Language and the resilience of knowledge

Investigating *which* knowledge we stand to lose as a result of language death, exploring the factors that influence the resilience of knowledge.

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Abstract

Hundreds of languages worldwide are endangered, and the common notion is that such language loss results in knowledge loss. In this thesis, I investigate the idea that different knowledge might have a different *resilience* to this process, and explore *what* factors influence what happens to knowledge when a language disappears. What factors influence whether knowledge can survive language death? The thesis addresses the research question: *What factors influence the resilience of knowledge in case of language loss?* To investigate this, I sent a questionnaire to researchers who have worked on endangered language projects all over the world, inquiring about their experiences with language endangerment and knowledge loss. This research explores potential factors that influence the resilience of knowledge when a language vanishes and proposes a model for analysing and scaling this resilience. The thesis concludes that the resilience of knowledge is partly influenced by *properties* of knowledge, which need to be considered when investigating what language loss in practice means for knowledge loss.

Keywords: Endangered languages, knowledge loss, language loss, resilience of knowledge, properties of knowledge

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1 Introduction

1.1 Introduction to Endangered Languages

How many languages are spoken in the world? One possible answer to this question is around 7,000, based on estimates from the early 21st century.[1] However, this number is very difficult to verify. Consider the difference between a dialect and a language as described by David Crystal in his book *Language Death*: "on purely linguistic grounds, two speech systems are considered to be dialects of the same language if they are (predominantly) mutually intelligible."[2] So, if speakers can still understand each other in their own tongue, according to this definition, these could be considered dialects of the same language. However, as Crystal continues, that would mean that Swedish, Danish and Norwegian should be considered dialects of the *same* language.[3] Of course, this is not the case, but it exemplifies the difficulty of counting the number of languages in the entire world.[4] It is not an easy question to answer.

In a way, counting the world's languages is similar to counting the world's plant and animal species – an incredibly difficult task for their sheer number, their similarities, their spread across the globe and their ability to change and evolve. While the exact number of existing languages is difficult to verify, one thing has become increasingly evident in examining the world's languages: the number of languages around the world is decreasing, *rapidly*. "Of the approximately 7,000 documented languages, nearly half are considered endangered."[5] A recent study puts the number of languages lost by the end of this century at around 1,500:

> "Our future predictions give cause for concern that within 80 years there could be 1,500 or more languages that will no longer be spoken, yet a third of these currently have little or no documentation."[6]

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[1] K. David Harrison, *When Languages Die: The Extinction of the World's Languages and the Erosion of Human Knowledge* (Oxford University Press, 2007), 13. From Gordon 2005.

[2] David Crystal, *Language Death* (Cambridge, UK ; New York, NY: Cambridge University Press, 2000), 8.

[3] Crystal, *Language Death*. On pages 3 to 11, David Crystal explains the difficulties with counting the worlds' languages at length. For example, on page 8, he states the most general idea in formalising what a language is opposed to a dialect, is that "on purely linguistic grounds, two speech systems are considered to be dialects of the same language if they are (predominantly) mutually intelligible." Then, he states that that would mean that Swedish, Danish and Norwegian should also be considered dialects of the same language. As this is obviously not the case, "purely linguistic considerations can be 'outranked' by sociopolitical criteria." This illustrates the complexity of even quantifying the amount of existing languages in the world.

[4] Crystal, *Language Death.* Crystal further explains the factors that come into play when trying to estimate how many language exist, how many languages have been 'discovered' and at what rate languages might be dying and on what factors that depends. See Chapter 1, *What is language death?*, for a brief overview of the most important factors and circumstances in trying to establish the endangerment status of a language or the rate at which different languages might be dying. For example on page 12, Crystal writes that "population size alone is not an accurate indicator of a language situation." This is because it also depends on how scattered these people speaking the same language live.

[5] Lindell Bromham et al., 'Global Predictors of Language Endangerment and the Future of Linguistic Diversity', *Nature Ecology & Evolution* 6, no. 2 (February 2022): 163, https://doi.org/10.1038/s41559-021-01604-y.

[6] Bromham et al., 170.

Even though this number is not as disturbing as other predictions,[7] it is still alarmingly high – 1,500 out of 7,000 languages could disappear over the course of this century alone. And even if this number is uncertain – the fact that it is not exactly *known* what the world is losing is also an alarming notion. The world is losing languages, all over the globe.[8]

However, language death is not something new. Languages have come and gone all throughout human history. Imagine, for example, a community splitting up and moving to other areas. The language of the new communities could start to develop into their own varieties. Over time, these varieties could become so different that they could no longer be regarded as the same language. They might even have become so different from the original language that this original language no longer exists. Such loss of a language can then also give rise to new languages. It is, in a way, similar to evolution: a language's 'original' form might go extinct, but it evolves into something 'new'.[9]

However, in contrast to this more natural evolution of language – known as *language change*[10] – *language death* occurs when "a given language becomes increasingly restricted in use, and ultimately ceases to be passed on from one generation to the next."[11] Language death can have various causes,[12] but one frequent cause is the oppression of certain languages in favour of others, as happens with "systematic forms of oppression", such as colonialism.[13] People may – either voluntarily or involuntarily – cease to speak a certain language, which ultimately leads to language death.

Languages can disappear in different ways,[14] but *language death* has become a more central focus. The year 1992 is often considered the general 'starting point' of the matter, as

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[7] It is often stated that by the end of this century the world may have lost half of its linguistic diversity.

[8] Christopher Moseley, *Atlas of the World's Languages in Danger* (UNESCO, 2010). The Atlas of the World's Languages in Danger gives a good overview and visual representation of the scale of the issue.

[9] Luisa Maffi, 'Endangered Languages, Endangered Knowledge', *International Social Science Journal* 54, no. 173 (September 2002): 385, https://doi.org/10.1111/1468-2451.00390. "Under these normal circumstances, it is accurate to say that languages do not die: they only get transformed."

[10] Maffi, 385.

[11] Maffi, 385. "That is when, rather than being transformed through use and intergenerational transmission, a given language becomes increasingly restricted in use, and ultimately ceases to be passed on from one generation to the next. In such cases, the flow of communication and transmission is interrupted because speakers voluntarily or unwillingly shift to another, generally dominant, more prestigious, more powerful language and choose not to teach their native language or languages to their children. In extreme but far from rare instances, the breakdown of communication and transmission may even be due to decimation of the speakers because of natural disasters, disease, war, or genocide."

[12] Bromham et al., 'Global Predictors of Language Endangerment and the Future of Linguistic Diversity', 170. "The loss of language diversity results from a complex network of factors, particularly those associated with colonization, globalization, and social and economic change."

[13] Gerald Roche, 'Abandoning Endangered Languages: Ethical Loneliness, Language Oppression, and Social Justice', *American Anthropologist* 122, no. 1 (March 2020): 164–69, https://doi.org/10.1111/aman.13372. "Such fields, I argue, have an important role to play in helping us understand how language endangerment is produced."

[14] Maffi, 'Endangered Languages, Endangered Knowledge', 385. "Both phenomena are known, or can be inferred, to have occurred throughout the history of humanity."

since then, the precarious situation of endangered languages became more widely known.[15,16] As stated by the *Endangered Language Archive* (ELAR): "Linguistic diversity is in decline because of fast-paced modernisation. The way people live is changing rapidly because of the effects of climate change, globalisation, and urbanisation."[17] In short, languages are dying because of global linguistic homogenisation.[18] Yet, this process is not widely known, nor are the implications of this high rate of disappearance: "Without intervention, language loss could triple within 40 years, with at least one language lost per month."[19] Another study from 2019, which has investigated the rate of language loss over the past *200 years*, writes the following:

> "The results of this study show that the current rate of language loss is 9 languages per year, which is a far cry from the widely cited, "One language dies every 14 days." However, if the trajectory of spreading language loss maintains its present course, the rate of language loss is likely to reach that level by the middle of the next century."[20]

As David Crystal wrote in 2000, but as I believe is still relevant today: "we are at a critical point in human linguistic history, and most people don't know."[21]

So, *how many languages are spoken in the world?* While the exact number is unknown, the thing that one can know for sure is that the number of languages is steadily decreasing. If I were to follow some of the bleak estimates of the world losing half its linguistic diversity over the course of this century, that would mean that – if I come live 102 years, which is unlikely but not impossible – I might have *witnessed* the loss of half of the world's languages in my lifetime. Although 'witness' may not be the correct choice of words: with the world in ecstasy over saving a certain plant or animal species that was near extinction, the loss of languages is happening rather – quiet.

Languages, once lost, can never be fully retrieved. The death of so many languages leaves loss in its wake. Cultural loss, loss of identity, human rights, but also loss of knowledge. One could regard the last speaker of a language like an archive:

> "the moment the last speaker of an unwritten or unrecorded language dies, the archive disappears for ever. When a language dies which has never been recorded in some way, it is as if it has never been."[22]

What do communities stand to lose with the death of a language? One thing that I want to emphasise is that such statements about the death of a language do not necessarily mean the loss of *all* knowledge held by these people, but rather that to *some degree* it could lead to

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[15] Michael Krauss, 'The World's Languages in Crisis', *Language* 68, no. 1 (1992): 4–10. In 1992, Michael Krauss published his article *The World's Languages in Crisis*, which raised the urgency of bringing awareness of language endangerment to a bigger audience.
[16] Crystal, *Language Death*, preface. In 1992, the *International Linguistics Congress* in Quebec came up with a statement underlining the urgency to start documenting endangered languages.
[17] 'About | Endangered Languages Archive', accessed 9 September 2024, https://www.elararchive.org/about-us/.
[18] Harrison, *When Languages Die*, 15.
[19] Bromham et al., 'Global Predictors of Language Endangerment and the Future of Linguistic Diversity', 163.
[20] Gary F. Simons, 'Two Centuries of Spreading Language Loss', *Proceedings of the Linguistic Society of America* 4 (2019): 11.
[21] Crystal, *Language Death*, ix.
[22] Crystal, 2.

knowledge loss. Is there knowledge that in practice cannot survive a language shift, as certain knowledge is too dependent on the language to be able to survive without it? Language loss and knowledge loss seem linked:

> "The recent proliferation of news stories as well as of popular books on the loss of linguistic diversity (e.g., Crystal 2000, Dalby 2003, Nettle & Romaine 2000) – which generally point to a link between language loss and culture and knowledge loss"[23]

This thesis will focus on investigating what language loss means for knowledge, and what factors influence the relation between these two. What factors influence the resilience of knowledge in case of language loss?

1.2 Introduction to Language Documentation

This section discuses some facets of language documentation to situate this thesis, starting of in section 1.2.1 with a brief history of language documentation, while section 1.2.2 offers a brief look at the current situation of language documentation, and section 1.2.3 discuses certain motivations behind language documentation.

1.2.1 Brief History of Language Documentation

The history of language documentation is quite extensive, but in the case of endangered languages, it should be regarded as the effort undertaken by people who document languages that are not their own. Language documentation "has evolved considerably in the context of the massive, world-scale language contact of the past 500 years."[24] For example, during the exploration of the Americas, not only animal and plant species were documented and collected – this was also the case for languages. Floris Solleveld exemplifies this in *Language as a Specimen*, when explaining "how often linguistic and naturalistic collection actually went together."[25] The documentation of plant or animal species and potential inquiry into their 'original' names can naturally provide samples of a foreign language, even though a lot of explorers in these times also renamed species, and classified them differently. However, there were also expeditions that collected grammars and vocabularies for the sake of documenting the *language*, for example by José Celestino Mutis, in 1762.[26] Additionally, "At the same time, in Europe, there was an increased interest in the languages spoken on the continent for comparative reasons."[27] People wanted to learn about the workings of languages, and investigate whether there were for example universal rules to language.

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[23] Luisa Maffi, 'Linguistic, Cultural, and Biological Diversity', *Annual Review of Anthropology* 34, no. 1 (1 October 2005): 612, https://doi.org/10.1146/annurev.anthro.34.081804.120437.

[24] Anthony C. Woodbury, 'Language Documentation', in *The Cambridge Handbook of Endangered Languages* (Cambridge University Press, 2011), 162.

[25] Floris Solleveld, 'Language as a Specimen', *Berichte Zur Wissenschaftsgeschichte* 46, no. 1 (2023): 97.

[26] Rebeca Fernández Rodríguez, 'Language, Science and Globalization in the Eighteenth Century**', *Berichte Zur Wissenschaftsgeschichte* 46, no. 1 (March 2023): 39, https://doi.org/10.1002/bewi.202200040. An example is "polymath José Celestino Mutis (1732–1808)." In 1762 and 1763, Mutis "requested a license for a botanical expedition. […] Mutis was not only an excellent botanist, but he was also a collector of knowledge and books. Born into a family of librarians, he understood the value a book could have, and therefore, since his arrival in America he had been collecting grammars and vocabularies in different languages."

[27] Fernández Rodríguez, 39.

An example of a large-scale documentation project is that of Russian Tsarina Catherine II, whose aim was to collect data of *all* languages that could be found. The immense project was initiated in 1784 and developed by Prussian botanist Peter Simon Pallas.[28] It is nowadays known as the Pallas Project.[29] The project "followed German polymath Gottfried Wilhelm Leibniz's (1646–1716) idea of using the most common words in a language to discover the universals of language."[30] Various people were sent off to 'collect' languages: explorers, members of religious orders – for example missionaries such as Jesuits – and natural scientists.[31] The results of these endeavours are nowadays being reevaluated, investigating the connection between language documentation by outsiders and colonialism, and investigating the field of *missionary linguistics* as a subfield of the history of linguistics.[32] It is an important project in the history of language documentation – and also, more specifically, for the sake of *endangered* languages. As Tjeerd de Graaf states in *Endangered languages in the 21st century*'s ninth chapter; *Historical material for safeguarding endangered languages*: "This dictionary contains language data on hundreds of different languages, some of which are now extinct, while others are severely endangered. For some languages the data in the dictionary are in fact the oldest or one of the oldest known sources."[33]

The history of language documentation is vast, and the above example offers only a glimpse the widespread interest in this field of study. Such language collections over the past few centuries have amassed a lot of vocabularies and linguistic data – many of which still exist in some form or other – yet also languages that are long gone. And with the current rate of language death, this interest in collecting language over the years has led to "a scholarly discipline or framework now increasingly termed DOCUMENTARY LINGUISTICS, for which carrying out endangered language documentation has been the defining project."[34] This field of *documentary linguistics* has been created by Nikolaus Himmelmann in 1998.[35]

1.2.2 Current Language Documentation

In this thesis, the study of language will not simply be regarded as the study of "texts, dictionaries and grammars."[36] Opposed to collections like that of Catherine II, word-lists alone will not suffice in this context for a fitting understanding of language. One needs to look at language not just as a specimen to be examined and dissected on the research table,

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[28] Fernández Rodríguez, 39.

[29] Tjeerd De Graaf, 'Use of Historical Material for the Safeguarding of Endangered Languages', in *Endangered Languages in the 21st Century* (Routledge, 2023), 134. The Pallas Project 'Comparative Dictionary of all Languages and Dialects'.

[30] Fernández Rodríguez, 'Language, Science and Globalization in the Eighteenth Century**', 39. This was to be done by collecting books on grammars and dictionaries and translating a vocabulary list of 400 words into as many languages as possible.

[31] Fernández Rodríguez, 39.

[32] Otto Zwartjes, 'The Historiography of Missionary Linguistics: Present State and Further Research Opportunities', *Historiographia Linguistica* 39 (4 December 2012): 185–242, https://doi.org/10.1075/hl.39.2-3.01zwa.

[33] De Graaf, 'Use of Historical Material for the Safeguarding of Endangered Languages', 134.

[34] Woodbury, 'Language Documentation', 162.

[35] Nikolaus P. Himmelmann, 'Documentary and Descriptive Linguistics', *Linguistics* 36, no. 1 (1998): abstract, https://doi.org/10.1515/ling.1998.36.1.161. "It is proposed that documentary linguistics be conceived of as a fairly independent field of linguistic inquiry and practice that is no longer linked exclusively to the descriptive framework."

[36] Ryan Henke and Andrea L. Berez-Kroeker, 'A Brief History of Archiving in Language Documentation, with an Annotated Bibliography', December 2016, 415, http://hdl.handle.net/10125/24714.

but as something *alive.* Language needs to be studied *in* its context, or natural habitat if you like, to be fully understood.

In *A Brief History of Archiving in Language Documentation*, Henke and Berez-Kroeker's summarise the practice of language documentation from the end of the 19th century up and until 2016. Importantly, they describe the shift from *descriptive linguistics*, with its focus on "texts, dictionaries and grammars", to *documentary linguistics*, "or *language documentation*", which includes the use of a language in a speech community. The latter comprises a much broader field, in which the methods of the more digitalised age of archiving can be beneficial.[37]

Linguistic anthropology is the study of the role of language within the social context.[38] It does not only look at the purely linguistic side of language, such as grammar, but it includes the use of language in the real world.[39] Another such endeavour, although with a different background and methodology, is for example "sociolinguistics".[40] Within the scope of endangered languages, investigating the use of a language within the community – and not just its written linguistic rules – is of great importance to understanding it more thoroughly. In this thesis, language will be understood not just as its grammar and rules, but as something that is also shaped and defined by the people who use it. Something that lives. Assigning meaning and assimilating knowledge happens through language *use* and therefore language, within this context, cannot be fully understood without taking its social context into account.

Apart from the field changing in terms of how to regard language, the way of looking at knowledge has also taken a turn. Non-Western knowledge is gaining more recognition, and more and more research turns to traditional knowledge. In *Western Science and Traditional Knowledge: Despite Their Variations, Different Forms of Knowledge Can Learn from Each Other*, Fulvio Mazzocchi explains the importance of embracing traditional knowledge.[41] One example of the merging of traditional knowledge in scientific knowledge is the book *Pulse of the Earth*[42] about the need to understand the traditional knowledge and scientific knowledge of Java's earth, geographies and volcanoes together.[43] It emphasises "how older knowledges enable new forms of knowing."[44] Interest in Traditional Ecological Knowledge (TEK)[45] has been growing. "Because TEK has declined as the influence of Western culture has spread,

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[37] Henke and Berez-Kroeker, 415.

[38] Alessandro Duranti, *Linguistic Anthropology: A Reader*, *International Encyclopedia of the Social & Behavioral Sciences*, 2009, 1, https://doi.org/10.1017/CBO9780511810190.

[39] More on linguistic anthropology can be read in Duranti's reader. Duranti, *Linguistic Anthropology*.

[40] Duranti, 2-5. In Chapter 2 of Linguistic Anthropology: A Reader, Alessandro Duranti gives an overview of the different terms that are used in academics for the combined study of language and culture, such as "Linguistic Anthropology, Anthropological Linguistics, and Sociolinguistics," explaining how these different terms came about, in which ways they are similar and different."

[41] Fulvio Mazzocchi, 'Western Science and Traditional Knowledge: Despite Their Variations, Different Forms of Knowledge Can Learn from Each Other', *EMBO Reports* 7, no. 5 (May 2006): 466, https://doi.org/10.1038/sj.embor.7400693. "Western science and traditional knowledge constitute different paths to knowledge, but they are rooted in the same reality. We can only gain from paying attention to our cultural history and richness."

[42] Adam Bobbette, *The Pulse of the Earth: Political Geology in Java* (Duke University Press, 2023).

[43] Bobbette, 5. "The assumed divide between modern science and local knowledge is tenacious, even though it is not real."

[44] Adam Bobbette, *The Pulse of the Earth: Political Geology in Java* (Duke University Press, 2023), 79.

[45] Fikret Berkes, Johan Colding, and Carl Folke, 'Rediscovery of Traditional Ecological Knowledge as Adaptive Management', *Ecological Applications* 10, no. 5 (October 2000): 1251–62, https://doi.org/10.1890/1051-0761(2000)010[1251:ROTEKA]2.0.CO;2. This article explains the rise of Traditional Ecological Knowledge over the years and how it is important and valuable.

there is an urgent need to identify and apply this knowledge for future benefit."[46] With the academic world gradually shifting its gaze to traditional, local or indigenous knowledge,[47] it is interesting to compare this growing interest in the knowledge to the attention given to indigenous languages – and often *endangered* languages – in which this knowledge resides.

1.2.3 Motivations

Why do people care about documenting endangered languages? I am not part of an endangered language community and therefore can in no way speak for the kinds of loss experienced with the loss of one's language. There are, however, different actors and parties at play in the current situation of language endangerment who have something to lose or gain from the vanishing of certain languages. And with different parties come different interests. An in-depth answer to the question why one should care for the decline of languages can be found in the *Global Action Plan of the International Decade of Indigenous Languages (2022-2032)*.[48] First, and maybe foremost, one's language is part of one's identity. Many people are witnessing their language disappearing, and know they might be the last few to speak it. Whatever it is that dies with the language – language loss results in emotional loss and the loss of culture and identity: "If diversity is a prerequisite for successful humanity, then the preservation of linguistic diversity is essential, for language lies at the heart of what it means to be human."[49] There are numerous reasons to care for endangered languages, whether action is being undertaken to protect the right to speak your language of choice,[50] for the maintenance of cultural identity and the "value of linguistic heritage,"[51] or to keep the knowledge of endangered language communities 'alive'. This thesis will focus on that last aspect: the resilience of knowledge in dying languages. However, I want to emphasise that this is in no way more or less important than the other forms of loss experienced with language loss – it is merely the focus of this research.

There are a lot of projects revolving around endangered languages, focusing either on documenting the language or trying to revitalise it in the community, or both. There are voluntary projects as well as funded research projects, trying their best to preserve endangered languages and all that comes with it. Ever since the extent of language death became apparent, different parties, like organisations and academic researchers, have been undertaking steps to help document and revitalise endangered languages. Researchers travel

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[46] Jay F. Martin et al., 'Traditional Ecological Knowledge (TEK): Ideas, Inspiration, and Designs for Ecological Engineering', *Ecological Engineering* 36, no. 7 (2010): Abstract.

[47] Fulvio Mazzocchi, 'Western Science and Traditional Knowledge: Despite Their Variations, Different Forms of Knowledge Can Learn from Each Other', *EMBO Reports* 7, no. 5 (May 2006): 463–66, https://doi.org/10.1038/sj.embor.7400693. In this article, Mazzocchi explains the fine line in using terms such as 'traditional', 'indigenous' or 'local' knowledge. For the scope of this thesis, I will generally just use the term *knowledge*, but as I am dealing with endangered languages which are often also Indigenous languages, much of the knowledge by endangered language communities will fall under the category of traditional knowledge.

[48] U. N. Secretariat, 'International Decade of Indigenous Languages, 2022–2032: Global Action Plan: Note/by the Secretariat', 2022, 5–6, https://policycommons.net/artifacts/9775371/international-decade-of-indigenous-languages-2022-2032/10674930/.

[49] Crystal, *Language Death*, 33–34.

[50] Secretariat, 5. "The right of free unimpeded choice of language use, expression, and opinion as well as self-determination and active engagement in public life without fear of discrimination is a prerequisite for inclusiveness and equality as key conditions for the creation of open and participatory societies."

[51] Tasaku Tsunoda, *Language Endangerment and Language Revitalization: An Introduction* (De Gruyter Mouton, 2006).

all over the world to collect data before the last speakers pass away, and communities whose language is endangered reach out to organisations in order to help them preserve this part of their culture. Documentation broadly focuses on documenting language and knowledge data, while revitalisation focuses on keeping the language alive in the community itself. In this thesis, the focus will be on *documentation* efforts.

To give a brief overview, here are some organisations that work for the documentation and/or revitalisation of endangered languages: *The Living Tongues Institute for Endangered Languages*[52], *7000 Languages*[53], *Foundation for Endangered Languages*[54], *Wikitongues*[55], *The Language Conservancy*[56] and the *Endangered Languages Project*[57]. Organisations such as these can have different aims. *The Language Conservancy*, focuses on revitalisation and are "dedicated to rescuing the world's endangered languages, restoring them to stability and health, and safeguarding them for future generations."[58] They raise funds and focus on educational materials for revitalising endangered languages. Another example, the *Living Tongues Institute for Endangered Languages*, have a focus on language documentation, but in order "to create language resources that will serve as a basis for language revitalization."[59,60]

Another interested party is the academic world, as mentioned in section 1.2.2, not only for documenting the endangered languages, but also for the unique traditional knowledge that people of such communities often have. Researchers visit endangered language communities in order to document endangered languages, but many language documentation projects also document specific knowledge. An example of western research turning to traditional knowledge is the following from the article *Traditional Ecological Knowledge (TEK): Ideas, inspiration, and designs for ecological engineering*:

> "This paper introduces the field of Traditional Ecological Knowledge (TEK) as an important source of ideas, inspiration and designs to help our profession meet this challenge [to design sustainable ecosystems, driven by renewable energies]. […] Because TEK has declined as the influence of Western culture has spread, there is an urgent need to identify and apply this knowledge **for future benefit**. Collaboration with scientists can help raise the social standing of indigenous people and of TEK

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[52] 'Living Tongues Institute for Endangered Languages', Living Tongues Institute for Endangered Languages, accessed 1 November 2024, https://livingtongues.org/.
[53] 'Empowering Communities To Teach, Learn & Sustain Their Languages', 7000 Languages, accessed 1 November 2024, https://www.7000.org.
[54] 'The Foundation for Endangered Languages (FEL)', accessed 1 November 2024, https://www.ogmios.org/.
[55] 'Wikitongues | Home', accessed 1 November 2024, https://wikitongues.org.
[56] 'The Language Conservancy - Supporting Language Communities Worldwide', The Language Conservancy, accessed 14 November 2024, https://languageconservancy.org/.
[57] 'Endangered Languages Project', accessed 1 November 2024, https://www.endangeredlanguages.com/.
[58] 'Our History', *The Language Conservancy* (blog), accessed 14 November 2024, https://languageconservancy.org/our-history/.
[59] 'Living Tongues Institute for Endangered Languages'.
[60] 'Living Dictionaries', Living Dictionaries, accessed 1 November 2024, https://livingdictionaries.app/. The *Living Tongues Institute for Endangered Languages* have created an online platform called *Living Dictionaries* on which communities can create an online dictionary to document their language. Members of a community can do this themselves or with the help of the organisation, and can decide for themselves whether this information is accessible for everyone or just for members of the community.

> within their own communities, thus contributing to cultural survival while maintaining this information."[61]

The inclusion of traditional knowledge into the scientific paradigm is one that can be applauded. However, one also needs to stay vigilant: while many individual academic researchers want the best for endangered language communities, and a fruitful cooperation between researchers and communities can result in a rewarding result for both parties, fact remains that certain research needs to be funded. A lot of research is funded by academic institutions with a certain *aim*, and thus, even those researchers who have the community's best interests at heart, might need to focus their research on certain topics. In practice, such documentation efforts may be, whether intentionally or not, focused on the interests of outsiders, parties in search of data and knowledge, with the underlying western ideology that knowledge can belong to anyone, as the driving force is western academic interest. Then, even though the inclusion of traditional knowledge is a step in the right direction, fact remains that such the western perspective and research might have a certain *aim* through which research focuses on specific knowledge as beneficial to the project. Therefore, while this collaboration is "contributing to cultural survival while maintaining this information,"[62] the focus of researchers might still influence *which* knowledge will survive.

There are many motivations for documenting endangered languages, one of which is the knowledge held by endangered language communities. A question that naturally follows from that notion is the following: what knowledge is actually lost with a language? The following section, 1.3, further introduces the notion of language loss leading to knowledge loss and explains the focus of this thesis.

1.3 Thesis Focus: Language Loss and Knowledge Loss

As stated at the end of section 1.1, there seems to be a link between language loss and knowledge loss. The aim of this thesis is to investigate this relation.[63] As K. David Harrison writes in his book *When Languages Die*:

> "Much – if not most – of what humankind knows about the natural world lies completely outside of science textbooks, libraries, and databases, existing only in unwritten languages in people's memories. It is only one generation away from extinction and always in jeopardy of not being passed on. This immense knowledge base remains largely unexplored and uncatalogued."[64]

For science and the understanding of the world, documenting and revitalising endangered languages is of great importance, as languages are practically unique encyclopaedias filled with knowledge which are about to be lost. As quoted in section 1.1, David Crystal uses a similar metaphor, but refers to endangered languages as disappearing archives.[65] And as Nick

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[61] Martin et al., 'Traditional Ecological Knowledge (TEK)', Abstract. Emphasis added.
[62] Martin et al., Abstract.
[63] This does not account for all types of loss that are experienced in case of language loss, such as for example emotional loss. As stated in section 1.2.3, I want to emphasise again that while this thesis does not directly focus on emotional loss or how language loss otherwise impacts individuals, I do not in any way want to downplay the importance of other types of loss that one can experience in losing one's mother tongue.
[64] Harrison, *When Languages Die*, 15.
[65] Crystal, *Language Death*, 2.

Evans writes in *Dying Words: Endangered Languages and What They Have to Tell Us*[66] in a metaphor about a library containing all stories and ideas in all languages:

> "As English, Spanish, Mandarin, and Hindi displace thousands of tiny languages in the hearths of small communities, much of this library is now molding away."[67]

While these are illustrative examples and not an exact representation of what happens – as not every bit of knowledge will necessarily be lost with the language – this still poses a question: to what extent does language loss lead to knowledge loss? Its 'impending loss' is one of the reasons why knowledge of endangered language communities is being documented. As most languages are only spoken, and their 'contents' only exist in people's minds, how can knowledge survive language death? The relation of language loss resulting in knowledge loss is rather unspecific. While documentation in no way guarantees knowledge's survival, a lot of endangered languages and knowledge held by communities are being documented, *because* the world is about to lose them. The language might no longer exist in a matter of years, months or even days. The main reason these endangered languages are being studied is *because* they are dying. Documentation projects often have a specific focus: document language X and document the community's knowledge about Y, for example medicine, plants, songs, tales or the environment – *because the world is bound to lose them.* However, does knowledge necessarily die with a language? Or could it be the case that certain knowledge survives *without* the language?

In almost all cases, language death happens gradually. There is usually another language involved that pushes the other away, until it is no longer there. But in this process, people are still communicating. Maybe not all in the same tongue, but there is communication. Then, compare, for example, historical knowledge to cooking knowledge – stories and histories seem highly dependent on language for transmission, while certain food recipes may depend less on language and more on demonstration in order to be transmitted. Then, cooking knowledge seems more likely to 'survive' onto another language. It could mean that a community facing language shift may lose a language, but not necessarily the knowledge of said language speakers. It seems highly unlikely that *all* knowledge would die with the language.

This implies that certain knowledge is somehow more *resilient.* Harrison writes the following: "Because knowledge transfer relies on oral transmission, its effectiveness is tied to language endangerment."[68] Then, if a language starts disappearing, knowledge transmission will become less and less effective. However, if certain knowledge can still survive, this suggests that not all knowledge is equally dependent on language. Thus, not all knowledge would be equally lost in case of language death. This leads to the question: what makes certain knowledge more *resilient* to language death?

In this thesis, I investigate the resilience of knowledge in case of language death. The relation language loss results in knowledge loss seems rather loosely defined. The aim of this thesis is not to contradict this relation – it is to further elaborate on this notion, by exploring the *resilience* of knowledge: it seems highly unlikely that all knowledge is irrevocably gone when a language dies – but then why would certain knowledge have a greater likelihood of surviving language death?

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[66] Nicholas Evans, *Dying Words: Endangered Languages and What They Have to Tell Us*, vol. 6 (John Wiley & Sons, 2009).
[67] Evans, 6:2.
[68] Harrison, *When Languages Die*, 53.

Initially, knowledge "types" were introduced, to investigate whether certain "types" of knowledge – such as for example medicinal, religion, plant, historical, hunting, farming, social, cooking, gardening, foraging, environmental, customs, traditions, landscapes, fishing, health, kinship, material culture, oral histories, mythological, weather patterns, et cetera – would show a greater resilience to language death. However, it turned out that looking at knowledge as categorised by "types" – for example *cooking knowledge* – and their respective resilience was not the right angle for this research.[69] Instead, the focus turned to underlying factors – for example being able to *demonstrate* knowledge – that influence the resilience of knowledge. This exploration of underlying factors resulted in a division between *external factors*, those factors that relate to the *circumstances* in which the knowledge resided, and *internal factors*, pertaining to *properties* of the knowledge itself. Exploring these factors is the main focus of this thesis: investigating what factors influence the *resilience* of knowledge in case of language death, and eventually proposing that the resilience of knowledge can be *scaled*. What determines this degree of resilience? Does knowledge X have certain *properties*, that makes it more resilient to language death than knowledge Y? This leads to the research question of this thesis: *What factors influence the resilience of knowledge in case of language loss?*

[69] This will be discussed in section 5.2.3 and section 5.6. Even though the focus has shifted from "types" of knowledge to factors that influence the resilience of knowledge, and more specifically *properties* of knowledge, the term "types" of knowledge will still be used throughout some sections in this thesis, as it guided the research and was part of the questionnaire around which this thesis revolves. The "types" should therefore be regarded as a means through which these factors have been investigated, and should not be seen as the main focus of this thesis. This will be restated in sections referring to "types" specifically.

2 Research Question

In this thesis, I will try to answer the following research question:

What factors influence the resilience of knowledge in case of language loss?

Answering this question will be done along the lines of three sub-questions. In this chapter I will give a short overview of the structure of this thesis. The three sub-questions that will lead up to formulating an answer the research question are:

1. *How are language loss and knowledge loss connected?*
2. *What "types" of knowledge can be distinguished?*
3. *What knowledge is lost with language death?*

Chapter 1 has provided an introduction to the topics of endangered languages and language documentation, and introduced the notion that with language loss comes knowledge loss.

Chapter 3 dives deeper into the relation between language loss and knowledge loss. Section 3.1 explores knowledge loss and transmission in general and section 3.2 discusses practical examples of it being a consequence of language loss. Section 3.3 further introduces the concept of the *resilience* of knowledge and section 3.4 dives into *how* language loss may result in knowledge loss and introduces the idea of *properties* of knowledge. This chapter will ultimately answer sub-question 1: *How are language loss and knowledge loss connected?*

Chapter 4 introduces the questionnaire that I sent to researchers who have worked on endangered language projects. Respondents have been asked about their projects, the knowledge they documented, and how they view the relation between language loss and knowledge loss.

Chapter 5 deals with the responses to the questionnaire. Section 5.1 deals with the endangerment status and section 5.2 provides a list of "types" of knowledge the respondents documented, answering sub-question 2: *What "types" of knowledge can be distinguished?* Here the shift in focus from "types" of knowledge to factors will be further explained. Section 5.3 focuses on responses pertaining to difficulties in documenting certain knowledge, and section 5.4 discusses what knowledge is lost or can survive in case of language loss according to the researchers. Section 5.5 explains how to correctly interpret this data, and section 5.6 answers sub-question 3: *What knowledge is lost with language death?* From these answers I have identified factors that seem to influence the resilience of knowledge in case of language loss, which will be discussed in chapter 6.

Chapter 6 proposes multiple factors that influence the resilience of knowledge in case of language death. These factors will be divided into *external factors* (circumstances of knowledge) in section 6.1, and *internal factors* (properties of knowledge) in section 6.2. Section 6.3 briefly discusses the importance of taking into account the endangerment status of a language. Finally, in section 6.4, I will propose a model constructed from the *properties* of knowledge in order to scale the resilience of knowledge, as the resilience depends on multiple factors. The model is a first exploration of how to arrive at a degree of resilience for certain knowledge through investigating its properties.

Chapter 7 concludes this thesis and with the abovementioned factors and model, formulates an answer to the research question: *What factors influence the resilience of knowledge in case of language loss?*

3 Language Loss and Knowledge Loss

In this chapter, I will discuss language loss and knowledge loss. Section 3.1 discusses two examples of knowledge loss and transmission and section 3.2 discusses two examples of language loss resulting in knowledge loss. In section 3.3, I will introduce the concept of the *resilience* of knowledge. Section 3.4 discusses an example of *how* language loss could lead to knowledge loss, relating to *properties* of knowledge and section 3.5 sets up the questionnaire in which I will inquire about more such factors that might influence knowledge's resilience. Over the course of this chapter, I will address the first sub-question: *How can language loss and knowledge loss be connected?*

Before continuing, I want to point out that in this thesis, I will be looking at the relation between language and knowledge, and the relation between language loss and knowledge loss. For the sake of completeness, I want to emphasise that I am aware that the causal relation 'language loss leads to knowledge loss' that I am investigating is in no way the only reason for knowledge loss. There are many other factors and circumstances that influence this process, but this thesis will focus on this relation.

Furthermore, I believe there to be an interdependence between language loss and knowledge loss, in the sense that if the one leads to the other, this could also be vice versa. However, within the scope of this thesis, I will look at the one-way relation of what happens to knowledge in case of language loss.

Lastly, regarding the definition of knowledge used in this thesis, when talking about the "knowledge of a language", I do not solely talk about a person's ability to understand or communicate in said language, but I refer to the knowledge that is known 'in' a certain language – so knowledge Y as known *in* language X. This is what will be meant with knowledge *of* a language. The definition of "knowledge" itself poses a difficult question that cannot be easily answered. The concept will be used in as broad a definition as needed.

3.1 Knowledge Transmission and Loss

Knowledge is mutable. It grows, changes and vanishes through use and disuse over the years. It can reside within a person's mind, be written down, or be embedded in social practices and behaviour. But knowledge, once attained, is not sure to survive forever. People forget things, as knowledge might become less used or used in a different context. They may not write knowledge down, or do not pass it on to the next generation. This results in knowledge changing or being lost altogether. In this section I will give two examples of knowledge: the first one showing that knowledge loss can also happen apart from what happens with a language, and the second one to introduce the notion that a breakdown in knowledge transmission might occur if the language were no longer there.

3.1.1 A Concrete Example

An example of lost knowledge is that of the recently rediscovered components of Roman concrete. People have wondered for a long time how it could be possible that Roman constructions were able to survive the ages so well compared to other constructions. With all the 21st century's knowledge and modern science, how come nowadays people cannot create concrete with at least a similar durability? The concrete of the 21st century is weaker than its Roman predecessor.[70] Did the Romans use different materials or methods, and if so, how come they are no longer in use if those methods worked so well?

[70] Linda M. Seymour et al., 'Hot Mixing: Mechanistic Insights into the Durability of Ancient Roman Concrete', *Science Advances* 9, no. 1 (6 January 2023): 1, https://doi.org/10.1126/sciadv.add1602' "In

Recent findings explain a breakthrough in rediscovering knowledge of the Roman concrete enterprise. The elements that went into Roman concrete and mortar had different components than thought until recently, and also the process of making the construction material had different methods than was hitherto known.[71] Interestingly enough, the Roman concrete still stands today, but the knowledge about its components and processes have proven to be less durable than the material itself.

This example shows that knowledge can be lost. Even though a lot is still known about Latin, its knowledge can still fade. Maybe the people who worked with this knowledge did not pass it on or write it down. Maybe they *did* write it down, but the writings have not survived the years, or have become unintelligible to us. Maybe the Romans ran out of the needed materials – or things to build – and the knowledge went out of use. There are numerous possible reasons for knowledge to disappear. Whether that be practical knowledge such as the creation of durable concrete, or historical knowledge such as the historical account of an important battle. If knowledge is no longer used or shared – for whatever reason – it is lost.

3.1.2 A Stellar Example

In the article *Indigenous use of stellar scintillation to predict weather and seasonal change*,[72] from 2019, the authors write about their research in Australia's Torres Strait, where they researched Indigenous people's use of stellar scintillation in order to make predictions about the weather and seasonal change. "A person's ability to accurately 'read' the various changes in the properties of stars can assist them in predicting weather and seasonal change."[73] Observing the subtle changes in the twinkling of stars, combined with observing other factors such as wind, temperature and moisture, enables people to make predictions about the weather.[74] While this specific knowledge is still in use, and not 'lost' as the previous example, the article does express the importance of language in knowledge transmission:

> "Indigenous knowledge systems have a scientific underpinning that is derived through empirical observation, experimentation and deductive reasoning (Mazzocchi 2006; Nakata 2010). This knowledge is often passed to successive generations not through written word but through oral tradition. Oral traditions are passed through strict protocols to ensure vitality and longevity"[75,76]

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contrast to their modern counterparts, ancient Roman mortars and concretes have remained durable in a variety of climates, seismic zones, and even in direct contact with seawater, as in the case for maritime concrete."

[71] Seymour et al., abstract, "Together, these analyses provide new insights into mortar preparation methodologies and provide evidence that the Romans employed hot mixing, using quick lime in conjunction with, or instead of, slaked lime…"

[72] Duane W. Hamacher et al., 'Indigenous Use of Stellar Scintillation to Predict Weather and Seasonal Change', *Proceedings of the Royal Society of Victoria* 131, no. 1 (2019): 24–33.

[73] Hamacher et al., 24.

[74] Hamacher et al., 31. These observations do not comprise the entire prediction system: "stars are just one of many natural objects observed for predicting weather. To the trained eye, subtle changes in apparent stellar properties can be used to determine changes in atmospheric conditions. These can be combined with other local data, such as the behaviour of animals, clouds and other natural objects and phenomena as part of a comprehensive weather forecasting system."

[75] Hamacher et al., 28.

[76] Lynne Kelly, *Knowledge and Power in Prehistoric Societies: Orality, Memory, and the Transmission of Culture* (Cambridge University Press, 2015), XXIV. In this book, Kelly describes ways in which communities with "non-literate knowledge systems" across history have managed to transmit knowledge, in which she views "oral tradition as a structured information system".

Then, if such oral transmission breaks down due to a language disappearing, what becomes of such Indigenous knowledge systems?

3.2 Practical examples of Language Loss resulting in Knowledge Loss

What is the effect of language loss on knowledge? If a language vanishes, is 'only' the linguistic knowledge, so the workings of the language, lost? What about the knowledge that resided *in* the language: the knowledge that is known 'with' the language? Is that lost too? In this section, I will give two practical examples of what language loss seems to imply for knowledge.

3.2.1 Medical knowledge in Endangered Languages

To give a practical example, consider the following article by Cámara-Leret and Bascompte: in *Language extinction triggers the loss of unique medicinal knowledge*[77] they researched the connection between language and knowledge in the field of medicinal plant knowledge in North America, northwest Amazonia, and New Guinea. Their research states that if multiple languages share the same knowledge about a plant, the knowledge is less prone to being lost.[78] This speaks to reason. Similar to being spread over a greater number of people, being spread over multiple languages gives knowledge a higher rate of survival, or as they call it, a higher resilience. However, what they found was that most plant knowledge is *linguistically unique.* This means that specific knowledge is only 'known' by one single language.[79] Then, consequently, if this medicinal plant knowledge truly only resides in just *one* language, and the language dies, the knowledge dies with it.[80] As "87 percent of the world's living plant and animal species have not yet been identified, named, described or classified by modern science," the loss of a language could mean the loss of a lot of knowledge about plant and animal life.[81] Crystal emphasises the loss of knowledge as having an even more dramatic outcome for the human species in general:

> "Accordingly, when language transmission breaks down, through language death, there is a serious loss of inherited knowledge: 'Any reduction of language diversity diminishes the adaptational strength of our species because it lowers the pool of knowledge from which we can draw.'"[82]

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[77] Rodrigo Cámara-Leret and Jordi Bascompte, 'Language Extinction Triggers the Loss of Unique Medicinal Knowledge', *Proceedings of the National Academy of Sciences* 118, no. 24 (15 June 2021): e2103683118, https://doi.org/10.1073/pnas.2103683118.

[78] Cámara-Leret and Bascompte, 1.'Therefore, if knowledge about medicines is shared widely among indigenous groups that speak different languages, knowledge resilience would be high. That is, even if some indigenous languages go extinct, their medicinal plant knowledge would still be safeguarded in other surviving languages with whom such knowledge is shared.'

[79] Cámara-Leret and Bascompte, 1. "Here, we find that most medicinal knowledge is linguistically unique—i.e., known by a single language— and more strongly associated with threatened languages than with threatened plants. Each indigenous language is therefore a unique reservoir of medicinal knowledge."

[80] It can be argued that some knowledge is more permanently lost than other knowledge; I will explore this topic in section 6.2.5 *Origin of the knowledge*.

[81] Harrison, *When Languages Die*, 15.

[82] Crystal, *Language Death*, 34. Also quoting Bernard (1992: 82).

This loss of knowledge as a result of language loss, and the potential global consequence, is also expressed in the article *Indigenous Peoples: Traditional knowledges, climate change, and health*, from 2023:

> "Although often not considered in climate and health dialogues, Indigenous languages are an important element of Indigenous health and greater planetary health [30,31]. Indigenous languages are an exquisite repository of Traditional Ecological Knowledges (TEK) (see Glossary), eco-centric cultural and sustainability practices, and Land-based traditions. […] With this projected [language] loss will go thousands of years of complex ecological knowledge systems [30]."[83]

'Language loss resulting in knowledge loss' is proposed as a *global* problem in the above two examples, in terms of "adaptational strength" and "greater planetary health." Although it is not anyone's responsibility to prevent this, the example illustrates a potential consequence of language loss. However, I believe it is more effective to explore it on a smaller scale, on the community level itself, as that is where the loss of such knowledge might have the most immediate effect. The loss of adaptational strength might not be a straightforward issue for a wealthy, western readership, but imagine living in a more secluded community. If knowledge of the environment, the weather, the land and wildlife is accumulated in a language, and is usually not written down: what does it mean if a community loses the language this knowledge 'resides' in? Were a language that has been spoken for decades to be lost to a more recently introduced language, what knowledge – about for example weather conditions, the seasons, cultivating the land and animal migrations – does the community stand to lose if most knowledge was *linguistically unique*?[84] Can certain knowledge still 'survive' onto another language?

3.2.2 Marra and Kriol

In *Marra and Kriol: The Loss and Maintenance of Knowledge across a Language Shift Boundary*, Gregory Dickson writes about his research in Australia with the Marra people. In the community, the Marra language is shifting to Kriol, with now only few Marra speakers remaining.[85] Dickson investigates "what happens to the cultural knowledge of a group, as encoded in the lexicon of the language they speak, when they have gone through processes of language shift."[86] Dickson investigates knowledge loss and maintenance, so with the vanishing of the Marra language, what knowledge does not make it to the younger Kriol-speaking generation? On page 267, Dickson exemplifies *bush medicine* as a domain of knowledge in which there is a difference in knowledge of the Kriol speakers versus the knowledge of the Marra speakers:

> "Yet diminished knowledge among younger generations is plainly apparent. This exists in both expressed knowledge (i.e. knowledge of terminology and oral demonstration of knowledge) and in practice, that is, the degree to which young

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[83] Nicole Redvers et al., 'Indigenous Peoples: Traditional Knowledges, Climate Change, and Health', *PLOS Global Public Health* 3, no. 10 (2023): 5. Word in brackets added for clarity.
[84] Cámara-Leret and Bascompte, 'Language Extinction Triggers the Loss of Unique Medicinal Knowledge', 1.
[85] Gregory Francis Dickson, 'Marra and Kriol: The Loss and Maintenance of Knowledge across a Language Shift Boundary', *Unpublished Doctoral Thesis, The Australian National University, Canberra*, 2015, abstract.
[86] Dickson, 37.

people can and do name, recognise, harvest, prepare and use various traditional medicines."

The difference in knowledge between the Marra and Kriol speakers is not only the case for the domain of *bush medicine.* Dickson also mentions the following domains:

- "Saltwater fishing and hunting: e.g. dugong hunting, names of dugong types, saltwater fish species
- Knowledge of mangrove and coastal land ecosystems
- Spear making and hunting with spears
- Traditional practices relating to fire (e.g. lighting fires, use in hunting)
- Topographic nomenclature and knowledge
- Water transport and navigation, including making and using canoes."[87]

However, is this diminished knowledge amongst Kriol speakers *due to* the language shift? The diminished knowledge among the younger Kriol speaking part of the community could, for example, be due to the knowledge becoming less in use, because of a changing way of life. In line with this, Dickson concludes that "Given the large-scale social disruption and lifestyle changes that have occurred since Marra ceased being transmitted to children, it is impossible to reach definitive conclusions about the manifestations that the loss of the language has for the ontology of Kriol-speaking Marra people."[88] So, indeed, loss of certain knowledge can be triggered by other factors than language loss alone. However, as Harrison writes in *When Languages Die*: "there is a massive disruption of the transfer of traditional knowledge across generations. This arises in part from the way knowledge is packaged in a particular language."[89] So, as the Marra and Kriol case indeed exemplifies, there is a disruption of traditional knowledge across generations – *and* this is in part dependent on what is happening with the language. While keeping other potential causations in mind, it is important to look at what is happening to the language to understand what is happening to the knowledge. Dickson gives examples of specific domains, or types, of knowledge that could be lost with the loss of a language in the process of language shift. While Dickson writes of the uncertainty regarding the extent of influence of language, he does describe "expected areas where Kriol speakers cultural practices and language use does not reflect the knowledge of their Marra speaking forebears and the intricacies of their language."[90]

3.3 The Resilience of Knowledge

In this section I will introduce the idea of the *resilience* of knowledge. Harrison describes the issue of knowledge loss at length. He argues that "the disappearance of languages will cause

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[87] Dickson, 267. "Bush medicine is just one domain of traditional knowledge in which a disparity between generations appears to exist, so the decision to focus on it here is somewhat arbitrary. Examples of other domains of knowledge that appear to be significantly reduced among young adult Kriol speakers, in particular those residing primarily in Ngukurr, include: • Saltwater fishing and hunting: e.g. dugong hunting, names of dugong types, saltwater fish species • Knowledge of mangrove and coastal land ecosystems • Spear making and hunting with spears • Traditional practices relating to fire (e.g. lighting fires, use in hunting) • Topographic nomenclature and knowledge • Water transport and navigation, including making and using canoes."

[88] Dickson, abstract.

[89] Harrison, *When Languages Die,* 16.

[90] Dickson, 'Marra and Kriol', abstract.

a massive erosion of the human knowledge base."[91] As seen in the above examples, the loss of a language seems to imply some degree of knowledge loss. Then, the notion can feel intuitively right. If a language dies and its last speakers pass away, there must be knowledge that they take with them to their grave. That can be knowledge about the world that they have not shared or could not share with people outside of their language speaking community, such as knowledge about religion, or historical tales, or knowledge about specific fish. It can also be the linguistic data of their language. While a final speaker might not have been a linguist themselves, their passing still means that knowledge about what languages are and how they can behave is lost. Imagine – if you have to – that you are *not* a linguist: there are certain grammatical rules within your language that you use every day which you might not even be aware of. Grammatical rules that come naturally to you, but need to be taught step-by-step to people who want to learn your language. Then, the death of a language, whether it held much knowledge about the world or not, *is* inherently a form of knowledge loss. Then, this example of grammar, some linguistic knowledge, seems to have a certain *property* that seems to make it vulnerable to language loss: it is knowledge that one is not necessarily *aware* of. It is a structure that one is taught without being all too aware of it. Then, how can the survival of such knowledge be *equally* likely as the survival of knowledge about, for example, a certain fish that one consciously *aware of* and wants to share?

This potential division into varying likelihoods of survival is what I call the *resilience* of knowledge. The resilience of knowledge is the degree to which certain knowledge is resilient against language death. I believe that every 'unit'[92] of knowledge can have its own *resilience*, and that this resilience can be scaled. Knowledge unit A is more resilient in case of language death than knowledge unit B, because of X, Y, Z. In this thesis, I am investigating the "X, Y, Z" – the factors that influence the resilience of knowledge. Consider the following example: imagine the last remaining speaker of a language, who has knowledge which they want to convey to their community:

A. knowledge about making fish-traps, and
B. knowledge about the migration pattern of fish.

Imagine no one in the community speaks or understands this speaker's language anymore. However, one of these 'units' of knowledge *does* seem easier to convey without the use of spoken language. The art of making fish-traps is something that can – at least partially – be shown, while explaining the migration pattern of fish requires more concepts of a deeper level of understanding, such as explaining differences in time and place. Migration patterns might be shown by for example drawing it, but the practical side of showing how to make a certain fish-trap appears to be less dependent on such deeper concepts. Then, one could suggest that *knowledge about making fish-traps* is more resilient in case of language death than *knowledge about the migration pattern of fish*, because of the former being something that can be *demonstrated*, and because the latter seems to be more *dependent on deeper concepts*. The above example illustrates that knowledge might have a certain *degree* of resilience, based on certain factors. What are these factors? What influences the resilience of knowledge? This brings me back to the research question:

What factors influence the resilience of knowledge in case of language loss?

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[91] Harrison, *When Languages Die*, 16.

[92] With a knowledge 'unit', I refer to one specific 'instance' or 'item' of knowledge, for example *fish-trap making knowledge*, or *knowledge of a certain recipe*, or *knowledge of palm trees.* For more on 'units', see the introduction to chapter 6.

In formulating an answer to this question, I work towards a division into two categories of factors, as mentioned in section 1.3: *external factors* and *internal factors*, in which *external factors* relates to the circumstances that influence whether knowledge may survive language death, and in which *internal factors* relate to *properties* of the knowledge itself that make it more or less resilient.[93]

In section 3.4, I will go into the notion 'language loss leads to knowledge loss' on a more fundamental level, looking *how* this can come about through exploring how language 'embeds' knowledge. This way knowledge can be embedded in a language is what I believe to be a first example of a *property* that knowledge can have – a property that influences the resilience of said knowledge in case of language loss. It works towards the factor *Embeddedness in the language* that is further explained in section 6.2.1 as one of the *internal factors.* The following section forms the first consideration of such a knowledge *property,* and shows *how* it may let language loss result in knowledge loss. This sets up the questionnaire in chapter 4, in search for more factors that influence the resilience of knowledge.

3.4 *How* Language Loss leads to Knowledge Loss

In this section, I will discuss some examples from literature showing *how* it can be the case that language loss results in knowledge loss. This section is a first exploration of the *resilience* of knowledge as described in section 3.3. The examples in this section all revolve around the way knowledge is embedded *in* a language and the way language has an internal structure. These examples will illustrate the idea that there are certain factors that influence the *resilience* of knowledge. What does certain knowledge 'have' that makes it more resilient, or vulnerable, than other knowledge? I will provide examples that go into a more fundamental understanding of knowledge 'in' a language. I will discuss how language and knowledge can be connected and subsequently how this specific connection between language and knowledge makes knowledge partly dependent on language, making it a factor that influences the resilience of knowledge in case of language death.

3.4.1 Lost in translation

Can anything be translated, or do things get lost in the process? And, if so, what things are lost? Can any word be fully translated to another language? This is a common question pertaining to the notion of what gets "lost in translation". There is often talk about some specific word in your or another language that is quite difficult to grasp in another language, as there is no direct one-to-one translation. "It means something like X and Y, but not *exactly*." One frequently used example is that of the Dutch word 'gezellig', which is a culturally bound word that might be difficult to translate.[94] However, this difficulty can arise

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[93] The above knowledge units' seeming difference in resilience – because of one being knowledge that can be *demonstrated*, and the other *depending on deeper concepts* – illustrate the *internal factors*.

[94] Fenna Van Nes et al., 'Language Differences in Qualitative Research: Is Meaning Lost in Translation?', *European Journal of Ageing* 7, no. 4 (December 2010): 315, https://doi.org/10.1007/s10433-010-0168-y. "Translation of quotes poses specific challenges, because it may be difficult to translate concepts for which specific culturally bound words were used by the participants. For example, the Dutch word *gezellig* was used commonly by late-life couples, expressing the feeling they had when doing things together. The meaning expressed with this typical Dutch word included experiencing togetherness in doing everyday activities together, often at specific times of the day and in the own home. Translating the word *gezellig*, only as "cosy" would reduce the meaning. Using more words than in the original quote, however, changes the voice of the

for many words. In the article *Language Differences in Qualitative Research: Is Meaning Lost in Translation?*, apart from 'gezellig', another example is given, namely the word 'wandelen':

> "In the following example, we were not aware of translation problems when translating the Dutch *wandelen* to walking, because according to several dictionaries, 'walking' was linguistically correct. However, native English speakers understood walking as the Dutch *lopen*, as to move from one place to another on feet, only as instrumental transportation. However, the activity *wandelen* consisted of a complex constellation of different meanings including the intrinsic enjoyment of the activity, enjoying nature and its associations with Sunday afternoons and holidays together. Ultimately 'going for walk' seemed more appropriate to represent the meaning"[95]

Initially, the researchers were not aware of translation problems for this word. This example illustrates that for example the cultural importance of a word can be lost in the process of translation. This is not necessarily only the case for words of which it is known that they have a culturally bound meaning, but also for words of which the subtleties of the meaning are more 'hidden'.

For instance, words or expressions can have a different form or structure in different languages. Imagine trying to translate the expression "feeling blue" to another language. The target language might not ever connect colours to moods in such a way, but that does not mean that it is impossible to translate the meaning of this expression to another language. If the target language has words for feeling sad or depressed, the meaning of the expression can survive in the target language. While this form or structure might be meaningless when translated to the other language, this does not mean that the concept is non-translatable – the underlying concept that is being transmitted, for example sadness, might very well be easily translatable in the target language. Just because there is no one-to-one equivalent in the target language when translating, does not mean the entirety of the meaning, and thus the knowledge will be lost. It just might need some extra context and description. But in a way, that is the case for almost every word, whether that is to capture the entire meaning in the target language or to *check* whether an already-existing word in the target language is *truly* a one-to-one equivalent.[96]

Relevant to translating concepts and finding correct one-to-one translations across languages is the research by Anna Wierzbicka on *semantic primitives*, or *semantic primes.* In her book *Semantic Primitives*, Wierzbicka first argues for the existence of certain concepts that are universal across all languages: "concepts that all human beings share."[97] Such concepts – for example 'I', 'you', 'someone', 'live', 'die', 'when/time', 'where/place' – are referred to as *semantic primitives*, and are "presumably undefinable meanings. […] The primes themselves are innately given, and are also inter-translatable between all languages:

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participant. This is especially problematic as giving voice to people is seen as an important aim of qualitative research (Denzin and Lincoln 2000)."

[95] Van Nes et al., 314.

[96] Crispin Wright, 'Indeterminacy of Translation', in *A Companion to the Philosophy of Language*, ed. Bob Hale, Crispin Wright, and Alexander Miller, 1st ed. (Wiley, 2017), 675, https://doi.org/10.1002/9781118972090.ch26. For further reading, related to translations and the accompanying uncertainties, is the *gavagai problem*, as first introduced by Quine. It addresses the issue whether one can ever be certain of making correct translations at all. On page 675 and 676, Wright explains the issue clearly.

[97] Anna Wierzbicka, '"Semantic Primitives", Fifty Years Later', *Russian Journal of Linguistics* 25, no. 2 (2021): abstract.

their basic meanings are universal."[98] Over the years, the final number of *semantic primitives* has been concluded to be 65, which encompasses all concepts that all human beings share, no matter the language. Wierzbicka and Cliff Goddard believe to have "identified, in full, the shared "alphabet of human thoughts.""[99,100] In order to make translations from one language to another, understanding potential universals is key, as they may form the foundation of what all humans understand of the world and from *what* fundamentals to build more complex translations.

3.4.2 Hidden in the structure – Fish, Berries and Reindeer

As exemplified in section 3.4.1, different concepts or words can have a different 'relation' to language. Different languages have different structures and such structures 'hold' knowledge. One way in which knowledge can be embedded in the structure of a language, is through classifications. Different classifications embed knowledge in different ways. The following examples will consider the different ways knowledge can be embedded *in* language, through looking at examples of categories and taxonomies.

Different languages use different naming systems. Harrison describes that the naming of animals often contains knowledge: "Each naming system packages information in different ways."[101] A simple example such as 'goldfish' versus 'salmon' exemplifies that certain names *can* contain more knowledge than others. In this case, one only needs to know what a 'fish' is to understand that 'goldfish' most probably belongs to this category, – while one cannot be certain when encountering the word 'salmon'. Such names can be separated into *opaque* terms and *descriptive* terms – *opaque* terms being names such as the English name 'cod', where the word itself has no giveaway as to its meaning, there is nothing to derive any of this fish's characteristics from, whereas the name 'bullhead' would be a *descriptive* term, providing more information about the particular fish.[102] This exemplifies how knowledge can be embedded *in* the language.[103]

Another way to understand the embeddedness of knowledge in language is further looking into categories. People categorise the world around them, as stated by George Lakoff in *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind*: "There is nothing more basic than categorization to our thought, perception, action, and speech. Every

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[98] Daniel Dor, *The Instruction of Imagination: Language as a Social Communication Technology* (Oxford University Press, USA, 2015), 64. This theory was popularised and worked out by Anna Wierzbicka, in her book "Semantic Primitives" which came out in 1972.

[99] Wierzbicka, '"Semantic Primitives", Fifty Years Later'.

[100] Literature that also relates to the topic of languages and concepts is Wierzbicka's book: *Imprisoned in English: The Hazards of English as a Default Language* (Oxford University Press, 2013).

[101] Harrison, *When Languages Die*, 25.

[102] Harrison, 42.

[103] An important side-note here is that these descriptive terms can be guiding, but can also misleading. In case of a misnomer, for example the word 'jellyfish', a term may seem *descriptive*, while it might not be. While a jellyfish might also live underwater, just like fish – a jellyfish is no *fish* in terms of the scientific classification system one might be accustomed to. However, the word 'jellyfish' does in other ways quite rightfully describe the animal – maybe even more so than other words. The word 'jelly' seems descriptive indeed, and while it might not be a fish in scientific standards, it has the same living habitat as fish. Is it then truly a misnomer just because it is not a member of the scientific classification of fish? A jellyfish is not a *fish* according to the western scientific classification system, but does that make the word "jellyfish" less useful? The main take-away here should be that the classifications *may* embed knowledge in a language. Whether this is only strictly useful information or not, and to whom, is beside the point.

time we see something as a *kind* of thing, for example, a tree, we are categorizing."[104,105] Categorisation is ever-present in thought and language, and influences how people name things. Additionally, as John F. Sowa writes in *Knowledge Representation*: "In every field of human endeavor, from cooking and fashion to topology and quantum mechanics, concepts are only meaningful in relation to other concepts in tightly organized structures of thought. Knowledge acquisition begins with words, but it must find the connections that link those words in larger patterns."[106] Therefore, in investigating language structure and translation, one should incorporate such larger patterns, like categorisation and their influence on language.

Does categorisation determine the language one uses? Or does the language influence the categorisation one makes? In *From perceptual to language-mediated categorization*, Westermann and Mareschal describe that categorisation is not fully dependent on language, as it has been shown that young children also categorise before they have language, based solely on perception.[107] The act of categorising is therefore not fully language-dependent. However, after passing the learning stage – when a child is learning words and categories – comes "the transition from pre-linguistic perceptual categorization to language-mediated categorization."[108] Categorising becomes intertwined with language, influencing the labels and naming systems people use for things in the world.

Categorisation becomes intertwined with language from a certain age, but how exactly? In *Is It Culture or Is It Language? Examination of Language Effects in Cross-Cultural Research on Categorization*, Ji, Zhang and Nisbett examine the effects of culture and language on categorisation.[109] The separate effects of the two are difficult to measure, as culture and language are difficult to separate from one another.[110] But as they are embedded in each other, for the purpose of exemplifying the connection between knowledge and language, the effect of language will be applied in this example, even if it is partly paired with the effect of culture. Ji, Zhang and Nisbett use the difference between *taxonomic categorization* (category-based classification, for example 'seagull' and 'squirrel') and *thematic categorization* (relationship-based classification, for example 'squirrel' and 'tree') to show the influence of culture and language on categorisation.[111] "Language serves as an organizer of knowledge (Hamers & Blanc, 2000), and there is reason to believe that aspects of language influence categorization."[112] Then, categorisation connects language and knowledge: language organises knowledge, and this organisation is based on making categorisations. By naming things and putting them in categories, knowledge in language Y becomes more closely 'related' to certain things, which it might be less 'related' to in

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[104] George Lakoff, *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind* (University of Chicago Press, 2008), 5. This book is useful for more information on categories.
[105] For more information about the *prototype* theory of categorisation, one could consult: Eleanor Rosch, *Principles of Categorization*, 1988, https://doi.org/10.1016/b978-1-4832-1446-7.50028-5.
[106] John F. Sowa, *Knowledge Representation: Logical, Philosophical and Computational Foundations* (USA: Brooks/Cole Publishing Co., 1999), 445.
[107] Gert Westermann and Denis Mareschal, 'From Perceptual to Language-Mediated Categorization', accessed 13 September 2024, https://doi.org/10.1098/rstb.2012.0391.
[108] Westermann and Mareschal, 4.
[109] Li-Jun Ji, Zhiyong Zhang, and Richard Nisbett, 'Is It Culture or Is It Language? Examination of Language Effects in Cross-Cultural Research on Categorization', *Journal of Personality and Social Psychology* 87 (1 July 2004): 57–65, https://doi.org/10.1037/0022-3514.87.1.57.
[110] Ji, Zhang, and Nisbett, 58. "Language is a medium for transmitting and internalizing culture. Culture and language are therefore embedded in each other."
[111] Ji, Zhang, and Nisbett, 57.
[112] Ji, Zhang, and Nisbett, 58.

language X. Not all languages or cultures organise in the same way,[113] enabling different languages to hold different knowledge.

Now, categorisation influences language. One way of looking at categorisations is through taxonomies.[114,115] I will exemplify how such taxonomies, in different languages, can hold different knowledge. Examples of knowledge *within* language structures can be found in the naming of animals across different languages and looking at folk taxonomies. Whereas the *scientific taxonomy* of the animal kingdom and the subsequent naming deals with genetic relatedness, *folk taxonomies* are based on locally useful characteristics, such as function.[116] Folk taxonomies might for example categorise certain fruits by their edibility, effectively naming the fruits per this characteristic. Language – as discussed above – is intertwined with such folk taxonomies, potentially giving language-users additional information about for example a certain plant or animal within its name.[117,118] Then, if a language 'embeds' knowledge differently in its structure, what does that mean for this knowledge if said language dies? Is it merely a unique structure, or can such a structure also hold unique knowledge?[119] The two following examples show the embeddedness of knowledge in language structures, and that knowledge might be packaged in such a way that it might not be obvious to non-speakers it 'hides' within the structure.

3.4.2.1 Berries

Take the following example: imagine you go to an endangered language community and start creating a dictionary. You have collected the following words for certain fruits in the community's area:

Apple	=	hazal
Pear	=	petel

[113] An example of this is given by Ji, Zhang and Nisbett: in some cultures, categorisation is more 'based' on theme, while in others taxonomy is the deciding factor.
[114] Rosch, *Principles of Categorization*, 30. "By *category* is meant a number of objects that are considered equivalent. Categories are generally designated by names (e.g., *dog*, *animal*). A *taxonomy* is a system by which categories are related to one another by means of class inclusion."
[115] Harrison, *When Languages Die*, 35. The practice of taxonomy is "naming individuals and groups, sorting things into groups, discovering relations among them."
[116] Harrison, 38-39. "Divisions by function, so alien to the scientific classification, are not the exception but the norm in human classification strategies."
[117] Harrison, 40. "Folk taxonomies encapsulate generations of subtle and sophisticated observations about how the pieces of the animal and plant kingdom fit together, how they relate to each other and to humans."
[118] Certain folk taxonomies might have an obvious merit, such as a classification system that incorporates whether a fruit is poisonous or not. So, recognising a fruit's edibility from its name. However, certain folk taxonomies might not have a usefulness for outsiders. Imagine a classification of fruits on whether men or women are allowed to eat them. This might not seem useful for outsiders who do not uphold values relating gender and eating habits, but that does not make this taxonomy less valuable. While the knowledge it practically packages might be less useful for others around the world, as only people in this certain community hold the belief that certain fruits are meant for certain people, that does not make the folk taxonomy less valuable. However, whether this knowledge is valuable or not and to whom, does in this case not matter, as the examples here are merely to show that knowledge *can* be embedded in a language, and that this is not necessarily the same in every language.
[119] Harrison, *When Languages Die*, 9. "We also lack a clear understanding of what exactly is being lost – is it unique, irreplaceable knowledge, or merely common sense knowledge uniquely packaged?"

Berry	=	yobol
Melon	=	mitil

You have not focused on too many different aspects of the language, and only upon returning home and talking to another person with a lot of knowledge of fruits of said region, have you come to realise that this dictionary holds more information than you first realised. The language has namely a structure with the following 'rules':

Words for edible fruits end with:	*–al* or *–el*
Words for poisonous fruits end with:	*–ol*

So, *yobol*, the berry, is poisonous. Language can 'package' knowledge. Knowledge might be difficult to reach without a full understanding of the language (structure) and the realisation of said knowledge to be there. Maybe, the 'rule' of poisonous things ending with *–ol* does not only apply to fruits, but also to other plants. And what about the other parts of the words you have documented? Maybe the prefix *mi–* tells one something about the fact that this fruit can be collected during summer, or can be found near a river.

3.4.2.2 Reindeer

Another example of knowledge embedded in words is that of the reindeer vocabulary of the Tofa people. In the Tofa community in southern Siberia, reindeer herding is, or at least used to be, a huge part of the Tofa culture. The reindeer herders had a wide vocabulary to talk about a specific type of reindeer that they recognised, based on "age, sex, rideability, fertility and tameness."[120] An example is the word *chary*, which can in one word convey that a reindeer is a "'5-year-old male castrated rideable reindeer.'"[121] Then, with this sentence, it seems possible to translate the entire concept of *chary*, but the more difficult thing is to realise this knowledge 'hides' within the language in the first place. If one points at a reindeer in the distance and says "chary", and the linguist in question does not realise the *extent* to which this word contains knowledge, it might just be translated as the word for 'male rideable reindeer' or '5-year-old male reindeer', missing a lot of knowledge that the word "chary" also encompassed. This also means that the above 'correct' definition of *chary*, might also be incomplete.

3.4.3 Losing knowledge

As already stated in section 3.2.2, Harrison writes that the disruption in the transmission of traditional knowledge from generation to generation partially results from how knowledge is structured within a language.[122] Then, if a language starts disappearing and that particular way of packaging knowledge vanishes, knowledge is likely to be lost – as the structure of the language itself could *hold* knowledge. This embedded knowledge, 'hidden' or rather 'embedded' in the structure, is more likely to be lost if the language dies, as the structure is part of the language itself.

The above examples take me back to the problem of *lost in translation*: one can in theory never be completely sure to understand exactly what another is saying, so in a way, there is *always* room for things being lost in translation. The specific issue here is that one cannot be certain whether something is lost or not. What is even more jarring is that

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[120] Harrison, 27.
[121] Harrison, 27.
[122] Harrison, 16. "there is a massive disruption of the transfer of traditional knowledge across generations. This arises in part from the way knowledge is packaged in a particular language."

knowledge that is lost in translation then also would likely be knowledge that is *linguistically unique*[123] – as the success of the transmission also depends on *what* the outsiders know. If the outsiders do not even know of the existence of knowledge X, they do not ask for it, look for it, or maybe even acknowledge it when it is presented to them. Then, knowledge that is linguistically unique seems more prone to being lost with the language. Not because it is impossible to translate, but because of potential knowledge gaps between communities and the way certain knowledge is embedded in the structure of a language. I want to make clear that I do believe that translation is useful and works, but that I also believe that to some extent, language might have embedded knowledge in such a way that is more difficult to become apparent, than other knowledge. I do not know for certain if some knowledge is virtually *impossible* to be translated, but I do believe that there is a *degree* to which certain knowledge is easy or difficult to translate.[124] There is a *degree*, so a division of sorts, in the difficulty of knowledge transmission based on language.

Language can package knowledge in a certain way. And over time, certain knowledge has become embedded *in* language in such way that, to speakers of the language, this knowledge might have become second nature. Language can have such intricate structures that it is not only a vehicle for knowledge to be transmitted with – knowledge can also be hidden *in* the language structure itself as explained in the examples in section 3.4.2 about berries and reindeer. Therefore, when losing a language, one loses a way of packaging knowledge that might be so different from other languages, that one also loses knowledge that is embedded within the *structure* of the language itself. Different knowledge can be structured differently in language – it can be deeply embedded, or not necessarily embedded in the structure at all – and therefore the loss of a language can have a different effect on each such 'unit' of knowledge.

3.5 Concluding

In this chapter, I have discussed how one may understand the connection between language and knowledge, and the relation between language loss and knowledge loss, answering the first research sub-question: *How can language loss and knowledge loss be connected?* I have introduced the concept of the *resilience* of knowledge and the hypothesis that certain knowledge could have a higher resilience in case of language death than other knowledge. One of the factors that seems to influence this resilience is the particular way a language structure can 'hold' knowledge, as exemplified in section 3.4. The way in which knowledge is embedded in language seems to influence the likelihood of said knowledge's survival. I propose that the way knowledge can be embedded in a language is a *property* of knowledge, which I have named *Embeddedness in language*. However, apart from this *Embeddedness*, I believe there to be more factors that influence the likelihood of knowledge surviving in case of language death. Seeing how knowledge can be embedded in a particular way in a language, that seemingly makes it more or less likely to 'survive' language death, inspired me to inquire about more such factors that influence the *resilience* of knowledge.

In the remaining part of this thesis, I will further investigate factors that influence the resilience of knowledge in case of language loss. This will be done through the eyes of researchers who have actually worked on endangered languages in the field. What other factors determine the resilience of knowledge? Chapters 4 and 5 revolve around the questionnaire that I have sent to researchers involved in documenting endangered languages.

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[123] For *linguistically unique*, see section 3.2.1.

[124] This is in line with Wierzbicka's idea of certain universals concepts, *semantic primitives*, being the same across all languages, as described above in this section.

What have these researchers encountered in the field while documenting language and knowledge? The central themes in the questionnaire are the endangerment status, “types” of knowledge, knowledge that is difficult to document, and what knowledge can or cannot survive language death according to the respondents. From the responses to the questionnaire, I have identified factors that seem to influence the resilience of knowledge, which will be discussed in chapter 6.

4 Questionnaire

In this chapter I will focus on the questionnaire that I have sent to researchers who have worked on endangered language projects. The questionnaire comprises eight questions and can be found in *Appendix A.* Central in the questionnaire are the two remaining sub-questions:

2. *What "types" of knowledge can be distinguished?*
3. *What knowledge is lost with language death?*

The questionnaire is built around these questions in order to work towards formulating an answer to the research question.

4.1 The Right to Forget

This thesis looks at documentation of language and knowledge in endangered language communities, and I wish to point out two things before continuing.

Firstly, within the scope of this thesis, documentation is not considered the necessary way to 'save' languages. I will use the examples from documentation efforts as a *means* through which I can investigate the process of language loss and knowledge loss. The questionnaire provides insight into the experiences of researchers documenting in an endangered language community. Their responses give me a look 'inside' such a process, enabling me to investigate what happens to knowledge when a language is disappearing. I do not necessarily regard documentation as the way to save knowledge or save a language – it gives the opportunity to see what might happen to knowledge when a language is lost.

Secondly, languages and their knowledge do not necessarily 'need' saving. From a generalised western point of view, knowledge might belong to anyone, but this ideology is not shared with everyone. Communities may not wish for outsiders to get involved in their knowledge at all, impending knowledge loss or not. The most important thing is that the community can decide if and how they want to proceed with such documentation projects.[125] For certain communities, 'loss' can also be a part of their culture. The fact that for a western readership, 'loss' is generally considered a bad thing does not necessarily make this the case for everyone. Certain things being lost can be part of a culture. One of the respondents wrote about this:

> "**There are also things that the communities do not want to keep or pass down**. I have tried to get some information about the past tribal warfare. There are taboos in place that require all parties to be present if such story were to be retold and recorded. In practice it means that the story will disappear with its bearers because they were unwilling to get together for the recording despite my repeated attempts. I have stopped trying now and **respect the right to forget**."

[125] Pirjo Kristiina Virtanen, Torjer Olsen, and Pigga Keskitalo, 'Contemporary Indigenous Research within Sámi and Global Indigenous Studies Contexts', in *Indigenous Research Methodologies in Sámi and Global Contexts* (Brill, 2021), 10. This is linked to *Indigenous methodologies*, as in this paper, Virtanen emphasises "The notion at the time that the Sámi themselves should decide how research was conducted, was part of the rise of the Indigenous decolonialism that emerged in the 1960s, which has been getting stronger ever since." This notion also applies to Indigenous communities and to endangered language communities in general.

4.2 Respondents

The questionnaire has been sent to researchers who have worked on endangered language documentation projects. As most of the respondents work, or have worked, on multiple languages and projects in various regions worldwide, they were asked to focus on one or two projects that they have worked on closely.

Respondents were contacted through my internship supervisor at the *Living Tongues Institute for Endangered Languages*, through the mailing list *Lingtyp*: a discussion list for The Association for Linguistic Typology, through the DoBeS mailing list and through the network of my supervisor Dr. Stef Spronck.

4.3 Motivation

The questions were created to better understand the process of knowledge documentation within endangered language documentation. The first question is practical, as different projects focus on different languages and regions and use different scales in order to classify the 'endangered-ness' of a language. In these various scales that are in use, the label "endangered" or "nearly extinct" might not always mean the same.[126] The motivation for questions 2-7 were the lack of data on the *process* of knowledge documentation within endangered language documentation. This interest arose when going through online data archives on endangered languages, and seeing that while different knowledge was documented in different projects, there seemed to be no meta-analysis on this practice, nor a comparative review of *what* knowledge was collected, who wanted it to be documented, and how easy or difficult this process was.

While going through the Endangered Language Archive (ELAR) to investigate the knowledge that is being documented in endangered language projects, it quickly became apparent that such a study would be fruitless by going through the online database alone.[127] The online archive holds a lot of data, however, ELAR has no standard model or framework regarding what topics or knowledge the collection holds. After contacting the archive, I was told that researchers are free to categorise their project as they see fit. The upside of this is that the categorisation of knowledge does not have to meet certain requirements and can be done however the researcher in question sees fit. However, it also poses the problem that there is no real overview of what kinds of knowledge are collected. Is someone looking for knowledge about traditional recipes from endangered language communities? ELAR might have a lot to offer, but only if the information can be found. Some researchers made clear distinctions into several fields or categories, making browsing the archive's contents easier. For example in the *!Xun* collection[128], there are different *Topics* such as 'Conversation', 'Dance', 'Death', 'Ecology', 'Folklore' and 'Games', to just name a few. Other ELAR collections have no categorisation of their contents at all. No generalisation whatsoever might make it extremely difficult to locate data on a specific sub-topic – or even find out this data exists in the archive at all. While the archive is useful for going through data on a specific language, such as *!Xun*, it is ill-suited for comparing different projects or collections.

Another problem I encountered was the fact that within the collection there was little to no information on the *process* of the language documentation, and the potential difficulties or problems one might run into when documenting certain knowledge. It lacked a personal account of the researchers' work. To my understanding, there could be important information

[126] More on this in section 6.1.2 *On the endangerment status.*
[127] 'ELAR Collections', accessed 21 January 2025, https://elararchive.org/collections/.
[128] 'Khoisan-Boden-0486 | Endangered Languages Archive', accessed 21 January 2025, https://www.elararchive.org/uncategorized/SO_3226e232-2eba-4d77-a97d-27543d47e9ee/.

in the *way* data is collected, as it could tell a lot about the specific communities. To exemplify, the lack of ecological knowledge in a collection on a certain language could have a myriad of reasons: perhaps the project was not focused on collecting such knowledge; the researcher did not know how to document that knowledge; the community did not want such knowledge to be documented; the ecological knowledge of the community was not regarded as 'new'; etcetera. However, the lack of information on the *process* of documentation makes it difficult to draw any conclusions about why certain knowledge is in the collection, while other knowledge is not. I had expected that such accounts would have been included. Some collections do have an insightful overview of the project's aim and certain knowledge that is in the collection, but not extensive enough for the purposes of this thesis.

In trying to get an overview of knowledge that has been documented, I needed an alternative approach. A more direct approach would better fit to find out more about different endangered language documentation projects, the knowledge they revolved around, and the researchers' experience on such knowledge transmission and knowledge loss. That is how I got to the questionnaire, reaching out to the researchers who have contributed to the documentation of languages and knowledge, yet about whom I could not find any 'experience reports' on the process of documenting language and knowledge.

These questions aim to give one a better understanding of how knowledge gets lost and to what extent this is due to the death of a language. The data gives insight into the ways these researchers view knowledge's survival in relation to language endangerment, and while these experiences are all unique – with different researchers, languages, communities, circumstances and knowledges – their culmination makes for an insightful look into the workings of such projects. It might shed light on recurring troubles or themes, and hopefully gives more insight into factors that influence the resilience of knowledge in case of language loss.

4.4 Data analysis

The data from the questionnaire has been analysed with Taguette.[129] Coding the responses to the questionnaire has been done following the principles of qualitative data analysis by Victoria Elliott in *Thinking about the Coding Process in Qualitative Data Analysis.*[130] I have divided the data into multiple codes and themes, which have eventually resulted in the following relevant topics and structure:

- Language metadata
    - Which endangerment status?
    - On the endangerment status
- Types of knowledge
    - Which types?
    - On making types
    - Stepping away from types
- Difficult to document
- Influence of language loss on knowledge
    - What is lost?
    - What survives?

[129] Rémi Rampin and Vicky Rampin, 'Taguette: Open-Source Qualitative Data Analysis', *Journal of Open Source Software* 6, no. 68 (10 December 2021): 3522, https://doi.org/10.21105/joss.03522.
[130] Victoria Elliott, 'Thinking about the Coding Process in Qualitative Data Analysis', *The Qualitative Report*, 24 November 2018, https://doi.org/10.46743/2160-3715/2018.3560.

The 20 respondents have named a total of 47 languages on which they have worked. This is not the total of languages that all these researchers have worked on – the 47 languages are the ones they answered the questions about. Some respondents have worked extensively on one project, others have worked on more projects and languages than they mentioned, but focused their answers on their biggest or most recent projects.

In chapter 5, I will provide the data that has come out of the responses to the questionnaire. This section is split up into the above four themes: *Language metadata, Types of knowledge, Difficult to document* and *Influence of language loss on knowledge.* Each theme will briefly deal with different questions and the researchers' responses, refer to the data in the appendices, and show their relevance to the thesis.

5 Responses

5.1 Language metadata

In this section I will discuss the language metadata and the endangerment status of the languages that the researchers have worked on. In *Appendix B,* I have added the exported Taguette markings I coded with 'On the endangerment status'.

5.1.1 Which endangerment status?

Respondents were asked what the endangerment status of the language is and which scale they used. There are a lot of different scales on which to decide what the endangerment status of a language is. Scales that respondents have used are the following: Ethnologue's EGIDS, LEI, Glottolog's AES, UNESCO Atlas. For example:

> "[Language X] is 'critically endangered' – 5.1 on the Glottolog scale."

> "UNESCO severely endangered"

> "According to Glottolog, the language is "threatened". There are still a few hundred speakers, all above 60, who have learned it as L1, they all are bilingual with Spanish."

Some respondents did not mention using a specific scale, even though this was specifically asked in the question. They answered the question of the endangerment status in one of the following ways or combinations thereof: Number of speakers; Descriptive word without naming a scale; Description of whether the language is still being passed on and how; Creating own scale. For example:

> "Highly Endangered (fewer than 200 speakers?)"

> "[Language X]—moribund, only a few elderly speakers"

> "[Language X] is threatened, children still learn the languages in most of the villages but many people are moving outside the villages. [Language Y] is basically moribund, there are only 3 speakers left and in their daily lives they mostly speak [Language X]."

5.1.2 On the endangerment status

Asking to which part of the language loss continuum a language of a certain project belongs is important as there is no standardised classification. Glottolog, for example, has the Glottolog's Agglomerated Endangerment Status (AES),[131] which uses the classifications: *not endangered, threatened, shifting, moribund, nearly extinct,* or *extinct*; whereas Ethnologue has Ethnologues's Expanded Graded Intergenerational Disruption Scale (EGIDS)[132], which has the classifications: *international, national, provincial, wider communication, educational, developing, vigorous, threatened, shifting, moribund, nearly extinct, dormant,* or *extinct*. Both classification systems use 'nearly extinct', but chances are these definitions are not identical, seeing EGIDS has another label between *nearly extinct* and *extinct,* namely *dormant,* whereas in AES, *nearly extinct* and *extinct* are directly next to one another.

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[131] 'Glottolog 5.1 - GlottoScope', accessed 12 February 2025, https://glottolog.org/langdoc/status.
[132] 'Methodology', Ethnologue (Free All), accessed 17 October 2024, https://www.ethnologue.com/methodology/.

Glottolog's *nearly extinct*: definition not mentioned.

Ethnologue's *nearly extinct*: "The only remaining users of the language are members of the grandparent generation or older who have little opportunity to use the language."[133]

Such differences between the scales could create confusion about the actual state of endangerment of a language. When a researcher writes that the language they worked on is 'endangered', it is preferable to know which scale they used. However, not all researchers mentioned using a specific scale. Some respondents write about the difficulty of denoting the endangerment status and the faultiness of number of speakers or degree of 'endangered-ness' that might be found in existing scales. This can for example be due to outdated data, or an incomplete account of the factors that influence the endangerment status of a language. A few interesting remarks on the scaling systems are quoted below:

> "No, my assessment isn't based on any of these scales. **I don't trust Glottolog**, because the decisions are highly ideological."

> "When we started the project, it was listed as endangered, but the assessment was probably **based on insufficient data** and the fact that about 10 years ago it and the communities who speak it did not have the governmental recognition. Ethnologue lists it as "stable" now, though my colleague did publish a study suggesting that it is "endangered language with status 7-Shifting."

> "[…] listed as "threatened" by ELP/Glottolog and "definitely endangered" by UNESCO. **I agree with these ratings.** The main factors are a low population figure and absence of indigenous language education/support."

> "I do not know, I have mostly been working on [Language X] and [Language Y]. [Language X] is still learned by children, [Language Y] is not."

Some respondents explicitly mention that existing numbers in these existing scales are not correct or up-to-date at all:

> "It's hard to say. […] Ethnologue etc. evaluate them as being used in education and in other domains (so the accurate label in GIDS would be 'developing'), but the variety being used is really [Language X], a standard promoted by the government and not spoken in the family domain, so **this evaluation is not really corresponding to reality**."

> "[…] listed as extinct on Glottolog. **This certainly isn't correct** – but with fewer than 40 speakers in 2019 this language is severely endangered (this is its status from the Unesco atlas). For all we know, it is spoken only by adults, with virtually no transfer."

This wide variety of answers underscores the urgency of language endangerment, as it seems a lot of data on endangered languages is not up-to-date. For this specific research, it is not vital to have the *exact* circumstances of each language, but it is good to have at least a broad

[133] 'Methodology'.

idea of the status of a language before considering how a researcher looks at the knowledge transmission that takes place.

While asking for the endangerment status seemed like a question with a single-word response, it is incredibly difficult to ascertain, as the circumstances of every language are different. Some language A in a small, remote community might be considered 'thriving' if it has 400 speakers, whereas language B might be seen as nearing catastrophe with that same number of speakers. Imagine only 400 remaining speakers of English. A respondent who worked on a language in New Guinea puts this rather well:

> "The main factors for these classifications is language community size, status, transmission to children. Measuring the size is quite hard to do in this part of New Guinea, because everyone is multilingual and women marry-in from other villages which speak other languages. I can therefore only give a rough estimate, which is 250 speakers. That small figure is quite normal in New Guinea, but in the classification system that measure endangerment such a small figure places the language automatically in the "endangered" category. […] I would say the status of the language is a mixed bag. As for transmission to children, the language is not endangered at all. Children learn the language and there is no real danger in sight. All of that being said: with only 250 speakers, it would take only a single generation to shift or partially shift to another language, and [Language X] would be lost."

Looking at the difficulty to ascertain the number of languages in the world, as discussed in section 1.1, it is also difficult to put a number on how many speakers are left of a certain language, and where a potentially endangered language 'flows' into another language. Then, it is understandable that the respondents who worked so closely on the projects denote the difficulty of putting a degree of endangerment on a language, as it all depends on so many different factors, making it difficult to generalise such circumstances.

5.2 Types of knowledge

In this section I will discuss "types" of knowledge. *Appendix C* contains a list of 99 "types" of knowledge as described by the respondents. It is a list of the types as described by the respondents, in alphabetical order, not altering the contents except for replacing instances of a name of a specific language with "[the language]". Exact doubles have been omitted.

5.2.1 Which types?

Respondents were asked into what "types" of knowledge they would categorise the documented knowledge in their project. The question prompted the researchers to write down "types" of knowledge they regarded as such in their respective research, and not a full list of "types" of knowledge they believe to exist. The list in *Appendix C* is by no means complete, insofar a list of this kind can ever be regarded as 'complete', it is compiled from the data that I was given.

5.2.2 On making types

Thinking about "types" of knowledge proved to be a bit of a challenge. In the email contact with the respondents, I have been asked repeatedly if I could not instead provide a list of types for them to choose from – but that was exactly the problem, as such a list did not yet exist, and it would be better to create it from scratch with the direct input from experts in the field. I *could* have created a list with the option for respondents to add categories outside of this list, but that still could have directed or influenced their answers. I believe their

experience to be a better starting point in creating such a list of "types" of knowledge.[134] Yet, it proved a not-so-easy question:

> "That is a pretty difficult question since it requires some kind of ontology of knowledge. […] These categories of knowledge are also quite easy to grasp because there are disciplines like biology or ethnobiology associated with them. There is much knowledge that is harder to classify."

> "It is very hard to do this – and it depends on both the historical and the contemporary situation of the speakers: e.g. in this case, I am talking about what was historically a small-scale hunter gatherer society with large territories, but where today people mostly live in mixed Aboriginal and non-Aboriginal towns, and survive on social welfare payments."

5.2.3 Stepping away from types

The list in *Appendix C* provides an answer to the sub-question: *What "types" of knowledge can be distinguished?* As mentioned before, this list is not complete and contains repetitions, as it is a first attempt at creating such a list of "types" of knowledge. However, this list of "types" of knowledge turned out to be less useful in answering the research question than I at first thought. I believed that by investigating "types" of knowledge, I might be able to investigate whether such "types" have a higher resilience in case of knowledge loss, *across* multiple languages. This will be further explained in section 5.6. Then, why keep it as a part of this research?

I want to point out that while looking at "types" of knowledge was in hindsight not the right way to go, it *is* the route that led me to answers and the conclusions of this research as they are now. Inquiring about "types" gave me insight into the considerations of the researchers – how they regard knowledge and what factors knowledge transmission depends on. While reading through the responses to the questionnaire, I realised that these "types" of knowledge could not directly provide some answer to which "types" of knowledge are more likely to survive as this was highly context dependent. The answers greatly varied across the different projects. Upon starting this thesis, I realised that such context-dependent influences would probably play a big role in whether knowledge could survive language death, but when reading about the structure of language and its way of 'embedding' knowledge,[135] I felt that it could not only be such contextual factors that decided the likelihood of certain knowledge surviving. I believed it to be something also *inherent* to certain knowledge; dependent on the specific knowledge one wanted to transmit. Then, with the realisation that looking at "types" would not bring me any further in this hypothesis, I needed to re-evaluate: while at first, I was looking at "types" of knowledge, to see whether certain "types" had *inherent* factors that made them more (or less) resilient to knowledge loss – as exemplified in section 3.3 with the example of knowledge on fish migration and making fish traps – I quickly realised that "types" were not the right thing to look at. These "types" were too context dependent, but reading further I realised I needed to look elsewhere. I realised I did not need to look at a "type" which made knowledge more resilient to language death, but at *properties* of knowledge that influenced this. As from the example in section 3.3, I wrote about the idea that 'Knowledge unit A is more resilient in case of language death than knowledge unit B, because of X, Y, Z.' I realised that instead of searching for A and B, in terms of one

[134] As can be found in the questionnaire in Appendix A, "types" of knowledge could be interpreted in any which way the respondents saw fit.
[135] As discussed in section 3.4.

knowledge "type" being more resilient than another, I needed to look at X,Y,Z, in terms of *factors* influencing the resilience. I stepped away from "types" of knowledge, and turned to investigate the factors that influence the resilience of a 'unit' of knowledge. What does knowledge 'need' in order to be more resilient to language death?

In section 5.3 and 5.4, I will discuss responses about the difficulty of documenting certain knowledge, and what can and cannot survive language death according to the respondents. In analysing these answers, the focus thus shifts from looking at knowledge "types" and their resilience to *what* makes knowledge resilient?

5.3 Difficult to document

This section focuses on knowledge that respondents described as being difficult to document. In *Appendix D*, I have added the exported Taguette markings I coded with 'Difficult to document'. Respondents were asked if they believed certain "types" were more difficult to document than other "types" of knowledge. If something is more difficult to document, this knowledge would be in more danger in case of language death as it seems less likely to survive the boundary from one language to the other. Initially, I was looking for similarities between documentation projects – were there common answers or similarities in which "types" were regarded as difficult to document?

Some respondents mentioned specific "types" of knowledge that they found more difficult to document than other types, while others mainly wrote about reasons *why* certain knowledge is more difficult to document without explicitly attributing them on a specific "type". As explained in section 5.2.3, I stepped away from this approach and instead shifted the focus to the underlying factors: *why* is certain knowledge more difficult to document? What makes it more difficult to document?

Apart from the difficulties of documenting certain knowledge *in the field*, the respondents were also asked whether they believed that certain knowledge is *inherently* more difficult to document. So, is there knowledge that is inherently more difficult to document, for example because of the nature of the knowledge or some properties it has, or is the chance of certain knowledge surviving based on circumstances?[136] What are the reasons that specific knowledge would be more difficult to document? This additional question was in some cases answered in the same manner as the first, but in some cases it elicited a more detailed answer on the difficulties of documenting certain knowledge, as it urged the respondents to think about the topic of knowledge a bit deeper.

5.4 Influence of language loss on knowledge

This section refers to the respondents' experiences and knowledge on the relation between language loss and knowledge loss. In *Appendix E*, I have added the exported Taguette markings I coded with 'What is lost?', referring to answers in which researchers described what is lost when a language is lost. In *Appendix F*, I have added the markings I coded with 'What survives?', for the responses pertaining to knowledge that could survive language loss. Some responses have been coded with both, as some responses were generally talking about their experience with, or view on, the relation 'language loss results in knowledge loss', or explicitly mentioned information pertaining to both.

These results provide an answer the third sub-question: *What knowledge is lost with language death?*, and will be discussed at length in the remainder of this chapter and in chapter 6. Examining what knowledge is lost with language death, what survives, and

[136] This distinction will be further explained in chapter 6, as the *external* and *internal* factors.

investigating *why*, ultimately brought me closer to formulating an answer to the research question. What factors influence the resilience of knowledge is case of language loss?

5.4.1 What is lost?

Appendix E gives the full overview of the marked responses, but here are a few examples of what researchers said about language loss and knowledge *loss*.

> "I can tell you that hunting techniques, ethnobotanical knowledge, traditional mythologies etc., in my experience die with the languages that code them."

> "No, but **I think it** [language death] **does have a very detrimental effect on knowledge in most cases**. There are few exceptions – see the following, which shows the loss of ethnobiological knowledge, but not kinship knowledge, in an endangered language community in Australia."

> "People will remember bits of their ancestry, but vague, they will remember some of the key survival technologies such as house building (but maybe not too well), stuff about farming and hunt (but maybe not too well). **I think most of the knowledge will be gone**."

5.4.2 What survives?

Similarly, *Appendix F* gives the full overview of the responses marked with 'What survives?', but here are a few examples of what researchers said about language loss yet knowledge *survival*.

> "Foraging (or plant medicine) knowledge, for instance, can be maintained independently of its linguistic aspects. Naming of things, of course, is tightly connected to recognising those things as distinct; but a situation where all that is left of the linguistic knowledge is some flora and fauna terms is language death still."

> "For me, the only things that are irretrievably lost are the categories of knowledge that are purely linguistic, like the meanings of particles."

> "In most cases, there is also a preservation of knowledge in the form of cultural practices, persisting worldviews or many other things that are maintained. Even linguistic structures (whether lexical or grammatical) can be maintained through calquing or loanwords in such situations."

> "There are many types of knowledge that can survive after the extinction of the languages in which they were originally transmitted. These include for example, knowledge who one's ancestors were, what clans they belong to and where they lived."

5.5 Interpreting the Data

The responses from the questionnaire are used in chapter 6 to formulate an answer the research question: *What factors influence the resilience of knowledge in case of language loss?*, and support arguments for factors that influence the likelihood of knowledge surviving when a language disappears. However, in most cases, what is literally talked about in these responses, is knowledge that can or cannot be *documented* by researchers and why. How to

use these examples of what *researchers* experience in endangered language communities, in order to answer in a broader sense for the influence of language loss on knowledge in general? In this section I will explain how to correctly interpret the data as used in chapter 6, by using the data of the outsider-researchers as a starting point, or backbone structure, for a more general idea of knowledge loss as a result of language loss.

Important to realise is that the used examples are from the experiences of outsiders – researchers who visited an endangered language community. Although these visits are usually quite extensive – comprising multiple consecutive months over multiple years – this is not the same as growing up in said culture. Therefore, how can these outsider experiences be used in trying to find out the likelihood of certain knowledge surviving language death? Maybe, researchers cannot document knowledge X, or see it survive, but that does not mean that it does not. It could be that, unbeknownst to the researchers, knowledge X survived with other community members, even though they speak another language. What the researchers report as knowledge that cannot survive, or is difficult to document, does not make it *final* what knowledge's resilience is based on.

However, the findings by the researchers can be guiding, because in a community that is facing language shift – such as the example of Marra and Kriol in section 3.2.2, where there are two languages being spoken in a community and one of the two is declining – there is a similar language-boundary that needs to be crossed. This is also the case with a researcher visiting a community. True, the people from the endangered language community share more common ground with other members of their community who speak a different language than with a visiting researcher. However, that does not render the answers provided by the researcher less valuable:

A community facing a language shift has the 'advantage' that all people in the community (whether they speak the vanishing language or the persisting language) have more common ground – culturally and in terms of shared knowledge – than a researcher coming in, and therefore will inherently have some knowledge be transmitted "by itself", through having lived together for a long time and great cultural similarities and ways of life.

However, not having a lot of common ground could also be considered an advantage. It provides a fresh perspective that might aid outside researchers in focusing on the successfulness of specific knowledge transmission and they might be able to recognise the hurdles that some knowledge needs to 'take' in order to be transmitted to people with another language.

In both cases, there is a language boundary. A language boundary between a language that is disappearing and another language. Language X is disappearing, and to see what knowledge might be retained or lost in that process, one can investigate the knowledge transmission from people speaking language X to people speaking another language. Which knowledge can survive onto another language? And what will inevitably be lost with the last speaker? And *why*? This is the same issue, whether one lives in the community, whether one is an outsider from a nearby-community, or whether one is a researcher from a completely different culture. Therefore, examples of reasons why researchers could not document certain knowledge seem in many cases also applicable to community-insiders; it will have certain side-remarks and disclaimers as mentioned above, but the essence of the transmission problem remains the same. One way to investigate what influences knowledge's resilience, then, is through the eyes of the researchers who visit these endangered language communities. Most importantly: this is also the only way through which such data is accessible to me. The documentation projects from the respondents have given insight into the process of knowledge transmission, and serve as a basis for creating a list of general factors that influence the resilience of knowledge in case of language death.

5.6 Concluding

Initially, what I started out with, was trying to find out if certain "types" of knowledge are more resilient in case of language death. The "types" of knowledge that I extracted from the data, however, were almost all based on some *theme* or *category*, as can be seen in *Appendix B*. Some examples of the 99 given "types" are *botanical knowledge, bush medicine knowledge, canoe building, cooking, fishing, handsigns, hunting, history of the community, kinship, myths*, et cetera. However, when reading about the types of knowledge that researchers deemed more difficult to document than other types, there were a lot of conflicting experiences. While one researcher wrote:

> "I can tell you that hunting techniques, ethnobotanical knowledge, traditional mythologies etc., in my experience die with the languages that code them."

Another researcher stated that:

> "Knowledge of the environment, flora and fauna, objects such as tools and obtaining food can be preserved without the language being preserved."

The type the former researcher mentioned as a type that will die with the language that encodes it, namely *ethnobotanical knowledge*, seems quite similar to the type *flora and fauna*, which the latter researcher denotes as a type that can be preserved without the language being preserved. Such disparities in which "types" of knowledge would be more resilient or vulnerable in case of language death could give rise to the conclusion that there is not one type that is more (or less) resilient. Maybe the resilience of a certain "type" is so language and context dependent that there is no way to draw any general conclusions on which types of knowledge are more likely to be lost with language death. Or, perhaps, if the number of respondents had been larger, there could have been a stronger indication that certain "types" are, in a way, more 'likely' to be resilient in case of language death, following potentially similar results in languages. However, this is no guarantee that it would also hold true for the next endangered language. Is it really fruitful to draw such a conclusion from data, like: 'plant knowledge is more likely to die with a language, because that is the case in *most* endangered languages'? Just because in most cases 'plant knowledge' might not outlive its language, does not mean it will be so in the next. I realised that is a too simplistic way to look at the problem, and languages are way too different and intricate for such a blunt method.

However, while the answers from the researchers did not unanimously point out that, for example, 'plant knowledge' is always sure to vanish with a language, while 'kinship systems' cannot be taken down by the vanishing of the language – many researchers were opinionated on one thing: certain knowledge seems to be able to survive language death, while other knowledge does not. As seen in section 5.4, researchers wrote about their experiences with certain knowledge 'surviving' language death, while others wrote that almost everything, or certain things, would for sure be lost with the language.

The fact that in the experiences of the respondents *some* knowledge is lost, and *some* knowledge survives, shows that there *are* different degrees to which knowledge can survive language death. Then, what creates that differentiation? What influences how vulnerable or resilient certain knowledge is in the face of language death? Seeing the responses to the questionnaire, I realised that it was not fruitful to look at a "type" of knowledge as being the deciding factor, but instead to look at the underlying cause of some knowledge being resilient or not. Instead of answering which "types" will in general be lost in case of language death, I

turned to investigate the *factors* that influence the resilience of knowledge. *Why* is certain knowledge more likely to be lost when a language vanishes, and how come other knowledge might survive this process?

Notably, when reading through the respondent experiences, there were a lot of researchers who talked about *why* certain knowledge was more likely to survive. The question to start out with is not *which* knowledge is more resilient, but instead, *why* is certain knowledge more resilient? Then, if one can find common underlying reasons for certain knowledge to "die with the languages that encode them" or to "be preserved without the language being preserved", one might be able to define what makes knowledge more resilient to language loss. What is the underlying reason 'plant knowledge' survives in certain cases? What does that knowledge 'have' that other knowledge does not? Or:

What factors influence the resilience of knowledge in case of language loss?

By investigating the data from the questionnaire, I have abstracted several factors influencing *why* certain knowledge might be more likely to survive language death, while other knowledge seems more likely to be lost. In chapter 6, I will make sense of this data by formulating an answer to the research question in three steps: introducing *external factors*, or circumstances that influence the resilience of knowledge; secondly, introducing the *internal factors*, properties of knowledge that influence the resilience of knowledge; and finally, introducing a first proposition of a model based on these factors, with which to explore and *scale* the resilience of knowledge.

6 The Resilience of Knowledge

In this chapter I will discuss my findings and formulate an answer to the research question in the form of a model with which to understand the resilience of knowledge when a language disappears. The model will be based on factors that seem to influence the resilience of knowledge, distinguishing between *external factors* and *internal factors*.

External factors are *circumstances of knowledge* that influence the resilience of knowledge in case of language death. These include circumstances such as seasonality, expertise, willingness, time, values, and will be discussed in section 6.1.

Internal factors are *properties of knowledge* that influence the resilience of knowledge in case of language death. The properties I will talk about in section 6.2 are *Embeddedness in the language*, *Structure of the knowledge*, *Complexity of the knowledge*, *Tangibility of the knowledge* and *Origin of the knowledge.* These properties are inherent to the specific knowledge and influence whether knowledge is resilient or vulnerable in case of language loss. The model that I will propose is based on these internal factors and proposes the idea of *scaling* the resilience of knowledge.

I have created the *external* and *internal factors* by examining the responses to the questionnaire, focusing on their similarities and differences related to reasons that made it difficult to document something, or the reasons that made it more difficult or easy for certain knowledge to survive. Some of these factors were mentioned by multiple researchers, for example, the way that the *expertise* of both parties needs to be at a certain level for successful knowledge transmission. After having created this list of responses, I tried to make a division. There were many factors that influenced the resilience of knowledge that had one thing in common: they were contextual. These were factors that depended on 'outside' influences – *circumstances* in which the knowledge resided. I labelled these factors as *external factors.* At

the same time, I went through this list of responses and explored factors that should not be labelled as circumstances. In doing this, I tried to bring the question of *what makes certain knowledge more resilient* to a deeper level: instead of looking at the circumstances in which knowledge 'resides', I focused on the actual differences between units of knowledge themselves. Are there factors that *inherently* make knowledge X more likely to survive language death than knowledge Y, apart from 'external' circumstances? I called these factors *internal factors*, but factors related to the 'essence' of the knowledge itself.

Exploring this division between *external* and *internal factors*, or circumstances of the knowledge and properties of the knowledge, also followed the ideas discussed in section 3.4 on *how* language loss might lead to knowledge loss: after observing that knowledge seems to have certain *properties* – such as being structured in a particular way within the language – could there be more such *properties* of the knowledge itself that influence the resilience of knowledge in case of language death? This chapter presents the result of this analysis.

Before going into the factors, I want to point out a few things. Firstly, notice that the *external factors* are extracted as factors that influence whether knowledge will survive in case of *language death*. However, most of these factors affect what happens to knowledge *independently* of what happens to language. So, these external factors are ever-present and not necessarily bound to what happens to language. However, I will not treat them in this broader way, as that goes beyond the scope of this research. The data that I have collected is *from* endangered language projects. Therefore, I need to regard all factors as they appear to me: examples of factors that influence the resilience of knowledge *in case of language loss*. I recognise the broader application of the external factors, but the focus of this thesis remains on knowledge loss and endangered languages. Directly following from this, is that the focus is on the *internal factors*. The internal factors and the ensuing suggestion for a model are the main contribution to this field, as the internal factors that influence the resilience of knowledge are more bound to what happens to language. Even though the focus is on the *internal factors*, the *external factors* are also part of the proposed answer to the research question as their presence also better illustrates the definition of the *internal factors.*

Secondly, since the respondents have answered the questions from a broad range of languages from all over the world, but the number of responses is limited, these factors do not form a complete list, but rather an exploration of the factors that influence the resilience of knowledge. Consequently, the model is a first proposition of its kind and should not be regarded as a complete and definitive model.

In certain instances, I will talk about the two parties in the process of knowledge transmission, which are the 'sharing' and the 'receiving' party. With *sharers* I refer to people from an endangered language community who share certain knowledge, and with *receivers* I refer to people who communicate with the *sharers*, whether they be community members as well, or outsiders from another language community or researchers specifically. I will also refer to certain members of these parties as 'speakers' or 'researchers', making clear in each case what their respective role in the process is.

Finally, as briefly introduced in section 3.3 *The Resilience of Knowledge*, I will at times refer to a 'unit' of knowledge. 'Unit' refers to one knowledge item, so to speak. For example, the knowledge of making a canoe can be a knowledge unit, as can the knowledge of trees, or knowledge of fish migration. These 'units' are not defined or delimited by a specific scope, but are merely there to refer to one specific part of knowledge in a clear manner. 'Unit' *could* in principle refer to broader and less specific 'instances' of knowledge – for example, *knowledge of palm trees*, but also *knowledge of trees* – but as will become clear in section 6.4, the more specified the unit of knowledge, the better the model will work. Preferably, a knowledge 'unit' refers to something quite specific like *fence making knowledge*.

In the sections below, I will introduce the external factors and internal factors with examples in order to show how they influence the resilience of knowledge, after which, I will introduce the model for scaling the resilience of knowledge.

6.1 External factors (Circumstances of knowledge)

In this section I will discuss four categories of *external factors* that influence the resilience of knowledge in case of language loss. These external factors are *circumstances* of knowledge that influence how likely it is that knowledge is lost with a language. Under external factors, I understand all factors that are not inherent to the 'essence' of language or knowledge. They are not properties of knowledge, but rather the external circumstances in which the language and knowledge 'live'. External factors depend on the outside world and on the *sharers* and *receivers*. I have subdivided the external factors into four categories by grouping similar answers and factors that seemed closely related together. The four categories of external factors that I have identified are the following:

1. Transmission gap
2. Personal and community values
3. Outside world
4. Life circumstances

Each category consists of multiple factors, of which several can apply to one unit of knowledge. For example, a factor from the category *Transmission gap* is *willingness*, which pertains to the importance of both sharers and receivers needing to be willing to share certain knowledge for it to be successfully transmitted. But, this *willingness* is of course not the only factor that influences the knowledge's resilience: from the category Outside World, the factor *seasonality* – pertaining to whether certain knowledge is ever-present in the world or is only used in certain seasons – can also influence the successfulness of that same knowledge transmission, and therefore its resilience in case of language death. So, both *willingness* and *seasonality* may all influence the likelihood of for example 'canoe making knowledge' to survive. This applies to all factors. Multiple factors – *willingness*, *seasonality*, etcetera – can apply to one unit of knowledge, and when taken together, these factors can provide a better understanding of the resilience of knowledge in case of language loss. I will expand on these factors in the sections below.

As explained in the beginning of this chapter, these external factors might also influence knowledge loss without the factor of language loss, but this will not be further addressed as it goes beyond the scope of this thesis.

6.1.1 Transmission gap

The first category is one that I will call the *Transmission gap*. This category of factors pertains to the willingness and dedication in sharing and/or receiving knowledge, an individual's interest and expertise in a certain topic. These factors play a crucial role in whether knowledge is shared or received. Documentation or transmission of knowledge only works if both parties are willing and able:

> "Of course the difficulty varies across types. Of many aspects of variation one is the particular interests and skills of each speaker, and their willingness to contribute to a project."

Even though certain knowledge might be considered difficult to share, if both parties are willing there is a chance it might just work out:

> "Sometimes it is difficult to elicit expressives, but that is often because people are hesitant to provide information on language that is "strange". But on the contrary, in [Language X], people go out of their way to teach me expressives, which are about 1/3 of the total lexicon."

Additionally, one needs to be able to find the right speaker for the right topic. The expertise of both the *sharer* and the *receiver* needs to be at a certain level for the most successful transmission of knowledge:

> "The further the knowledge is from the expertise of the linguist, the harder it is to document it properly. That's why I think we should work in teams and conduct documentation as a team effort."

> "Very specialized knowledge requires that one finds the right speakers and they are willing to share. E.g. we had one interview with a traditional healer, but it would have been really informative to be able to talk to a range of them."

This level of expertise, but also an individual's way of working, naturally equally applies to the receivers:

> "Plants are easier to get identified than birds (except for bird-watchers)."

> "Yes, plant names are hard to document because there are not usually species checklists, and so you would have to traverse long distances collecting plants, or work closely with botanists. Animals are easier, because you can find a published species checklist, and show it to speakers, and they recognize the photos/drawings."

Even though the above two quotes seem to show differences in each individual's personal expertise, both statements could still hold true for the respective projects these researchers worked on. Are plants easier than birds? This depends on the expertise of the sharer and receiver, but it might also depend on the *vastness* of the flora and fauna one is dealing with.[137]

These factors exemplify how certain transmission gaps between *sharers* or *receivers* of certain knowledge might influence knowledge's resilience when a language is vanishing, because of the individual *willingness* to share or receive something, the *interest* in putting in the effort to explain or understand something potentially difficult, and the *expertise* of both parties on the topic.

6.1.2 Personal and community values

Another category of factors that influences the resilience of knowledge is what I will call *Personal and community values*. Apart from the willingness and skill of both parties, it also

[137] This will be discussed in section 6.1.3 *Outside world*.

greatly matters what either party's values are in what they would share with one another.[138] In a community, certain knowledge might for example be restricted to certain people:

> "Religious knowledge might be tricky as well, e.g. some communities might restrict who can access their origin myths etc."

> "there are restrictions on sharing of this knowledge and passing it on to others, including outsiders."

Certain community values could result in certain restrictions on sharing specific knowledge. It might be that knowledge is secret, sacred, sensitive or taboo in a community, which could restrict with whom this knowledge is shared:

> "Some kinds of **'secret' knowledge** (initiation rituals, traditional medicine, hunting if it is currently banned in the area) may be difficult, or even impossible, to document, and I think that's perfectly ok."

> "I wanted to record traditional narrative and mythology, but really never got in the position to be entrusted the **sacred knowledge** (or perhaps never knew how to approach it efficiently)."

> "If you're a man it's going to be difficult to document discussions about abortion or **sensitive topics** like that, or women's initiation rites. If you're a woman (or are perceived as one by the community), I would imagine discussions about men's initiation might be harder to document."

> "As a male linguist, I would find it difficult to document for instance traditional cures for female ailments, due to **local cultural taboos**."

This reality in whether or not something will be shared with another person can be something that outsiders – such as researchers – face, but can also be the case for people *within* the community. If someone within a community is not yet of age, or of another gender, they might also not have access to certain knowledge.

While values can be adopted community-wide, there are also personal values, that do not necessarily need to be in line with the community perspective. Individuals might feel less inclined to share certain knowledge with another due to such personal values. These personal values can be the same as community-wide values, which is why I have put them in the same category.

While values can vary per community – and individual – there are a few commonly named reasons that underly certain values and consequent restrictions on sharing certain knowledge. Why is something considered *secret*? For example because it is women's knowledge, or age-dependent. Or because *having* certain knowledge is connected with having a certain status, privilege or ownership. I have listed a few examples below:

> "Other types of knowledge are harder to document because of my own presence, or **characteristics**. For example, it is naturally harder for a male researcher to hang out

[138] For clarity, *community values* is not necessarily the same as *traditional* or *Indigenous values*. *Community values* as they are now in a community might have changed because of culture shift, Westernisation or religious conversion.

> and work with women, or at least with women of all ages; vice versa for female researchers. It is not necessarily because people don't want to report on gender related topics."
>
> "In the Australian context, there is stuff that is only meant for a certain audience (for instance, **gendered access**) – which makes it inherently more difficult to document for an outsider (and, furthermore, with the obvious constraint that e.g. a man can't record a women's story); and once recorded, it may be forbidden to disseminate."
>
> "Yes, there are domains of **secret/proprietary knowledge** that may be known to storytellers, shamans, etc., but are not shared. There is **women's knowledge and men's knowledge**, that would not be shared with a researcher of the opposite sex."
>
> "it is quite hard to document place names in the Morehead district because often there is a secret secondary name for a place that makes reference to myth about that place. **Knowledge of such systems and details of place names are equivalent to a document of ownership in the Western world**. Therefore, I cannot publish an overview (e.g. a GIS map) of place names because it would interfere in ongoing land claims by rivalling clans or individuals."

Community values might also result in certain rules concerning under which *circumstances* to share certain knowledge:

> "There are also things that the communities do not want to keep or pass down. I have tried to get some information about the past tribal warfare. **There are taboos in place that require all parties to be present if such story were to be retold and recorded**. In practice it means that the story will disappear with its bearers because they were unwilling to get together for the recording despite my repeated attempts."

It is however not only an issue of whether someone wants to share something with another person. There being a culture of women's knowledge and men's knowledge also limits the number of people who *have* certain knowledge in the first place and therefore its resilience:

> "Also, the gender of the documenter naturally delimits the kinds of information that they have easier access to, as there are many tasks and types of knowledge that are more specific to men and women (e.g. in the Amazon men go hunting, and women make chicha, the traditional drink)."

Such restrictions limit the number of people certain knowledge may be shared with, but such restrictions themselves make the knowledge also inherently more vulnerable. Imagine certain knowledge only being shared with people on their 70th birthday. Even though the language might prosper, such values or restrictions might put an early end to knowledge if people do not become older than 65 years of age.

From this perspective it seems like certain values are mostly important from the *sharing* party, but the importance of values holds for both parties. If a *receiver* does not feel comfortable around certain knowledge or believes that certain information is 'not for them', the *receiver* also plays a part in whether this knowledge might survive. Consider the following situation:

> "I would also say any sort of rituals are hard – for example, I did not dare to ask if I could record a funeral when it was taking place in the community, as it felt predatory to me to attempt to record people when they were grieving."

Another example concerning personal values is personality, or characteristics. The individual characteristics of the holder or receiver of the knowledge might also influence the likelihood of the knowledge being transmitted. Say, a person does simply not like another person, this could definitely influence how much they share with one another.

Finally, the last example regarding *Personal and community values* I will discuss is certain beliefs. Whether knowledge can be truly lost forever, is partly dependent on such cultural values and beliefs, as different cultures and communities have different relations to knowledge:

> "In several Indigenous contexts, despite the local differences in the content, knowledge is considered to be relational and place-based, built in relations that include other-than-humans and the land (e.g. Wilson 2001; Guttorm 2011; Helander 2016; Valkonen & Valkonen 2019)."[139]

A western academic researcher might believe certain knowledge could be lost forever according to their beliefs of knowledge and loss, but in other communities the fact that younger generations do no longer have certain knowledge that the elders did, does not mean that the knowledge does not live on. Knowledge may, for example, still live on in ancestors, spirit animals or trees. So, such personal or community-wide shared beliefs also influence the way one looks at knowledge loss. Whether knowledge is 'lost' according to scientific western ideology, does not necessarily hold true in any other culture.

6.1.3 Outside world

The third category is about factors pertaining to the outside world influencing the resilience of knowledge. For researchers, certain knowledge might be more difficult to come by – while they might visit a community for long periods of time, this does not guarantee for all parts of community life to become visible. For example, if one wants to document knowledge of the birds and plants in the area, the outside world might affect the success of such an endeavour:

> "Some plants or animals were rare, or could only be found in hard-to-reach places, and therefore could not be documented. Many are subject to seasonal variation, and may not be present during a field trip."

Something being rare does not instantly mean that certain knowledge is forgotten – it might even be regarded as more special or 'protected'. However, as the knowledge originates from observations of its occurrence in nature, it is not unlikely that certain knowledge pertaining to rare occurrences might be lost or might be prone to change at some point. People might gain a better understanding of how a bird that they see every day behaves, opposed to a bird that is only spotted once a year. Then, if knowledge is rarely used or hard to come by due to its rarity in nature, this might also influence the likelihood of its survival.

Continuing on the concept of rarity influencing the resilience knowledge, the *vastness* of the knowledge in the outside world also plays a role. If a certain community lives in an area where there are only two species of tree, opposed to a community where there are

[139] Virtanen, Olsen, and Keskitalo, 'Contemporary Indigenous Research within Sámi and Global Indigenous Studies Contexts', 12.

dozens of tree species, this difference in presence of certain things in the world may influence the knowledge of certain topics people have, and therefore also influence how likely certain knowledge is to survive.

Both *rarity* and *vastness* are related to knowledge's 'occurrence' in the world, and another such factor to take into account is the *seasonality* of certain knowledge. Certain fruits grow in certain periods of the year, certain farming or hunting can be done in certain periods, and certain rituals might only be performed during summer:

> "I think knowledge related to seasonal phenomena is tricky if the research team just accidentally missed the relevant time window (e.g. we were never doing fieldwork during the termites harvesting season)."

> "Many are subject to seasonal variation, and may not be present during a field trip."

And how about the *accessibility*? Is the area where the knowledge can be practiced or 'found' still accessible? The knowledge might reside in peoples' minds, but in order to fully transmit certain knowledge across a language boundary, its visible character might be of great importance in correctly explaining the difference between one tree and another. Then, if a place is very difficult to reach, this lowers the chances of a more complete picture of the knowledge, and thus, its transmission:

> "dedicated trips and stays to specific locations."

> "you would have to traverse long distances collecting plants, or work closely with botanists."

For all above instances of factors from the *Outside world* that influence the resilience of knowledge, one major underlying influence is environmental change. If due to environmental change a certain animals no longer live in the area, a certain area can no longer be used for farming, or if a particular fruit does no longer grow in that climate, this knowledge might be more likely to be lost:

> "Aspects of mobility and foraging due to environmental change and restricted access to areas where this could have been better explored."

The above examples show how factors regarding the *Outside world* may influence the resilience of knowledge in case of language loss.

6.1.4 Life circumstances

This final category of *external factors* considers the *life circumstances* of the endangered language community. If life circumstances change, for example if a community moves or if they change subsistence practices, certain knowledge may fall out of use. Certain knowledge is closely connected to community life and subsistence practices, such as how to work the land, farm or hunt. Changes in life circumstances can influence which knowledge is practiced in the community and will therefore be 'given' to the next generation. Changes in life circumstances then influence the resilience of knowledge in a community:

> "When people switch to speaking another language, what traditional knowledge is kept depends on the socio-economic circumstances of their lives. E.g. the children of hunter gatherers who settle in towns won't have the opportunity to see their parents

> hunting, harvesting furs, and learning animal tracks and plant uses. But they may see tracking skills used around town for humans. But ways of showing respectful behaviour, child-raising and so on may continue to take place in the adopted language."
>
> "Language knowledge and the ability to speak the respective language are lost. other types of knowledge loss such as certain crafts, agriculture, etc. are also lost, but this in the case of [Language X] has to do with a radical change in the life style."
>
> "They conserve the knowledge about some aspects of the subsistence practices, but, since language shift is associated with migration to towns and cities, they lose much knowledge that they don't put into practice on daily basis."

If, however, an endangered language community retains (part of) their life circumstances, a respondent wrote that even though language loss is occurring, certain knowledge might survive *if* life circumstances stay more or less the same:

> "Knowledge of the environment, flora and fauna, objects such as tools and obtaining food can be preserved without the language being preserved, apart perhaps from some residual vocabulary. This is especially true when people have access to their traditional country and can make trips to country and carry out semi-traditional practices such as hunting and gathering."

As mentioned in the beginning of section 6.1, these *external factors* also seem to be able to drive knowledge loss, apart from what happens with the language. This final category is a clear example thereof. In a way, it also refers back to the interdependence of language and knowledge mentioned in the beginning of chapter 3: if life circumstances change, this could drive knowledge loss – as specific knowledge gets out of use – which in turn can drive language loss as it is no longer useful to talk about certain things. This does not necessarily mean that it can drive an entire language away, but it shows the two-sidedness of the relation. I believe this category of *Life circumstances* forms a clear example of how language loss is not the only factor in knowledge loss:

> "Changing subsistence modes or access to traditional land and its natural resources will drive knowledge loss in particular domains regardless of language loss."

However, as I have shown in the previous chapters, and from the responses of the researchers: language loss does seem to play a role in the vanishing of knowledge. Now, I will turn to *internal factors* and discuss exactly how this could be the case. These *internal factors* and how they influence the resilience of knowledge lie at the heart of this research.

6.2 Internal factors (Properties of knowledge)

In this section I will discuss five *internal factors* that influence the resilience of knowledge in case of language loss. These *internal factors* are *properties of knowledge* that influence whether knowledge is lost with a language. What I understand under *internal factors* are properties *of* knowledge – properties that a specific unit of knowledge might (to a greater degree) have than another unit of knowledge. These properties are inherent to specific knowledge.

These properties might need a bit more of an introduction: as mentioned in the beginning of this chapter, the creation of these *internal factors* has been guided by the ideas discussed in section 3.4, introducing *properties of knowledge*. In reading the responses from the researchers, the focus was on factors that influence the resilience of knowledge, because of the *properties* of that knowledge in particular. What makes knowledge unit A more resilient than knowledge unit B? From the responses I tried to identify underlying reasons for certain knowledge units to have a greater likelihood to survive language death. Things *inherent* to certain knowledge – properties. In a way these *properties* are similar to glass having the property that it can be transparent, parrots having the property of having a certain colour, and water having the property to freeze at zero degrees Celsius – I propose knowledge can have certain properties that are of importance to consider when investigating the resilience of knowledge in case of language death. Certain knowledge can be transmitted through words or it can be shown in practice. Certain knowledge can be structured into a step-by-step procedure, while other knowledge is non-linear. Certain knowledge is based on complex concepts, while other knowledge can be understood in simple notions. Such properties of knowledge can influence the likelihood of knowledge surviving language loss. The five *internal factors* I have identified are:

1. Embeddedness in the language
2. Structure of the knowledge
3. Complexity of the knowledge
4. Tangibility of the knowledge
5. Origin of the knowledge

As with the *external factors,* multiple factors may apply to one knowledge unit. So, the *Structure of the knowledge*, its *Complexity* and its *Origin*, et cetera may *all* influence knowledge's resilience in case of language loss. Additionally, both *external factors* and *internal factors* can at the same time apply to one knowledge unit. Each internal factor – or property of knowledge – will be discussed in the sections below.

6.2.1 Embeddedness in the language

Certain knowledge can be situated differently in a language. Certain knowledge about plants or fish can be second nature to a certain language-community, as that knowledge is situated in their language-structure in a certain functional way. In this section, I will explain how the resilience of knowledge can in part be influenced by its *embeddedness in the language* – how deeply certain knowledge is embedded in the structure of a language. This specific property of knowledge closely follows the discussion in section 3.4 and the argumentation of Harrison in *When Languages Die*:

> "I argue that the ways in which knowledge systems are linguistically encoded makes it very likely that they will vanish if the language does. They cannot be readily translated (or at all)."

As described in section 3.4, the structure of language can hold knowledge, for example through taxonomies. Some knowledge or concepts, can therefore be more deeply embedded in a language. However, the difficult thing about this is that it depends on the specific language. The Tofa language might have an intricate structure of all the different reindeer they distinguish, while language Y on the other hand might have a build-in distinction of poisonous versus non-poisonous fruits. This *embeddedness* in the language determines to some degree the likelihood of some knowledge surviving, as it may be *so* embedded that it

might not even occur to some to share or mention this knowledge. It might not even be explicitly talked about in the community, because the meaning of something – for example the knowledge that fruit X is poisonous as exemplified in section 3.4.2.1 with the berries – is *in* the word. If the 'poisonousness' of a fruit is conveyed with the word itself, and for a speaker it is similar to saying "applepoisonous", then there is no reason to be saying something like "applepoisonous will kill you if you eat it."

Then, if something is 'hidden' in the language-structure, it might be talked about less, and therefore be less likely to survive – as the knowledge is implicitly known by people who know the *language*. With the language being lost, this knowledge that is situated *in* its structure, might stand a lower chance of survival, without that linguistic structure. Still, it might survive all the same, but the *embeddedness* of certain knowledge in language partly influences to what extent the knowledge is 'second nature'. Something being second nature to a person depends on certain terms or concepts being embedded in the language, but also on the embeddedness in the culture. A respondent wrote about the *embeddedness* of concepts:

> "Especially difficult to grasp are concepts that are so deeply embedded that they seem second nature to community members, which is why they don't bother to explain them to the linguist."

In this case, it is unclear whether the embeddedness refers to the knowledge being embedded in the *language* or embedded in the *culture.* However, the example works for either case, because whether the embeddedness in *culture* or *language* is meant – the more embedded the knowledge, the more second nature it is to the speakers, giving speakers less and less reason to directly talk about the concept. A more clear example of knowledge being embedded in language structures is the following:

> "I know of many cases where linguistic knowledge persists even after the forms have been lost, e.g. calling a mother's sister's son 'brother' in a way that preserves the traditional kinship system but using the English lexicon."

The knowledge of the traditional kinship system might be so embedded in the structuring of the language, that in this example, the structure has survived onto another language, even though the original kinship words have not. This shows that the language structure can 'hold' knowledge, and therefore in case of language death, also be an important factor to consider when looking at knowledge that is lost.

Knowledge can be embedded differently in each and every language. Even if one cannot know beforehand to what degree certain knowledge is *embedded in the language*, realising certain knowledge *can* be embedded differently is an important factor as it influences the resilience of knowledge in case of language loss.

6.2.2 Structure of the knowledge

Apart from *how* knowledge is situated in the language-structure, knowledge can also have a structure of its own – or a lack thereof. In this section, I will explain how the *structure* of the knowledge itself plays a part in the resilience of said knowledge. A response from the questionnaire that is in line with this is the following:

> "a lot of analysis, reanalysis, and rerecording, or redocumenting is necessary. Without it, one cannot ask the right questions, and hence one is doomed to forget to document things that are relevant. **From that perspective, inherently harder to document are types of knowledge that are more elaborate in structure.** Compare, for example,

> documenting the procedure of building a garden fence – already a multi-step process – with documenting a speech genre – incredibly elaborated."

Knowledge that is more "elaborate in structure" could thus be defined as knowledge that has "a multi-step process." Another respondent mentions such a procedural property as underlying something that is more easy to document:

> "a ritual with a start and end"

So, knowledge can have a certain structure – something like a step-by-step process, knowledge with a well-defined beginning and end – and an more elaborate structure seems to result in an easier knowledge transmission. The example given in the first response gives a clear example of knowledge that would be easier to document, such as *knowledge of building a garden fence*. When comparing this knowledge to *knowledge of trees* in the area, the former knowledge is *structured* in such a way that even without words, it seems possible that one can convey this knowledge more easily to another than the latter, partly because the knowledge has a clear start and end. One collects wood and tools, one measures the garden's perimeter, and one starts building. After seeing this knowledge being executed, and the fence is finished and put into place around a garden, one can have solid reason to believe that they have seen the 'entirety' of the knowledge – the *knowledge of fence building* from start to end. Whereas, imagine walking through the woods with someone with *knowledge of trees*, which they are trying to convey, how can you know how much of the knowledge has been covered after the walk is finished? Maybe you have only seen five percent of all tree species in the area. And do you know whether this person with *knowledge of trees* told you *every* aspect of every tree you encountered, or just a few things? There is no real beginning or end, or therefore a clear *structure*, to this knowledge.

This showcases that knowledge that has a certain structure to it, might be more likely to survive if the language vanishes. This seems partly due to certain knowledge being reproducible, or learnt by participation:

> "**Knowledge of how to perform certain skilled operations** (manufacture, obtaining resources, etc, while they involve some specialised vocabulary nevertheless are mostly learnt by participation."

Transmitting knowledge through a structure can enable an easier way of transmission than non-structured knowledge. Then, why not call this property simply *procedural* knowledge? Another respondent talked about the difference between declarative and procedural knowledge:

> "The most striking difference is between what cognitive science distinguishes as **declarative knowledge (what you know consciously and can talk about)**, like traditional stories and ethnohistory, **versus procedural knowledge** (skills, knowledge that underlies things you can do, like speak your language, but that is not accessible to your conscious mind), **like activities that are done without a large spoken component**, such as making the traditional feather headdress, or describing words of the language that are more grammatical in nature, like discourse or interactive particles."

I think the core of this argument is solid – procedural knowledge seems indeed mainly based on activities without depending on spoken component. However, I believe breaking it up in a

slightly different way is better for this distinction into properties of knowledge that influence its resilience, as for certain knowledge, one may know *how* to do it, and it can be procedural, but one procedure still depends to a larger degree on language than another procedure.

Take for example the building of a garden fence: this can be done without a large spoken component, while for example a certain ritual is based on a particular person speaking certain words aloud at the first day of a harvest. Then, while both these examples are procedural, there is still a difference in how well they can be transmitted to others based on their dependence on language. Therefore, instead of using the term *procedural* as one of the properties of knowledge that influences its resilience, I have split it up into other properties. In this case, the *knowledge of fence building* would 'score' high in this property of the *structure* of knowledge, as it has a well-defined beginning and end, *and* it would score high on *tangibility of knowledge* which I will discuss in section 6.2.4, as *knowledge of fence building* is something visible and tangible.

Opposed to this, knowledge of said ritual would score high on this property of *structure* of knowledge, as the structure is also clear with a well-defined beginning and ending and when it occurs, but as the essence of the procedure might rely more on language rather than executing a manual task that can be seen, touched and reproduced, the ritual knowledge would score lower on *tangibility of knowledge*.

Following the above, I believe such *procedural* knowledge mainly depends on two factors: the *structure*, and the *tangibility* of the knowledge. Being *procedural* only does not cover the load, as procedural knowledge can still to a certain degree depend on language – and then the transmission of said knowledge, even though it is procedural, can still be less likely is case of language death.

One more critical note before continuing with the next factors is the following: having a clear structure is no guarantee for knowledge being successfully transmitted. While I have already pointed out that the properties I am discussing are in no way complete and one should consider *all* properties for each specific unit of knowledge – I want to make one final critical remark on the *structure* of knowledge and how much can actually be transmitted if knowledge has a clear, beginning-and-end, structure. Even though some knowledge can naturally be broken down into steps, which should make it easier to communicate or document, this does not guarantee that the knowledge will be transmitted in its entirety:

> "It is hard to document the traditional knowledge in all its extensiveness. For example, take building a house. It starts with looking for a place, what is needed, then the trees for the construction, do you grow them or look after them, how do you make sure you have enough? Then there are all the parts, the technologies, knowledge to make buildings earthquake-proof, repairs, etc. All of this is basically a life's work."

In order to make the garden fence, one also needs the *knowledge of trees*. The properties of knowledge that influence knowledge's resilience do not form a clear-cut division as to when knowledge is 'safe' – each property should be considered fully before any conclusions can be drawn. However, the above examples exemplify that the degree of *structure* of the knowledge does play a role in how likely the knowledge might be to survive language death. The more well-defined the structure of some knowledge, the more likely it seems to be able to communicate it effectively. So, the *structure* of knowledge can influence the resilience of knowledge.

6.2.3 Complexity of the knowledge

The previous two properties talked about the *embeddedness* of knowledge in the structure of language and the *structure* of the knowledge itself. In this section I will go into the *complexity* of the knowledge. This property focuses on the 'content' of the knowledge, and how the *complexity* of said contents influences the likelihood of knowledge surviving language death. Is some concept *simple* or *complex*, or somewhere in between? What is the degree of *complexity* for a specific unit of knowledge? What decides the *complexity* of a concept? One of the respondents wrote the following:

> "Documentation of cultural categories (e.g. the word *mangkwarrkant*, which describes travelling somewhere by an indirect route to avoid getting too close to someone who is in a proscribed kinship relation, such as a man's mother-in-law) can take a lot more time for an outsider to understand and record accurately than categories with a concrete extension that can be pointed to (like 'dog' or 'stick'). So things like emotions can be difficult for this reason."

As the researcher points out, certain categories or concepts might be more difficult to interpret correctly. In general, concepts like *sun*, *dance* and *stick*, can be considered less complex than concepts such as *place, time* and *culture*. The former have a "concrete extension that can be pointed to", while the latter seem to need more words to explicate them properly. As a basic guideline, one could argue to be able to measure the *complexity* of a certain concept based on how many words you need in another language to describe the word. Culturally bound words – such as exemplified in section 3.4.1 referring to the Dutch word *gezellig*, or the above word *mangkwarrkant* – seem to need a longer description in order to transmit the meaning of the word, making these words more *complex.*

In section 3.4.1, I have written about Anna Wierzbicka's work on *semantic primitives* – universal concepts that are used in every language. These include the concepts of *place* and *time*. Then, if all languages are said to use these concepts, with basic universal meanings, should these concepts not be *simpler* to convey than other concepts? Intuitively maybe, yes. According to this studies, one can at least be sure that – in the case of *place* and *time* – both the sharing and the receiving language have words for these concepts. However, the fact that people in different languages use these concepts differently, does not make them easier to convey. Because, *how* the other language uses these concepts is a whole different story. Just because every language has shared concepts, does not make them easier to translate. Cultures may conceptualise these concepts differently. As a concept such as *time* is an "abstract domain"[140] and one cannot visualise it in the same manner as one can visualise *dance* or *sun*, these concepts are bound to differ across cultures.[141] Then, even if these concepts are shared among all languages, the *way* they are shaped can be so drastically different, that these concepts are more complex than others.

Then, how to determine whether some knowledge should be labelled as *simple* or *complex* or somewhere in between? Are all such "abstract domains" then *complex*, and every other thing *simple*? Apart from straightforward differences between concepts such as *sun* or *time*, there are bound to be concepts or parts of knowledge that are more difficult to scale. Or concepts that are seen as complex in one culture, but are not regarded as such in another. Another respondent wrote the following:

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[140] Lera Boroditsky, 'How Languages Construct Time', in *Space, Time and Number in the Brain* (Elsevier, 2011), 333–41.

[141] Boroditsky, summary, "Taken all together these findings show that conceptions of even such fundamental domains as time differ dramatically across cultures and groups. The results reveal some of the mechanisms through which languages and cultures help construct our basic notions of time."

> "traditional stories: of course they can also be translated, but because they are so language-y in nature (using hard to translate words and formulae)."

Certain culturally bound concepts are hard to translate, and can therefore be considered *complex* concepts. Additionally, there are other forms of *complex* concepts, such as emotions and personal experiences. The above concepts in this section have mostly been about 'objective' concepts, although *time* is also something that an individual experiences and is to some extent subjective. However, as I am using a broad definition of knowledge, I will also incorporate instances of knowledge with a more subjective base. As a respondent writes:

> "It is inherently harder to document people's inner feelings about their current and past life experiences then it is about more 'objective' forms of knowledge such as the location of sites and clan territories."

The subjectiveness of the knowledge makes it more difficult to document, heightening the *complexity* of said knowledge. This should be seen as a different argument than the *external factor* in 6.1.2 pertaining to whether someone is willing to share something. What is meant here is that concepts such as emotions and feelings can be misunderstood, even when there is a clear intention to share. Whether 'happy' in your culture means the same as some form of that notion in another culture is not immediately clear.

Whether the contents of certain knowledge are subjective or objective, there are multiple reasons why certain concepts are more easily understood or complex to grasp. Creating a scale and describing to what degree certain knowledge contains or depends on *complex* concepts, gives an indication of how likely it is to be transmitted in case of language death.

6.2.4 Tangibility of the knowledge

After considering the *embeddedness* in language, the *structure* and the *complexity* of the knowledge, the final two properties I will discuss are focused on the extent to which the knowledge resides in the outside world, and therewith may be less dependent on language. The fourth *property* of knowledge I will discuss is the *tangibility* of the knowledge. An example that intuitively speaks to reason is the following:

> "In general, I would assume that activity-based types of knowledge could also be preserved following language death, e.g. traditional agricultural practices, production of certain artefacts."

> "Knowledge of how to perform certain skilled operations (manufacture, obtaining resources, etc, while they involve some specialised vocabulary nevertheless are mostly learnt by participation."

If certain knowledge is in part visible, it can for example be obtained by observing nature, or by observing others act on certain knowledge. This seems to give the knowledge another 'medium' through which to survive. Such properties of the knowledge regarding visibility, participation, physical presence and the awareness of having said knowledge, intuitively seem to make knowledge more resilient. Even though the language may be vanishing, certain knowledge seems to have a higher chance of surviving language death, as it is knowledge that has a visible or *real-world* aspect to it. If certain knowledge is visible – for example a certain skill, on *how* to do something – this gives the knowledge an extra dimension of being

transmitted. It can be explained, but it can also be shown. The degree of *tangibility* can influence the resilience of knowledge.

The more tangible, the more likely it seems that the knowledge is transmitted, in case of a language vanishing. A higher tangibility – so for example having words for it, it being visible, and being able to touch the thing that it relates to – is highly likely to add to the knowledge's resilience, because this gives the knowledge more 'means' through which it can be perceived or transmitted. For example, knowledge of how to correctly weave a basket or how to best build a fire.

However, this invokes the 'issue' of *tacit* knowledge – knowledge that cannot necessarily be taught, but needs to be learned by practice or experience. Tacit knowledge is difficult to put into words as it needs to be learned though experience. This knowledge then does not have an *additional* means through which it might survive, it just has a *different* means. The following response considers that:

> "Manual skills such as weaving (baskets, rooftops from palm leaves) or even pottery are hard to document, because merely seeing it does not guarantee being able to reproduce it."

The more *tangible* certain knowledge is, the more this 'issue' of *tacit* knowledge pops up. For example: not all language can be taught by *telling* about it. It needs to be practiced to be known. Understanding the right thickness or structure of a building clay paste is not something that can be seen with the naked eye, or fully described. It needs to be done or felt to be known. It cannot really be put into words – it is one of those cases of *when you know, you know*. Then, there is also knowledge that is not tangible at all, or at least *very* little. Respondents wrote about this:

> "Intangible culture, such as belief systems, where practice is often personal and without previous descriptions available can be difficult areas to document due to the linguist's lack of expertise and consultants not used to conveying such information. Ecological knowledge or wisdom can also be difficult."

> "yes, anything that is not somehow "tangible" because it is a ritual with a start and end, or a story with words, or a way of cooking or building or catching something. I'm thinking about things like how to behave with your family-in-law when you just married, where to go and not go to source firewood/plants for food/bamboo for constructing/whatnot and how to recognize these things, anything relating to relations between people in the community (who to go to with problems in your marriage, with your health, with money, who's related to whom in what way, how are the power balances). These things that you learn by growing up in a community, but that are hard to capture in a story or an interview."

These are examples of knowledge that might not be explicitly *told*, but is knowledge that is gained through participation. The more 'means' there are through which knowledge can be transmitted, the more likely it is to survive. And this is definitely the case when looking at a vanishing language. If the spoken communication breaks down, knowledge that has other ways of surviving, stands a better chance of surviving language death. This then depends on the *tangibility*, and tacit knowledge – whereas this is usually something difficult – might actually can be argued to have a higher resilience in this case, as I am looking at what happens to the knowledge when the *language* vanishes. Knowledge that is also grounded in other worldly things, seems to have a higher resilience to language death.

6.2.5 Origin of the knowledge

The final *property* of knowledge that I will discuss is the *origin* of the knowledge. This final property has not been identified through the responses to the questionnaire, but rather by literature research and thereafter regarding the entirety of the responses. This process allowed me to identify that most knowledge seems to divisible into two groups: knowledge that is mostly a product from the social world, for example community history; and knowledge that is mostly a product from interaction with the physical world, for example knowledge about gingko trees.

Where does the knowledge originate? It can be argued that some knowledge is lost more permanently than other knowledge when a language disappears: medicinal uses of certain plants might be rediscovered in the future, while the cultural significance of the plants for a certain language-community could be lost forever. This has to do with the *origin* of the knowledge: does the knowledge originate from the physical world or the social world? Where did certain knowledge 'come from'? This section will make a distinction in the resilience of knowledge based on the *permanency* of knowledge loss, which is based on the *origin* of the knowledge: what knowledge is truly lost *forever*, and which knowledge is still 'available' in the world?

In his book *Knowledge Representation*, Sowa writes the following: "language is a tool for discriminating and creating structure out of the primordial knowledge soup."[142] The word-choice 'primordial' seems to imply that Sowa believes knowledge to exist outside of the human mind. This is one of the possible views that lie at the heart of the great epistemological question as to *what* knowledge is, and what the prerequisites are for something to be knowledge, or for knowledge to exist. Part of the debate is whether knowledge needs to be *known* in order to be called knowledge. Imagine there is information about a certain animal written down in a book. However, the author of the book is the only person that ever encountered this animal, and has sadly passed away – now, if no one knows about this animal's existence, nor about the existence of this book and its contents, is there knowledge about this animal? If knowledge can to some extent exist outside of the human mind, one could make the argument that the *origin* of knowledge also in part determines its resilience: certain knowledge of the physical world then can exist in the world whether it is known or not, while social knowledge, for example values such as shaking hands upon meeting, can only come into existence from the mind and people interacting.[143]

In *When Languages Die,* Harrison states the following about knowledge loss in case of language death: "Once vanished, can such knowledge be re-created, will it re-emerge spontaneously after a while, or is it forever unrecoverable?"[144] Continuing on the above, I believe that there is a distinction to be made there: if a language were to disappear, and the community has never shared their knowledge about clan history, this knowledge may never resurface again, while knowledge about the working of the tides is something that can be 'rediscovered.' This is something I will call *permanency* of knowledge loss.

The point of permanency is that a division can be made between knowledge that is lost forever with language death and knowledge that can be 'rediscovered' even after the last speakers pass away. Imagine a secluded community speaking language X. Their knowledge about a certain religious story would be lost forever with the death of the last speakers of the

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[142] Sowa, *Knowledge Representation*, 349.

[143] This might boil down to how individualistic human behaviour is. Or whether human behaviour also follows patterns that will re-occur and therefore, knowledge of values and such, might reappear in the same way.

[144] Harrison, *When Languages Die*, 9–10.

language.[145] However, knowledge about a certain blue-coloured moss that grows on trees would be momentarily lost, but could potentially be 'rediscovered' by others. There seems to be a division in knowledge that is lost forever and knowledge that could re-emerge. The easy break seems to be some category of knowledge that originates from 'the physical world' or 'the social world'. The first, based on observations of the world, so for example knowledge about certain plants or birds, could potentially still be rediscovered by others, while knowledge about a certain religion and its practices might never re-emerge the same. The loss of such knowledge from the social world would therefore be more permanent.

A counterpoint that can definitely be made is that over the years, this particular blue moss can also evolve or go extinct, which would change the 'rediscovered' knowledge so structurally that it in no way resembles the lost knowledge that the speakers of language X had of the moss. Then, should one not speak of 'discovery' instead of 'rediscovery'? The knowledge changed, so, the original knowledge was truly lost after all. Even though this counterpoint is true, it does not fully hold: while the original knowledge might truly die with the language, there is knowledge that is partly re-discoverable. For example the working of the tides. Say that only speakers of language X have discovered the working of the tides, but because of a natural disaster, this community of speakers dies. The working of the tides might be rediscovered in a different way, in a different context and with a different meaning – but the knowledge is at least partially 'rediscovered'. The knowledge might not be exactly the same, but the odds of such 'physical world' knowledge re-emerging seem higher than the odds of 'social world' knowledge re-emerging – as the former is based on a semi-constant phenomenon in the real world.[146] Here, the phrase "once lost, always lost" only holds for certain knowledge. Therefore, based on the *origin* of the knowledge, a distinction can be made in a degree of permanency of knowledge loss which influences the resilience of knowledge when a language dies.

6.3 Status Dependence

An important distinction to make is that in different circumstances, these internal factors might be interpreted differently. I have been talking about what happens to knowledge when the language starts to vanish. Section 5.1 has to a great extent discussed the endangerment status of a language, and in this section this is important to take into account: I want to briefly show that the above *internal factors* also have another side to them.

As discussed in section 6.2.1, if a language is lost, knowledge that is *deeply embedded* in the language structure seems more likely to be lost with the language. The language has a certain structure in which knowledge resides, and the structure of the language is something that is generally considered lost *with* the language.

However, if one looks at thriving languages or languages that are spreading, knowledge that is *deeply embedded* might give said knowledge a *higher* resilience: if certain knowledge is more deeply embedded and firmly set in some *thriving* language X, this knowledge could instead be considered *more resilient*, because it means that when language X spreads, this more *deeply embedded* knowledge 'comes with' the language. Knowledge being more deeply embedded in language can, in different circumstances, then arguably also result in knowledge being more resilient. It is more *dependent* on the language, and then, depending on the status of the language, can bring resilience or vulnerability in its wake.

[145] Even if the story happened to survive to some degree in a neighbouring language, in theory it is feasible that the story would be lost forever.
[146] Assuming that the constants of the world of today will also hold in the world of tomorrow.

6.4 Scaling the Resilience of Knowledge

In order to explore the *resilience* of a certain knowledge 'unit', I propose the ability of *scaling* the resilience of knowledge, as the resilience of a 'unit' of knowledge depends on multiple factors.

The five internal factors that have been described above can be 'applied' to knowledge in order to learn more about its resilience or vulnerability. In this section, I will introduce a first exploration of a potential model with which to determine the resilience of certain knowledge in the case of language death. Each of the five internal factors is not simply a property that a unit of knowledge *does or does not* possess – each internal factor should be regarded as a property that a unit of knowledge possesses to a certain *degree.* In a way, it can be seen as a scaling system: certain knowledge *has* a certain *complexity*: it can be *simple* or *complex*, but it can also be somewhere in between, or even contain a bit of both. Knowledge X has a certain degree of *tangibility*, it can be *more tangible* than some other knowledge, while some other knowledge might not be *tangible* at all.

I will walk through three examples, showing that the separate factors can be scaled, and therefore can generate different degrees of *resilience* for each knowledge 'unit'. I will do this for *fence making*, *reindeer names* and *fish migration*, all of which have already been mentioned or discussed before in this thesis. I will go through each of the five internal factors and consider how to define the resilience of these specific units of knowledge.

Embeddedness in the language

Firstly, I will consider the *embeddedness* in language. Is the knowledge somehow deeper embedded in the language? This might be the most difficult factor, as this only becomes obvious after a deep study and consideration of the language. The most important aspect of this factor, as discussed in section 6.2.1, is that people need to keep in mind that not all knowledge might reside on the same level of the language. Some knowledge can be so deeply embedded that it is second nature to the language speakers, but difficult to 'see' for outsiders. Considering the examples, I will mark the *Embeddedness* of *fence making knowledge* and *fish migration knowledge*: "unknown". As there is more information about the *reindeer names* knowledge of the Tofa people, in which it has been shown that a lot of knowledge resides in single words that might not be immediately obvious to outsiders, I will consider the *Embeddedness* of *reindeer names knowledge*: "more knowledge than lies on the surface of the language".

Structure of the knowledge

Secondly, the *structure* of the knowledge. *Fence making* is a step-by-step process, with a clear start and end. *Fence making knowledge* then will be labelled: "structured, step-by-step".

How about the *reindeer names*? There seems to be no real way to apply structure to this knowledge unit. It is not a step-by-step procedure of any kind nor does it have a clear start or end. It is an assimilation of words and names, which in the naming system might have some structure, but that then would refer back to the *Embeddedness in the language* as that revolves around the structure of the words amongst each other and not to the knowledge that is being conveyed. *Reindeer names* in terms of the *structure of knowledge* will be labelled: "non-linear, not step-by-step, not necessarily structured".

Then there is *fish migration*. While the above two examples seemed straightforward in their division around structure, *fish migration*'s structure seems to be somewhere in between. The knowledge is not as clearly structured as *fence making* where one can follow the process from the first step to the last. The knowledge of fish migration does have a certain structure however, as it is based on the recurring way that fish move around. The knowledge of such migration is based on the cyclicity of it, the realisation that *fish migration* follows a

certain pattern. When conveying this knowledge to another person, the fact that there is a certain pattern or structure could enable one to convey this knowledge more easily. Therefore, while it may be less clear of a pattern than *fence making*, the *fish migration knowledge* gets a *structure* label along the lines of: "partly structured as the migration follows patterns over time".

Complexity of the knowledge

For *fence making* knowledge I can keep the *complexity* of the knowledge fairly short, there do not seem to be *complex* concepts involved in this knowledge. There might of course be complex concepts involved, regarding for example to the best time of the year to pick the right wood for making poles that are necessary for a good fence, but the basic concept of the knowledge unit, the creation of the fence, does not seem to need complex notions. Therefore, I labelled it: "does not seem to incorporate *complex* concepts".

How complex is the *reindeer names* knowledge? The fact that this wide variety into different reindeer names (depending on age, sex, rideability, et cetera) can be considered complex in itself does not necessarily make this property simple to fill out. One might already know that the concepts are extremely bound to the culture and skills of the community, making it more difficult to distinguish the different reindeer for outsiders, however, the knowledge does not necessarily seem based on certain complex concepts, or abstract domains, such as space and time. Nor do they seem to have a subjective base, which is inherently more complex to grasp. Therefore, the explication of this kind of knowledge seems – even though it is new and difficult to outsiders – fairly possible. The biggest hurdle is the awareness of there being so many variations and the recognition of all the slight differences hiding within the words. I will label the *reindeer names*: "complex for its wide variation of culturally bound words, does not seem to incorporate *complex* concepts".

Fish migration knowledge can be considered complex, because of its inherent use of *complex* concepts as time and location and the change of these two. Imagine standing next to a river with a person who does not speak your language and trying to explain that the school of fish that is swimming past does that every first day of the month in summer and spring, around noon, and that they will return here at the end of the day. The *fish migration knowledge* will thus be labelled: "incorporate *complex* concepts (such as time, space and change thereof)".

Tangibility of the knowledge

On the tangibility of these examples, the labels will mostly speak for themselves. For the *fence making* I will label this property: "visible procedure and visible end result, touchable, participation".

Reindeer names knowledge will be labelled: "visible or audible differences between reindeer". The different reindeer are recognised and distinguished by certain features. While for example visible features might be difficult to observe or recognise for an outsider who is new to this knowledge, these visible features form a tangible aspect to the knowledge.

Fish migration knowledge will be: "migration is 'visible', but is a higher-order conclusion one can arrive at after repeated observation or explanation". Imagine again standing next to the river with another person and pointing at a school of fish swimming past. After seeing this *one* time, one cannot have the knowledge that these fish do this every month. While the knowledge has a tangible aspect as the migration is in theory 'visible', it needs a lot more for this to get to the knowledge of *migration*. It is in a way a conclusion of a higher order that, while having a tangible property, is not immediately visible, in the way that making a fence is more *direct*.

Origin of the knowledge

Finally, the *origin* of the knowledge units. Fences are built by humans and they do not just 'randomly' appear in the natural world. It is a human construction and therefore finds its origin in *the social world.* It is a product of human communities and cannot be observed somewhere without humans having made it first. Therefore the *origin* of *fence making knowledge* will be: "origin lies in the social world". While the fence itself of course resides in the physical world, it is not a natural construct.

On the other hand, the origin of *reindeer names* and *fish migration* will be labelled: "origin lies in the physical world". Imagine everyone forgetting about the migration of salmon: then, this knowledge is still out there in the world, and may be 'rediscovered' at some point.[147] What people 'do' to this knowledge is beside the point here, it merely shows that the origin of the knowledge can be found in nature, and thus its "origin lies in the physical world".

For *reindeer names*, the same goes. The differences by which the names are given are real-world differences, such as the age and sex of the reindeer. Then, how about 'rideability'? That variation is clearly a man-made construct, right? Therefore one can argue that part of the origin of this knowledge does not lie in the physical world, but in the social world. However, this can however be contradicted, as this *rideability* depends on other real-world differences – other physical features of a certain reindeer – is it for example strong, muscular and calm? Then, the *origin* of the *reindeer names knowledge* is labelled: "origin lies in the physical world".

[147] As discussed in section 6.2.5.

6.4.1 The model

The above considerations of the three examples have led to the following model:

Fence making knowledge:	
Embeddedness in the language:	unknown
Structure of the knowledge:	structured, step-by-step
Complexity of the knowledge:	does not seem to incorporate *complex* concepts
Tangibility of the knowledge:	visible procedure and visible end result, touchable, participation
Origin of the knowledge:	origin lies in the social world

Tofa reindeer names knowledge:	
Embeddedness in the language:	more knowledge than lies on the surface of the language
Structure of the knowledge:	non-linear, not step-by-step, not necessarily structured
Complexity of the knowledge:	complex for its wide variation of culturally bound words, does not seem to incorporate *complex* concepts
Tangibility of the knowledge:	visible or audible differences between reindeer
Origin of the knowledge:	origin lies in the physical world

Fish migration knowledge:	
Embeddedness in the language:	unknown
Structure of the knowledge:	partly structured as the migration follows patterns over time
Complexity of the knowledge:	incorporate *complex* concepts (such as time, space and change thereof)
Tangibility of the knowledge:	migration is 'visible', but is a higher-order conclusion one can arrive at after repeated observation or explanation
Origin of the knowledge:	origin lies in the physical world

From the internal factors, and their explanations, one could conclude something like this: 'Knowledge that is *not deeply embedded* in the language, has a *clear structure*, comprises *simple concepts*, is *tangible* to a great extent, and *originates in the physical world* is very resilient, and therefore more likely to survive language death.' *Simple concepts* might be easier to transmit than *complex concepts*, the same goes for *structured* knowledge opposed to knowledge that is for example *non-linear*. A higher degree of *tangibility* seems to give more ways of being transmitted and surviving and knowledge originating from the *physical world* gives it a more 'permanent' property. Then, by creating such *properties* of knowledge and with this model ascribing them to specific 'units' of knowledge, one could create a better understanding of knowledge and its resilience in case of language death.

6.4.2 Importance of small 'units'

The examples used above are all relatively well-delimited instances of knowledge, not encompassing too much different information, and indeed being one 'unit'. This is important

for the best use of the proposed model. To exemplify that the investigation of the resilience of a knowledge 'unit' that is broader and more encompassing is less fruitful, I will take some examples from the "types" of knowledge from *Appendix C* as described by the respondents, showing why these are not the best fit to explore the resilience of certain knowledge. Consider the following few examples from the "type"-list in *Appendix C*:

- Canoe making
- Child-raising practices
- Cooking practices
- Flora and fauna
- Health knowledge
- Historical knowledge
- History of the community
- Weather patterns
- Woodworking

These examples encompass a broad range of different knowledge, but also a wide variety of *how much* knowledge each topic encompasses. Not all such "types" are useful for the proposed model, as the knowledges on the list are too varying in how broad they are. The list, however, does show what steps should be taken instead, using knowledge in smaller, more specific 'units'. I will explain the importance of using small 'units' of knowledge for the best results of the proposed model, by showing that too broad 'units' of knowledge – as is the case for most proposed "types" of knowledge – do not work well on the model. The more specific a knowledge 'unit' is, the more well-defined the *resilience* of said knowledge can be.

When looking at the "types" above, and trying to use them on the model, one can see fairly quickly that there is a problem in determining these knowledges' resilience. *Cooking practices* is quite broad – one could apply it to the model, but it would work better if one knew which *practice* specifically: is it knowledge about a certain soup recipe, or knowledge about how to scale a fish for a meal? The same goes for *Child-raising practices* – one could apply it to the model, but the properties of the knowledge would highly depend on whether this pertains to knowledge of how to teach a child manners, or knowledge on how to change diapers. *Flora and fauna, Health knowledge* and *Historical knowledge* are extremely broad "types", compared to relatively smaller "types" such as *Canoe making, Weather patterns* and *Woodworking. Canoe making* seems similar to *fence making* in its extensiveness and therefore seems a useful unit to apply on the model of the internal factors. However, *Flora and fauna* is more of an umbrella term. It encompasses a lot of knowledge – so much even that two units of the examples above – *fish migration* and *reindeer names* – could fit into this type, under *fauna*. To exemplify that, for example, *flora and fauna* does not work optimally in investigating the resilience, I have applied it to the model:

<u>*Flora and fauna*</u>:	
Embeddedness in the language:	unknown
Structure of the knowledge:	not necessarily structured
Complexity of the knowledge:	does not seem to incorporate *complex* concepts
Tangibility of the knowledge:	visible
Origin of the knowledge:	origin lies in the physical world

Since both *fish migration* and *reindeer names* could fall under *fauna*, it becomes clear that such a broad term is hardly useful in determining the resilience. For the (non-)'unit' *flora and fauna* one could argue that this knowledge is *not necessarily structured*, and *does not seem to*

incorporate complex concepts: it could be an assimilation of knowledge about all plants and animals in the area, how they look and what their characteristics are, and when and where to find them. It is already difficult to make such an extreme generalisation for such a wide field, and this is also not really fruitful: both *fish migration* and *reindeer names* fall under *flora and fauna*, yet these properties that I have ascribed to *flora and fauna* do not correspond the properties of both *fish migration* and *reindeer names.* While the properties are more or less in accordance with the properties one might ascribe to *reindeer names*, they are the complete opposite of the properties one might ascribe *fish migration,* which I considered to be *partly structured as the migration follows patterns over time* and as *incorporating complex concepts (such as time, space and change thereof). Flora and fauna* is too broad a knowledge 'unit' for the model. Using it on the model means that one has to overgeneralise the properties of *flora and fauna*, resulting in the loss of what the properties of the actual knowledge 'units' within this term are. I believe this model works best for smaller scope, more specific knowledge units.

Still, it might be interesting to compare such a broad term to other broad terms, for example comparing *flora and fauna* to *historical knowledge*. One could then still make some inferences about how generally, *flora and fauna* knowledge tends to be visible and with its origin in the physical world, while generally *historical knowledge* tends to be less tangible and has its origin in the social world. However, point remains that the more specific a unit of knowledge, the more one can infer about its resilience.

6.4.3 Modelling with *resilience scores*

In order to really compare two knowledge 'units' on their resilience, it could for future application be useful to attach scores to the factors. In order to apply this to the model, I believe it needs to be explored further, but as an exploration of such a model with *resilience scores*, consider the following: each factor could have a 1 to 5 scoring system, with a lower score referring to a property that renders the knowledge *vulnerable*, and a higher score referring to a property that renders it more *resilient*.

Internal factors' influence on the *resilience of* a 'unit' of knowledge in case of language death:

Factors	**More vulnerable**	**More resilient**	
Embeddedness in the language:	deeply embedded	(1–2–3–4–5)	not deeply embedded
Structure of the knowledge:	no structure	(1–2–3–4–5)	very structured
Complexity of the knowledge:	complex	(1–2–3–4–5)	simple
Tangibility of the knowledge:	not tangible	(1–2–3–4–5)	highly tangible
Origin of the knowledge:	social world	(1–2–3–4–5)	physical world
Resilience of the knowledge: ($5 \geq$ resilience score ≤ 25)	*sum of the above*		

Low number: *vulnerable* knowledge in case of language death
High number: *resilient* knowledge in case of language death

So, for example, *fence making knowledge* which has been stated to be very structured, could in this model score a 5 on *Structure.* As for *Complexity*, as the knowledge seemingly does not depend on complex concepts, one could say this knowledge unit scores a 5, rendering it more *resilient.*[148] Consider filling out the *Resilience score model*, for *fence making knowledge*:

[148] I am aware that the scoring in that specific property is counter-intuitive, and further exploration of such a model including *scores* might benefit from renaming the factor to *Simplicity of the knowledge.*

Internal factors' influence on the *resilience of* ***fence making knowledge*** in case of language death:

Factors	**More vulnerable**		**More resilient**
Embeddedness in the language:	deeply embedded	(1–2–**3**–4–5)	not deeply embedded
Structure of the knowledge:	no structure	(1–2–3–4–**5**)	very structured
Complexity of the knowledge:	complex	(1–2–3–4–**5**)	simple
Tangibility of the knowledge:	not tangible	(1–2–3–4–**5**)	highly tangible
Origin of the knowledge:	social world	(**1**–2–3–4–5)	physical world
Resilience of the knowledge: (5 ≥ resilience score ≤ 25)	*sum of the above*: **19**		

Low number: *vulnerable* knowledge in case of language death
High number: *resilient* knowledge in case of language death

The resilience score of *fence making knowledge* could in this example be 19, which could then be compared to resilience scores of other knowledge units. Applying such a system to the model could generate a faster way of determining whether knowledge X is more resilient than knowledge Y in case of language death.

However, such a model still presents many challenges. How to correctly apply these properties? Could it not be the case that some properties weigh heavier than other properties, and should thus have an additional factoring to make their influence more known? Would it always be the same properties that weigh heavier, or is that knowledge or language dependent?

Furthermore, I want to emphasise that when exploring the usefulness of such *resilience scores*, a high score, such as 25, does not imply *at all* that this knowledge is 'safe' in case of language death. That is not what this model is conveying at all. What it does say is that certain knowledge that scores very high on such a *resilience score*, inherently has properties that might make it more resilient in case of language death. This is not to say that this knowledge cannot be lost with language death, but that there are multiple factors to consider before deeming something lost.

Further research could investigate the applicability of such a model and its further development regarding the use and necessity of such additional features. This first exploration of such a model does not claim to fully answer any of these questions, but merely proposes the idea of exploring the resilience of knowledge and the ability of scaling such resilience based on the properties of knowledge.

6.4.4 Concluding

In answering the research question: *What factors influence the resilience of knowledge in case of language loss?*, the discussed internal factors bring one a step closer to a more complete understanding of the relation between language loss and knowledge loss. While the *internal factors* do not give a conclusive answer to whether something will be lost with a language or not, they do give a better-defined basis to work from in determining the likelihood of some knowledge surviving. If properly executed and refined, such a model could give more insight into why certain knowledge is more likely to survive language death. Such a model implores one to think about knowledge and its properties – and the different effects that language death can have on knowledge and why. While these properties of knowledge are by no means complete or final, they are a first exploration toward understanding *why* certain knowledge might be more likely to survive language death, while other knowledge might be more likely to be lost.

What makes certain knowledge more resilient? The answer that this thesis proposes is that that in part depends on the *properties of knowledge.* The various properties that

knowledge has, together, give the knowledge a higher or lower likelihood of being transmitted, based on *Embeddedness in the language*, *Structure of the knowledge*, *Complexity of the knowledge*, *Tangibility of the knowledge* and *Origin of the knowledge*. These properties of knowledge influence the resilience of knowledge when a language vanishes.

7 Conclusion

In this thesis I have answered the research question: *What factors influence the resilience of knowledge in case of language loss?* In chapter 6, I have introduced two kinds of factors: *external factors*, which relate to the circumstances in which knowledge resides, and *internal factors*, pertaining to the properties of knowledge. While both factors are important for a thorough understanding of the resilience of knowledge, the *internal factors* are more case-specific, as these relate to the relation between language and knowledge. In section 6.4, I have proposed how these internal factors could form the basis for a model with which to investigate the resilience of certain knowledge in case of language death.

By investigating language and knowledge, and researchers' experiences with language loss and knowledge loss in endangered language communities, this thesis concludes that certain *properties* of knowledge – *Embeddedness in the language*, *Structure of the knowledge*, *Complexity of the knowledge*, *Tangibility of the knowledge* and *Origin of the knowledge* – are factors that influence the resilience or vulnerability of knowledge in case of language death. Exploring such underlying *properties* of knowledge that tie it to language results in a better understanding of what might happen if a language vanishes. This gives insight into to what extent certain knowledge is bound to language by specific properties – and consequently, when the language vanishes, what knowledge is more likely to go with it. The proposed factors and model are a first exploration of such underlying factors connected to what might happen to knowledge when a language starts vanishing. The number of respondents is too small to draw any definitive conclusions, but this research could form a starting point for exploring what is bound to be lost.

Further research could dive into further developing a model for the resilience of knowledge. It could also investigate whether certain concepts are generally more likely to be *deeply embedded* across languages, whether there are concepts that are in general considered *complex*, or whether there is a clearer distinction to be made regarding the degree to which some knowledge has a clear *structure* – due to potential universals in language and knowledge.[149] Differentiation by specific *properties* of knowledge could lead to a better understanding of *why* something is lost with language death, which might ultimately lead to a better understanding of *what* knowledge is lost with language death. This can be considered a step in the right direction in exploring exactly what the world loses with the incessant vanishing of languages.

Not everything can be stopped, or, importantly, *needs* to be stopped. Every community, every language is its own voice of reason. This is also the case with language loss and knowledge loss – knowing certain knowledge is less resilient and might die with a language, does not mean there needs to be a plan to stop this process. Knowing what knowledge is more resilient in case of language loss is a step in the right direction, and how people want to respond to that is up to them – that is a way to truly give people a voice.

[149] Similar in a way to Wierzbicka's theory on *semantic primitives*, as discussed in section 3.4.1, pertaining to universals in all languages.

8 Appendices

8.1 Appendix A

Questionnaire October 18th, 2024

Thesis Research – Endangered languages and knowledge loss

Maya Hendrix
Research master, History and Philosophy of Science
Utrecht University

Introduction

For my master thesis, I am looking into endangered languages and the resulting loss of knowledge. My main goal is to investigate whether different "types" of knowledge are at varying risk of being lost when a language dies. Specifically, when language X is endangered but there is an endangered language project working on it, can such a project, *in theory*, preserve all knowledge? Or are there categories or "types" of knowledge that are particularly difficult to document and are therefore more likely to be lost when the language dies?

The aim of this research is to create a more detailed overview of the specific "types" of knowledge that are lost when a language disappears, and to investigate whether certain kinds of knowledge require more attention or specialised expertise for documentation. This could potentially help field researchers and endangered language communities as a more refined idea of how certain knowledge is connected to language might help direct documentation and revitalisation efforts to cases where they are most needed.

All questions are optional, but you are encouraged to fill out all of them. When using the term "the project", I do not refer to one specific project; feel free to respond based on any project you have worked on, such as your largest or most recent one. You may interpret the phrase *"types" of knowledge* in any way you see fit. To give a general idea, "types" of knowledge could for example be classified by theme (e.g. medicinal, cooking, religion, etc.), function (e.g. skill, wisdom, etc.), or any other form. Feel free to use any "type" of knowledge you see fit.

Questions

1. What is the endangerment status of the language(s) you worked on? Is the status based on Glottolog, EGIDS, UNESCO, LEI or another scale?

2. Into what "types" of knowledge would you categorise the documented knowledge in the project?

3. What do you believe is the most valuable knowledge that has been documented because of the project (that might otherwise have been lost)?

4. What were the differences in what the project wanted to document and what the community wanted to document?

5. Were there things that both the project and the community wanted to document, but turned out to be difficult or even impossible in practice? So, in the field, would you say certain "types" of knowledge are harder to document than others?

6. In theory (without external obstacles such as e.g. lack of willingness or expertise), would you say certain "types" of knowledge are *inherently* harder to document than others? Please elaborate.

7. According to you, does language death necessarily result in complete knowledge loss? Or are certain "types" of knowledge less dependent on language?

8. Are there any other comments you would like to share?

If you would consider filling out your contact information for potential follow-up questions:

- Name:
- Email address:

Please, send this filled-in form back to:

Maya Hendrix
m.hendrix@students.uu.nl

For any questions, you may also reach out to me.
Thank you for your time!

8.2 Appendix B

Taguette markeringen: On the endangerment status

[Language X] is threatened, children still learn the languages in most of the villages but many people are moving outside the villages

[Language Y] is basically moribund, there are only 3 speakers left and in their daily lives they mostly speak [Language X].

[Language Z] is highly endangered because there are so few speakers (approx. 110)

[Language A] is vital, there does not appear to be a shift to a more dominant language and multilingualism is more or less stable

[Language B] is threatened because more and more [Language B] are marrying from the outside

No, my assessment isn't based on any of these scales. I don't trust Glottolog, because the decisions are highly ideological

Labels: On the endangerment status

Both languages I've worked on are EGIDS 7.

Labels: On the endangerment status

I haven't chosen these languages for any endangerment status. Most of them are spoken by around 10K or less people, the smallest being Pana, perhaps 400, of which the majority are bi-ethnic and tri-lingual. [Language X] and [Language Y] are being passed on to the children and they participate in asymmetic multilingualism. Their language is not used as a lingua franca outside the villages, although people marrying in are usually socialized to the language quite easily. [Language Z] has a wide range of varieties that experience different transmission situations, from [Language A] spoken near the capital Vientiane which is moribund, to others that are still transmitted to children. [Language B] and [Language C] are still being transmitted, but elders lament the lack of traditional culture that is contained in their language capacities.

Labels: On the endangerment status

Nearly Extinct (fewer than 30 speakers)

Labels: On the endangerment status

Highly Endangered (fewer than 200 speakers?)

Labels: On the endangerment status

Threatened (some 2000 speakers?)

Labels: On the endangerment status

Threatened (some 5000 speakers)

Labels: On the endangerment status

When we started the project, it was listed as endangered, but the assessment was probably based on insufficient data and the fact that about 10 years ago it and the communities who speak it did not have the governmental recognition. Ethnologue lists it as "stable" now, though my colleague did publish a study suggesting that it is "endangered language with status 7-Shifting"

Labels: On the endangerment status

It's AES status is listed as 'threatened'.

Labels: On the endangerment status

AES: 'shifting'

Labels: On the endangerment status

AES: 'shifting'

Labels: On the endangerment status

(Myanmar; AES: 'not endangered')

Labels: On the endangerment status

Ethnologue (EGIDS) classifies the languages under this code as: “stable”

It is classified as “endangered” according to LEI.

its AES (Agglomerated Endangerment Status) there status is: “shifting”.

Labels: On the endangerment status

Most of these classifications rely on the data that I have published in my grammar. The main factors for these classifications is language community size, status, transmission to children. Measuring the size is quite hard to do in this part of New Guinea, because everyone is multilingual and women marry-in from other villages which speak other languages. I can therefore only give a rough estimate, which is 250 speakers. That small figure is quite normal in New Guinea, but in the classification system that measure endangerment such a small figure places the language automatically in the “endangered” category. As for status, [Language X] is not an official language, nor is it an administrative language in the schooling system, the church, etc. English takes on this role, and most speakers have a very good command of English. On the other, many official ceremonies are held in [Language X], like public speeches, announcements, partly the church service, even the (primary) school is a mix of English and [Language X]. I would say the status of the language is a mixed bag. As for transmission to children, the language is not endangered at all. Children learn the language and there is no real danger in sight.

All of that being said: with only 250 speakers, it would take only a single generation to shift or partially shift to another language, and [Language X] would be lost.

Labels: On the endangerment status

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from Glottolog:

Severely Endangered (20 percent certain)

Threatened (80 percent certain)

8b (Nearly extinct)

9 (Dormant)

8b (Nearly extinct)

Labels: On the endangerment status

UNESCO severely endangered

Labels: On the endangerment status

According to Glottolog, the language is “threatened”. There are still a few hundred speakers, all above 60, who have learned it as L1, they all are bilingual with Spanish.

Labels: On the endangerment status

[Language X]: Informal assessment: immediate extinction; one confirmed speaker aged 89

[Language Y]: critically endangered; full transmission to children uncertain

[Language Z]: stable, transmission to children

Labels: On the endangerment status

---

listed as extinct on Glottolog. This certainly isn’t correct – but with fewer than 40 speakers in 2019 this language is severely endangered (this is its status from the Unesco atlas). For all we know, it is spoken only by adults, with virtually no transfer.

Labels: On the endangerment status

[Language X]—not endangered, but some language shift is happening
[Language Y]—moribund, only a few elderly speakers

Labels: On the endangerment status

Both are listed as shifting on Glottolog. [Language X] may be slightly more stable than [Language Y].

Labels: On the endangerment status

It’s hard to say.

Labels: On the endangerment status

Ethnologue etc. evaluate them as being used in education and in other domains (so the accurate label in GIDS would be ‘developing’), but the variety being used is really [Language X], a standard promoted by the government and not spoken in the family domain, so this evaluation is not really corresponding to reality.

Labels: On the endangerment status

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this evaluation is not really corresponding to reality.

Labels: On the endangerment status

I would say they are both definitely endangered, as most young people are not speaking it amongst themselves.

Labels: On the endangerment status

I do not know

Labels: On the endangerment status

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listed as “threatened” by ELP/Glottolog and “definitely endangered” by UNESCO. I agree with these ratings. The main factors are a low population figure and absence of indigenous language education/support.

Labels: On the endangerment status

‘critically endangered’ ---5.1 on the Glottolog scale.

Labels: On the endangerment status

There are no children currently growing up as first language speakers of [Language X], [Language Y] or [Language Z]. There are a small number of elderly fluent speakers of [Language Y] and [Language Z], and still some young adults who are fluent in [Language X]. Some children speak an adapted form of [Language X].

Labels: On the endangerment status

Critically endangered, as per UNESCO

Labels: On the endangerment status

8.3 Appendix C

Types of knowledge from the questionnaire:

1. ???
2. Knowledge of the environment: environmental calendars, landscapes and wayfinding, animal behaviour and taxonomy, medicinal and useful plants, astronomy, myths and legends, material culture and artistry, etc.
3. academic knowledge (linguistic knowledge), general knowledge
4. activity-based types of knowledge
5. autobiographical knowledge about acquisition and use of L1 (the endangered language) and L2 (the dominant language)
6. biological knowledge
7. botanical knowledge
8. bush medicine knowledge
9. canoe building
10. child raising practices
11. children's knowledge (They play games, have all kinds of puzzles, for example string figures, there is jokes, short format language arts, child play in general.)
12. conversations (language use)
13. cooking
14. cooking practices
15. culturally specific meanings
16. customs and traditions
17. customs related to hunting and subsistence
18. development of the region (Amazon, where rubber extraction and crude oil extraction take place)
19. diagnostic knowledge
20. ethnohistory
21. ethnobotanical knowledge
22. ethnobiological topics
23. ethnography of communication
24. fishing
25. flora and fauna
26. food
27. foraging subsistence mode
28. gardening
29. grammatical knowledge of dialect and register variation across forms of what are considered to be [the language]
30. grammatical structure
31. grammar
32. handsigns
33. health knowledge
34. health practices
35. historical knowledge
36. histories documented, life stories, clan histories, origin stories, prophecies, traditional lore
37. history of the community
38. house building
39. hunting
40. kinship

41. kinship system
42. knowledge of dialect and register variation across forms of what are considered to be [the language]
43. knowledge of language (unconscious knowledge of grammar etc.)
44. knowledge of named places within [the] country, including their locations, their natural features such as water courses and rock formations, and cultural ones such as rock paintings
45. knowledge of the forest, all the animal and plant species which runs in hundreds
46. knowledge of the grammar and lexicon of the language
47. land ownership
48. landscape knowledge
49. language
50. lexical knowledge (including some ‘encyclopaedic’ knowledge, including elements and narratives of traditions)
51. lexical knowledge (language data)
52. lexicon
53. life stories
54. linguistic knowledge
55. linguistic knowledge: knowledge of history
56. linguistic knowledge: knowledge of type
57. linguistic knowledge: knowledge of typological distribution
58. material culture
59. myths
60. narrative tradition
61. narratives of personal experiences
62. natural remedies vocabulary
63. oral histories
64. oral tradition
65. people’s lives and customs
66. plant medicine
67. poetic language
68. religion
69. rituals
70. ritual language
71. society and kinship
72. sociolinguistics
73. specific vocabularies (e.g. ethnobotany, ethnomedicine, sacred sites, genealogical and anthropological information)
74. stories and song
75. stories including traditional myths and people's life histories
76. story-telling
77. subsistence practices
78. traditional and modern songs
79. traditional folklore
80. traditional knowledge
81. traditional law and land tenure
82. traditional mythology
83. traditional practices
84. traditional shamanic knowledge

85. traditional social organisation including named clans, who belongs to them and where their territories are located
86. traditional stories (‘dreamings’)
87. traditional stories (under story-telling)
88. traditional technologies
89. traditional vocabulary including kinship terminology, normal and respectful ways of behaving, tracking and hunting skills, plant knowledge, gathering and uses, knowledge of places and wayfinding, ceremonies (e.g. initiation, funeral)
90. traditional wisdom and history (kin terminology and its cultural relations)
91. weather patterns
92. woodworking
93. child-raising practices
94. life stories (clan histories, myths, narratives)
95. mythological knowledge
96. genealogy
97. origin stories
98. oral histories (clan-related)
99. local traditions

8.4 Appendix D

Taguette markeringen: Difficult to document

natural conversations are hard to document, because there is a tendency to make everything a performance in documentary circumstances – in a sense documenters create the speech genres.

Labels: Difficult to document

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chants or rituals related to assault sorcery for obvious reasons

Labels: Difficult to document

If you're a man it's going to be difficult to document discussions about abortion or sensitive topics like that, or women's initiation rites. If you're a woman (or are perceived as one by the community), I would imagine discussions about men's initiation might be harder to document.

Labels: Difficult to document

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rituals in practice – a little because I feel like an intruder with my camera and a little because of issues with informed consent

Labels: Difficult to document

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also documenting stories was hard for [Language X] (everyone says they've forgotten them), and is so far impossible for [Language Y] (for the same reason)

Labels: Difficult to document

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yes, anything that is not somehow "tangible" because it is a ritual with a start and end, or a story with words, or a way of cooking or building or catching something. I'm thinking about things like how to behave with your family-in-law when you just married, where to go and not go to source firewood/plants for food/bamboo for constructing/whatnot and how to recognize these things, anything relating to relations between people in the community (who to go to with problems in your marriage, with your health, with money, who's related to whom in what way, how are the power balances). These things that you learn by growing up in a community, but that are hard to capture in a story or an interview.

Labels: Difficult to document

I once spent one village trip trying to find old people to tell stories in their language, which I had already worked with a speaker to collection about 2,500 words into a basic lexicon and I could speak the language to a reasonable daily degree. In the end, no one could tell us a story, but instead we collected lots of ethnographic information about an ideology of forgetting that is associated with the politics of being on the wrong side of a political line, as well as a cultural intimacy issue vis a vis a larger culture/language that is seen to be more 'civilized'.

Labels: Difficult to document

I don't think so, because all knowledge is embedded in culture, and all cultures treat knowledge in their own way. Sometimes it is difficult to elicit expressives, but that is often because people are hesitant to provide information on language that is "strange". But on the contrary, in Bit, people go out of their way to teach me expressives, which are about 1/3 of the total lexicon.

Labels: Difficult to document

What I have observed is that the biggest obstacle to documentation is the lack of the linguist's dedication to learning the language, participating in the culture to the degree that they are invited, and spending time with people. In Laos, it is also not the total amount of time that a linguist spends in the community, but the sustained effort to continue to come back and assume some sort of role in the extended kinship systems. One needs to engage in the behavior that is expected from the local social norms. In Laos, unless the linguist embraces the cultural norm of muan 'having fun and being relaxed' they will not get far. It is important to remember that to them, language is not about science but about social relations and performance. For us, sound is everything. People do not mind if you have bad grammar or make word-choice mistakes, but when you speak clearly (have good pronunciation, paying attention to the phonetic/phonological, but also prosodic and performative aspects of language) then you are in.

Labels: Difficult to document

I expect some of the more "experimental" work will be difficult (if they do decide to do it) — e.g. spatial relations with either paper or video stimuli.

Labels: Difficult to document

The most striking difference is between what cognitive science distinguishes as declarative knowledge (what you know consciously and can talk about), like traditional stories and ethnohistory, versus procedural knowledge (skills, knowledge that underlies things you can do, like speak your language, but that is not accessible to your conscious mind), like activities

that are done without a large spoken component, such as making the traditional feather headdress, or describing words of the language that are more grammatical in nature, like discourse or interactive particles.

Labels: Difficult to document

The team did want to spend more time on documenting woodworking and fishin knowledge, but we were on a tight budget and had to deliver other things, and such a documentation would have required dedicated trips and stays to specific locations.

Labels: Difficult to document

I think knowledge related to seasonal phenomena is tricky if the research team just accidentally missed the relevant time window (e.g. we were never doing fieldwork during the termites harvesting season). Very specialized knowledge requires that one finds the right speakers and they are willing to share. E.g. we had one interview with a traditional healer, but it would have been really informative to be able to talk to a range of them.

Labels: Difficult to document

Some plants or animals were rare, or could only be found in hard-to-reach places, and therefore could not be documented. Many are subject to seasonal variation, and may not be present during a field trip. The problem here is not simply an inability (on the part of the researcher) to film or photograph these organisms. The main issue is that when the name of such an organism is mentioned in a text, it becomes impossible to assign a precise real-world referent to that name.

Labels: Difficult to document

Some kinds of ‘secret’ knowledge (initiation rituals, traditional medicine, hunting if it is currently banned in the area) may be difficult, or even impossible, to document, and I think that’s perfectly ok.

Labels: Difficult to document

As a male linguist, I would find it difficult to document for instance traditional cures for female ailments, due to local cultural taboos.

Labels: Difficult to document

Especially difficult to grasp are concepts that are so deeply embedded that they seem second nature to community members, which is why they don't bother to explain them to the linguist.

Labels: Difficult to document

It is probably trivial to mention that certain types (like recording secret myths or practices of black magic) are harder to document than everyday activities (gardening, hunting or fishing practices).

Labels: Difficult to document

Other types of knowledge are harder to document because of my own presence, or characteristics. For example, it is naturally harder for a male researcher to hang out and work with women, or at least with women of all ages; vice versa for female researchers. It is not necessarily because people don't want to report on gender related topics.

Labels: Difficult to document

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it is quite hard to document place names in the Morehead district because often there is a secret secondary name for a place that makes reference to myth about that place. Knowledge of such systems and details of place names are equivalent to a document of ownership in the Western world. Therefore, I cannot publish an overview (e.g. a GIS map) of place names because it would interfere in ongoing land claims by rivalling clans or individuals.

Labels: Difficult to document

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a lot of analysis, reanalysis, and rerecording, or redocumenting is necessary. Without it, one cannot ask the right questions, and hence one is doomed to forget to document things that are relevant.

From that perspective, inherently harder to document are types of knowledge that are more elaborate in structure. Compare, for example, documenting the procedure of building a garden fence - already a multi-step process - with documenting a speech genre - incredibly elaborated.

Labels: Difficult to document

Of course the difficulty varies across types. Of many aspects of variation one is the particular interests and skills of each speaker, and their willingness to contribute to a project.

Labels: Difficult to document

One would be the ‘ways of talking’, the idioms and usual ways of putting a meaning. Another is technical vocabulary, especially in domains where the recorder lacks the particular expertise, and also may not have sufficient command of the everyday language. Another is special registers, including perhaps song.

Labels: Difficult to document

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it depends on the skills of the researcher and the interests of the teachers, and on what is considered sensitive or secret/sacred in the community. Plants are easier to get identified than birds (except for bird-watchers). Constellations may be difficult to identify without a stellarium - but they be difficult if they are associated with secret knowledge. This is why team fieldwork is so valuable, with people from different disciplines.

Labels: Difficult to document

I wanted to record traditional narrative and mythology, but really never got in the position to be entrusted the sacred knowledge (or perhaps never knew how to approach it efficiently).

Labels: Difficult to document

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sensitive knowledge. In the Australian context, there is stuff that is only meant for a certain audience (for instance, gendered access) – which makes it inherently more difficult to document for an outsider (and, furthermore, with the obvious constraint that e.g. a man can’t record a women’s story); and once recorded, it may be forbidden to disseminate.

Labels: Difficult to document

Yes, plant names are hard to document because there are not usually species checklists, and so you would have to traverse long distances collecting plants, or work closely with botanists. Animals are easier, because you can find a published species checklist, and show it to speakers, and they recognize the photos/drawings. Placenames (toponyms, hydronyms) can also be challenging, due to distances and lack of maps with vernacular names for named topographic features. For [speakers of language X] and [speakers of language Y], landscapes are sacred, and in habited by spirits, and so there is a great density and richness of placenames, mostly undocumented and held only in memory.

Labels: Difficult to document

Yes, there are domains of secret/proprietary knowledge that may be known to storytellers, shamans, etc., but are not shared. There is women's knowledge and men's knowledge, that would not be shared with a researcher of the opposite sex.

Labels: Difficult to document

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a comprehensive dictionary.

Labels: Difficult to document

It is hard to document the traditional knowledge in all its extensiveness. For example, take building a house. It starts with looking for a place, what is needed, then the trees for the construction, do you grow them or look after them, how do you make sure you have enough? Then there are all the parts, the technologies, knowledge to make buildings earthquake-proof, repairs, etc. All of this is basically a life's work. Similar domain would be hunting or the knowledge of the forest, all the animal and plant species which runs in hundreds. There are the weather patterns and the knowledge related to farming which will be crucial for the adaptation to climate change. From some work on health-related issues, I have realised that there is a lot of diagnostic knowledge. People recognise diseases but do not always have a cure. There is also a lot happening with children. They play games, have all kinds of puzzles, for example string figures, there is jokes, short format language arts, child play in general. I think we cannot catch it all, the way is to empower the communities to catch some of what they want to keep.

There are also things that the communities do not want to keep or pass down. I have tried to get some information about the past tribal warfare. There are taboos in place that require all parties to be present if such story were to be retold and recorded. In practice it means that the story will disappear with its bearers because they were unwilling to get together for the recording despite my repeated attempts. I have stopped trying now and respect the right to forget.

Labels: Difficult to document

The further the knowledge is from the expertise of the linguist, the harder it is to document it properly.

Labels: Difficult to document

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we would have liked to have recorded somebody making a canoe, but this skill/knowledge is being lost, and nobody was making one during my time there (it involves choosing and cutting down a tree, hollowing it out, etc., and usually takes several weeks). Manual skills such as weaving (baskets, rooftops from palm leaves) or even pottery are hard to document, because merely seeing it does not guarantee being able to reproduce it. I would also say any

sort of rituals are hard – for example, I did not dare to ask if I could record a funeral when it was taking place in the community, as it felt predatory to me to attempt to record people when they were grieving. Also, the gender of the documenter naturally delimits the kinds of information that they have easier access to, as there are many tasks and types of knowledge that are more specific to men and women (e.g. in the Amazon men go hunting, and women make chicha, the traditional drink).

Labels: Difficult to document

Definitely. Anything that involves cultural taboos, or that is restricted knowledge in the documented community will be more difficult to document. I would also say, like above, anything that involves manual skill is going to be hard (so production of material goods, but also playing instruments etc.). Religious knowledge might be tricky as well, e.g. some communities might restrict who can access their origin myths etc. (as far as I know this was not the case in the communities I worked with).

Labels: Difficult to document

I could not document anything about their history and the history of the village.

Labels: Difficult to document

Aspects of mobility and foraging due to environmental change and restricted access to areas where this could have been better explored.

Labels: Difficult to document

Intangible culture, such as belief systems, where practice is often personal and without previous descriptions available can be difficult areas to document due to the linguist's lack of expertise and consultants not used to conveying such information. Ecological knowledge or wisdom can also be difficult.

Labels: Difficult to document

One example would be knowledge of specific places of cultural significance within [Language X] country that were known to the elders but which we were unable to find.

Labels: Difficult to document

It is inherently harder to document people's inner feelings about their current and past life experiences then it is about more ‘objective’ forms of knowledge such as the location of sites and clan territories.

Labels: Difficult to document

Documenting terms for flora and fauna is difficult, since people frequently don’t know the English/Latin names for particular species (and these may not even exist), and it is not always possible to find specimens. Even where a specimen is available, an outsider like myself will frequently be entirely unfamiliar with the species and it is not always obvious what are the important aspects to photograph / document for later identification.

Labels: Difficult to document

Documentation of cultural categories (e.g. the word *mangkwarrkant*, which describes travelling somewhere by an indirect route to avoid getting too close to someone who is in a proscribed kinship relation, such as a man’s mother-in-law) can take a lot more time for an outsider to understand and record accurately than categories with a concrete extension that can be pointed to (like ‘dog’ or ‘stick’). So things like emotions can be difficult for this reason.

Labels: Difficult to document

Knowledge of traditions (narratives, mythology, kinship) is often difficult to document, either because it has been lost through the process of colonisation and destruction of pre-colonial lifeways, and/or because there are restrictions on sharing of this knowledge and passing it on to others, including outsiders.

Labels: Difficult to document

8.5 Appendix E

Taguette markeringen: What is lost?

I can tell you that hunting techniques, ethnobotanical knowledge, traditional mythologies etc., in my experience die with the languages that code them.

Labels: What is lost?

I can't think of a case where ethnobotanical knowledge (medicinal plants etc.) is maintained while the language is lost, for example, and likewise with traditional myths.

Labels: What is lost?

I'd really like to know this. I don't think any type of knowledge is dependent on a specific language – that wouldn't make any sense, then people with different mother tongues could never learn to communicate about each other's knowledge. Yet I'm hearing all the time that language loss = loss of knowledge. Sometimes I think it's because language loss happens when the local culture is weakened (for e.g. socioeconomic reasons or with pressure from the government), and so these are just two unrelated things that tend to happen simultaneously. You stop talking your language and you stop building bamboo houses because your focus is now on training your kids to become modern world citizens. Or you stop talking your language and you stop doing herbal medicine because the government tells you these things are stupid or forbidden. But I'd love for language loss = loss of knowledge to be true, because it's a great reason to document languages.

Labels: What is lost?

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traditional stories: of course they can also be translated, but because they are so language-y in nature (using hard to translate words and formulae)

Labels: What is lost?

My collaborators stress the importance of ritual, song and story. I personally am concerned about ecological knowledge. But what unites all of these in my mind is the performative and aesthetic elements of language.

Labels: What is lost?

No, most knowledge is actually not (fully) dependent on language — sure, it might "feel" or "taste" different in the ancestral language, but you can get a pretty good approximation from translations and I would never denigrate the knowledge of people who are doing what they

can to maintain their cultures after having their language taken away by saying that it is somehow inauthentic. For me, the only things that are irretrievably lost are the categories of knowledge that are purely linguistic, like the meanings of particles.

Labels: What is lost?

What is for sure being lost in all these cases, is an intricate linguistic system that would take millenia to re-mature or re-appear. So that is the real loss.

Labels: What is lost?

When people switch to speaking another language, what traditional knowledge is kept depends on the socio-economic circumstances of their lives. E.g. the children of hunter gatherers who settle in towns won't have the opportunity to see their parents hunting, harvesting furs, and learning animal tracks and plant uses. But they may see tracking skills used around town for humans. But ways of showing respectful behaviour, child-raising and so on may continue to take place in the adopted language.

Labels: What is lost?

Hard to answer, because language death implies loss. If you mean cultural knowledge, then that's not necessarily dependent on language.

Labels: What is lost?

Foraging (or plant medicine) knowledge, for instance, can be maintained independently of its linguistic aspects. Naming of things, of course, is tightly connected to recognising those things as distinct; but a situation where all that is left of the linguistic knowledge is some flora and fauna terms is language death still.

Labels: What is lost?

I argue that the ways in which knowledge systems are linguistically encoded makes it very likely that they will vanish if the language does. They cannot be readily translated (or at all).

Labels: What is lost?

I think most of the knowledge will be gone. What will be gone is also a unique and coherent way to put in the words the experience of being alive and living in the world. The experience will still be available in the sensory domain but not transferrable in the same way verbally.

Labels: What is lost?

I don’t think it does, but it will depend on the community.

Labels: What is lost?

In case of both [Language X] communities I have worked with, there is a substantial number of people who identify ethically as [Language X], even though they don’t speak the language. They conserve the knowledge about some aspects of the subsistence practices, but, since language shift is associated with migration to towns and cities, they lose much knowledge that they don’t put into practice on daily basis.

Labels: What is lost?

Language knowledge and the ability to speak the respective language are lost. other types of knowledge loss such as certain crafts, agriculture, etc. are also lost, but this in the case of [Language X] has to do with a radical change in the life style.

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Language knowledge and the ability to speak the respective language are lost. other types of knowledge loss such as certain crafts, agriculture, etc. are also lost, but this in the case of [Language X] has to do with a radical change in the life style.

Labels: What is lost?

I think that will depend on what is driving the language loss. Changing subsistence modes or access to traditional land and its natural resources will drive knowledge loss in particular domains regardless of language loss.

Labels: What is lost?

8.6 Appendix F

Taguette markeringen: What survives?

No, most knowledge is actually not (fully) dependent on language — sure, it might “feel” or “taste” different in the ancestral language, but you can get a pretty good approximation from translations and I would never denigrate the knowledge of people who are doing what they can to maintain their cultures after having their language taken away by saying that it is somehow inauthentic. For me, the only things that are irretrievably lost are the categories of knowledge that are purely linguistic, like the meanings of particles.

Labels: What survives?

No, but I think it does have a very detrimental effect on knowledge in most cases. There are few exceptions – see the following, which shows the loss of ethnobiological knowledge, but not kinship knowledge, in an endangered language community in Australia

Labels: What survives?

In general, I would assume that activity-based types of knowledge could also be preserved following language death, e.g. traditional agricultural practices, production of certain artefacts.

Labels: What survives?

No, “complete loss of knowledge” is far too strong, and it is putting the speakers, or non-speaker descendants in a passive role. There are cases in which the entire population is wiped out (linguicide), but in most cases the population is shifting to another language over some time. In most cases, there is also a preservation of knowledge in the form of cultural practices, persisting worldviews or many other things that are maintained. Even linguistic structures (whether lexical or grammatical) can be maintained through calquing or loanwords in such situations.

It is hard to untangle, but there can be loss of knowledge without language shift (or death) just because there is a dramatic/traumatic event. Likewise there can be language shift without knowledge loss.

What is for sure being lost in all these cases, is an intricate linguistic system that would take millenia to re-mature or re-appear. So that is the real loss.

Labels: What survives?

In most cases, there is also a preservation of knowledge in the form of cultural practices, persisting worldviews or many other things that are maintained. Even linguistic structures

(whether lexical or grammatical) can be maintained through calquing or loanwords in such situations.

Labels: What survives?

Knowledge of how to perform certain skilled operations (manufacture, obtaining resources, etc, while they involve some specialised vocabulary nevertheless are mostly learnt by participation.

Labels: What survives?

When people switch to speaking another language, what traditional knowledge is kept depends on the socio-economic circumstances of their lives. E.g. the children of hunter gatherers who settle in towns won't have the opportunity to see their parents hunting, harvesting furs, and learning animal tracks and plant uses. But they may see tracking skills used around town for humans. But ways of showing respectful behaviour, child-raising and so on may continue to take place in the adopted language.

Labels: What survives?

I believe that all I recorded can also be retained in the dominant language, if someone records it. The knowledge is only retained through the language documentation because it's the language that is primarily of interest, and nobody would easily do such a project here when only Spanish were spoken.

Labels: What survives?

Foraging (or plant medicine) knowledge, for instance, can be maintained independently of its linguistic aspects. Naming of things, of course, is tightly connected to recognising those things as distinct; but a situation where all that is left of the linguistic knowledge is some flora and fauna terms is language death still.

Labels: What survives?

People will remember bits of their ancestry, but vague, they will remember some of the key survival technologies such as house building (but maybe not too well), stuff about farming and hunt (but maybe not too well). I think most of the knowledge will be gone.

Labels: What survives?

I don’t think it does, but it will depend on the community.

Labels: What survives?

In case of both [Language X] communities I have worked with, there is a substantial number of people who identify ethically as [Language X], even though they don’t speak the language. They conserve the knowledge about some aspects of the subsistence practices, but, since language shift is associated with migration to towns and cities, they lose much knowledge that they don’t put into practice on daily basis.

Labels: What survives?

There are many types of knowledge that can survive after the extinction of the languages in which they were originally transmitted. These include for example, knowledge who one’s ancestors were, what clans they belong to and where they lived.

Labels: What survives?

There are many types of knowledge that can survive after the extinction of the languages in which they were originally transmitted. These include for example, knowledge who one’s ancestors were, what clans they belong to and where they lived.

Labels: What survives?

I know of many cases where linguistic knowledge persists even after the forms have been lost, e.g. calling a mother’s sister’s son ‘brother’ in a way that preserves the traditional kinship system but using the English lexicon. But that is not to underplay the catastrophic amount of knowledge and culture that is lost with language.

Labels: What survives?

Knowledge of the environment, flora and fauna, objects such as tools and obtaining food can be preserved without the language being preserved, apart perhaps from some residual vocabulary. This is especially true when people have access to their traditional country and can make trips to country and carry out semi-traditional practices such as hunting and gathering.

Labels: What survives?

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