns, and then women in their early thirties[56].

Table 3.5: Hazard ratios to first birth for women who ever had a relationship (weighted)

	Predictors	Hazard ratios
Ethnic identification (time invariant)	*Non-Māori (reference)*	
	Mainly Māori	1.69 ***
	Mainly European	1.52 **
Highest qualification (time invariant)	*Tertiary qualification*	
	No qualification	1.99 ***
	Secondary qualification	1.41 ***
	Other tertiary qualification	1.34 ***
Age Groups (time variant)	*30-34 years (reference)*	
	12-19 years	0.00 ***
	20-24 years	0.01 ***
	25-29 years	0.01 ***
	35-39 years	0.57
	40-44 years	0.10 *
Location (time invariant)	*Main urban area (reference)*	
	Minor urban area	1.30 ***
	Rural area	1.09

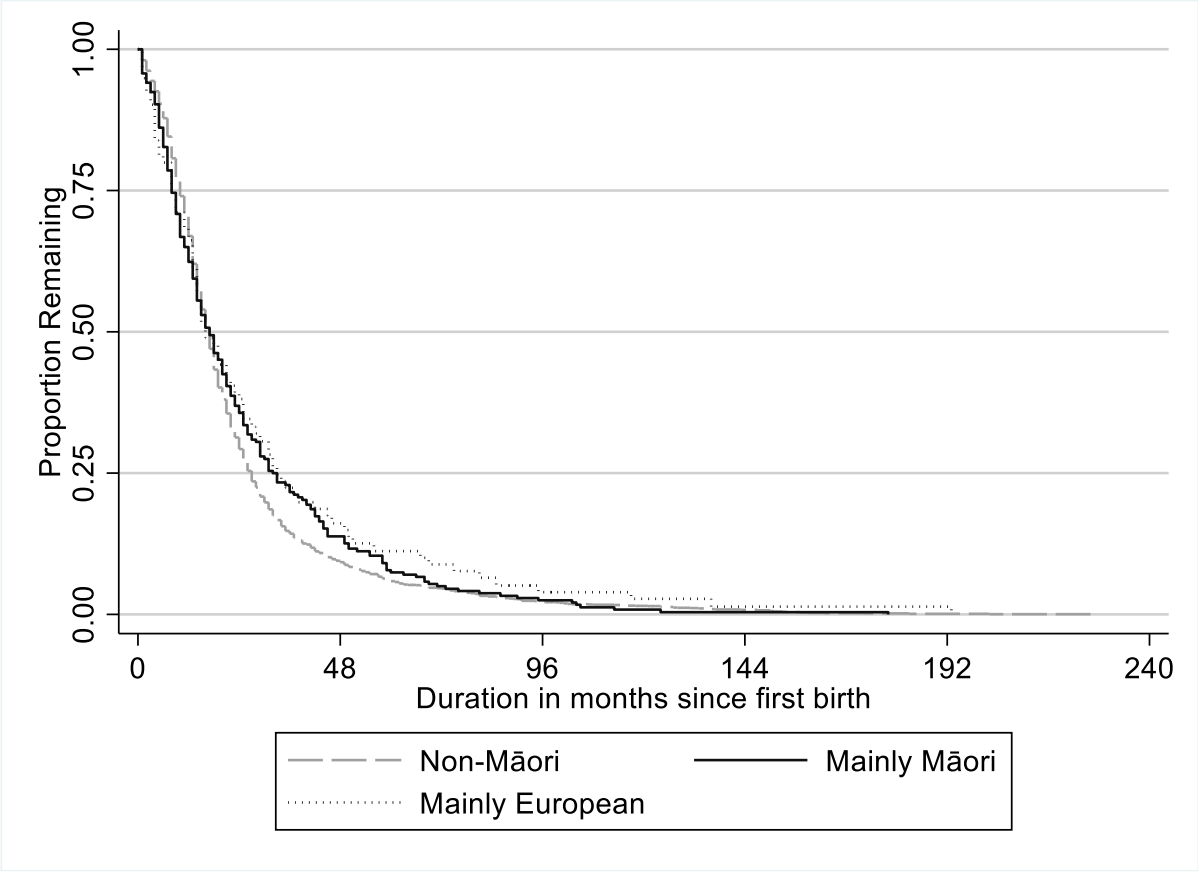
Source: NZWFEE
+p<0.1 *p<0.05 **p<0.01 ***p<0.001

[56] We investigated the interaction between ethnic identification and education. We created a binary for each variable i.e., ethnic identification = Mainly Māori (consisting of all women who identified sole or mixed) and non-Māori; education = no education and education qualification (combining all those women with a qualification). The hazard ratio of the interaction between *Mainly Māori* with *No Qualifications* was 0.75 with p=0.065, indicating that there is no association or interaction between ethnic identification and education.

3.5.1.2 Transition to second birth

The survival curves for the transition to second birth (Figure 3.3) are much steeper and closer than the previous birth, making it more difficult to distinguish between the three ethnic groups. However, at the two-year mark (24 months), it becomes a little clearer that non-Māori women have their second child earlier than both Mainly Māori and Mainly European women, and within four years of having their first child. The difference between Mainly Māori and Mainly European are minimal but starts to widen after four years, with Mainly Māori women birthing their second child slightly earlier.

Figure 3.3: Kaplan-Meier survival estimates for transition to second birth by ethnic identification (weighted)



The hazard ratios in Table 3.6 are consistent with the survival estimates. Although the rates are slightly below 1.00 for both Mainly Māori and Mainly European, ethnic identification is not a statistically significant predictor of the timing of second birth, once education, age and residence are accounted for. Once again, having no qualifications features as an important predictor to second birth but this time age becomes significantly correlated with the timing to second birth. In particular, the probability of bearing a second child was more likely for women aged 35 years and above, with the hazard ratio quite pronounced for women over 40 years (2.30). This seems logical given the pressure to have another child and/or complete the desired family size before the end of a woman's reproductive period. The chances of birthing a second child were slightly higher for women living outside of the cities, especially more so for women living in rural areas (1.23) albeit only slightly

higher than women in small towns (1.12). Overall, the strongest predictor to second birth was women in their early 40s, and then women living in rural areas.

Table 3.6: Hazard ratios to second birth for women who ever had a relationship (weighted)

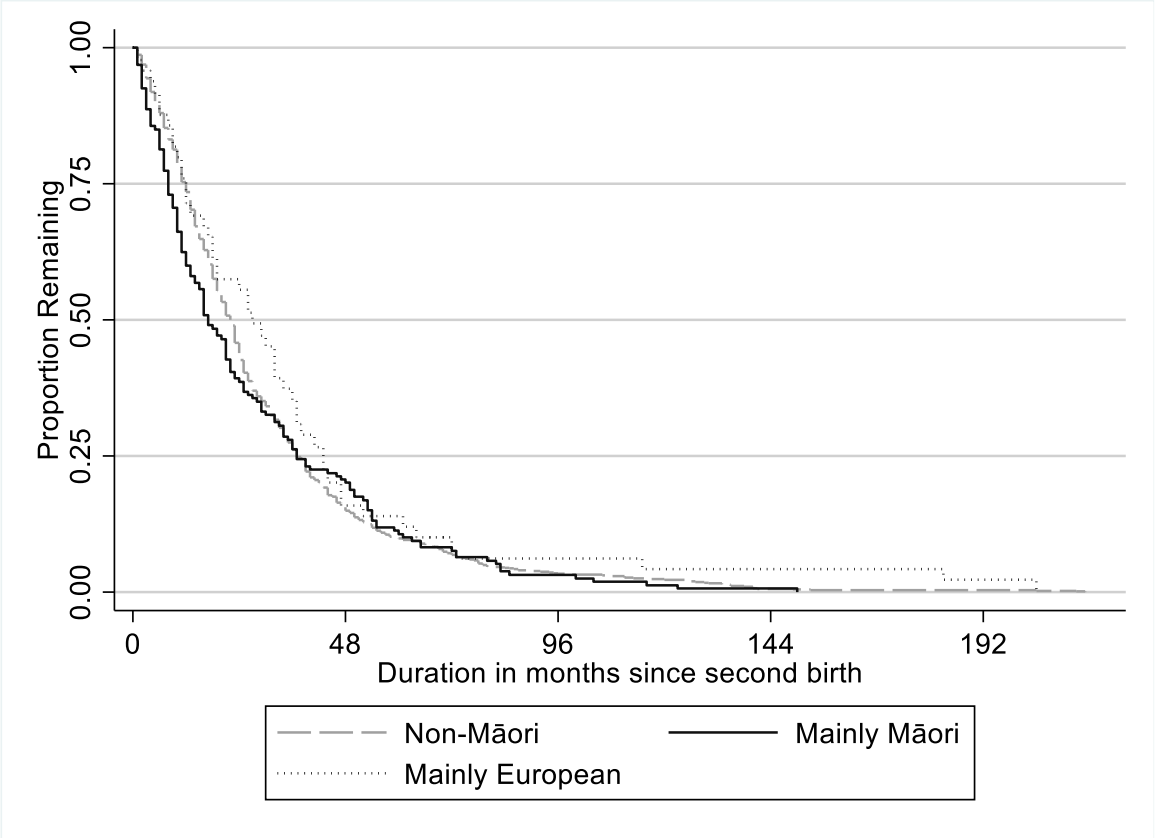
Predictors		Hazard ratios
Ethnic identification (time invariant)	*Non-Māori (reference)*	
	Mainly Māori	0.98
	Mainly European	0.89
Highest qualification (time invariant)	*Tertiary qualification*	
	No qualification	1.11 +
	Secondary qualification	0.98
	Other tertiary qualification	1.08
Age Groups (time variant)	*30-34 years (reference)*	
	12-19 years	0.62 ***
	20-24 years	0.80 **
	25-29 years	0.89 +
	35-39 years	1.10
	40-44 years	2.30 **
Location (time invariant)	*Main urban area (reference)*	
	Minor urban area	1.12 *
	Rural area	1.23 ***

Source: NZWFEE
+p<0.1 *p<0.05 **p<0.01 ***p<0.001

3.5.1.3 Transition to third birth

Like the transition time to second birth, we see steeper survival curves to third birth, although the differences between ethnic groups are a little more distinguishable. Mainly Māori birth earlier within the first two years (24 months), and Mainly European and non-Māori are about the same. However, around about the third-year mark, there is a cross-over of non-Māori with Mainly Māori. Between the 4-year (48 months) and 8-year (96 months) mark, the survival estimates are very close between the ethnic groups but seem to widen after 8 years with Mainly European birthing their third child later than their counterparts for the remainder of the observation period.

Figure 3.4: Kaplan-Meier survival estimates for transition to third birth by ethnic identification (weighted)



When we look at the hazard ratios, only the age variable is significant to third birth, especially at older ages (35+ years). Again, the chances of women older than 40 years birthing faster to third birth are considerably higher (2.14) than women in their early 30s. In addition, the hazard rates for women aged 35-39 years are statistically significant. The rates for the other independent variables are close to the reference group but are insignificant.

Table 3.7: Hazard ratios to third birth for women who ever had a relationship (weighted)

	Predictors	Hazard ratios
Ethnic identification (time invariant)	*Non-Māori (reference)*	
	Mainly Māori	1.11
	Mainly European	0.85
Highest qualification (time invariant)	*Tertiary qualification*	
	No qualification	0.99
	Secondary qualification	1.02
	Other tertiary qualification	0.99
Age Groups (time variant)	*30-34 years (reference)*	
	12-19 years	0.99
	20-24 years	0.81 *
	25-29 years	0.88 +
	35-39 years	1.58 **
	40-44 years	2.14 **
Location (time invariant)	*Main urban area (reference)*	
	Minor urban area	1.13
	Rural area	0.99

Source: NZWFEE
+p<0.1 *p<0.05 **p<0.01 ***p<0.001

3.6 Discussion

The purpose of this paper was to explore the association between Indigenous identity and fertility. Using the Kaplan-Meier estimates and piecewise exponential models we explored how the timing of fertility, and the duration of birth intervals vary by *expressed identification*. Our rationale for doing this is to better understand the distinct Indigenous fertility patterns in CANZUS countries, where childbearing tends to be concentrated at the younger ages, in stark contrast to the deferred childbearing of women from the dominant white populations. Research has shown that Māori have more children on average, and lower rates of childlessness than non-Māori, even at higher education levels (Rarere, 2018). Māori women also have their children earlier. Since the late 1970s Māori age-specific fertility has been concentrated at ages 20-24 years and has only recently (2013/2014) shifted to 25-29 years. Women who start reproduction earlier in their life generally have more children (i.e., higher completed fertility) relative to those who start later (Bumpass et al., 1978; Gyimah, 2003; Morgan & Rindfuss, 1999; Morgan et al., 2001). However, Morgan et al. (2001) notes that the link between early fertility and higher completed fertility does not necessarily depend on a more rapid pace of fertility. The authors state: "Because earlier childbearers have more years in which to have births, their fertility could be higher because they have longer to decide to have additional children and/or more years in which they could have a child that was unwanted at conception" (Morgan et al.,

2001, p. 55). For obvious reasons timing does matter in fertility because it determines the number of children (parity) a woman bears over her reproductive period, and therefore the future size and composition of a population.

Based on our analysis the differences in timing between Māori and non-Māori are very clear and apparent, especially to first birth. There is little room to doubt that Māori start their child-bearing earlier than non-Māori. However, our primary interest is to explore Māori cultural identity as a determining factor in fertility. We assumed that how women ethnically identify themselves is one facet of a deeper cultural orientation, and hence, we used it as the best proxy for our study, and to get closer to understanding the role of cultural identity in fertility outcomes. We wanted to see whether Māori women who identify exclusively or primarily as Māori have an earlier first birth, and shorter birth duration than women who identify as Māori but see themselves primarily as European. After controlling for education, age, and residence (location), Māori ethnic identification (sole or mixed) was significant in explaining the transition to first birth. However, women who identified Mainly Māori (*thicker ties* to Māori identity) had a higher risk to first birth than Mainly European (*thinner ties* to Māori identity), and the difference between the two was statistically significant. However, ethnic identification was insignificant for explaining the transition to second and third birth orders. The median length of time to first birth for women who identified exclusively or mainly as Māori was much shorter than for non-Māori. However, somewhat surprisingly, there was little difference in the median duration across all birth orders compared to women who identified as Māori but perceived themselves primarily European. Generally, we found that the survival estimates and hazard ratios for Mainly European were closer to Mainly Māori than non-Māori.

3.7 Conclusion

The broader motivation of this paper was to build better cultural understandings of Māori fertility as a means of contributing towards the development of broader Indigenous-centred theories about Indigenous population change. Previous research has already shown that those with multiple ties to Māori have more children on average and lower rates of childlessness, even when taking into consideration education and location (Rarere, 2018). This paper builds more empirical evidence by investigating Māori cultural identity, as a proxy for cultural orientation, as an important determinant of the timing of births, including subsequent. We untangled cultural identity using ethnic group indicators in the NZWFEE survey to test our idea, and to better represent Māori realities. Is cultural orientation a key determinant of fertility? While we cannot be too definite about cultural orientation, the empirical evidence (including previous studies) suggests that there is something *culturally important* going on, but this is limited by cultural identifiers captured in data collection instruments. In terms of timing and spacing, cultural identity seems to be a key determinant in the timing to first births but not necessarily to second birth or third birth. However, birth intervals at the higher birth

orders may not necessarily be a concern for Māori women (sole or mixed) because they have a longer exposure of risk to complete their fertility.

We also acknowledge that our study has limitations. Firstly, we acknowledge the potential for reverse causation. Given that ethnic identification is captured at the time of survey (i.e., after reported childbearing), there is the potential that, for example, earlier childbearing could lead to stronger identification as Māori. Secondly, we also note limitations with the survey data. In particular, we have used location and highest qualification as time invariant variables in our piecewise exponential modelling, knowing that of course these are both time-varying variables i.e., people migrate or gain qualifications at various points of time. However, we had limited time-specific data and histories in order to create these as time-varying variables.

There are issues with the discipline of demography – it predominantly draws on Western theories to interpret/understanding Indigenous demographic behaviour. Research across the academy, and especially in a positivist-dominant discipline such as demography (Kertzer and Fricke 1997; Petit 2013; Greenhalgh 1996) has privileged Western knowledge systems while disregarding Indigenous worldviews (L. Smith 2021; Axelsson and Skold 2011; Taylor 2009). There is a need for more Indigenous-centric theories and/or culturally appropriate tools to complement and reframe how we should conduct and interpret demographic research of Indigenous fertility trends and patterns.

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CHAPTER FOUR: THE IMPORTANCE OF WHAKAPAPA FOR UNDERSTANDING FERTILITY

Moana Rarere*

4.1 Abstract

The Māori fertility transition—which saw a shift from high to low birth rates between 1966 to 1976—was one of the most rapid fertility declines observed anywhere in the world. Since then, Māori fertility has hovered around replacement level (2.1 births per woman), somewhat above that of Pākehā (European) New Zealanders. More striking are differences in timing with Māori women bearing their children younger and over a longer duration. This paper sits within a broader research project that asks: What are the important influences that have sustained contemporary Māori fertility patterns? Drawing on Mana Wahine (Māori women's discourses) and whakawhiti kōrero (interviews) with wāhine Māori (Māori women) this paper highlights whakapapa (genealogy) as an important concept in broadening and deepening our understandings of fertility, and situating individual fertility and reproduction within a broader set of relations.

4.2 Introduction

The women in the room were aghast. However, the kuia (female elder) was defiant. She had just finished proclaiming that she encouraged her young mokopuna (grandchildren) to have babies because, to her, it was about the survival of her whakapapa (genealogy).

I begin with my own observation of an exchange that occurred some years ago in a religious Sunday School meeting of women. The topic of discussion was teenage pregnancy. A few of the women had expressed their disdain towards young solo mothers because, in their view, childbearing should be reserved for those who were 'respectably' married. Others preferred that their daughters pursue education and a career before settling down to have a family. The kuia, however, disrupted their discourse. To her, having children was about preserving and sustaining whakapapa, hence why she encouraged her grandchildren to reproduce, and to start early. It was a rite of passage that the kuia not only expected, but welcomed and embraced. Her position highlights the important, but often

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overlooked, significance of cultural values for understanding Indigenous fertility. Using a qualitative research methodology, this paper examines Māori women's perspectives on fertility, revealing a much broader set of understandings than the output of reproduction. What I find are powerful narratives of 'whakapapa' as an important concept in making sense of fertility and situating individual fertility and reproduction within a broader set of relations.

4.2.1 Whakapapa

Whakapapa is a Māori term that is commonly translated as 'genealogy', 'lineage' or 'descent' (Whakapapa n.d.). As a verb, whakapapa also means to "recite in proper order" one's genealogy, or to "lie flat", to "place in layers" or "lay one upon another" (Williams 2000, p. 259). Similar to how kinships are mapped on a pedigree chart, whakapapa is like the 'layering' of generations upon another. Whakapapa, however, is more than a 'list' of names (Mahuika 2019). Embedded within the concept of whakapapa, is the layering of knowledge or narratives passed down through the generations (Barlow 1991). In short, simple English translations such as 'genealogy' do not adequately represent the depth and breadth of meaning, or the potential of whakapapa in te ao Māori (the Māori world). To give a sense of how significant whakapapa is, Rawiri Taonui states:

> *Whakapapa is a taxonomic framework that links all animate and inanimate, known and unknown phenomena in the terrestrial and spiritual worlds. Whakapapa therefore binds all things. It maps relationships so that mythology, legend, history, knowledge, tikanga (custom), philosophies and spiritualities are organised, preserved and transmitted from one generation to the next. Whakapapa is the core of traditional mātauranga Māori (Māori knowledge).*
>
> (Taonui 2011, p. 1)

Thus, whakapapa is the binding mechanism or the 'lifeblood' through which everything is connected: the physical and metaphysical. Nepia Mahuika writes that whakapapa is paramount in te ao Māori because it is "crucial to assertions of Māori identity and tribal membership" (Mahuika 2019, p. 1). More broadly, whakapapa has been described as a framework of Māori epistemology and knowledge (Mahuika 2019), and is a central feature of Māori research methodologies. For example, Joseph Te Rito (2007) uses whakapapa as a methodological tool to tell his own story of his connections and relationships to his hapū (sub-tribe) and tribal whenua (land).

The preservation and transmission of whakapapa through the generations (Barlow 1991; Taonui 2011) is intimately connected to reproduction, but extends beyond the creation of life to embody the complex relationships between all things. Ani Mikaere captures this well:

> *The significance of the whare tangata[57] [womb] is rooted in the creation of the world and in the overriding tapu [sacredness] of whakapapa … the inherent tapu of each Māori person is sourced in their connection, through whakapapa, to the rest of humanity, to the atua [Gods] and to the environment.*
>
> (Mikaere 2017, p. 41)

By breaking down the term into its two components, whakapapa can also mean "to become ("whaka") earth ("papa")/be embraced towards Papa (earth mother)" (Mika 2014, p. 53). Here, Carl Mika (2014) refers to Papatūānuku (earth mother), a powerful figure that exemplifies the "generative foundation of all life" because "all things are born of her and nurtured by her" (Royal 2007, p. 2). According to Māori cosmogony, the origin of all living things, including the natural world, centres on the union and eventual separation of the atua (gods)—Papatūānuku and Ranginui (sky father) (T. Smith 2012). Pinnacle to their union was the birth of children, including natural phenomena, who then bore more children and so forth (Royal 2007). It is said that through their son, Tāne, who formed a woman, named Hineahuone, out of the earth, became the first female to birth a child (Royal 2005).

Similarly, because of their power to generate life through the whare tangata, wāhine are creators, providers, and nurturers of life—past, present, and future generations (Higgins and Meredith 2011; Mikaere 2017). Ani Mikaere writes that "the survival of the whānau, hapū and iwi is dependent upon the reproductive functions of women" (Mikaere 2017, p. 41). Framed another way, the following well-known whakataukī (proverb) encapsulates the centrality and the mana (power/status/authority) of wāhine, including Papatūānuku, to the survival of humanity (Jahnke 1997; Pere 1982):

> *He wāhine, he whenua, e ngaro ai te tāngata*
>
> *By women and land, men are lost.*

The significance of reproduction or fertility is also reflected in many te reo Māori (the Māori language) concepts. For example, traditional Māori society is comprised of kinship groupings: whānau, hapū, and iwi. Whānau is often translated as 'family' or 'extended family' but also means 'to birth'. Hapū generally refers to a 'clan' or 'sub-tribe' but also means 'pregnant'. Iwi is commonly referred to a larger tribal grouping but also means 'bone' or 'strength'. The term whenua has dual meanings with reference to Papatūānuku and pregnancy/birth because it means both land and placenta.

[57] Literal translation of this Māori term is 'house of humanity', which specifically refers to the woman's womb or uterus where human life is formed and developed.

Clearly, whakapapa has a much broader and deeper set of meanings than that connoted by the term fertility—the production of offspring (Weeks 2016). What I am interested in here, is how wāhine Māori view fertility. First, I provide a brief overview of Māori fertility trends.

4.2.2 Māori fertility

Aotearoa/New Zealand (NZ) is a useful context to explore these deeper meanings of fertility. NZ is a settler-colonial state consisting of two major populations: Māori, who are the Indigenous peoples of the land, and Pākehā (New Zealanders of European descent) who form the dominant group. Although their histories have very much been intertwined since first contact, two very distinct demographic fertility histories have transpired. The Māori fertility transition was described as one of the most rapid shifts of its time. Beginning in 1966, Māori fertility underwent a significant decline that eventually saw it converge to a level similar to that of Pākehā by the late 1970s (Pool 1991). Although this transition has been framed as an inevitable 'convergence' to Pākehā fertility, the timing and mechanisms facilitating the change were very different (see Pool 1991; Pool et al. 2007). Following a pattern similar to the Western European transition, the Pākehā fertility transition occurred around a century earlier, and was stimulated by delayed marriage. In contrast, the Māori fertility transition was achieved by the universal uptake of effective contraception i.e., the 'pill'. Even in a contemporary context, where society favours and facilitates low fertility and smaller families, important differences persist. Since the 1980s, Māori fertility has remained fairly stable, hovering mostly above the theoretical population replacement level of 2.1 births per woman, whereas Pākehā birth rates have predominantly mirrored levels similar to other economically advanced nations experiencing long-term sub-replacement fertility. Most notably, research has shown that Māori women bear children earlier, and over a longer period of time (Jackson et al. 1994; Johnstone et al. 2001; Didham and Boddington 2011; Stats New Zealand 2017). Similar trends have been identified in other Indigenous nations in settler-colonial states, particularly Canada, Australia, and the United States (Johnstone 2011).

In the fertility literature, the Davis–Blake model (Davis and Blake 1956; also see Bongaarts 1978, 1982) has been the conventional framework for explaining fertility outcomes. Fertility is defined narrowly as 'live' or 'actual' births, compared to fecundity, which refers to a woman's ability to reproduce. Hence, the Davis–Blake model focuses on the factors that specifically lead to a 'live' birth. The model identifies eleven 'proximate determinants' through which social, cultural, economic, and bio-social factors, also known as 'explanatory factors', can influence fertility outcomes. The proximate determinants are classified according to whether they influence the likelihood of or exposure to one of the three phases of fertility: intercourse, conception, or gestation. For example, use or non-use of contraception directly affects exposure to conception. Use or non-use could be influenced by cost, access, or attitudes towards contraception. While the Davis–Blake model is useful in terms of exploring the influence of cultural knowledge and attitudes through a proximate determinant on fertility levels, the model stops short in terms of understanding the timing of births.

The broader research is interested in how the cultural context shapes decisions around birth timing and, in particular, early childbearing.

A review of the demographic literature on Māori fertility reveals very little attention given to Māori understandings of fertility or Māori worldviews. The problem is partly explained by the fact that most of the studies have been conducted by non-Māori men. Furthermore, most of the post-Māori fertility transition literature has primarily focused on 'describing' Māori fertility patterns in comparison to the fertility patterns of the dominant Pākehā group (Didham and Boddington 2011; Pool 1991; Statistics New Zealand 2004; Zodgekar 1975). The problem with this approach is that demographers have generally resorted to Western-based approaches and interpretations to explain differences or trends in fertility. Yet, there are increasing calls from within the discipline "for more 'cultural' explanations of demographic behaviour" (Szreter et al. 2004). Johnstone (2011) has argued that to better understand Indigenous fertility patterns an "indigenous theory for population change is needed", one that reflects "social, economic, political, historical and cultural realities" (p. 117).

As a way forward, I draw on Mana Wahine (Māori women's discourses) to help further our understanding of contemporary Māori fertility patterns. From a Kaupapa Māori research standpoint, the absence of Māori worldviews and thinking in demographic research on Māori fertility is highly problematic. Kaupapa Māori research asserts that any research, especially involving Māori interests, should be conducted "by Māori, for Māori, and with Māori" (L. T. Smith 1996, p. 48). This is particularly important to ensure that "cultural integrity is maintained when analysing Māori issues" (Pihama 2010, p. 10). Research across the academy, and especially in a positivist-dominant discipline such as demography (Kertzer and Fricke 1997; Petit 2013; Greenhalgh 1996), has privileged Western ways of knowing while disregarding Māori and Indigenous peoples' worldviews (L. T. Smith 2021; Axelsson and Sköld 2011; Taylor 2009). While the analysis of fertility is a core undertaking in demography, studies of Indigenous fertility have overwhelmingly been conducted by non-Indigenous demographers deploying Eurocentric theories, frameworks, and tools. More importantly, however, there has been very little consideration of wāhine Māori perspectives in demographic studies of Māori fertility, which seems counter-intuitive considering that 'fertility' is a space that is predominantly female-focused. Furthermore, Indigenous women are too often seen as the subjects of research, rather than those with expertise. In response, this research is being conducted by myself, a wāhine Māori researcher. I also draw on Mana Wahine as a framework to address the lack of both Māori and wāhine perspectives in the demography of Māori fertility.

4.2.3 Mana Wahine: Reclaiming the Māori fertility space

Mana Wahine is the power and authority of women, with mana meaning authority or prestige, and wahine meaning woman. Female authority has always existed in te ao Māori (the Māori world) but emerged as a theoretical and methodological approach in the 1980s/90s, and was largely centred on

Māori women's discourses (Te Awekotuku 1991; Pihama et al. 2019a, 2019b; L. T. Smith 1992). Mana Wahine was developed to respond to the impacts of colonisation on the status of wāhine Māori, and to reassert Māori identity (Pihama 2001). As a framework, Mana Wahine privileges mātauranga Māori knowledges, methods of knowledge creation, and ways of knowing that are specific to Māori women (Jahnke 1997; Pihama 2001; Simmonds 2011, 2014; L. T. Smith 1992). Like Kaupapa Māori Theory (see Pihama 2010; G. H. Smith 1997; L. T. Smith 2021), Mana Wahine challenges dominant Western frameworks, enabling Māori women to push back against the colonial constructs that have 'othered' or defined them based on patriarchal and colonial belief systems (Irwin 1992; Pihama 2001, 2020; L. T. Smith 1992; Te Awekotuku 1999). One of the core aims of Mana Wahine is to [re]claim and [re]present the status of wāhine Māori according to mātauranga wāhine. One way to do this is to make "visible the narratives, experiences, in all of their diversity, of Māori women" (Simmonds 2011, p. 11). Given the dominance of Western theories and methodological approaches in the scholarships on Indigenous and Māori fertility, Mana Wahine creates an empowering space for Māori women to articulate their own understandings of fertility, whānau (family), and whakapapa from their own cultural standpoint.

4.2.4 Whakawhiti kōrero: Interviews

The interview materials presented in this paper are one method of enquiry, and are a part of a broader research project that aims to understand how cultural identity shapes contemporary Māori fertility. Earlier analyses applied quantitative methods using NZ Census population-level data to investigate intra-group differences in Māori fertility (Rarere 2018). The population-level data did not provide the depth of information to understand the socio-cultural context or nuances of fertility from wāhine Māori perspectives, and thus a key purpose of the interviews was to gain deeper insights. With the aims of the broader research agenda and Mana Wahine in mind, this paper brings to the foreground narratives of wāhine Māori lived experiences and perspectives collected through a Kaupapa Māori research method called whakawhiti kōrero (hereafter kōrero), which takes the form of a conversation similar to an unstructured to semi-structured interview but is primarily a responsive and interactive dialogue of shared knowledge or learnings that brings "enlightenment to a given situation" (Berryman 2013, p. 271). Prior to the kōrero, the wāhine were provided with an information sheet and informed consent form. The information sheet included a very brief and broad overview of the research topic, interview process, and confidentiality protocols. The consent form specified their rights pertaining to participation, withdrawal, anonymity, review, and ownership of interview data. Although the idea behind whakawhiti kōrero is to have an interactive dialogue, an interview schedule of questions was also prepared to help guide or prompt the kōrero, if required. The wāhine were recruited through whanaungatanga, meaning relationships, kinships, or family connections. In research, whanaungatanga is applied as a process similar to purposive and snowball sampling where the researcher draws on their own familial, social, and/or professional relationships to help identify and

invite participants to contribute (Bishop et al. 2014). In this case, the wāhine were recruited from a variety of social and professional networks. A total of eight kōrero were conducted with nine wāhine Māori; one of which involved a mother (age 45) and daughter (age 20) who chose to kōrero together. Six kōrero were conducted in-person at their home or in their workplace, and two via video call due to COVID-19 physical distancing restrictions. Given the small sample size, the views expressed here are not intended to be representative of all Māori. Instead, these views help us to gain deeper understandings of fertility beyond population-level data.

The kōrero were audio-recorded, and ranged between 30 and 120 min long with seven of the kōrero at least an hour long; therefore, providing ample and rich 'data' to analyse. The recordings were then transcribed in edited form (rather than strict verbatim) by a professional service provider and myself, the interviewer, and then thematically analysed. I went through a manual process of identifying, analysing, and reporting themes within the data. This involved reading each transcript at least four times for the purpose of re-familiarising myself with the material, noting down initial ideas, coding key features of the data, and correcting any errors (especially te reo Māori words) or inaudible dialogue that the professional service provider could not ascertain. Decisions around themes were framed by the overall research questions, and Mana Wahine concepts and theories (mentioned earlier). During this process, I also contacted the wāhine participants for either further clarification or validation of themes. Many themes and sub-themes emerged within and across the kōrero, reflecting a variety of experiences. However, because of space limitations, this paper will only focus on the themes of whakapapa and whānau as important concepts in understanding fertility. This means that not all of their stories will be reflected in this paper because some focused more on other themes, such as the economics of raising children, or the stigmatism of having many children. Pseudonyms and approximate ages have been used in this paper to protect the identity of the wāhine and their whānau.

4.3 Wāhine Māori fertility narratives

4.3.1 Continuation of whakapapa and whānau

The topic of fertility stimulated a keen interest amongst the wāhine, shown by their desire and willingness to talk about the topic openly and freely. Karlene (age 38) provides insight as to why fertility is popular by alluding to how it is intrinsically linked to Papatūānuku, and its connection to and continuation of all things:

> *We have such a hardcore[58] thing around birthing. Birthing is amazing too because it is really related to the environment and the way the world operates and that*

[58] In this context, the speaker is meaning 'staunch', 'steadfast', 'hard-line' or obsessive interest with the idea of birthing.

> *continuation of things and whenua-ki-te-whenua[59] and all those things, like we come from her and we go back to her and all those things. Fertility is really interesting for that stuff. When I'm dealing with what I'm dealing with for our whānau and stuff like that and to think about how that continuation has been disrupted, it is going against the natural flow of the world almost.*

(In-person interview, November 2018)

The topic also stirred interest for many of the wāhine because for them, it is about the continuation and survival of their whakapapa, which Karlene alluded to in the previous quote. Here she refers to the disruption of a genetic condition that affects the males in her bloodline, because if not detected early and managed, it can be fatal. However, procedures that enhance 'fertility' chances gives Karlene a sense of hope in 'saving' her 'whakapapa':

> *We are now in a process where we are looking at having our condition put on the new-born screening list so the little heel prick test that you get when your baby is born, they are now going to screen for this condition. What is absolutely amazing about that is that we will be able to help so many more children way before they get to a point where they might lose their lives… With the new-born screening testing, if they have children now it can get picked up easier and I can connect with them [wider whānau] and I can help them to secure our whakapapa in ways that really count.*

Karlene recounts six generations of her whakapapa with the disorder, which is carried through her maternal line. She then shared a story of how the disorder came to be in her whakapapa. It is said that a long time ago a "woman was stolen" by Karlene's iwi (tribe) from another iwi. In retaliation, the other iwi had placed a 'curse' on the woman so that if she birthed sons, they would die, and therefore, discontinue her whakapapa. Karlene explains that males represent a chiefly position in her iwi:

> *Like you know how the males were the ones that were able to be like rangatira [Māori chiefs] in certain forms and have many wives and spread their seed very far or whatever. With the male line discontinued then it would be sort of a woman, you know but then you would have to have girl babies to carry on the line.*

Karlene is grateful to be a survivor of that whakapapa:

> *What interested me about what you [to the researcher] were doing was that it directly related to what I was talking about and what I'd been going through, the*

[59] Whenua means both land and placenta. In this context, the speaker is talking about the return or the connection of people, as symbolised by the 'placenta', to the land.

> *fertility and what I think about when I think about how I'm a survivor of all this stuff. Fertility has been kind of luck of the draw where I'm here today. If I had been a boy, if it was my father had been a carrier and he could have died.*

For mother and daughter, Kaiora (age 45) and Hana (age 20), bearing and raising children was encouraged in their whānau because it was about replenishing the whānau (family), hapū (sub-tribe), and iwi (tribe). Kaiora states:

> *Well I've been brought up in a family, I've got six sisters and one brother. I have a majority of a female family. We were always encouraged and brought up to have children when we were of the age and have a partner that was able to look after us and look after the family, and encouraged to have lots of children! I think the reasoning for that was so that we could replenish and keep our family name going and replenish our iwi [tribe] and hapū [sub-tribe]. So I guess that is the kind of teachings that I continue today with my own children, encouraging them to be able to grow up with their children now while they're kind of young, but also the career in their lives will always be there afterwards, and their studying. I have always encouraged them to do what they feel is strong in their hearts and to follow that.*

(Teleconference interview, September 2021)

Rearing and nurturing identity within the whānau plays an important role in fertility decisions. Their whānau have always been "quite open to talk about things". Kaiora believes that being open makes it easier just in case any of her children were expecting:

> *Because if your whānau aren't people to kōrero [talk] about everything and share everything, then of course if you were to get hapū [pregnant] at a young age you would be so scared to even tell your parents, that you would then possibly make the decision of having an abortion or not going through with actually telling people, or perceptions of what they might say. Whereas a whānau that kōrero together and does a lot of things together, you will get them coming out and saying things a lot more easier, especially in those hard situations.*

Kaiora has also taught her sons about the mana (power/status/authority) of wāhine and reproduction, and again emphasises the importance of replenishing their hapū and iwi:

> *So for me it was about them being comfortable that this was something natural, and that this is why us as wāhine are built the way that we are built, to be able to have babies and to be able to nurture and look after these babies and to replenish*

> *our hapū [sub-tribe] and our iwi [tribe] to keep it going. So yeah, so we've been a pretty open whānau in terms of that, because I want my boys to be able to look after their partners when they get partners, and treat them that same way and understand their partners as well... Yeah, so when I say replenish our iwi and hapū, that is why. It is about keeping our bloodlines alive, keeping them going. In terms of mātauranga Māori and our upbringing, our kids have been pretty lucky that they've been brought up in a balance of both worlds.*

Despite the importance of reproduction in te ao Māori, there is also the very real possibility, for various reasons, of 'whare ngaro', in this context meaning no offspring or issue. However, one can still 'parent' or 'mother' even though they may be physically unable to birth children. 'Whāngai' is a Māori customary practice, similar to adoption and/or fostering, where a child/children are raised by someone other than their birth parents, who is usually a relative (Keane 2011, p. 1). There are various reasons for the practice of whāngai, one of which is to 'gift' children to couples who cannot have children (see Keane 2011), and therefore to help preserve whakapapa (Glover et al. 2008). At the time of the interview Tāniko (age 43) has not been able to conceive or birth her own children. She was in her mid-30s when she met her current husband and his two young daughters. Although she has taken on the role as 'mum', Tāniko has always wanted to birth her own "blood". With time against her, at age 38, she and her husband started a fertility programme involving assisted reproductive technology. At the time of the kōrero, nothing has since emanated but she is still hopeful. It is a sensitive issue for her, and she is learning to accept that she may never be able to have her own children. Having children was always on the cards for Tāniko, which is partly linked to her beliefs around life purpose and the inherent potential of womanhood:

> *I want to know or feel what it is like to be a mother. I think that is one of the greatest callings on the earth, is to be a mother. I know that if I don't have it in this life, I know that I'll be eligible and be able to have that in another life—hopefully. I have two daughters at the moment, and I don't call them my step-daughters 'cos [because] my current husband of 5 years is; our understanding between us is that our girls have two mums. So they have a biological mother and they have me. We don't call it step or whāngai [foster/adopted child]. It's just mum.*
>
> (In-person interview, May 2018)

Ideally, Tāniko wants two boys so that her daughters get "to experience being older sisters". However, her most important reason for wanting children relates to whakapapa, in particular, to have her own blood:

> *And, to have my own blood—you know. To be blood of my blood. To be able to have a really intrinsic close connection with another human being is kind of what I'd love to experience. And I believe it comes from birth. Having your own. It's an intrinsic connection; through birth. Through shared whakapapa. Yeah shared living—life experience; shared traits; shared talents; mannerisms. Yeah I want to experience that as a mum. To know what that's like. And to experience that with a partner. My current partner; he'd be really good with babies. But, I don't know if want to leave this world without having children; biologically. I'm thinking on that. I don't really want to leave this world without not having a child. A biological child. You know, kind of, that's where my head is at.*

Janice (age 67) emphatically states: "Because they didn't believe in not trying to have [children]!" She was referring to her parents and their generation. Janice came from a big whānau of at least 16. Her mother had lost a few, and there were quite a few whāngai kids, a customary practice of adoption and fostering. Back in those days, it was the 'norm' to have big families. Janice shares how she asked her mum one time, "How come you had so many kids?" Her mother's response was: "I don't know, I got pregnant and that was it". Janice reflects on her mum's answer:

> *I don't think they even thought about it. It wasn't planned. There was no birth control, and if they did have I don't think they wanted to use it. I believe from what my mother says, I believe that.*

(In-person interview, July 2018)

Janice explains that times were different back then, and especially points out that whānau were resilient: "Yeah, I mean it is a flippant way of saying it but I think they just went with the flow". Her mother and father coped with their many children because things "weren't as expensive as they were" and "it was easy to grow off the land". The kids helped work the land, and they never starved nor wanted for anything. Did it have anything to do with the aroha (love) for kids that Janice alluded to earlier in her kōrero? She says "Oh, that too. It had to be that!" especially for the number of kids her mother had.

Even though they did not end up 'having big families' themselves, Janice observes within herself and amongst her siblings the same kind of aroha for kids that her parents had. For example, Janice has only ever birthed one son, and legally adopted two. However, when talking about her kids, she also includes her seven whāngai. Many of her siblings also had whāngai. I ask Janice why they embraced so many whāngai. The answer was simply, "aroha".

It has only been in recent years that Diane (age 53) has been engaging more with her whakapapa and reconnecting with her extended whānau members, iwi, and hapū. I asked about her upbringing, and

commented that there is this perception that Māori have ‘big’ families. Diane disagreed with my comment and exclaimed that there are just two of them: her and her brother. However, what unfolds during our kōrero is a constellation of relationships: Her whakapapa of who is who, how they relate, and the nature of that relationship. It is a ‘story’, not just a list of names. After telling me about her background, it becomes clear that her whānau goes beyond her and her brother. Diane is so passionate about her whakapapa that she is eager to help me understand by showing me an art-piece she created that represents some of her closest whānau members. It is interesting because she uses motifs that represent a particular whānau member. For example, her Pākehā grandmother is represented by an ‘anchor’ because she comes from Wales. A fish-hook (matau) and a treble clef represent her musically talented Māori father. She points to the many photos on her walls—her tūpuna (ancestors), aunties, uncles, cousins—the living and the dead. Diane showed me her whakapapa book that she is organising after attending a whānau reunion. It is clear that her whakapapa is her extended whānau.

4.3.2 Whakapapa: Importance of maintaining names

Reproduction not only meant replenishing the whānau but also keeping the “family name going” (Kaiora, age 45). In her study of Māori names, Joeliee Seed-Pihama (2017) states: “Ingoa tangata (personal names) are an expression of te reo Māori (Māori language), Māori identity, and tino rangatiratanga (self-determination)” (Seed-Pihama 2017, p. i). Other wāhine also talked about the importance of retaining whānau names through the generations. It also meant remembering prominent names of ancestors in their whakapapa lines. Sometimes children were named after significant events pertaining to their iwi or hapū.

Karlene (age 38) clarifies that Māori were identified by their iwi. Some were named after significant events or people, for the purpose of remembering one’s whakapapa:

> *We never had second names [surnames] until colonialism. We had only first names because we identified our last names were our iwi, that was how we were identified by our whānau... That was my own understanding. I am a descendent of this, the name you can call me by is this, but then again with naming, you look at Joeliee’s mahi [referring to Joeliee Seed-Pihama’s PhD research] and she talks about how people get named after events that have happened, people that are important, all sorts of tikanga [protocols] around that, so you are only carrying a name to remind you of something else that is more important than self.*

Mother of 12, Rāhera (age 41), said it was definitely about carrying on the whānau names, so much so that she has ensured a third of her offspring carry her own whānau name:

> *Well with my four little ones, they’ve got my last name [surname], where my boys all carry on my last name, the four oldest boys got their father’s last name and*

> *then my four youngest have got my partner's last name. To me, carrying the name on is quite important, if they keep it still floating on in there.*

(In-person interview, October 2018)

It took concentration to record the names of Diane's six children. Diane was very patient and deliberate as she carefully spelt out their lengthy names. All but one are known by their nicknames. However, most of her children's proper names are a mixture of Māori, Cook Island Māori, Hawaiian, and Native American. One child has four middle names. Another has three. Most importantly however, their names have deep and personal meaning. I recognise two of the Māori names. They are the names of the captains of two prominent waka (Māori canoes) of the 'great migration' across the Pacific Ocean, of whom Diane is a descendant. One time, Diane's uncle rebuked her for using such prominent ancestral names. In her defense, she exclaimed that she did not understand the significance or tikanga (protocols) around name-giving:

> *Yep, so when I gave him those names, I did not understand the significance of name-giving. So that's something that I've learnt. My uncle just ripped a big one up my bum*[60]*about a few months ago when I went down to see my dad's brother. [Her Uncle said] "You shouldn't have named him those names … da-da-da-da-da … [you] didn't ask!*

(In-person interview, May 2018)

She acknowledges her ignorance as being because she was raised by her Pākehā grandparents.

4.3.3 Influence of whānau

The sharing of pregnancy and birthing experiences showed the support that most of the wāhine received from their whānau from the time of pregnancy, and also how the whānau played a role in influencing them.

Irene (age 75) felt the safety and security of her whānau when dealing with the shock of falling pregnant at age 17. Irene had a promising future ahead of her, having excelled throughout school, and had aspirations to attend a top New Zealand University to undertake a career in dentistry, a field where there is very little Māori representation. She shared how it was very overwhelming for a young wāhine because not only did it change her life and crush her career aspirations, but it also came with the prospect of being judged and shamed at the time. After asking her to explain more, she says that there was a social stigma of having a child out-of-wedlock during the 1960s. However, her situation was amplified more so because she was an active member of a religious institution that promoted sex and procreation only within marriage:

[60] Meaning that her uncle rebuked or reprimanded her with sterness.

> *Being 17 and that happened to me after being accepted into university. The prestige of being accepted to where I wanted to go was amazing and then suddenly finding that all changed and I've got this baby growing inside me. I think, I'm 17, my life can't be over, this is where I was. You don't want to talk about it because back in those days, it would have been 62/63 [1962/1963], the stigma was quite relevant. The stigma stuck, people looked down on you and it wasn't an accepted thing to be in that situation. I didn't even want to talk about it with my family at first, but because I always felt safe in my family, I did.*

(In-person interview, September 2021)

Despite the challenges, Irene emphasised that her whānau were her biggest support.

Karlene's fertility decisions, however, were to some extent complicated by the influence of her whānau. Knowing the implications of the genetic disorder in her whakapapa, Karlene revealed that her mother did not want her to abort her first pregnancy because it would be her mother's first mokopuna and fulfill her mother's desire to be a grandmother. Karlene did not abort but said that it was "not ok!" for her mother to intervene in her decision-making process. However, when the wider whānau found out that Karlene terminated her third pregnancy, the whānau did not take it very well. It was not something that they wanted to talk about. In hindsight, Karlene reveals an important point that may resonate with many whānau Māori:

> *That wasn't a thing that we did. It is not natural, it is not a Māori style of thing that we talk about doing. In my whānau, we don't talk about abortion as a thing that people do. We always talk about 'da da'[so and so] is pregnant and having a baby, 'da da' [so and so] is pregnant and having a baby… Yeah, we all have our babies. We just have babies. We just keep popping out babies.*

Hana is enjoying the experience of being a new mum to her 10-month-old girl. It is very clear throughout the interview that Hana and her partner have the support of their parents, and the whānau, to raise the baby. It was clear from the time of announcing her pregnancy, right up to birth, that the whānau were supportive and happy. For example, when it was time to birth, "it was a really whānau atmosphere" and "everybody had their own job to play"; the uncles would do the "Uber runs", Hana's siblings would sing waiata (songs), and everyone would karakia (pray) together. The positive whānau atmosphere was created to help Hana stay calm and to make it a nice atmosphere for when baby arrived. Hana's mum, Kaiora, is enjoying her first mokopuna. Interestingly, during the interview, Kaiora makes a quip to Hana (with Hana's partner in the background) to give her more mokopuna.

Waimihi (aged 61), birthed 6 children and had her first when she was 17. Waimihi explains that she was lucky because "in those days you had your parents" for support and "things were a lot cheaper". Waimihi also shared how her parents responded joyfully to the news of a mokopuna, their first:

> *Mum and them were rapt. Dad was rapt because that was his first. When she was born, that was their little sunshine.*

(In-person interview, October 2018)

Waimihi's daughter, Rāhera, is not one of the 'average'. She has birthed 12 children over her lifetime, whose ages range from 3 to 22 years old. Rāhera had her first when she was 20 years old. Rāhera does not socialise much with her friends, as she prefers to be around her immediate whānau, who have been her greatest support. Some people are shocked when they find out how many kids she has had, and even go so far to ask "when are you going to stop?" She does not worry much about what other people think, including her uncle, whose religious values influenced how he 'counselled' her about having children:

> *My mum's brother, her older brother. He wanted me to stop having children and get married, because he was [a member of the Church]... I think once he became [a member of the Church] and he did the thing, he wanted everyone to change their ways.*

On the other hand, Tāniko's whānau and friends just expected her to get pregnant:

> *I was very promiscuous ... so there wasn't pressure ... everyone just expected me to be the first ... get pregnant at 14/15 [age], have heaps of kids and end up on the, you know, kinda I dunno, doing the status quo back [in my hometown], which was being on the DPB [domestic purposes benefit][61] and having kids. But that just wasn't my lot. My mates and whānau, did really think I'd be one of those, but I wasn't.*

When Tāniko got married in her early 20s, she thought she would get pregnant:

> *I was 25 years, and then I just always thought I would get pregnant; I just always thought I would. And if it was an accident to get pregnant, then that was fine. But*

[61] The Domestic Purposes Benefit (DPB) was a social welfare payment to: 1. Primarily support single parents with dependent children, or 2. to support primary caregivers of the sick and infirm. In this case, the Tāniko is referring to the single parent welfare support. Welfare reform changes came into effect on 15 July 2013, and the DPB was replaced with the 'Sole Parent Support' and 'Supported Living Payment' (see Ministry of Social Development n.d.).

> *I've never been pregnant; never had a miscarriage; I've never; I just haven't been able to get pregnant.*

Curiously, I asked Tāniko how her whānau responded when she reached her 30s and still had not had any children. Tāniko said that her whānau were very sympathetic and encouraged her in a loving way:

> *Yes. From my siblings/sisters. In a loving way. They wanted to know, "Hey wow, come on, you know, you should be getting pregnant". It wasn't a bad pressure. They actually wanted me to experience that for myself. And you know, my siblings know me well. And they tell me, you'll be an awesome mum when you're a mum.*

She reflects on not being able to birth her "own blood":

> *So that, does play on my mind as I get older. Being young and not having children from birth, and then to teenager, and then to young adult… and now I'm in my 40s, and I, it just feels; I kind of have an acceptance about it now, which I didn't have when I was 5 years ago; I wanted to pregnant and have a child; my thoughts are now: if it happens it happens. If it doesn't, I'm ok. I'm not at that point. But I am getting to that point. Moving towards that.*

Her siblings have been there to help Tāniko raise her two daughters that she has come to love as her own. Her husband has also helped her to grow into motherhood:

> *And they [her siblings] support now, with raising our two girls. They're very supporting. Helping to raise our girls. And guidance. And I would go with them if I needed support or tried to work something out… He's [her husband] a very patient man who… gives me the space, physical/mental space to work through something… So he helps me read in between lines.*

Diane's in-laws were not so keen on her having any more children after her third, as she had one-year intervals in between each birth. She recalls her in-laws' words, rather abruptly: "Keep your legs closed. You don't need anymore!" I enquired further as to why they would say that. She explains that she was living in poor circumstances at the time amongst her husband's people in a Pacific Island nation. Her husband was earning $6000 a year and there were many times when they struggled even "to pay a $12 power bill". She also describes how they had boxes for the kids' beds, and had to save for three weeks just to buy a box of crayons so that she could make ABC books for her kids because they could not afford a $10 library card. Diane says: "That is why they said don't have any more kids 'cos you can't afford it". It was an "interesting life" but the situation compelled her to be creative, such as learning how to make mattresses from kapok trees and collecting coconut to make coconut cream.

4.4 Discussion

A major impetus for this research is to address a major gap in the Māori fertility literature where there has been very little focus on Māori cultural understandings of their own fertility trends. The broader research asks: What are the important influences that have sustained contemporary (post-Māori transition) Māori fertility patterns? I especially draw on the voices of wāhine Māori to help answer this question. I noted that Māori are a diverse population, and that the views expressed in the kōrero are not representative of all Māori nor are evenly shared. Coercive state policies of assimilation resulting in the alienation of land, and the suppression of language and culture has had intergenerational impacts on identity and knowledge of whakapapa. The continuing legacy of colonisation has been traumatising for some individuals and their whānau (families) such that there is a reluctance to fully engage or reconnect with their cultural identity, including learning te reo Māori (Māori language) (Reid et al. 2017; Te Huia 2015).

4.4.1 Whakapapa and fertility

Despite having one of the most dramatic fertility declines in the world, the significance of whakapapa endures and manifests in nuanced ways that are evident in the distinctive patterns of Māori fertility. Whakapapa came through quite clearly across the majority of the kōrero in a number of ways. Some wāhine were more explicit than others. For example, Karlene (age 38) used the term whakapapa at least 20 times during our kōrero but she framed it in a way that signified how important fertility is to preserve and to continue her bloodline. However, the challenge for her and her whānau, which in this context could take on both meanings of birth and family, is dealing with a genetic disorder that affects the males in their whakapapa line. Knowing this information has, to a major extent, influenced Karlene's fertility decisions, including abortion, but knowing about the disorder has also motivated her to look for solutions that would "secure our whakapapa in ways that really count" (Karlene, age 38). Other wāhine used terms or phrasing that essentially reflected the concept of whakapapa. For example, Kaiora (age 45) mentioned how she was raised in a family that "encouraged to have lots of children" and that the reasoning behind this was to replenish their family name, and iwi, and hapū. She has taught this same principle to her own children so that it is normalised as a natural life process, that even her own daughter Hana (age 20) felt supported by her whānau during her first birthing experience. As another example, Tāniko used the term blood to signify whakapapa: "to have my own blood... to be blood of my blood". Even though she has not been able to birth her own biological children, right throughout her kōrero, she still discusses the concept of whakapapa as an important reason behind reproduction. In addition, the retention of important whānau or tūpuna (ancestor) names, and/or their tribal histories was also implicated in replenishing or the survivorship of the whānau (family), hapū (sub-tribe), and iwi (tribe or 'bone').

For the purpose of illustrating the essence and powerful potential of whakapapa in its broadest sense, I make an additional but important note here with regards to the methodology in collecting these narratives. Whakapapa was embedded in their kōrero, and was essentially the mechanism through which the wāhine expressed themselves, in the sense that whakawhiti kōrero enabled the wāhine to 'whakapapa' in terms of reciting and/or layering their own narratives based on their lived experiences. An important part of that process is to whakawhanaunga, which, in this context, means to build relationships, and in this case, to build those relationships between myself, as the researcher, and the wāhine. Depending on the nature of the relationship between myself and the wāhine, the wāhine typically began their kōrero with their own whakapapa, that is, their background, and in each case, it started with whānau, that is, their family or birth stories. For example, one wahine[62] began layering her story with her birthdate, birthplace, and birth order, followed by a broader story of her siblings and birth mother before proceeding with her own life progression. Similarly, other wāhine built their story by beginning with their childhood, and their position and relationships within their whānau before talking about their own family formation. The topic of fertility itself instantly took one wāhine back to reliving the distressing moments of falling pregnant in her teens, and then dealing with the stigmatism of birthing out-of-wedlock back in the day. However, for most of the wāhine, going through the process was a means to heal from some of their challenges of bearing and raising children because talking about their lived experiences meant they could reflect and identify the positive aspects of their life course.

These wāhine narratives in this research also enhance and add to the many other voices, including the kuia mentioned earlier in this paper, that have emphasised the importance of whakapapa in fertility decisions. A study of Māori attitudes to assisted reproductive technologies also highlighted "whakapapa as an essential human and cultural resource, placed at the centre of consideration regarding relatedness and the appropriate use of [assisted human reproduction]" (Glover and Rousseau 2007, p. 117). Although the broader 2005–2006 study (see Glover et al. 2008) focused on Māori attitudes towards reproductive technologies to deal with infertility, their interview participants expressed similar sentiments as the wāhine in this research:

> *Women, too, tied fertility and sexual identity together through the perpetuation of whakapapa: 'we are here to propagate the next generation, your whakapapa'; 'women are produced to have children… to keep the whakapapa going'; 'we're put on this earth for a reason and it's to carry on whakapapa, and a lot of us take it very, very seriously'.*
>
> (Glover and Rousseau 2007, p. 122)

[62] Note: wāhine, with a macron, is plural for women; wahine, no macron, is singular for woman.

In summarising these statements, the authors note: “Here we see whakapapa being closely tied to reproductive ability, appearing in fact as the thing that was to be reproduced—made obvious in the one statement, ‘your child is your whakapapa’” (Glover and Rousseau 2007, p. 122). Similarly, a collection of Māori experiences of fertility and infertility in He Kākano (Hiroti 2011) highlighted the contribution of whakapapa to nurturing Māori society: “For many, the yearning to contribute to the whakapapa of whānau, of hapū and of iwi is paramount. Nothing is more important than nurturing, to have the opportunity to share aroha, knowledge and whakapapa with uri [descendants]” (Hiroti 2011, p. iii).

Mātauranga wāhine, and hence mātauranga Māori, literature helps us to understand further why whakapapa is central to human reproduction. As mentioned earlier in this piece, Ani Mikaere (2017) speaks extensively about the position of wāhine in the pre-colonial te ao Māori, and how this has been severed since the colonisation of Aotearoa New Zealand. She particularly expands on the role of wāhine as whare tangata, and how they are critical to the survival of whānau, hapū, and iwi.
Hope Tupara (2011) notes the intertwining of birth and whakapapa, and emphasises how central these concepts are in te ao Māori:

> *Whakapapa (genealogy) forms the foundation of Māori philosophy. Birth is the instrument by which whakapapa is created. All things are related through whakapapa—the gods, natural phenomena, humans and all other living things. Whakapapa provides a way of understanding the universe and its past, present and future.*
>
> (Tupara 2011, p. 1)

In reviewing the literature on Māori teenage pregnancy, Leonie Pihama (2011) similarly echoes the centrality of fertility to the sustaining of life:

> *The place of pregnancy and birth is clearly central within a whakapapa based society. The nurturing of future generations is fundamental to the collectives survival and sustenance of such societies.*
>
> (Pihama 2011, p. 1)

4.4.2 Whānau and fertility

Central and woven through many of the wāhine narratives was the abiding presence and influence of their wider whānau (family). This indicates that fertility, in its broadest sense, is not an individual (or a couple’s) matter, nor is it an isolated event or process. The wider whānau have a collective responsibility and vested interest in the raising of children. Leonie Pihama et al. (2019c) notes: “Traditional practices of childrearing centred on concepts such as ‘Matua Rautia’, which calls for

collective responsibility in the nurturing of children and places emphasis on the collective in ensuring wellbeing for children. Matua (parent) and rau (hundreds) reflects the philosophy that raising a child is not an individual endeavour, but rather a job for the whole community" (Pihama et al. 2019c, p. 5). What also matters in fertility decisions are those who have gone before (ancestors/tūpuna) and those who are to come (posterity/uri). All whānau members have an interest, to some extent, in the wellbeing and survival of their whānau. These ideas were reflected in all of the narratives presented. In a few cases, some whānau discouraged wāhine to birth more, such as in Diane's (age 53) case. Not reported in this paper was Diane's views about today's younger generation. When reflecting on her own struggles in birthing and raising six children, she voices that young people today should "wait". Diane was not alone in her opinion. Waimihi (age 61) and Rāhera (age 41) also hoped that their tamariki (children) and/or mokopuna (grandchildren) would get an education and job first before settling down to have a whānau. In most cases however, whānau members generally expected or supported child-bearing.

4.4.3 Theorising Māori fertility

Another important reason for this research is to centre the lived experiences and perspectives of wāhine Māori. This is important in terms of the broader objectives of Mana Wahine. Not only is it to privilege and make visible wāhine Māori voices, but to also respond to Eurocentric interpretations of their own fertility. Presenting these narratives in this paper helps to fulfill these objectives, albeit, because of space limitations their stories in their entirety could not be sufficiently represented. However, overall, their voices echo and re-emphasise the broader reasons for fertility and reproduction: whakapapa and whānau. The voices of the wāhine Māori in this research project, along with other wāhine Māori-based studies (Glover and Rousseau 2007; Hiroti 2011; Mikaere 2017; Pihama 2011), provide a cultural resource as to how we should view Māori fertility in the field of demography, bearing in mind, however, that these views are not evenly shared or representative of all Māori.

This discussion encourages a much wider concept of fertility than one finds in the mainstream literature. Demographic theories focus on family formation processes that lead to a fertility outcome, that is, a live birth. As mentioned earlier, fertility is defined very narrowly in the field of demography, and are primarily interested in measuring a live birth. The stories of the wāhine, supported by mātauranga Māori literature, suggests fertility means something much bigger in te ao Māori, and involves the wider whānau. In the case of Tāniko (age 43) for example, her desire to birth her own biological children is still a very real desire. In the meantime, she is still mothering her husband's daughters as her own. T. Smith (2012) uses the term "aitanga" to mean offspring or progeny. In breaking the word down, ai meaning "to produce or procreate" implies the potential to reproduce (T. Smith 2012, p. 3). Whānau input also plays an important role, and even before the event of a conception. As stated earlier, fertility is not an isolated or individual decision. Fertility is strongly

interconnected with whānau, hapū, and iwi. Thus, it is clear that whānau (immediate and extended) play an important role in the pre-natal and post-natal care of children.

When viewed within the Davis–Blake framework, whakapapa is an important 'explanatory factor', however, there is still more research to be done in terms of understanding how it influences one of the proximate determinants, and therefore, the different phases of fertility, i.e., intercourse, conception, or gestation. 'Fertility' is also fundamental to the survival of the Māori population. The demographic history of Māori tells us why reproduction has been important for their survival. Ian Pool's (1991) work in Te Iwi Māori refers to the "Decades of Despair, 1840–1901" where survival of the Māori population "hung in balance" (Pool 1991, p. 61) primarily because of high mortality. However, slowly but surely, from the 1920s, and especially after World War II, the population recovered brought about by high fertility, and decreasing mortality rates. As of 30 June 2021, the Māori population in Aotearoa NZ is estimated at 875,300, comprising 17 percent of the national population (Stats New Zealand 2021). Māori are considered to be a "closed" population (Pool 1991), although a significant proportion with Māori ancestry live in Australia. Fundamentally, however, the growth or survival of the Māori population depends on births. Perhaps, the demographic history of Māori, and the current composition of Aotearoa New Zealand's population provides a broader context as to why some may 'encourage' their whānau to reproduce? It is a much more complex matter that does need further explanation, of which whakapapa and whānau are indeed significant pieces of the puzzle. What we do know, however, is that we need to rethink how we go about understanding and interpreting Māori fertility. Demography does provide or point towards some of the answers in terms of understanding the broader population trends, and in some sense, the wāhine narratives enhance some of the literature, but most importantly, adds an important dimension to understanding Māori and, more broadly, Indigenous fertility patterns.

4.5 Conclusions

The kuia, mentioned at the start of this paper, disrupted the mainstream discourse surrounding teenage pregnancy and solo parenting by standing her ground. I learnt that day that it was whakapapa that motivated her to influence and encourage her mokopuna to bear children, and as early as possible, because essentially it was about continuing her's and, therefore, her ancestors' bloodline. Although she stood alone on that particular day, this research, along with others, show that the kuia is not alone in her thinking. This concept of whakapapa matters because studies of Māori fertility and current theories or ideas in the field of demography do not reflect Māori perspectives about their own fertility. To address this issue, Mana Wahine empowers wāhine Māori by drawing on mātauranga wāhine and, by the same token, mātauranga Māori, to take a stand and push back against others' interpretations of their lives. Like the kuia, their lived experiences expressed through whakawhiti kōrero re-emphasised the importance of whakapapa in fertility-based decisions, and therefore, fertility outcomes. Thus, the

mana, that is, power, status, and authority of whakapapa should not be underestimated or disregarded. However, fertility is a multi-faceted and complex space for wāhine Māori to navigate because they are often taken in the context of their wider whānau and socio-economic aspirations.

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CHAPTER FIVE: EXPLORING THE RELATIONSHIP BETWEEN 'CULTURE' AND MĀORI FERTILITY - REFLECTIONS AND IMPLICATIONS

5.1 Introduction

I return to the kuia whose kōrero was shared in the opening chapter – the matriarch who inspired me to undertake this thesis. She was courageous in challenging the dominant discourse around childbearing amongst younger women, especially young sole parent mums. The kuia encouraged her mokopuna to start bearing children early because it was about the continuation and preservation of her whakapapa. Her stance reminded me that there is another view – an Indigenous-centred view – that has rarely been acknowledged in demographic analyses of Indigenous fertility. As a Māori woman and university-based demographer who regularly engages with the materials and methods of demography, I feel a sense of responsibility to bring Indigenous perspectives and knowledge about fertility to the foreground. This is important as most of the studies of Indigenous fertility have been undertaken by non-Indigenous demographers who utilise theories, perspectives, and frameworks grounded in the experiences of western European countries. The most influential model used for understanding fertility trends and patterns has been the Demographic Transition Model, with its underlying theory of modernisation as the dominant causal force. The Second Demographic Transition Model highlights the influence of socio-cultural factors to explain sub-replacement fertility trends that have unfolded in more developed countries. Other fertility theories, such as gender-equity and risk-aversity, generally emphasise individual responses to macro-level and structural forces that determine fertility choices.

In settler-colonial states, the same theoretical explanations used to explain the fertility behaviour of women from the dominant groups are also applied to Indigenous women. This does not entirely make sense given that Indigenous fertility transitions have had different timing and mechanisms (Pool, 1991), and significant differences in fertility patterns persist (Jackson et al., 1994; Johnstone et al., 2001; Pool, 1991; Pool et al., 2007; see also Stats NZ, n.d-a.; Stats NZ, n.d-b). In the CANZUS countries, for example, Indigenous women generally start family formation earlier than non-Indigenous women (Johnstone, 2011).

In this thesis, I focused on Māori women in Aotearoa as a case-study for understanding Indigenous fertility patterns, especially age-specific fertility. Much has been written and studied about Māori fertility. Although some scholars have suggested that culture could potentially explain differences in Māori fertility patterns (Douglas, 1977; Johnstone et al., 2001; Pool, 1991; Zodgekar, 1975), most studies do not explore this in any detail, focusing instead on socio-demographic explanations. Therefore, in this thesis, I asked: *To what extent does culture influence contemporary Māori fertility*

patterns? Using a methodological approach based on Kaupapa Māori and Mana Wahine, and the tools of demography, my mixed methods study has been able to examine in depth the link between culture and Māori fertility, using a range of sources.

In this chapter, I reflect on the theoretical and empirical contribution of my analyses and findings. I begin with a reflection on the frameworks used in this thesis – Kaupapa Māori and Mana Wahine – in studying Māori fertility in demography. I then summarise the key findings, and then reflect on some of the limitations of the analyses and data sources, and the challenges of trying to operationalise a complex concept like culture in survey instruments like the Aotearoa census and the NZ Women: Family, Employment and Education survey (NZWFEE). I then conclude with a brief discussion of the implications for future research.

5.2 Reflections

5.2.1 A Kaupapa Māori and Mana Wahine lens on Māori fertility

In a novel approach, I turned to Kaupapa Māori and Mana Wahine to address the lack of attention given to culture in the demographic literature on Māori fertility. This was a straightforward decision for me because the research focus of my study is essentially on wāhine Māori and whānau which means 'to birth' and 'family'. It has also meant navigating this research using frameworks and tools from two very different epistemological platforms. However, there is hope.

Kaupapa Māori is essentially a theory of transformation (Pihama, 2010; Smith, 1997; see also Pihama et al., 2015), meaning that it has the power to change the theoretical and research landscape that is often dominated by Western knowledge systems and understandings. Kaupapa Māori is grounded and informed by mātauranga Māori (Pihama, 2010). Because Kaupapa Māori is a template that provides a "culturally defined theoretical space" (Pihama, 2010, p. 6), it can help to transform how we think about – analyse and interpret – Māori fertility. And there are templates that kairangahau Māori (Māori researchers) can draw on for inspiration. Kaupapa Māori is a proven methodological tool (Smith, 2021), which is evident by how it has been applied across several subject areas over the past few decades, including the sciences (Hudson et al., 2020; Hutchings, 2002, 2004; Jackson & Mercier, 2020; Paul-Burke et al., 2020; Whaanga et al., 2020; see also Pihama et al., 2015). Mana Wahine shares the transformational focus of Kaupapa Māori but is specifically concerned with the intersection of being Māori and a wahine. (Simmonds, 2011). I not only wanted to approach my thesis with a Kaupapa Māori lens, but to also incorporate and amplify wāhine Māori perspectives, as the bearers and/or nurturers of children.

Very few studies have used a Māori lens to understand Māori population change, including fertility. Edward Te Kohu Douglas (1977) explored the cultural responses embedded within Māori tribal communities as a way of bringing a much stronger cultural focus to understanding the Māori fertility

transition. Kukutai's (2001, 2004, 2011) work on state practices of ethnic and racial classification and census-taking helped paved the way towards a more nuanced understanding of how Māori identity can be better captured and reflected in demographic analyses (see also Kukutai & Pool, 2014). While these earlier studies were not explicit in using a Kaupapa Māori approach per se, they bear the hallmarks of research, in a field that is mostly positivist, that sought solutions to understand and represent Māori in ways that address Māori concerns in terms of Māori knowledge (Cram, 2006).

In this thesis, I found the use of Kaupapa Māori and Mana Wahine particularly helpful for guiding my analyses and interpretation of results – both quantitative and qualitative. For the qualitative component, both paradigms informed the ethical principles and practices of the interviewer (myself) to ensure that the power dynamics commonly found in 'researcher/researched' relationships are minimised as much as possible, and where wāhine Māori felt safe to share their views, thoughts, and feelings about a personal topic. Furthermore, the paradigms helped frame the lens upon which to analyse the kōrero in terms of looking for concepts or themes that align with mātauranga Māori understandings of reproduction and fertility e.g., whānau, hapū, iwi, whakapapa, whāngai, et cetera.

Similar to using Kaupapa Māori in the discipline of epidemiology (see Paine et al., 2021), Kaupapa Māori, and in this research Mana Wahine, particularly played a critical role in this research by questioning data relations and practices within the field of demography, hence developing "a more critical, contextualised and compassionate methodology, and a reconfiguration of data relations and data practices within quantitative research" (Paine et al., 2021, p. 198). As denoted by the conceptual framework discussed in Section 1.5.2 of this thesis (see also Hutchings, 2004), Mana Wahine particularly recognises and calls for representation of diverse wāhine Māori views. Hence, for the quantitative analyses of this research, rather than resort to a 'unidimensional' category or the bifurcation of Māori and non-Māori for comparisons, the 'core-periphery' model was a useful tool here for reconfiguring sub-group categories that conceptualise Māori cultural identity in more nuanced ways that go beyond the binary (Kukutai, 2011). Kaupapa Māori and Mana Wahine also guided the interpretation of the quantitative analyses by shifting the emphasis towards cultural understandings of Māori fertility, rather than turning to regular demographic or economic reasonings. The paradigms also called for caution and accountability by highlighting the limitations of the empirical analyses, especially when using concepts, constructs, and measures that are pre-determined in data sources such as the census. While the purpose of using cultural identity (by expressed identification) was to ascertain whether something culturally important is going on – to better understand Māori fertility patterns – it was never intended to be used as a scale of 'Māoriness' (see Durie, 1995) nor were the analyses intended to be deficit focused. I unpack this limitation further below, particularly around conceptualising culture, and the impact it has on the analyses and findings.

What this research has highlighted, however, is that Kaupapa Māori and Mana Wahine pushes demographers or population researchers, in a similar way that it does for epidemiologists, to:

> *think more critically about the taken-for-granted practices and conventions in epidemiology [or demography], including the definition, collection and use of ethnicity data, approaches to recruitment and sampling, statistical techniques…and perhaps more fundamentally, the nature of relationships between "researchers" and the "researched", the positionality of the researchers and the theoretical underpinnings of epidemiology [or demography] as a "science" (Paine et al., 2021, p. 198).*

5.2.2 Recap of findings from the empirical studies

The findings from these analyses indicate that 'cultural identity' is an important factor in Māori fertility, and that 'whakapapa' and 'whānau' are central to Māori fertility decisions. The statistical analyses (Chapters Two and Three) showed clear evidence of a positive association between Māori identity and fertility. Based on the 2013 Census data, the analyses showed clear differences in parity by Māori identity, as measured by express identification. Women with multiple and unambiguous ties to Māori identity (what I described as 'core') had lower rates of childlessness and more children on average whereas women with single ties to Māori identity ('descent only') had higher rates of childlessness and smaller number of children on average – resembling fertility patterns similar to non-Māori women. On the other hand, women with ties to both Māori and European ethnic identity ('Māori+' group) generally had patterns of parity closer to the 'core' group. A similar pattern was found by age groups, education levels, and geography.

The 1995 NZWFEE survey was very valuable in this analysis because it collected a wide range of fertility-related and family formation questions including birth histories with dates, which allowed me to undertake more granular analyses of differences in birth timings and intervals by expressed identification. Although the results based on the NZWFEE survey were not as compelling - especially across all birth orders – based on the hazard ratios (risk rate) even after controlling for education, age, and location – 'mainly Māori' turned out to be a strong predictor in the timing to first birth. Further analyses - median time of birth intervals – clearly showed 'mainly Māori' had a slightly shorter interval to first birth than 'mainly European', but for both groups significantly more so than non-Māori. Overall, these quantitative results suggest the relationship between Māori culture – as indicated by identity– and fertility is significant and a valid area of research.

To obtain a more in-depth understanding as to why we might see these patterns of Māori fertility, the analyses of whakawhiti kōrero data (Chapter Four) helped to enhance the quantitative analyses of this study. Two themes particularly stood out as important reasons for having children – whakapapa and whānau – and were still an enduring factor in today's context. Whakapapa is more than an inventory

of names (Mahuika, 2019). It also embodies the narratives and knowledges that have been passed down through generations and is the fundamental framework for mapping relationships (Barlow, 1991; Mahuika, 2019; Taonui, 2011). Whakapapa is also central to reproduction (Glover & Rousseau, 2007; Mikaere, 2017; see also Glover et al., 2008) because the survival of the Māori collective – whānau, hapū, and iwi – is dependent upon reproduction. It also implies the mana of wāhine, as te whare tangata (Mikaere, 2017), as reflected in the very powerful whakataukī – *He wāhine, he whenua, e ngaro ai te tāngata (by women and land, men are lost)*. This same principle was echoed by the wāhine Māori experts – that whakapapa was an important reason for bearing children because it meant the continuation of bloodlines. For some wāhine, designating children's names after prominent ancestors, events, or places, also meant the preservation of whakapapa.

Whānau, which is often translated as 'family' or 'extended family', also means 'to birth', thus signifying the importance of reproduction/fertility for the benefit of the collective. The topic of fertility was always discussed in the context of the wider whānau (family), not just the individual or couple, suggesting that whānau played an important role and influence in the wāhine' lives and their fertility choices, such as, encouraging them to have children, and to some extent, influencing them to start earlier. In some cases, however, having children or having them earlier was not always encouraged depending on the circumstances e.g., health and economic constraints. Whānau also played an important role at the birth or in the support and/or rearing of children. The influence of whānau also extended to the inter-generational transmission of values, ideas, and beliefs systems about the importance of having children for the benefit of the wider collective i.e., whānau, hapū, and iwi.

The findings from this thesis have determined that there are important cultural orientations and meanings associated with Māori fertility, it is important to bear in mind that these findings need to be understood within the parameters of the analyses.

5.2.3 Limitations of the study

5.2.3.1 Conceptualising and measuring 'culture'

The concept of 'fertility' was more straight-forward to conceptualise and measure i.e., parity and timing, and more accessible through secondary demographic data sources. However, one of the challenges in undertaking the analyses was operationalising such a broad and complex concept – culture, and therefore, finding a suitable measure for 'culture' was a little more complicated.

In this study, I considered 'culture' as a broad term to encapsulate ideas, customs, social behaviours, values, and worldviews of a collective (Jenks, 2005; Ogburn, 1937). However, we cannot assume that a collective is homogenous – that individuals share the same sentiments of 'cultural identity'. Nor can we ignore the enduring impact of colonisation on Indigenous peoples in settler-colonial states, and their identities. Colonisation was instrumental in land confiscation, and in the suppression of

language, culture, and institutions, and the legacy of colonisation continues today. One of the aims of colonisation is to displace Indigenous identity – facilitated through, for example, Government policies of assimilation and integration (see Thomas & Nikora, 1992; and Williams, 2019). Intergenerational impacts include loss of knowledge of whakapapa and "difficulty connecting to both te ao Pākehā and te ao Māori, simultaneously or individually" (Greaves et al., 2023, p. 167). However, over the last four decades or so we have seen a resurgence in Indigenous Māori culture (Māori renaissance) and language revival, indigeneity, and decolonisation – providing opportunities to reconnect. The main point however is that Māori identity is very complex and diverse, and there are calls for policy research and population surveys to recognise Māori identity as heterogenous, and to adapt approaches to account for multiple forms of expression (Greaves et al., 2022).

There has been ample research that has sought better measures of Māori cultural identity in surveys. Building on earlier models that conceptualised and located Māori individuals according to characteristics of Māori identity, culture, well-being, and knowledge (see Durie, 1995), Mason Durie's Te Hoe Nuku Roa framework (1995) helped set the stage in measuring 'Māori identity' that links a diversity of cultural and ethnic measures with other important indicators to provide a more comprehensive profile of Māori peoples. Over the past decade or so we have seen other models of identity measurements such as Houkamau & Sibley's (2010, 2015) Multidimensional Model of Māori Identity and Cultural Engagement (MMMICE2), Māori Identity Signatures by Greaves et al. (2015), and Racial-Ethnic identities by Webber et al. (2013). On a larger scale, Stats NZ's Māori wellbeing survey – Te Kupenga – collects data relevant to Māori cultural identity such as tikanga and whanaungatanga. However, while these surveys and measurements provide more granular conceptualisations and measurements of Māori cultural identity, this study had to make the most of data sources that captured and measured both 'culture' and 'fertility' for population-level analyses.

In demography, a census or large surveys are a regular go-to for population-level analyses. Their power and validation rests on representation of the whole population because of its coverage and numbers. For this study, the only two data sources available that captured the relevant variables and that would provide sufficient numbers in order to test and validate my hypothesis, are the Aotearoa census and NZWFEE survey. In terms of obtaining an adequate measure to represent 'culture', these data sources provide expressed identification. In the census, this took the form of Māori identity indicators - descent, ethnicity, and iwi, while the NZWFEE survey collected ethnicity. While expressed identification is limited, in terms of reflecting more diverse expressions of Māori identity, the 'core-periphery' model was useful in constructing a range of Māori sub-group categories that goes beyond the unidimensional category and typical Māori-Pākehā binary (Kukutai, 2011; Kukutai & Pool, 2014) but still conceptually closer to measuring 'culture'. However, in constructing the sub-categories using the survey, we were at the mercy of working with smaller numbers, and therefore had to compromise to some extent on power and validity.

We can however take heart that undertaking two separate analyses using two different data sources can provide some level of confidence in the overall results. On top of that, the qualitative analyses provides greater context and depth, from a culturally-centred position, for understanding Māori fertility.

It is therefore important to remember, that these analyses and findings come with their caveats – their concepts, constructs, measures are limited through the data sources. For the quantitative analyses, expressed identification is only one dimension of Māori cultural identity. Also, I reiterate here: these cultural identity measures, i.e., ethnic and descent that we reconfigured for the purposes of this study, were never really intended to measure 'strength' of ties to cultural identity nor were they intended to measure levels of 'Māoriness' nor to invoke a bogus notion of blood quantum. With regards to the census, it is designed more to take an official count of people and dwellings in Aotearoa, and in the case of cultural identity measures – for the purpose of monitoring policy outcomes and the Crown's responsibilities to tangata whenua. Rather these sub-categories were constructed to make a qualitative distinction related to cultural orientation.

Therefore, the overall findings from the quantitative component of the analyses must be viewed in this light: that there is a significant relationship between cultural identity and Māori fertility, but is limited by one dimension of cultural identity – expressed identification – which is pre-determined by the census and survey.

5.2.3.2 Modelling the relationship between culture and fertility

One area that the quantitative component of the analyses did not thoroughly explore is the impact of cultural identity on fertility through intermediary factors as advanced by the Davis-Blake/Bongaarts model of proximate determinates (see Section 1.3.4). To recap, the model purports that macro-level external factors (environmental, socio-cultural, and economic) have an impact on fertility outcomes through a range of intermediary factors such as, attitudes towards contraceptive use. Although the NZWFEE survey collected a wide range and depth of fertility-related and family formation questions, including contraceptive histories, there simply was not sufficient time to expand on the initial analysis within the timeframe of the research. In the broader scheme however, the priority was to at least conduct initial analysis to at least establish whether there is a plausible and substantial relationship between culture and Māori fertility. We can also take comfort that the analyses deployed advanced event history analysis using the Kaplan-Meier survival estimates to explore the impact of culture on the timing of births and duration of birth intervals, which included control variables i.e., education, location, and age. There were still marked differences in fertility outcomes by expressed Māori identification, even when taking into consideration these other variables. For example, we found, even in the census analyses, that the inverse relationship between education and fertility is still consistent with mainstream theories (Cochrane, 1979; Diamond et al., 1999; Michael, 1973). What

this says is that culture has a role, but so do other factors that mainstream theories have already confirmed.

5.2.3.3 Insights from the whakawhiti kōrero: Deciding what is valid

The whakawhiti kōrero provided more in-depth information to enhance and again complement the quantitative component of the analyses. Unlike the quantitative component, establishing a direct link between cultural orientation and fertility, especially parity, was not necessarily an over-riding aim of the whakakwhiti kōrero. Instead, the method of whakawhiti provided the opportunity for wāhine Māori to express their own views on what fertility and/or reproduction means to them – a very self-determining approach to research. Although there is a desire to rebalance the power relationship that can be found in researcher-participant relationships, it can be a tricky space to navigate as an 'insider/outsider' researcher. By that, I mean being aware and reflective of my own conduct, interests, value judgements et cetera, and how these can determine the course of the kōrero. However, as part of the research ethics application, I cited proper protocols to follow based on the cultural guidelines teased out by Smith in her groundbreaking 1st edition book – *Decolonizing Methodologies* (see later version 2021, and 2005), which was further enhanced by Cram (2001). Care also had to be taken, however, with the analysis of the material – where a researcher can exercise even greater power over what content is considered 'valid' or 'worthy'. To mitigate this, it was important for me as a researcher to ensure that the wāhine Māori contributors were informed throughout the whole post-kōrero process – including having access to a full transcript, and having the opportunity to comment on what they deemed as important ideas. On occasions, this included additional visits with some wāhine Māori. On other occasions, some decided not to invest further time to revisit their kōrero. So, it was not always perfect. However, documenting the analytical process was important to ensure at least a descent level of accountability and integrity. Unfortunately, because of the volume of information from the kōrero[63] and time and capacity constraints (e.g., word limits), not all the themes or ideas could be presented or further explored in this thesis e.g., whare ngāro and whāngai. However, this could be a doorway of opportunity for further research beyond this study but needs to be considered within the confines of research ethics[64].

The method of in-depth interviewing also compromises on representation - only nine wāhine were interviewed. However, the value of whakawhiti kōrero comes from the depth of information to help frame understandings of the numbers in the quantitative component of the study. In this research, whakapapa and whānau emerged as important themes, and concurred with other studies of Māori fertility (infertility) from a mātauranga Māori lens (see Glover et al., 2008; Glover & Rousseau, 2007; Green, 2012; Hiroti, 2011; Le Grice et al., 2016; Mikaere, 2017; Pihama; 2011). What the kōrero

[63] Interviews times ranged from approximately 30 mins to 2 ½ hours.
[64] The approved ethics application states that all hard or soft copy information will be held by the researcher for a period of five years and then be securely destroyed or returned to the participants.

does tell us is that there is a much more broader reasons, beyond the current understandings or theories about fertility in the field of demography, which takes a very narrow view – as an output of reproduction i.e., live birth.

5.3 Implications for future research

The findings, along with the limitations of this study, provide an opportunity to further develop Māori demography, and more broadly Indigenous demography.

Firstly, there could potentially be an opportunity to use other nuanced purpose-designed measures of cultural identity e.g., MMMICE2 as a proxy for 'culture' and to link these with fertility variables e.g. parity and timing. For this to occur, however, it would require a purpose-built survey, similar to the NZWFEE survey to be constructed or, better still, revised to include more cultural identity categories. Or alternatively, perhaps fertility could be an addition to other surveys, however, this would need to align to the purpose of those other surveys. The NZWFEE survey would be the more ideal and logical instrument because it was specifically designed to collect family formation, reproduction, and fertility data. There are a few reasons to re-run and adapted and updated version of the survey. A limitation with the survey was its age - it's been nearly 30 years since it was first administered. It would be useful to gauge how family formation and fertility behaviour has changed over the past 30 years or so – considering that Aotearoa total fertility rates are at sub-replacement levels and trending downwards, and recent Māori fertility trends are showing a marked dip (see Stats NZ, n.d-b.). Still, however, sufficient resources would be needed to administer the NZWFEE at the same scale as previously, although much of the groundwork has already been done (see Marsault et al. 1997). So, reinventing the wheel would not be a viable option, and a large-scale instrument such as the Aotearoa census, would not have the capacity to host more nuanced measures of cultural identity nor other variables around fertility. I also do not think that there would be an appetite for the census in the future, as the costs of administering a census is high, and currently Stats NZ is heavily invested in its Census Transformation programme that sets out a plan to transform the census but to also look at the potential of other data sources (Stats NZ, n.d-c.). There is, however, is a strong desire and momentum to look to administrative data sources through the *Integrated Data Infrastructure (IDI)* system hosted by Stats NZ. The IDI is a large research database ('big data') of linked administrative data, mostly from government agencies, that holds de-identified microdata about people and households (Stats NZ, n.d-d.). Perhaps the IDI could be a potential source to link fertility data with other datasets – on the assumption that other data sources have the right variables for linking to take place, and that the quality of data outputted is not overly compromised. There are also concerns around the quality of the data in the IDI for Māori aspirations, including the quality of ethnic identifiers (Greaves et al., 2024).

Either way, there would need to be a strong business-case and rationale to develop or adapt a survey and then administer it, especially if obtaining a sufficient sample size matter, as it requires a lot of resource to execute. The question then is, would there be a different result if more nuanced measures of cultural identity were used? Maybe not. In this thesis, two different data sources were used to test the relationship between culture and fertility: The census – where its strengths lies in its coverage and representativeness by counting entire populations and the capability to study large-scale and emerging patterns and trends (see Jackson & Kukutai, 2019) and, The NZWFEE survey – where its strength lies in its depth of information about a particular subject and can be generalised back to a population-level census for representativeness, what Jackson & Kukutai (2019) describe as the "flesh on the bones" (p. 180). Also, even though the cultural identity measures in the census and survey were not entirely the best in terms of reflecting Māori socio-cultural realities, Kukutai's work (2001, 2004, 2010, 2012; see also Kukutai & Pool, 2014) on building better Māori identity indicators to construct a range of Māori sub-group categories using population instruments such as the census, has clearly and consistently demonstrated that there are cultural differences in behaviour, living conditions, and outcomes (Kukutai, 2011). Based on these earlier works, perhaps we can be even more confident in the findings from this study. Also, this thesis has demonstrated that using both population-level data source and a survey sample, and whakawhiti kōrero data are complementary, can provide some confidence in the results in terms of validation and robustness.

More can be explored. Firstly, as mentioned earlier, there is the opportunity to extend on the NZWFEE survey analyses by exploring how culture influences fertility through proximate determinants associated with: 1) exposure to intercourse, 2) exposure to conception, and 3) gestation. Included in here could be the potential to look at attitudes towards contraceptive use and methods, and whether that has any impact on fertility outcomes. Secondly, some of the questions in the survey may also need updating to include, for example, more modern contraceptive methods but also to ascertain if there is an appetite to further explore 'culture' and 'fertility' then there would be some advocacy around building in better measures of Māori cultural identity – even if it could possibly include iwi and descent. However, the addition or adaptation of survey questions would need to be balanced within the context of MDSov principles (see Te Mana Raraunga Māori Data Sovereignty Network, 2018; Kukutai et al., 2023) and measured against the risk of 'survey fatigue'. Furthermore, participants may be reticent to share such personal and sensitive information – particularly in light of new digital technologies, overseas based digital storage facilities, and big data platforms (e.g., IDI) to 'monitor' or 'survey' individuals – with very little knowledge of how their data is shared, stored, or used. There may also be a proportion of the population who may be reticent to share information about such a sensitive topic – especially around childlessness or infertility – although it was pointed that any resistance to participate in the survey was minimal at the time of the 1995 NZWFEE (Marsault et al., 1997). We also know that Māori response rates to data collection instruments have

been declining, taking for example the 2018 Aotearoa census (Stats NZ, 2019). Thus, consideration of protocols around the management and archiving of data needs to thoroughly thought out, and advocacy from the Te Mana Raraunga MDSov network has been critical here, and we as kairanghau Māori working in the field need to play our part too.

A final note: a key over-arching purpose of this thesis was to mostly make a substantial contribution and in the field of demography and population research. Current theoretical frameworks and analytical practices in the field are inadequate for understanding Indigenous demography, and as demonstrated in this thesis, for understanding Indigenous fertility. The overall findings from this thesis affirm that there is a need to build on current theories of fertility in the field of demography by incorporating Indigenous perspectives, including their lived experiences of enduring a settler-colonial context of colonisation. Current fertility theories particularly focus on individuals who base their decisions mostly from an economic perspective e.g., Post-materialism, Rational Choice Theory, Risk Aversion, and Gender-Equity. This takes a very narrow and individualistic approach to how fertility choices are made. However, this research has highlighted that cultural values also need to be included – particularly where studies of Indigenous fertility is concerned. These decisions, while eventually made by the individual, are also made in a much broader context, especially where the responsibility to the wider collective, i.e., the whānau, are concerned. Indigenous fertility as a collective matter is a very different perspective from prevailing theories which are almost entirely focused on individual autonomy and choices within the context of macro-level factors that are predominantly socio-economic in nature. For dispossessed Indigenous peoples, fertility means whakapapa and whakapapa is the continuation of a collective identity. While the focus of this study was on Māori in Aotearoa, and Kaupapa Māori and Mana Wahine have been very useful here, there are some insights that can be shared or considered in the study of Indigenous fertility in other settler-colonial states. And while there is a shared history of colonisation and dispossession, there are also some differences in contexts. In saying that, Indigenous-centred frameworks and tools need to come from within their own contexts. It also means that demographers and analysts alike need to take consideration of broader context, including culture, when analysing or interpreting Māori fertility. However, from the Kaupapa Māori research and Mana Wahine perspectives, it is important, for various reasons, that kairangahau Māori should be at the forefront of that research. One of those reasons, is to ensure cultural integrity is maintained in research. I therefore end with these words penned by Kathie Irwin (1992):

> *We don't need anyone else developing the tools which will help us to come to terms with who we are. We can and will do this work. Real power lies with those who design the tools – it always has. This power is ours. Through the process of developing such theories we will contribute to our empowerment as Māori women, moving forward in our struggles for our people, our lands, our world, ourselves. (p. 5)*

And lastly, a final word on behalf of the kuia – reproduction, fertility, family formation - it was always about whakapapa and whānau. He mana wahine, he whare tangata!

‘Te Whare Tangata’ by artist and copyright owner Robyn Kahukiwa.

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APPENDIX A – CONSENT FORM, INFORMATION SHEET, AND INTERVIEW SCHEDULE

UNIVERSITY OF WAIKATO
FACULTY OF ARTS & SOCIAL SCIENCES

Understanding contemporary Māori demographic reproduction trends

RESEARCH PARTICIPANT CONSENT FORM

Name of participant: _____

I have received a copy of the *Information Sheet* describing the research project. Any questions that I have, relating to the research, have been answered to my satisfaction. I understand that I can ask further questions about the research at any time during my participation, that I can withdraw my participation up to one month after the interview, and that I understand my rights as a participant.

The interview will be informal and conversational and will be more of a kōrero between Moana and myself. I understand that I can bring along whānau members or others to support my kōrero with Moana. I also understand that I can communicate bilingually and/or in te reo Māori.

By agreeing to participate in this research I understand:

- My rights as a participant in this research as set out in the information sheet.
- I can withdraw from the research any time prior to the publication of results.
- I do not have to answer all questions. I can stop the interview at any time, and I can ask to have the recording device turned off at any time.
- I can review the transcript of this interview and can request to edit, omit, or add any material to that transcript within a reasonable timeframe after the interview.
- Unless I wish to be identified, I understand that my identity will be anonymous in the presentation of the research findings. I can request to have any sensitive information discussed in the interview to be left out of the research publications or negotiate how it is used with Moana.
- By signing this consent form, I recognise that I will retain ownership of my kōrero, but I give consent for the researcher to use the kōrero for the purposes of the research outlined in the Information Sheet.

Please complete the following checklist. Tick [✓] the appropriate box for each point.	**YES**	**NO**
I consent to the interview being audio-recorded.		
I wish to receive a copy of the interview transcript so I have an opportunity to edit, modify, add or delete to my kōrero.		
I would like the audio-recording and transcript to be returned to me upon completion of this research.		

I have discussed the representation of my identity in the research, and…(circle one):
a) I would like to be named in the research
b) I would like the researcher to use a pseudonym

PARTICIPANT :

Signature : _____

Date :

Contact Details : _____

I, Moana Rarere (the Researcher), agree to abide by the conditions set out in the information sheet/consent form and I will ensure that no harm will be done to any participant as a result of this research.

RESEARCHER : Moana Rarere

Signature : _____

Date :

Contact Details : moana.rarere@waikato.ac.nz

DDI : 07 838 4761

UNIVERSITY OF WAIKATO
FACULTY OF ARTS & SOCIAL SCIENCES

RESEARCH INFORMATION SHEET

Research title: Understanding contemporary Māori demographic reproduction trends

Researcher: Moana Rarere, National Institute of Demographic and Economic Analysis, University of Waikato

The Research

This research seeks to better understand Māori reproduction (birth) trends in the field of Demography (study of population change) by including wāhine Māori perspectives. This research is being conducted for a Doctor of Philosophy qualification (PhD), and is grounded in Kaupapa Māori and Mana Wahine frameworks.

Research Process

This research seeks to engage Kaupapa Māori methodologies and practices that are underpinned by tikanga Māori. The researcher is committed to working collaboratively to ensure research engages with what is important to the participants. Information will be collected through a one-on-one or small group interviews in the form of an informal and conversational-type interview – 'a kōrero'. Kōrero will take place at an agreed location that is convenient and safe.

I anticipate that kōrero will last between 1-2 hours. Moana will be guided by the participants in the interview, however, some general themes and questions can be provided. Interviews will be audio-recorded and transcribed. Transcripts will be returned to participants so that they have the opportunity to add, modify, or delete material. Participants can decline to be audio-recorded or can ask for the recorder to be stopped at any stage of the kōrero.

Your Participation

Based on our initial conversation, you have indicated an interest to participate in this research and I would greatly appreciate your time and contribution to a kōrero. You are welcome to bring whānau support along. Interviews can be carried out in the medium that you are most comfortable with – te reo Māori, English or both.

Confidentiality

I will treat all discussions held within the interviews as private and confidential and will not share with anyone outside of that forum. Unless you choose to be identified, your identity will be anonymous in the presentation of the research findings. I will also work with participants to establish the protocols for managing sensitive information.

Transcripts, audio-recordings, participant information and any related correspondence will be stored in my locked office. Any electronic information will be stored on computer databases which are only accessible by password and is changed on a regular basis. Where requested, copies of transcripts, audio recordings will be given to participants. All hard or soft copy information will be held for five (5) years and then will be securely destroyed, or if desired, returned to participants.

Where transcription services are required, audio-recordings will be sent through online data storage platform e.g. Drop-box. The service provider will be advised of the ethical requirements of this research.

Your Rights

Participants have the right to:

- Decline to participate
- Stop the interview at any time
- Decline to answer any question
- Decline to be audio recorded
- Ask for the audio-recorder to be turned off at any time
- Edit, omit, or add any material within a reasonable timeframe after receiving the transcript
- Withdraw from the study up until one month after the interview
- Participate in English, te reo Māori, or both
- Ask questions at any time during your participation in this research

Research Outcomes and Outputs

Participants will also be informed that research findings will form part of the final doctoral thesis, which will be available online. The combined results of this research may also be distributed in conference and seminar presentations, academic books and journal

publications. Any proposed publications involving interview findings will be offered to the participants for review.

All information (e.g. interview responses, recordings of interviews) shared with me during the research will remain the intellectual property of the participant(s). The copyrights of the actual research thesis and outputs will be owned by the researcher.

This research project has been approved by the Human Research Ethics Committee of the Faculty of Arts and Social Sciences. Any questions about the ethical conduct of this research may be sent to the Secretary of the Committee, email fass-ethics@waikato.ac.nz, postal address, Faculty of Arts and Social Sciences, Te Kura Kete Aronui, University of Waikato, Te Whare Wananga o Waikato, Private Bag 3105, Hamilton 3240.

Ngā mihi mahana

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UNIVERSITY OF WAIKATO
FACULTY OF ARTS & SOCIAL SCIENCES

Understanding contemporary Māori demographic reproduction trends

INTERVIEW GUIDE

Information for this research will be collected through *'whakawhiti kōrero'* (conversation). This method takes the form of an informal conversation; similar to 'semi-structured' and 'unstructured' interviews. The discussion will largely be guided by participants, however, these questions and topics for discussion provide a general guide to the kōrero if required.

Topic area	**Questions**
Background – whānau life and upbringing	Tell me a bit about your upbringing? Where? By who? With who? How many? What were some of the values you were brought up with? (Ask the same Q's but for the persons who brought them up)
General perceptions of Māori fertility discourses. (As a lead in, this topic area may involve a brief verbal and visual presentation of Māori birth patterns).	Why do you think Māori don't have as many children as they use to? Statistics also show that Māori have babies much younger (teens/young adults) than Pākehā/non-Māori. Why do you think that is? Public comments have suggested Māori have too many kids. How many is too many? What's your thoughts on that?
Ideal number of children/family size	How important is it to have children? Why? At what age do you think someone should have their first tamaiti (child)? Why? What is the ideal number of tamariki (children) to have? Why? How many tamariki would you like to have? Why? How many tamariki do you have? (Kia tūpato! (Be careful) If appropriate, probe as to why the differences in preferences and actual)
Whānau influences	Tell me some experiences you had while growing up. In what ways did your whānau influence you to have children? Why do you think that is?
Aspirations for children	You mentioned you have tamariki. Do you have any mokopuna? What are your aspirations for them when they become taiohi/rangatahi (teenagers/young adults)? What would you do if they got pregnant? (or what did you do?)

APPENDIX B – CO-AUTHORSHIP FORM

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

Co-Authorship Form

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This form is to accompany the submission of any PhD that contains research reported in published or unpublished co-authored work. **Please include one copy of this form for each co-authored work.** Completed forms should be included in your appendices for all the copies of your thesis submitted for examination and library deposit (including digital deposit).

Please indicate the chapter/section/pages of this thesis that are extracted from a co-authored work and give the title and publication details or details of submission of the co-authored work.
Chapter 3 - Indigenous fertility in Aotearoa New Zealand: How does ethnic identity affect birth spacing and timing?

Rarere, M., Jarallah, Y., & Kukutai, T. (2023). Indigenous fertility in Aotearoa New Zealand: How does ethnic identity affect birth spacing and timing? Journal of Population Research, 40(4), 25. https://doi.org/10.1007/s12546-023-09321-y

Nature of contribution by PhD candidate	Writing and structuring of paper, creation of figures/tables, submission and review of article
Extent of contribution by PhD candidate (%)	90

CO-AUTHORS

Name	Nature of Contribution
Tahu Kukutai	Structuring and co-writing of introduction section; feedback and suggestions on draft article; help with reviewer feedback of 1st submission
Yara Jarallah	Technical advice on method and data analysis; feedback and suggestions on draft article and data presentation; help with reviewer feedback of 1st submission

Certification by Co-Authors

The undersigned hereby certify that:

- the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and

Name	Signature	Date
Tahu Kukutai		29/11/23
Yara Jarallah	YARA JARALLAH	30/11/23

July 2015