Sociolinguistics
Interdisciplinary Perspectives

Edited by Xiaoming Jiang

SOCIOLINGUISTICS - INTERDISCIPLINARY PERSPECTIVES

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Meet the editor

Dr. Xiaoming Jiang obtained his BS degree in Psychology from the East China Normal University in 2005 and his PhD degree in Cognitive Neuroscience from Peking University in 2010. He has been a research fellow in the School of Communication Sciences and Disorders, McGill University, since 2013. His research utilizes experimental methodologies to uncover social aspects of human speech and language processes. While serving as reviewer for nearly 30 international journals, he has published 25 peer-reviewed articles as a leading author on high-impact journals including *Human Brain Mapping*: *Social, Cognitive and Affective Neuroscience*; *Cortex*: *Journal of Experimental Psychology: Human Perception and Performance*; *Neuropsychologia*; and *Speech Communication*. His research on speaker confidence and trustworthiness has been media-covered by the *Forbes* and the *New Scientist*.

Contents

Preface

This book provides a new interdisciplinary perspective on how the language use is shaped by and evolves with human society and how in turn social activities are constructed by the way how language is organized and communicated. Sociolinguistics conventionally covers a wide range of research themes that include dialectology/language variation and change, language choice/code switching/translanguaging, language maintenance and shift, language contact (pidgins, creoles, "new colonial languages"), language in education, language in politics and governance, language in interaction, multilingualism/bilingualism language policy, planning and management, sociolinguistics of minority/lesser-used languages, language and gender, critical sociolinguistics, and research in sociolinguistics.

With a contribution from multiple scientific disciplines, spanning from linguistics, sociology, psychology, computer science, health communication, to education, this book characterizes fundamental questions, represents wide applications, and introduces state-of-the-art approaches in the modern sociolinguistic research. Three unique questions are asked and addressed by eight independent chapters contributed by researchers from different fields.

The first three chapters contribute to the diversity and dynamics of the language use with perspectives from multilingualism, human development, and organizational change. Chapter 1 shows a simulation study on how evolutionary changes in an endangered language are affected by the mutation frequency of the idiolects. Chapter 2 draws important links between human biological (especially genetic and neural) and sociocultural constraints on language acquisition and summarizes intergenerational language change. Chapter 3 defines the interprofessional interactions in the changing organizations. These chapters shed light on socioconversational dynamics and diversity at different levels.

Three follow-up chapters give a selective overview on how sociolinguistic processes construct the change in language learning, policy planning, and health education. Chapter 4 provides an in-depth critical discourse analysis of archival document of one of the early British explorers to sub-Saharan Africa. The chapter advocates how embedding Standard English in learning serves an important endeavor for nonnative speakers to acquire English in a foreign-language speaking environment. Chapter 5 systematically reviews the relevant theoretical issues in the study of the language policy and planning. Chapter 6 focuses on the health communication discourse, highlighting the role of language use in the curriculum on the practice of the social work in public health nurses. These chapters undoubtedly characterize the power of applying sociolinguistic analysis to different social contexts.

Last but not the least, the final chapters characterize the latest advancement in experimental approaches to sociolinguistic studies on communicative and cognitive aspects of language use. Chapter 7 provides an empirical study on using online text comments to classify multi-

media (video) with machine learning classification. Chapter 8 provides a systematic review of psychological experiments on sociolinguistic processes, focusing on nonverbal and verbal cues in a cross-cultural and cross-linguistic communicative setting. The chapter highlights culture as an important factor to the decoding and encoding of verbal and nonverbal cues. These chapters open a new arena for the future investigations of cognitive and communicative mechanisms of sociolinguistic processes, highlighting the significance of combining empirical experiments with rigorous experimental design and smart large-scale data computing methodologies.

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Diversity and Dynamics of Language Use: Perspectives from Multilingualism, Human Development and Organizational Change

The Evolutionary Dynamics of the Mixe Language

Aida Huerta Barrientos

Additional information is available at the end of the chapter

Abstract

Mexico has been characterized by its great linguistic diversity concentrating 364 native linguistic variants from 11 native linguistic families. Unfortunately, the risk of disappearing of Mexican indigenous languages represents a problem for Mexican culture since they are precisely the medium through which cultural knowledge is transmitted. The risk of disappearing is reflected on a small number of native speakers and their geographical dispersion, the prevalence of adult speakers, and the tendency to abandon transmission strategies to youngest generations. The aim of this chapter is to analyze the impact of idiolect mutations on the evolutionary dynamics of the linguistic group Mixe in Camotlán, San Sebastian, Puxmetacán, Mazatlan, and Coatlán communities. First, we develop a conceptual model of the linguistic group Mixe as complex adaptive system, followed by the implementation of an agent-based simulation model in NetLogo, and finally, we analyze the evolutionary dynamics of the Mixe language, depending on the mutation rate of the idiolects. From the simulation analysis, we observe that when the mutation rate in idiolects is equal to zero, the Mixe language becomes homogenous. On the contrary, when the rate of mutations is equal to 100, a large number of language variants are generated and the risk of disappearing increases for Mixe language.

Keywords: Mixe language, modeling and simulation, complex systems, agent-based modeling

1. Introduction

At the global level, languages have been recognized by the UNESCO as instruments for the preservation and development of the tangible and intangible heritage of the world. All efforts focused on promoting the dissemination of native languages have not only emphasized linguistic diversity and multilingual-multicultural education but have also led to greater awareness of linguistic and cultural traditions throughout the world and have inspired solidarity with indigenous people, based on the understanding, tolerance, and dialogue [1].

It is widely accepted that linguistic diversity at global level is concentrated in nine countries, which have almost 3500 native languages. These countries are Papua, New Guinea, Indonesia, Nigeria, India, Cameron, Australia, Mexico, Zaire, and Brazil [2].

In 2008, the National Institute of Indigenous Languages (INALI) issued a document called Catalogue of National Indigenous Languages [3]. In this catalog, the INALI recognized that in Mexico, there are 68 native linguistic groups derived from 11 native language families, generating 364 native variants. The 11 native linguistic families recognized by the INALI are the following: Álgica, Uto-Aztecan, Yuman Cochimí-Seri, Oto-Mangue, Maya, Totonac-tepechua, Tarasca, Mixe-Zoque, Chontal, and Huave Oaxaca.

On the one hand, the Mexican Federal States of Oaxaca, Veracruz, Sonora, Michoacan, and Hidalgo have the concentration of the greatest number of native linguistic families (see **Figure 1**).

On the other hand, considering the criterion of historical settlements, the Federal States that concentrate the largest number of native linguistic groups are Chiapas and Oaxaca, followed by Campeche, Quintana Roo, and Veracruz.

From the linguistic perspective, native languages are determined mainly by human cognitive abilities such as the processes of perception, attention, learning, categorization, flowcharting, and memory [5]. Also, native languages are useful for sociocultural interactions of the villagers. In this direction, the capabilities of native languages depend on the role of speakers in socioeconomic, political, cultural, and environmental contexts. As Ref. [6] points out, native languages play a fundamental role in society and culture as they provide the central means through which cultural knowledge is transmitted.
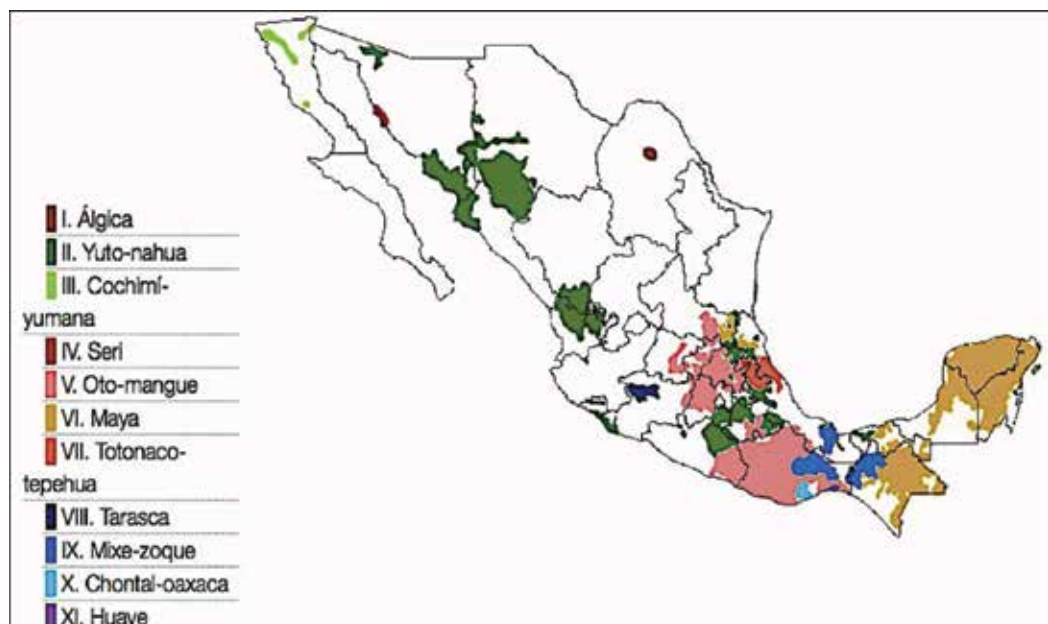

Figure 1. Geographical distribution of the eleven native linguistic families in Mexico based on Ref. [4].

From the systemic perspective, native languages can be conceptualized as complex systems with emergent properties that arise from the social interaction among their speakers [7]. The communicative interactions over time among native speakers and communities have produced changes in native languages such as coadaptation, reorganization, and development, which enable the communication process optimization among speakers, both at individual and community level. For instance, at individual level, native speakers are able to generate their own idiolect, from their experience with their environment/context. While at community level, the native language is considered and emergent property that arises from the complex dynamic interactions among idiolects of speakers [8].

The problem that currently native languages are facing in Mexico is the high risk of disappearing and substitution. The risk of disappearing is reflected, as reported by the INALI [9], by the small number of speakers, the geographical dispersion of native speakers, the prevalence of adult speakers, and the tendency to abandon transmission strategies of language to youngest generations. Additionally, due to the governmental policies on linguistic and cultural homogenization, native language´s speakers tend to adopt common languages, often as a result of migration processes [10]. As a consequence, speakers combine multiple meanings of other languages with their native language, resulting in the emergence of new and unpredictable linguistic properties. Based on data provided by the INALI [9], in Mexico 64 native linguistic variants present an extreme risk of disappearing; 43 have a high risk; 72 show a medium risk; and 185 present a nonimmediate risk.

Table 1 shows the risk of disappearing for the Mixe-Zoque linguistic family, formed by seven linguistic groups: Ayapaneco, Mixe, Oluteco, Popoluca de la Sierra, Sayula Popoluca, Texistepequeño, and Zoque. This chapter focuses on the study of Mixe linguistic group.

Due to its inherent complexity, emergent properties of Mixe linguistic group cannot be determined by traditional methods such as analytical models, but rather should be studied using simulation models, which in recent years has been recognized as an experimental tool in modern science. The aim of this chapter is to analyze the impact of idiolect mutations on the evolutionary dynamics of linguistic group Mixe in communities such as Camotlán,

Linguistic family	Linguistic group	Risk of disappearing
Mixe-Zoque	Ayapaneco	1
	Mixe	**4**
	Oluteco	1
	Popoluca de la Sierra	4
	Sayulteco	3
	Texistepequeño	1
	Zoque	4

1. Very high, 2. Act, 3. Medium, 4. Nonimmediate.

Table 1. Risk of disappearing of linguistic groups of Mixe-Zoque family [9].

San Sebastián, Puxmetacán, and Coatlán geographically located in Oaxaca, Mexico. We believe that a better understanding on the evolutionary dynamics of linguistic groups through agent-based simulation models can provide the main guidelines for establishing effective public policies to reduce the risk of disappearing native languages in Mexico.

This chapter is divided into five main sections. First, a conceptual model of Mixe linguistic group as a complex adaptive system is developed. Second, an agent-based simulation model is implemented using NetLogo software. Third, the evolutionary dynamics of Mixe linguistic group is analyzed as function of the mutation rate of native speaker´s idiolects. Finally, the concluding remarks are drawn.

2. Mixe language as a complex adaptive system

The concept of complex adaptive systems (CAS) was first introduced by Walter Buckley in 1967 and refers to systems that are composed by multiple interrelated fundamental elements interacting in a nonlinear way whose structure is based on hierarchical levels. The interrelated elements are complex in nature and are characterized by significant internal properties that are highlighted as being part of a total system [11]. In the study of CAS, it is interesting to know their emergent properties that arise at a higher structural level as a result of interactions among elements at a lower structural level. It is also of interest to know the fitness landscape that depends on the state variables of CAS, which change over time.

To carry out the study of emergent properties, the synthetic microanalysis and simulation are mainly used. Through the development of simulation models, it is possible to understand the evolution of CAS. In this section, the conceptual model of the linguistic group Mixe is developed based on CAS approach. In Section 2, the agent-based simulation model is implemented using NetLogo software.

2.1. Modeling Mixe language as a complex adaptive system

Mixe area is geographically located in Oaxaca, Mexico, and politically constituted by 19 municipalities and 106 Mixe agencies [12]. Mixe agencies are grouped in three geographical zones: the uptown, the middle, and the lower (see **Figure 2**).

In this chapter, we study two agencies located on the middle zone, Camotlán and San Sebastián, and three agencies located on the lower zone, Puxmetacán, Mazatlan, and Coatlán.

Based on the systemic composition from the synthetic microanalysis suggested by Auyang [13], the Mixe linguistic group is conceptualized as a CAS, presenting the following characteristics:

- Multiple key components—Native speakers of Mixe language, near to 100,000 [12], have oral tradition that emerges from the sociocultural interactions among the natives.

- Different structural levels—At microlevel, Mixe language is constituted by idiolects of individual native speakers, whereas at macrolevel, Mixe language is constituted by the communal language. In the case of Camotlán, San Sebastián, Puxmetacán, Mazatlan, and

Coatlán agencies, the evolution of Mixe language is observed at macrolevel. It is a result of micromechanisms that govern sociocultural interactions among natives. In this direction, Mixe language is spoken in different ways from one agency to other, creating new language variants. Additionally, in agencies adults prefer Mixe language to communicate [12].

- Intrinsic diversity among its key components—Individual idiolects are products of the exposure of speakers to Mixe language [14] and the experiences within a socioeconomic, cultural, and environmental context. Over the last 450 years, Mixe people have developed a struggle of resistance and defence of their freedom and autonomy to decide themselves about their territory, the natural resources, economy, religion, and cultural organization [12].

- Functional dynamics—Mixe language is an open system that exchanges information with the complex environment that surrounds it. In order to survive, it is necessary that Mixe language adapt itself to new environmental conditions, adjusting its functional units through modification and selections of cultural memes.

- The impact of the social structure—Linguistic interactions among natives of Mixe agencies are not random but rather are limited by social networks, both internally and externally. As Ref. [15] explains, the social structure and sociocultural interactions among speakers have a crucial affect on the process of language evolution. In the case of Mixe agencies, the social structure is based on communities and the principal of them is the family. Thus, Mixe communities are large families composed by smaller families. It is important to note that the communal authority supports the power all times in the general assembly and is constituted by elderly people [12].
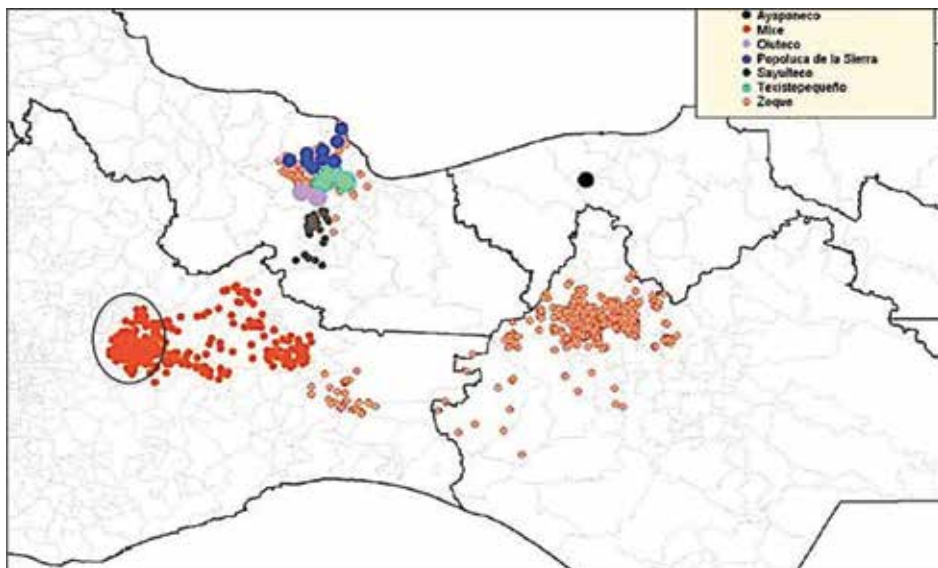

Figure 2. Geographical location of communities whose native linguistic groups belong to the native linguistic family Mixe-Zoque.

2.2. The evolution process of Mixe language

As Ref. [16] notes, the evolution of a language is part of the evolution of interactions among speakers and their communities. Based on Darwin evolution theory, the evolutionary dynamic of Mixe language can be explained by means of two main processes: replication and selection.

On the one hand, the replication process generates descent idiolects with modification. The language dynamic in this case can be understood as a change in the language due to replication of idiolects. In case of cultural transmission, the replication process includes changes in language [17]. As Ref. [18] explains, changes in languages are given from cultural memes such as thoughts, ideas, and ideologies that are learned and passed from person to person. Thus, during cultural changes, people are the transmitters of such changes [19].

On the other hand, speakers are engaged in a sociocultural context based on both the message to be transmitted and the social structure of their own community. Thus, speakers of Mixe language make a selection of those linguistic variants replicated. From the evolutionary point of view, the new variants of Mixe language that achieve a high replication frequency spread across communities, creating new variants. In the next section, an agent-based simulation model is implemented considering the conceptual model of Mixe language as a CAS to analyze the conditions under which new language variants emerge.

3. An agent-based simulation model of Mixe language

The goal of an agent-based modeling and simulation is to create computational agents that interact intelligently with their artificial environment. According to Ref. [20], computational agents are typically characterized as follows:

- Autonomy—Agents have direct control of their own actions and internal state.

- Social skill—Agents interact with other agents through a computer language.

- Reaction—Agents are able to perceive the complex environment and respond to it. The environment can be physical, virtual or simulated, and include other agents.

- Proactivity—Because agents react to complex environments, they must take goal-oriented initiatives.

Agents also have a degree of intentionality, thus the environment must be interpreted in terms of a metaphorical vocabulary of beliefs, desires, motives, and emotions, which are applied more in the description of people. Some of the attributes of interest in the modeling of agents are, for instance, knowledge and beliefs, inferences, social models, goals, planning, language, and emotions.

A typical agent-based simulation model contains the following four elements [21]:

- Agents, their attributes, and the complex environment.

- Relationships among agents and the interaction methods.

- A network for connectivity that defines how and with whom agents interact.

- Agents live and interact with their own environment and with other agents.

The software used to program agents has its origins in the areas of artificial intelligence, in the subfield of distributed artificial agents [22, 23], whose aims of study are the properties of agents and the networks of interactions. Although there is a great variety of software for implementing agent-based simulation models, NetLogo™ is the most preferred by modelers [24]. NetLogo™ simulation software is widely used by the simulation model developer community. It is an open programming language that considers a baseline grid. Agents are represented by squares, and the state of each agent is updated depending on the state of its neighbors when there are interactions among them. The interesting thing about agent-based simulation modeling using NetLogo™ is that it is possible to observe the patterns which emerge from the interactions among agents without the existence of a centralize control.

3.1. An agent-based simulation model of Mixe language

At individual level, it is assumed that native speakers of Mixe language are able to generate their idiolects from their own experience within a sociocultural context. In this case, Mixe speakers with their own idiolects are modeled as agents, whereas at community level, Mixe language is considered a communal emergent property that arise from the complex dynamic interactions among idiolects of native speakers, as suggested by Baicchi [8]. The interface of the agent-based simulation model using NetLogo™ consists of simulation parameter´s controls and a grid of 35 × 35 squares. Each square represents virtually an agent with its own idiolect that is randomly assigned at the beginning of the simulation model execution. The minimum number of idiolects assigned at the beginning is 255. Each idiolect is characterized by the following parameters: number of attributes, the mutation rate, the influence factor, and the threshold of intelligibility. Indeed, in the latter case, it is considered a linguistic property through which two different idiolects can understand each other without having studied or learned previously the other. We also assumed that agents interact a defined number of times within a geographical delimited area.

4. Analyzing the evolutionary dynamic of Mixe language

We designed two simulation scenarios on which the simulation parameter´s values are varied (see **Table 2**) to analyze the evolutionary dynamic of Mixe language as a function of the mutation rate of idiolects in communities such as Camotlán, San Sebastián, Puxmetacán Mazatlan, and Coatlán. The simulation time was fixed to 50 discrete steps.

Table 3 shows the results of a field study reported by Wurn et al. [25] about the values for linguistic intelligibility of Mixe languages in Camotlán, San Sebastian, Puxmetacán, Mazatlan, and Coatlán.

4.1. Analysis of the evolutionary dynamics of Mixe language in Camotlán

Figure 3(a) illustrates the simulation results for scenario 1. The simulation model initially considers about 255 diverse idiolects assigned randomly among the agents. As agents start to

interact socially with other agents considering a mutation rate equal to zero, the number of idiolects decreases until the prevalence of a few. As seen in **Figure 3(b)**, simulation scenario 2, the simulation model initially considers around 330 diverse idiolects assigned randomly

Parameter values	Scenario 1	Scenario 2
Number of interactions	6	6
Mutation rate	0%	100%
Maximum distance among speakers	3	3
Threshold of influence factor	50%	50%
Number of speakers or agents	1225	1225

Table 2. Parameter values and simulation scenarios.

Mixe community	Linguistic intelligibility value
Camotlán	96
San Sebastián	94
Puxmetacán	86
Mazatlán	90
Coatlán	100

Table 3. Values of linguistic intelligibility in Mixe communities.

Figure 3. Evolutionary dynamics of Mixe language in Camotlán, (a) mutation rate equal to 0%, (b) mutation rate equal to 100%.

among the agents. As agents start to interact socially considering a mutation rate equal to 100, the number of idiolects decreases slowly and remains oscillating around 170.

4.2. Analysis of the evolutionary dynamics of Mixe language in San Sebastián

Figure 4(a) illustrates the results of simulation scenario 1 for San Sebastian community. The simulation model initially considered about 300 different idiolects. As agents start to interact socially with a mutation rate in their idiolects equal to zero, the number of idiolects decreases rapidly. As seen in **Figure 4(b)**, the case of simulation scenario 2, the simulation model initially considered around 330 different idiolects. As agents start to interact socially with a mutation rate in their idiolects equal to 100, the number of idiolects decreases slowly and remains oscillating around 180, reaching peaks at values of 300.

4.3. Analysis of the evolutionary dynamics of Mixe language in Puxmetacán

Figure 5(a) illustrates the results of simulation scenario 1 for Puxmetacán community. The simulation model initially considered about 300 different idiolects. As agents start to interact socially with a mutation rate in their idiolects equal to zero, the number of idiolects decreases rapidly. After twenty steps in the simulation model very few idiolects remain. As seen in **Figure 5(b)**, the case of simulation scenario 2, the simulation model initially considered around 300 different idiolects. As agents start to interact socially with a mutation rate in their idiolects equal to 100, the number of idiolects decreases slowly and remains oscillating around 210, reaching peaks at values of 260.

Figure 4. Evolutionary dynamic of Mixe language in San Sebastián, (a) mutation rate equal to 0%, (b) mutation rate equal to 100%.

4.4. Analysis of the evolutionary dynamics of Mixe language in Mazatlan

Figure 6(a) illustrates the results of simulation scenario 1 for Mazatlan community. The simulation model initially considered about 300 different idiolects. As agents start to interact socially with a mutation rate in their idiolects zero, the number of idiolects decreases rapidly.

Figure 5. Evolutionary dynamic of Mixe language in Puxmetacán, (a) mutation rate equal to 0%, (b) mutation rate equal to 100%.

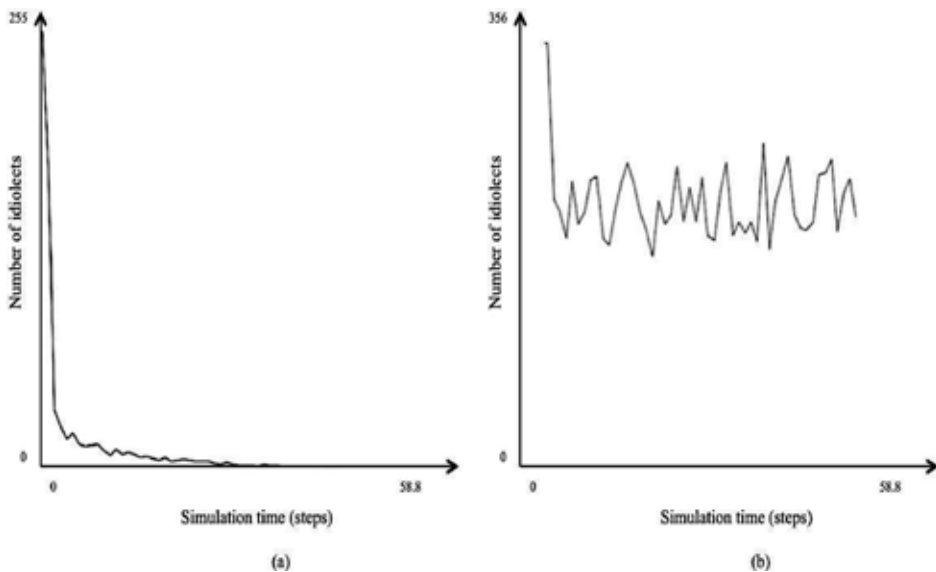**Figure 6.** Evolutionary dynamic of Mixe language in Mazatlan, (a) mutation rate equal to 0%, (b) mutation rate equal to 100%.

After fifteen simulation steps, a few idiolects survive. As seen in **Figure 6(b)**, the case of simulation scenario 2, the simulation model initially considered around 260 different idiolects. As agents start to interact socially with a mutation rate in their idiolects equal to 100, the number of idiolects decreases slowly and remains oscillating around 170, reaching peaks at values of 260.

4.5. Analysis of the evolutionary dynamics of Mixe language in Coatlán

Figure 7(a) illustrates the results of simulation scenario 1 for Coatlán community. The simulation model initially considered about 300 different idiolects. As agents start to interact socially with a mutation rate in their idiolects zero, the number of idiolects decreases rapidly. As seen in **Figure 7(b)**, the case of simulation scenario 2, the simulation model initially considered around 300 different idiolects. As agents start to interact socially with a mutation rate in their idiolects equal to 100, the number of idiolects decreases slowly and remains oscillating around 200, reaching peaks at values of 250.

5. Concluding remarks

From the simulation model results, we observed that when the mutation rate in idiolects is equal to zero, through the interactions among speakers, the language becomes homogeneous, that means a very small number of idiolects survive so the Mixe native language remains with minimal linguistic variations. On the contrary, when the rate of mutation in the idiolects of speakers is equal to 100, a large number of idiolects remain active. In consequence, a large

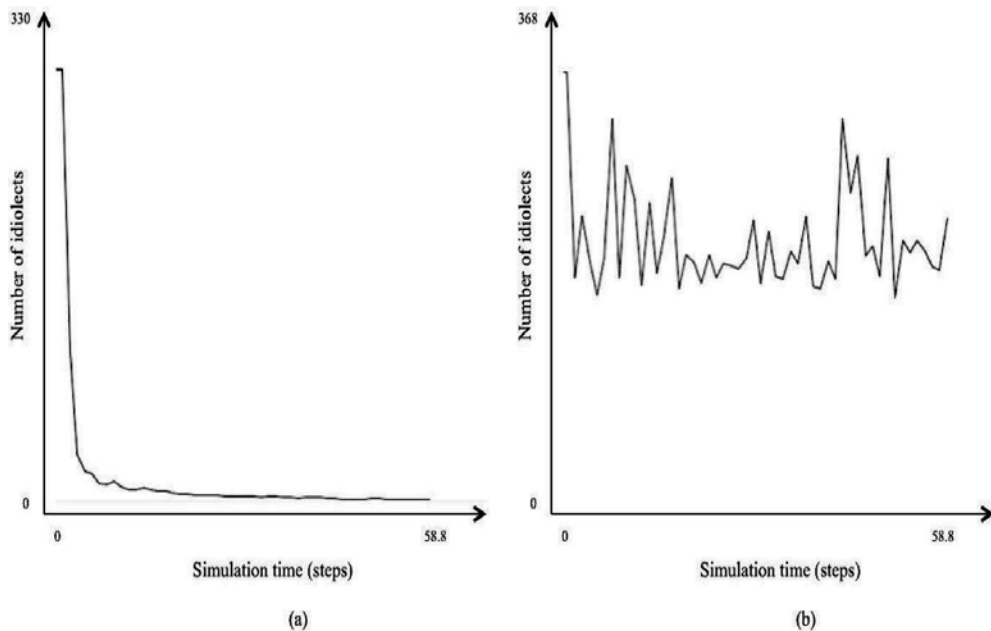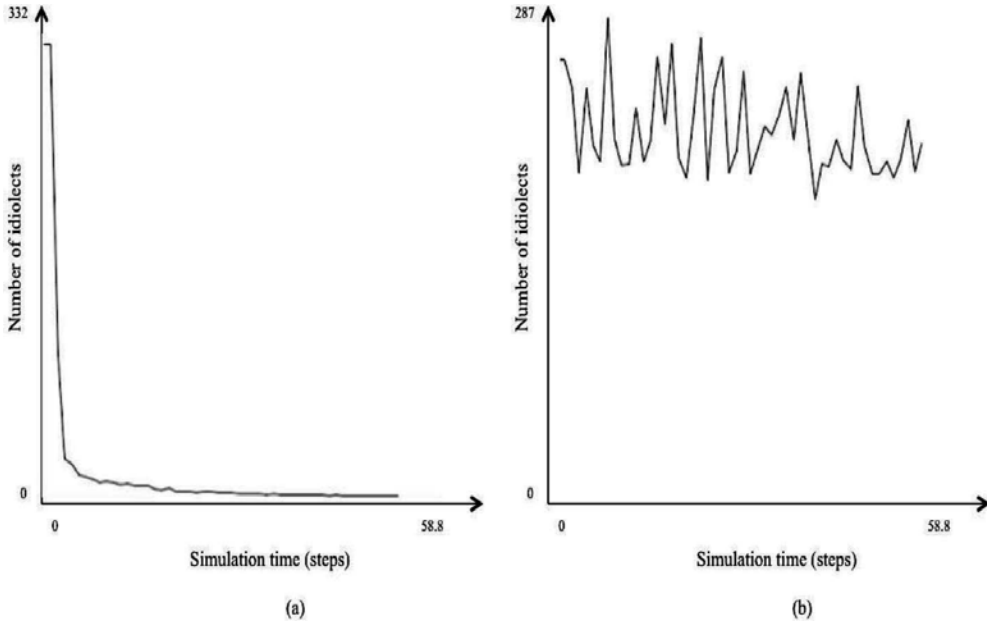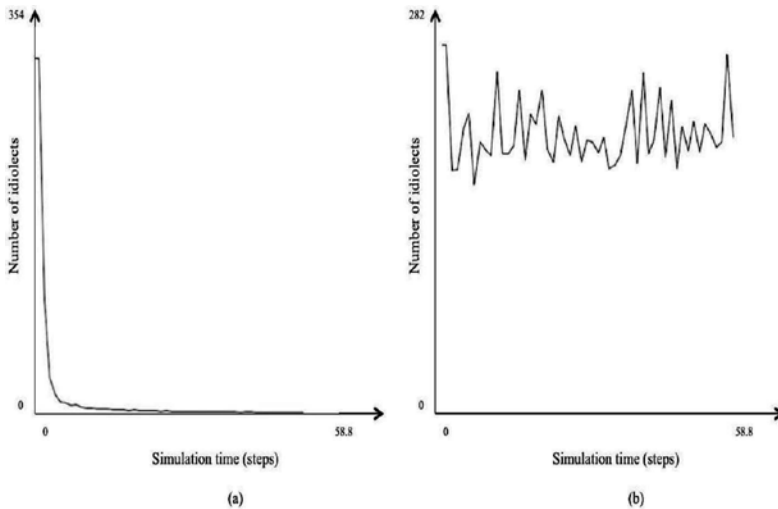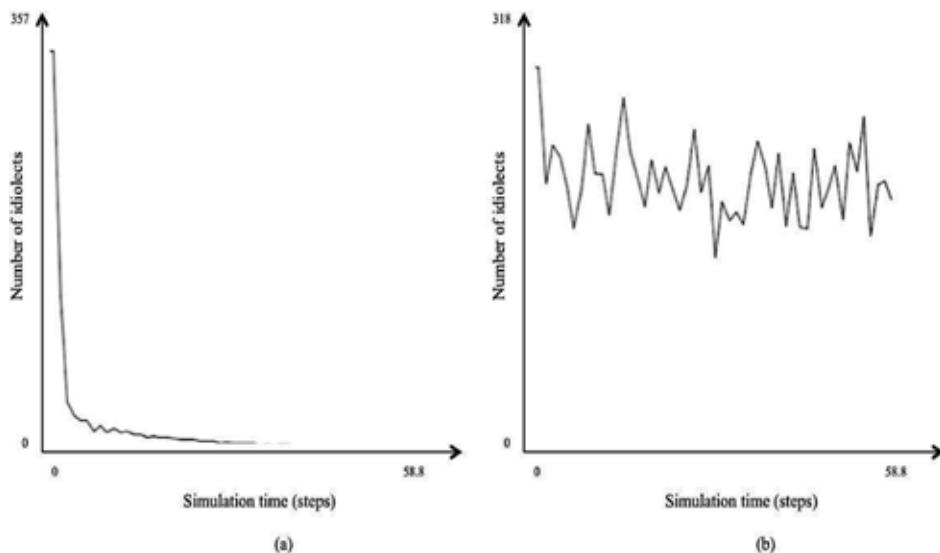**Figure 7.** Evolutionary dynamic of Mixe language in Coatlán, (a) mutation rate equal to 0%, (b) mutation rate equal to 100%.

number of language variants are generated and the risk of disappearing for the Mixe language increases. The simulation results in both cases are independently of the initial number of idiolects that are randomly assigned to speakers at the beginning of the simulation execution. That means, in the case of mutation rate equal to zero, the number of idiolects decreases fast and tends to be zero in a minimum time, while in the case of mutation rate equal to 100, the number of idiolects decreases slowly and remains oscillating along a certain number, but it never tends to be zero. A similar situation is observed in the case of the variation in the next three simulation parameters: the number of interactions among agents, the number, and the distance of speakers. To lower/higher value of these parameters at a mutation rate equal to zero, correspond to a low decrease in the number of idiolects, but along time the number of idiolects tend to be zero. While to lower/higher value of interactions, number and the distance of speakers at a mutation rate equal to 100 correspond a large number of idiolects that remain active whose value oscillates but never decreases to zero. In conclusion, the influence of simulation parameters such as the number of interactions, the number, and the distance of speakers on the evolutionary dynamics of Mixe language is just in terms of time. The importance of native languages in Mexico is based on the fundamental role they play in the society and culture, as they provide the central means through which cultural knowledge is transmitted. Therefore, the public policies of revitalization of native languages such as Mixe should be focused primarily on increasing the number of speakers through effective strategies for the transmission to youngest generations, and second, in improving living conditions of native speakers in their own territories in order to reduce the rate of migration which encourages to speakers for the adoption of common languages generating language variants through the combination of multiple meanings of other languages with Mixe.

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Language Evolution, Acquisition, Adaptation and Change

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Abstract

In the twenty-first century, there are between 6000 and 8000 different languages spoken in the world, all of which are in a continuous state of evolving, by inter-mixing or stagnating, growing or contracting. This occurs through changes in the population size of the people who use them, the frequency and form of their use in different media, through migration and through inter-mixing with other languages. As Stadler et al. argue, human languages are a 'culturally evolving trait' and when it occurs language change is both sporadic and robust (faithfully replicated) and the main established variants are replaced by new variants. Only about 200 of these disparate languages are in written as well as spoken form, and most, except the popular ones like Mandarin, Spanish, English, Hindi, Arabic, Portuguese, Bengali, and Russian, are in decline of use. But how did language itself evolve and come to be the most important innate tool possessed by people? The complex issue of language evolution continues to perplex because of its associations with culture, social behaviour and the development of the human mind.

Keywords: language evolution, language shift, cognitive adaptation

1. Introduction

There are several opinions as to the origin of human language [1, 2]. These include that language originated in a gesture basis, in primitive vocalisations, or in song; but most probably, a combination of all three contributed to human language development over approximately the last 200,000 years. Language, as much as technology, is the pinnacle of human evolutionary achievement—culture and society would not be possible without language. How is it that novice language learners can acquire a complex knowledge of language without necessarily knowing the grammatical rules and cognitive processes that lie behind it? As Fedurek

and Slocome suggest 'Linguists have been intrigued by this counter-intuitive gap, known as Plato's problem, between the quality and quantity of available linguistic data and the complexity of linguistic knowledge from which such inputs are created' [3]. The nature or nurture debate is perhaps simplistic, but it nevertheless represents in language evolution the convergence of biology with culture. As Jakobson suggested, the question is whether 'the isomorphism of these two different genetic and verbal codes can be explained by a simple convergence stemming from a similarity of needs, or whether the foundations of the manifest linguistic structures, intimately based on molecular communication, are not directly patterned on the structural properties of the latter' [4]. Approaches to language acquisition and use have taken one of four paths: first, language structure and how structure is informed by human biology and physiology; second, the ability to acquire language among human and possibly some animal species; third, the functional conditions of language; and fourth, the history of the evolution of language [5].

In contemporary times, most theoreticians agree that language has arisen because of the interaction of three complex adaptive systems: biological evolution, human learning and through the acquisition and sustainment of human culture [6]. However, biological evolution imposes physiological constraints, as does the human environment. Thus, conversely, it may be a poverty of stimulus, which creates the need for a linguistic structure and a genetic and cultural substrate to linguistic development. Humans are physiologically adaptable and intelligent and can fashion their environments after their own conscious thought. Of human capabilities, language is one of the most complex phenomenon and its multi-valency and ubiquity make it a distinctive property of human culture. As Fedurek and Slocome put it: 'Language enables humans to represent and communicate complex abstract information, and it occurs in verbal, gestural and written forms' [7]. Language is also inherently combinatorial, with syntax (sentence structure) leading to semantics (sentence meaning).

2. The social conditions of language

In order to explain language acquisition, the eminent linguist Noam Chomsky proposed that there is a sophisticated genetically encoded propensity for humans to acquire language, which comprises a Universal Grammar (UG) that undergirds language use, and a language acquisition device (LAD) that guides linguistic competence from observed and learned 'social' data [8]. Thus, although there is a physiological substrate for language propensity, the information of language is also located in the wider 'semiosphere' negotiated between people and their environment and other people. Language is a shared mental as well as physical (sound and kinetic) construct. It is as if it is a property distributed across communication networks among individual and groups of people, communities and cities. As Starte states, 'there is no absolute distinction between the evolution of media, language, or that of the human species' [9]. We cannot conceive of human society without forms of communication and language. It is also often said that 'language does not fossilise', by which is meant that language is ephemeral, and linguistic markers are by and large mental constructs that do not indexically substrate in the ecosystem.

The first forms of recorded expression are thought to be those that co-evolved with techno-logical innovation and took place some 20,000–30,000 years ago. Starte also states that there was a progression from logographic and phonetic writing to forms of syllabic and alphabetic writing [10]. What makes language special is that, although the vocabularies of most language users are limited to 50,000 words or so, those vocabularies are nevertheless constructed in a way that allows for unbounded transmission of messages which, when undergirded by a universal grammar, can result in a high fidelity of communication between language users.

From a bio-linguistic perspective, Berwick and Chomsky argue that:

> we can think of language as, in essence, an 'organ of the body', more or less on a par with visual or digestive or immune systems … it is a cognitive organ, like the systems of planning, interpretation, reflection… We can think of language as a mental organ, where the term 'men-tal' simply refers to certain aspects of the world, to be studied in the same way as chemical, optical, electrical and other aspects [11].

The use of language is predicated in humans on the expression of the FOXP2 and CNTNAP2 genes and the population frequency of two brain growth and development genes, ASPM and Microcephalin [12], but the array of possibilities for language use is limited only by cognitive complexity. However, fortunately the human brain at approximately 1350 cc has evolved just for the management of such complexity, and in the human brain, the temporal lobe is 23% larger than other brain regions and four times larger than that of our closest mammalian relatives, chimpanzees [13]. Linguists and cognitive neuroscientists have also determined which regions of the human brain are involved in which parts of speech with some degree of precision. For example, the understanding of proper nouns is thought to occur in the anterior and medial areas of the temporal lobe, and that of common nouns on the lateral and inferior temporal lobes [14].

Thus, language is enabled and constrained by human biology and physiology. The levels of human physiology that enable language stem from the brain and reach to the organs involved in the production of human speech, as well as those for the processing of the speech of others. At a higher level in language semantics than the functional structural underpinning of uni-versal grammar is the language lexicon, which may vary in arbitrary ways from language to language, allowing language history to be traced by shared lexical commonalities. Language can thus be thought of as a complex adaptive system that comprises a series of interacting agents, each of which responds to local conditions following simple rules [15]. As such, lan-guage allows people to divide the external world in a myriad of ways and to create artificial worlds, such that it is nearly impossible to imagine a social system comprising human beings that is not ordered by language [16].

While many species on the planet communicate, the cognitive possibilities that spoken and written language affords are thought to be distinctively human. It is unlikely that non-human animals or indeed any other species has syntactical grammar rules as complex as humans. As Fedurek and Slocome put it: 'humans can convey an infinite amount of messages using a limited number of words because of the powerful system of grammatical rules that govern the structure and form of language, including the ordering of words into meaningful sentences' [17]. The anthropologist Leach argues that the transmission of culture, in the sense of pat-terns of learned behaviour, from generation to generation by learning instead of by genetics,

is a characteristic of many other species: 'bees and ants have extremely elaborate, highly organized social systems which appear to get along without any concept-forming medium of communication which is even remotely similar to that of human language' [16]. Thus, it is clear that non-human languages exist, and that language itself is necessary but not sufficient property of human culture or indeed of animal culture.

3. How language is informed by biology and physiology?

Hauser et al. argue that language as a biological faculty may be divided in 'Faculty of Language in a Broad Sense' (FLB) and 'Faculty of Language in a Narrow Sense' (FLN) [18]: the former may be analogous to animal communication and include aspects of language faculty (includes the perceptual-articulatory apparatus); and the latter may be analogous to the human language faculty (and includes the conceptual and intentional apparatus). Kirby [5] and Corballis also assert that recursion is a defining property of human language. Recursion is defined as a procedure in which one of the steps involves invoking the procedure itself, such as that involved in nesting syntax meanings within sentences [19]. However, others hold a view that a reliance on recursion as the main feature of human linguistic difference may oversimplify syntactical aspects of human language, in which communicating prop-ositional structures is an adaptation consisting of many different interacting sub-systems within human consciousness and physiology. Thus, if there are common features between FLB sense and FLN, then the process of complex language use involving recursion, inten-tionality, empathy and meta-representation is a gradual one involving intermediate stages that also have evolutionary correlates and limitations. After all, the most distinctive prop-erty of language is that it is generative, allowing parts of language syntax to be recombined to make other language structures, which involves the 'embedding and concatenation of phrases' [20]. Consequently, is language use, like evolutionary behaviour, a process of con-stant adaptation? Is there a plausible evolutionary trajectory from protolanguage to ways of communicating that have yet to be imagined?

As Richardson and Boyd suggest, the division of labour between genes and culture is a co-evolu-tionary process [21]. The Baldwin effect argues that language adaptation occurring within an individual's lifetime may affect linguistic competence: in other words, if language use and linguistic competency give an advantage, a trait change within an organism's lifetime as a part of cultural evolution can be assimilated into the epigenetic repertoire. As Richardson and Boyd explain, 'so long as a higher capacity cultural communication system was favoured, cognitive modifications to more efficiently acquire explicitly linguistic features like symbolic words and grammar would be favoured as the system passed some threshold of complexity' [22]. Thus, it is possible that a Baldwinian effect can lead to random selection for linguistic competencies if they provide an adaptive advantage. In one sense, then, biology and social evolution act as a fixed-point attractor for human linguistic competency [23]. However, as Yamauchi and Hashimoto point out, it is possible that a strong assimilatory process might be available within 10–20 generations with a selective environment that is dynamically niche-constructed, but a functional redundancy may result on the genetic information of the learned

trait [24]. It is possible that the redundant genetic information becomes degraded while no effect is observed on a linguistic level. For example, the gene for birdsong results in natural selection of related adaptive physiological changes such that a functional redundancy occurs without externally motivated environment changes [25]. Arguably, the exciting things about language use and birdsong might happen in just a cycle of gene recession as other genetic factors are selected. For example, syntactic recursion may facilitate more complex language use that results in a gradual redundancy of selection but an increase in a selection of genes for other language features such as intentionality, with corresponding physiological adaptation in the neural networks.

If language is a form of cultural evolution, it is useful to look at the relationship between its historical progression and changes in human evolutionary physiology. Whilst some observations have been made (such as the descended larynx that enables human speech), it is difficult to isolate any one physiological feature in cognate language use (red deer and lions, for example, also have a descended larynx). More probably, language production is enabled because of the interaction of a number of different musculo-skeletal and neural features of human physiology, some of which are shared by other species. Thus, language could evolve from a rudimentary set of culturally transmitted signals, impoverished vocalisations or manual gestures to symbolic words and grammar via selective genetic adaptation, given the relative social utility of such communication. However, people are the product of their genes, gene expression and also the environment—all three are involved in the evolutionary process. Cultural evolution leads to the adaptation of a universal grammar. We can ask then the fundamental questions: What is the reason for linguistic diversity? What is the rate of linguistic evolutionary change? How quickly do languages adapt? What is the approximate rate of language change? If these questions we can then begin to understand not only how 'fixed' cultural meaning are temporally mutable and may change in time, and also how soon current linguistics constructs may become less intelligible to our 'future selves'.

Richardson and Boyd suggest that linguistic diversity arises not just because of 'cultural containment' by ethnicity or geography, but also for the sociological reason that it limits communication between people who cannot freely trust one another or in which truthful communications lead to maladaptive behaviours [21]. However, this is increasingly tested by conditions of globalisation, in which it could be argued that technology precedes the use of language frequency and adoption of new linguistic constructs. In this way, humans are also different from some other animal species in depending on social transmission for adaptive behaviours.

There is a three-cycle process of language change [26]. Main determinants are learning (ontogeny), learning produces cultural evolution, (glossogeny) take place with much slower biological evolution and development of phenotype (phylogeny). There are many more changes from language change (ontogeny) and learning at cultural level before physical genetic adaptation and change to phenotype (phylogeny). So both innate endowment and cultural evolution (development of memes, forms of cultural encoding such as library holdings, the development of the lexicon and public memory, etc.) effect language change. Occurs through millennia and through changes at the individual level, the wider cultural level of the (lexicon), and

biologically to the species. But ultimately genes encode the linguistic ability of people within the society, although language changes the fitness of the landscape for cultural formations.

4. Language adaptation

Intentional agency enters into most human communications. Because of the innate complexity of language, individuals may not have enough in common to facilitate open and honest communication all the time. Furthermore, individuals and societies are competitive and consequently many people have mixed motives in communication, including self-interest. If not all communication, speech and language is trustworthy, then some features of language may not have a selected advantage for evolution, depending on the cognitive and social cost of information exchange. This leads to the two features of human language use. Firstly, language variation may be adaptive; and secondly, because combinatory communications systems have rules of interpretation, they may be vulnerable to both misunderstanding 'noise' and also to 'deception'. Thus, it requires concerted forms of co-operation to enable language evolution. Nevertheless, language diversity may not have a basis in issues of trust. Presumably niche-adaptation is the most likely cause of such diversity, not deviant inventiveness. However, human biological complexity and conscious cognition in language occur on related but different levels of affect.

Coeval with language use, people have the ability to represent different referential locations of time and space through symbolic communication. While the basis of that ability might lie in gene acquisition and physiological capability, the sociality of language is largely separate from biological substrates. Hence, we can imagine that language use evolves in an individual's lifetime through acquisition of different linguistic competencies: for example, grammar and lexicon (tens of years). This stage is known as ontogeny, possibly leading to genetic adaptation through the Baldwin effect. However, languages evolve over hundreds of years (think, for example, of the differences between Chaucer, Shakespeare and the modern novel). This stage is known as glossogeny. The ability of species to engage with language abilities (such as a universal grammar) is acquired over thousands of years. That is known as phylogeny. MacWhinney adds an epigenetic stage (a combination of environmental and genetic interactions), a developmental (ontogenetic) stage, a processing time-frame, a social emergence time-frame and a diachronic (glossogentic) period of language change [27].

However, as Dediu suggests, 'it is becoming increasingly clear that not only are the pathways connecting genes to phenotypes non-linear and difficult to map, and that gene-gene and gene-environment interactions are the norm in the development of most phenotypic aspects, but also that there is no clear-cut difference between 'genetic' and 'environmental', that 'development' is not a discrete, encapsulated, and teleological phase in the life cycle of an organism, and that 'genes' are essential to all processes at all times' [12]. It is difficult to tell from evolutionary archaeology exactly how changes in human phylogeny resulted in the genetic selection for complex language ability amongst humans. Fitch suggests that it occurred somewhere between 200,000 years ago and the present day [28]. In most people, the control of language is co-ordinated by the left brain hemisphere—the regions of the brain which activate and integrate motor

control of the lips, tongue and vocal cords. It is the claim of many linguists that human beings are born with a knowledge of linguistic structure and the ability to acquire language (known as a Universal Grammar), which is encoded in the genome at least in part by the FOXP2 gene, which is linked to the linguistic features of the brain found in Broca's and Wernicke's areas and the pre-frontal cortex. The proponents of Universal Grammar (UG) argue that people are born with linguistic competency which has a genetic substrate. Thus, relatively small changes at the phenotypic level can lead to quite large cognitive and behavioural changes. Comparison with other animal species reveals that some animals (such as dolphins and parrots) have quite sophisticated imitative skills, which may imply a form of language-related empathy; similarly, animals may have 'functionally referential' alarm calls capable of bearing external referents. Apes are also capable of audience effects that can bear 'conspecific' information. However, as Fitch suggests, many such calls are not intentionally referential and might not shape calling in ways relevant to the listener's knowledge [29]. This does not necessarily imply that animals cannot individuate at a mental level in their communication, but rather they may not have theories of mind that are capable of attributing more than physiological awareness of others. Thus many animals lack an ability to 'shape' their communication in ways that humans do.

For Biological evolution, a canonical interactor is an organism as it interacts with environment, the ecosystem and fellow organisms, in such a way as it causes differential replication [30]. Either organism survives and reproduces or does not survive or reproduce. If it does reproduce, then its genes are differentially replicated. Similarly, in the process of language change, a speaker is interactor, who interacts with environment by virtue of speech and or written communication and whom causes some replication of linguistic variants and not others, resulting language constancy and/or a change [30]. There is (despite the conscious effort and motivation of a speaker and writer) a degree of randomness in replication process and random fluctuations in replicator frequencies. If a fluctuation is greater than zero, replication can take place and if the fluctuation happens to zero, then the replicator extinguished. The process of genetic drift is so termed because that change takes place in population simply due to random processes, and no selection takes place [31].

According to the argument of language evolution as a gradual adaption in human society from genetic assimilation and culturalization, the underlying genetic substrate of language enables a Universal Grammar, which is a set of grammatical principles that applies across all human languages. This goes some way to explaining language diversity—each society develops its own adaptation to a different linguistic environment that fits its locality and social identity. However, language might be shaped by physiological limitations that are not entirely dedicated to language. These include perceptuo-motor factors, including physiological features that account for the seriality of vocal structures, and perceptual systems that store sensory information (involving the retina, primary visual cortex, occipital lobe, the dorsal stream and the ventral stream; the vocal tract affected by the tongue, whose muscles are controlled by the hypoglossal nucleus and nucleus ambiguous); and lower jaw (controlled by the trigeminal nucleus; and lips controlled by the facial motor nucleus). Second, language might be shaped by cognitive limitations on learning and processing, including memory, and from structures of mental representation and reasoning (involving the cerebellum, lateral hemispheres, Broca's and Wernicke's areas, the *arcuate fasciculus*, and pre-frontal cortex) [32].

In order to describe the two inter-related issues of language development, Chater and Christiansen have specified the terms 'N-induction' and 'C-induction'. 'N-induction' describes the language challenge of understanding and manipulating representations and relationships in the natural world, and 'C-induction' describes how people acquire ability to converse and co-ordinate with each other. They make the point that in N-induction, the world imposes an external standard, but in C-induction the standard is social. The difference is that in the latter language conditions people to do the same thing but not necessarily the objectively true thing. While both conditions are predicated on learning, the second does not rely only on the correspondence theory of truth but also on 'relational' or performativity aspects of language. Chater and Christiansen make the point that language is mostly acquired by C-induction, given that there is no human-independent true language which people learn [33]. Rather, they learn the language of their developmental environment (although second-language learners may have more than one such environment).

Thus in the languages adaptionists' model, language is guided by genetic inheritance and the growth of cognitive structures (phylogeny), which are shaped by the environment as the learner acquires the language of their caregivers and culture, allowing for language evolution at the level of glossogeny. Such language acquisition contributes to the reproductive potential of the individual. At the level of individual and group language use, language may be seen as a mapping device between meanings and signals. In this way, languages may be composed with a shared signal structure, or be seen as being holistic, whereby such structure may or may not be implicated in a shared meaning space [34].

5. Language change

As Kuun points out, acculturation can be a social mechanism that acts as a catalyst for new identities and for language change [35]. When people are speaking the same language they do not necessarily share the same identity. The constructivist approach argues that ethnic identity can change constantly and that everyone identity is subject to change through language [36]. Language can act as a mediator of personal and social identity and where one language is used, multiple identities and second languages may provide a background lexicon to it. Identity is created from language to adapt to different situations. As Kuun argues, language shift process can be influenced by a variety of factors including: immigration, the value of a language and the status of a language for a given community, and also language shift may be determined by the education opportunities of the next generation [37]. Language shift may also be affected by opportunities to speak the same language, the influence of media on language and the opportunities to learn languages. Communities of language use are not homogeneous, there are segments who want to use the existing language, and those who want to change, in-group or out-group, strengthening or weakening of identity can result, and traits of identity, and language acquisition and change (e.g. Idiom and dialect) is constructed by language and shared between groups and may be gained and lost or acquired over time [37]. As Stadler et al. suggest '… individuals are biased towards variants which have recently seen

an increase in their frequency of use' [38]. Thus, language change may happen relatively quickly in individual terms but its uptake is nevertheless dependent on distribution within a population, which is subject to other temporal pressures on language use. These pressures might include: media use and availability, immigration, inter-mixing, access to public facility such as education and the extent to which the cultural adoption of language change takes place in a low or high context communication culture.

Emergence of language idiom is determined in part by occurrence of particular variants and frequency of interactions between different speakers [39]. New dialect formations are acquired or lost on the basis of frequency of use, in terms of exposure to tokens of language used by speakers with whom another speaker reacts. The primary or sole factor in new dialect formation is *accommodation* into language use [40]. Trudgill's theory is related to the fact that linguistic behaviour is determined by language use in communication interaction [41]. It shares compatibility with neural evolutionary theory, but also implies that propagation of language change is result of the relationship between speakers and social factors [42]. There are debates about what social factors are but most agree that they may include: social class, prestige, group identity and how speakers relate and adopt some linguistic markers but not others. However, according to Trudgill's theory, *frequency of use* and *accommodation* are the sole mechanisms, which account for new dialects evolving in language use [40].

Language change is a two-step process involving the generation of variations (innovations) and the propagation of a variant through a speech community [42]. The process of linguistic behaviour involves the replication of tokens of linguistic structure such as sounds, words and constructions in language use. Speaker acts form utterances which replicate structures heard before, and structures combine in new ways form novel utterances as the variability of language use is exponential [42]. Tokens of linguistic structure are called a 'lingueme,' replication altered by prior replications; linguemes may include phoneme, a morpheme or a whole phrase or any basic unit of a linguistic structure. The replication of one lingueme variant over another is influenced by a number of factors, for example, the rate of exposure to speakers, or social values attached to a lingueme. Hall argues that a second entity or interactor is requires for selection to operate, interactor causal 'differential replication of replicators' [43]. Types of interactor selection, some interlocutors will be preferred or dispreferred by the speaker no matter how frequently or infrequently he or she interacts with them. Consequently, some linguistic replications, some utterances are weighted accordingly, and some variants that are weighted more heavily will be differentially replicated [44]. The weighing of existing tokens is relative to new tokens and a reduction in weight of existing tokens, continues every time a new token is added to the speaker's memory [45]. The rate of decay is controlled by A, and A is small. Interestingly, the resulting decay function is close to the exponential form that is used in psychological models of memory [45].

Entrenchment in memory is dependent on continuously hearing new tokens that are broadly compatible three results. First, exposure to tokens distributed over time rather massed at once facilitates consolidation of memory. Second, a lower limit to the rate of decay is imposed by the consolidation of memory, discussed in terms of a 'time window' of lying down of memory.

If the time between two tokens of same variant is longer than others with whom they compete for the same 'time window', then those tokens do not help consolidate a memory trace [46]. Third, it is the result of linguistic generalization that linguistic forms of a higher token frequency are likely to be retained, whereas linguistic forms with lower token frequency more likely to be replaced by model variants, and low frequency forms in the morphological paradigm. In lower frequency, there is a larger gap between instances of memory formation allowing a greater time for decay between the arrival of individual instances, making it less likely that new tokens contribute to entrenchment in memory [46]. As Moder points out, although chunks may be fixed in form and meaning through a specific context, if component parts maintain their analysability, then the chunk is not immutable. When supported by possible contextual based inferences, the analysability of components (or the parts of a chunk) leads to significant shifts both in meaning of the chunk of compositionality. A strong association of communication with an alternative niche may lead to wide scale shift in form and meaning [47], hence, explaining language change.

Language change can occur relatively quickly—anywhere from decades to centuries, as the meaning of particular phrases morphs in the context of language use (ontogenic changes. For example, Moder points out how the meaning of the phrase 'begging the question' has changed over the course of 500 years, with changes in cultural context of language use. The original meaning meant 'asserting the question', rather than arguing the merits of position [48] with independent evidence meaning shifted since sixteenth century to include 'introducing a new question'. Diachronic change can be the result of 'chunking' in which formulaic expressions are thought to evolve out of 'form-meaning pairings that co-occur within communicative contexts' [49] and compositionality, which is the 'transparency of the meaning of the whole word or phrase … whether or not meaning predicable from the sum of meanings of its component parts'. Language change can come about through loss of chunking and compositionality [50]. However, the underlying evolutional physical structure of language changes very slowly, at only one gene variation in 5000–1000 years (phylogenic change).

As Clark [51] notes, Traugott [52] discusses the role that pragmatics can play in accounts of language change. Prominent are 'bridging contexts' in which an utterance can be understood by a listener as having innovative meaning, as well as an earlier meaning. In some linguistic contexts, the innovative meaning may be favoured but remain cancellable and not conventionalised. Some bridging contexts occur when an expression gives rise to a 'pragmatic implicature' frequently enough so that the context of implicature becomes associated with the expression. It becomes imprinted to 'cancel' the implicature so it is no longer clear that its activation is not a part of an emergent coded meaning. Blakemore distinguishes between a conceptual and procedural meaning [53]. A grammaticalisation, which is a process of language change in which nouns and verbs transform into prepositions and affixes, emerges when there is an addition of procedural information to the semantic of an expression, as well as already encoded information' [51].

As Operstean notes the main way language changes is through contact based theory as explained in the context of dialect acquisition or change: 'A language (or dialect) Y at a given

time is said to be descended from language (or dialect X) of an earlier time if and only if X developed into Y by an unbroken sequence of instances of native-language acquisition by children' [54]. But there are some linguistic variable and language-transmission situations that don't fit that strict definition. The acquisition of new dialects, or immigrant koines, for example, begins with mixing, or creation of pool of linguistic features drawn from language varieties present in environment in which language spoken. The mixing stage is followed by levelling, or loss of demographically minority variants [55]. In the new dialect formation, features that get levelled out are those that are", features that are selected reflect demographic ratios in contact environment, as well as level of constancy such as markedness, perpetual salience, semantic transparency, feature selection guided by 'founder principle', in which the linguistic features of founding population may have an advantage in selection [55]. The levelling stage is followed by simplification, or the elimination of marked variants and irregular patterns. The elimination of marked phonemes occurs in phonology (the system of contrasting relationships among speech sounds) and that of marked patterns in morphology (structures of words and parts of words; word relationships). Some of this process may be driven by adult second language acquisition. Some changes might occur from mistakes through slang uptake, others from shifts in meaning context. Formation contact varieties include hybrid forms, inter-dialect forms, variant forms from original language use which is 'left over' after levelling reallocated, pressed into service as new stylist marker, new variety stabilised acquires own forms [56].

Research indicates alternations between periods of abrupt and gradual change correlated with language transmission, intergenerational transmission to young learners during periods of gradual changes a non-generational transmission to adult learners during periods of rapid change. Operstean hypothesises an alternation between periods of punctuation (new language formation) and equilibrium (gradual compenetration among neighbouring languages) [57].

Intergenerational transmission is dominant mode during periods of gradual change. Gradual compenetration among neighbouring languages takes place through the bi and multi-lingual individuals, acquired languages as children, happens during stable periods of predominantly generational transmission. Social stability prevailing encourages maintenance of existing norms, and results in slow change. This is contrasted with the punctuation stage, in which the dominant mode is non-generational, and the breakdown of social structures of events which sets off punctuation brings about the breakdown of linguistic norms. Operstean notes that established language families may be made up of mixture of conservative and innovating languages [58].

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Adapting to Complexities in Dialogue

Jos H. Pieterse and Rombout van den Nieuwenhof

Additional information is available at the end of the chapter

"The language of change, a change of language."

Abstract

The world is getting a VUCA place. A world that is more volatile, uncertain, complex and ambiguous. Changing conditions can be seen at a global level, on the level of societies and organizations but also at a micro level of people. Dealing with differences requires awareness about our own world views, and an open mind to understand the viewpoint of others. For interaction to be productive, participants need to recognize the different voices that come into play. This 'social complexity' is a underlying aspect relevant for understanding how to cope with VUCA situations. The aim of this chapter is to describe the conversational processes that take place during interactions between different professionals in organizations. Applying the 'ladder of complexity' and discourse analysis in three cases reveal that different 'voices' can be distinguished in the process of organizational change. We promote incorporating sociolinguistics into the field of organizational change. Section 1 introduces the 'playground' we live in followed by different paradigms about communicating and change management. Section 3 introduces the 'ladder of complexity' aligning social complexity and dialogue. Section 4 describes 3 cases using discourse analysis to understand the interaction in conversations. Section 5 draws conclusions and give directions for future research.

Keywords: organizational change, dialogic organization development, open innovation, linguistics, discourse analysis, ethnography

1. Introduction

The nature of our work has changed, reflecting major shifts in technology as well as an ever-shortening lifecycle of ideas, products, and businesses. The complexity of new problems on a global scale requires the work of teams with diverse expertise to solve them (Andrews in Alessi and Jacobs [1]). In other words, the world is getting a VUCA place. The VUCA acronym was first used by the U.S. Army War College in the 1990s. In 2012, Taleb [2] published his book "Antifragile: Things That Gain From Disorder" in which he describes that "some things benefit from shocks; they thrive and grow when exposed to volatility, randomness, disorder, and stressors and love adventure, risk, and uncertainty" [2, p. 17]. In many situations where people are living and working together we can also see and feel the tensions that come along with this so called "VUCA world" arising from differences in world views and perspectives, from the dichotomy in our thinking and talking and from language in particular. We call something good or bad, true or false, it leads to profit or loss, it is mechanic or organic, it can be planned or is emergent, etc. We look for the best way to change things effectively, to design the best supply chain, to develop the best communication process, and so on. These assumptions are ingrained in our daily life, and questioning them is often looked upon with awkwardness and suspicion. However, when it comes to VUCA situations, we think it is not about finding "the truth" out there anymore, but about making tensions that come along with it productive in our daily communication.

It goes without saying that a VUCA world, society or (inter)organizational, often interdisciplinary, setting requires that everyone needs to adopt new ways of working, other communication and negotiation styles. From here on, we will focus on the organizational level, but it is understood that we also see similar grounds for developments in societies over the world. In order to solve complex (organizational) problems multidisciplinary, multiple players or stakeholders need to communicate intensively bridging differences related to different paradigms, worldviews, professional background, and typical language use (i.e., jargon). Working together can no longer be done from the comfortable space of one's own desk with people sharing the same local context, same professional perspective (i.e., engineering, human resource management, marketing, etc.) with inherently quite same implicit assumptions. On the top of this, workplaces are more flexible and globally dispersed (i.e., multinationals on a global scale with business unites and virtual (project)teams, different production plants in a country). Furthermore, our workplaces have become divers and are not always related to the traditional office spaces (i.e., hotels, canteens, restaurants, and even city parks). People meet physically but more and more virtually (Andrews in Ref. [1]). This "new way of working" adds on the top of professional differences another complicating factor of losing face-to-face contact. Online conferences replace the meeting rooms; email, Twitter, and Whatsapp messages replace oral communication and everybody is connected via social media. However, it can be questioned if people are really connected by using these kinds of media to communicate.

This new way of working is mostly related to organizational change (i.e., technological/social innovation, reorganizations, implementing new systems, procedures and organizing structures, or producing new products for customer demands). Within the field of change management and organization theories, "communication" is seen as an important factor to realize organizational change successfully. However, "communication" is also a broadly, nonuniform defined container concept. It is also well known that many change projects are not considered very successful [3]. Despite it is acknowledged that "communication" plays an important role and change is becoming increasingly complex, little attention is given to sociolinguistics within the field of change management and organization theories. We consider this as a promising research area that might increase our understanding about interaction dynamics between participants in change processes and organizing. To put it more strongly, we understand organizing as "a conversational process in which people together construct an organizational reality out of a variety of different positions" [4]. We therefore focus on the role of conversations [5] and on dialogues [6] in daily work and propose that different degrees of complexity are in fact different levels of complexity of conversations or dialogues. Conversations can be quite easy and smooth such as in simple situations but are not simple in VUCA situations and produce more tension when the level of complexity increases. Next, we propose the use of the "ladder of complexity" as a framework for understanding the level of complexity and increasingly complex group dynamics that works along with social interactions. With this "ladder," we discern seven levels of dialogue which imply different skills of participation of change subjects (e.g., service engineers) and different roles and skills of change agents (e.g., managers and consultants) to facilitate increasing difficult levels of complexity in dialogue. We will illustrate the use of the "ladder of complexity" [4] by reflecting on the typical language usage of different professionals interacting in conversations that we studied in three different cases as an empirical evidence and for proofing, the "ladder" could be helpful. Within these cases, we use multiple discourse methods to analyze the interactional practice in organizing work during organizational change processes. We will show that the three case situations have in common that they allow for the complexity and nuanced reality to exist. However, we also found differences in the way participants cope with the existing complexity in their conversations. We will focus on the richness of the cases, found in the context of organizational change and (open) innovation, and acknowledge their complexity as an essential ingredient of a fruitful analysis. Based on our research, we conclude with some key principles that can be helpful to increase the level of generative and productive dialogues and put a dialogical mind set into practice. In the next section, we describe extremes in thinking about communicating and change management, also known as paradigms.

2. Paradigms in communication and change management

Communication in general is a kind of container concept and has many different definitions. Most people know that communication is important in organizing and in realizing effective change. It is often heard that "communication" is the problem, it should be done better, paid better attention to, or should done in a different way. However, communicating and language,

in general, are often so obvious and implicitly entwined with our thinking and talking that we do not even realize what the impact is of our use of language on our thinking, our action, and on others. Most of the times, communication, as an overall container concept, oversimplifies the complexity of the interaction between people and the impact of language. Daily conversations are for example saturated with concepts and categories from business strategy and organization theory. We use rather general terms like "organizational culture," "closing the gap" between "the present" and "the future" and "the competences" needed to attain the desired goals. This section will focus on language and communication and their role in change management by describing two contrasting ways of thinking.

2.1. The representational and conversational paradigms

Within language literature, two positions can be discerned regarding the role of language in relation to the outside world; the representational school and the conversational school. We take these two schools as examples because they show different views about how language and the world around us are connected. The representational school assumes that in our language usage of all words, concepts, or phenomena refers to a fixed and well-known meaning or content [7, p. 46]. On the other hand, we have the conversational school that explicitly does not assume a fixed relation between the "sign" and the "signified." In this paradigm, the social character of language is acknowledged and that meaning and sense-making or sense-giving comes from the relevance assigned by the participants, suitable for the moment in time and contextual situation [8].

Both views can be put into models that obviously simplify the communication and interaction dynamics. First, the well-known sender-receiver model developed by Shannon and Waever [9] in the 1950s. This model fits quite well with the representational school and is still used when explained how communication works. The other model is based on Jakobson in Sebeok [10] to address different aspects that play a role during interaction processes, such as setting, topic, contact/relation, code, and the objective of the conversation. Ulijn and Strother [11] have elaborated this model and Pieterse [7] added psychological aspects, such as filters, mental models, and views on concepts like time and space. Based on these aspects, Pieterse [7] introduces a conversational communication model (**Figure 1**) which might display the complexity of communication during interaction processes. **Figure 1** shows that communication is a complicated process when all aspects are taken into account. However, we do not focus on the invisible individual psychological aspects. We can assume that psychological motives and thought processes play a role during interactions, but the only visible reality of communication, we have as subject of analyzing is the interaction between participants, the conversational turns expressed, and the typical language used.

In line with the conversational school, we consider communication as an interactional process where words only become (un-)useful in conversations where people construct meaningful pictures of reality together. What Wittgenstein [12] has called a language game, useful for themselves but not for others. As Shaw [5] points out it is this conversational life of organizations in which people constantly sustain and change the possibilities for going on together. Language use is not something that happens before action, it is already action itself. In addition, what seems like "just talking" will eventually change organizational life.
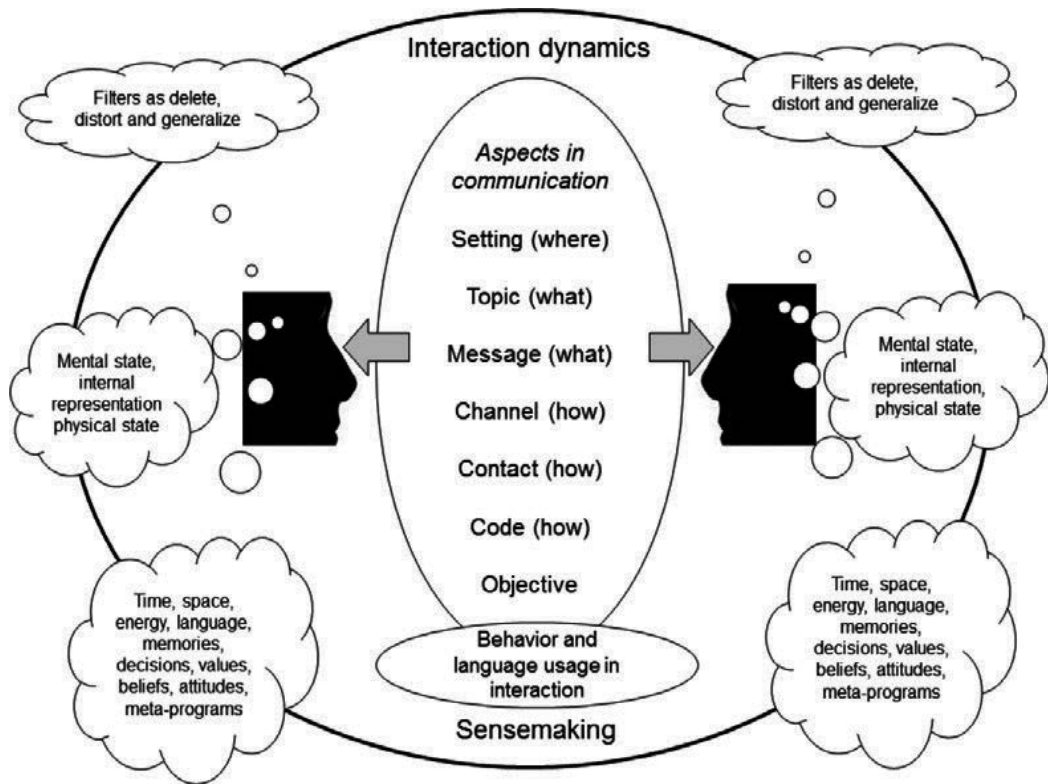
Figure 1. The conversational communication model (adapted from Ref. [7]).

Nevertheless, we think that both the representational and conversational schools have their own use. We do not choose one school of thought or paradigm as better or more applicable above the other. What we think is important to acknowledge that both perspectives exist (amongst others), and we need to find ways to cope during our daily interactions with possible tensions that arise between the representational and conversational school.

2.2. The planned and emergent change paradigms

Because we are describing interaction processes related to organizational change processes, it is good to describe two ways of thinking within the field of change management. First, the planned change approach and second the emergent change. The planned change approach is often seen as a standardized process with a focus on an organizational problem, top-down driven by top management in order to realize a solution and solve the problem (Weick in Beer and Nohria [3]). Bennis et al. [13] mention that planned change is a set of assumptions on how change is created, implemented, evaluated, and maintained. Planned change is "something that can be stopped or started at will" [14, p. 65].

However, starting this chapter with the notion that we are living in a VUCA world, "there is an increasing attention for the idea that organizational change is rather an emergent and

open-ended process than a set of interventions that can be thought of and planned upfront without unforeseen actions" [7, p. 37]. Weick and Quinn [15] consider change as a continuous process of modifications in daily work processes in systems, structures, and social practices that are formed and re-formed by people. Therefore, emergent change just happens one can say. No, we do not think so. Of course, there are visions, strategies, and impulses from outside and inside the organization. We see that things are continuously changing at a higher pace and with more impact on society, organizations, and people. Sometimes these changes are planned, but most of the time unforeseen "side effects" arise, which were not planned or could not be foreseen. In that sense, we think emergent change is something we have to cope with. Within emergent change, there is a need for continuous sensitivity of all organizational members to local contexts. In these situations, participants cooperate in real-time experimentation, are learning together, make sense of what they see and hear, explore and exploit available (tacit) knowledge, and get feedback from results, which leads to new actions (Weick in Beer and Nohria [3]). It seems to us that a VUCA world somehow reflects parallels with emergent change.

Nevertheless, also in a VUCA world, both the planned and emergent change paradigms are useful "lenses," depending on the situation. While building a plane, we rather like the engineers to take a planned change approach, although emergent change can happen too within certain limits. At the same time, an engineer working for the aircraft manufacturer might find it difficult to keep this line of reasoning and the emergent change approach could be more helpful. In addition, here, we do not find one approach better or more applicable than the other. One of the central notions in this chapter is that within a unique, complex, dynamic emergent change process with multiple participants and perspectives on communication and change approaches and with a diverse group of people, it is necessary to make the possible tensions productive through a generative dialogue.

Participants involved in emergent change processes have the task of linking together the object of change, the context of the change, and the different mental models of those involved [4]. Managing emergent change requires a joint effort of all participants to collaborate and co-create. Compared to planned change, the emergent change approach is one of the ongoing evolutions. This ongoing interaction between participants about the goals and object of change, the (changing) context of the change and understanding their own mental models requires a dialogue instead of discussions and consensus. The aim of the dialogue is at generating multiple views and rich approaches that are valuable for the situation at that moment and the overall change process.

Various sources of knowledge play a role in this: explicit, implicit, embrained, encoded, embedded, embodied, tacit, generalized, and actual knowledge [16], Lam in Boonstra [17], and [18]. Limited mental or emotional frames, however, can hinder the co-creative and generative process seriously. To obtain rich pictures, people in a dialogue need to questions each other's a-priori notions and "reach out in the not-yet-known" (Chia in Tsoukas and Kundsen [19]). Doing this requires to suspend our views, to listen in an open manner, and letting new information in to revise or (re-)adjust our beliefs and opinions. For the (dialogical) self, the deconstruction of speech is not different from the deconstruction of the self. Moreover, often this is

not a small thing. This is, where resistance and ethics come in exactly at the bifurcation points, where a dialogue can turn into a degenerative or into more generative ones [20]. So, complexity is not only related to freedom and innovation, but also with fear for the unknown and destructions of the narrative self. The dialogue ladder can be used to understand this highly subtle process a little better. The next section describes in more detail what it means to have a generative and productive dialogue in which participants together work hard to be productive despite tensions and conflict.

3. The generative dialogue and productive tension

In our perspective, organizational change is in fact a discursive process. This is a so-called social constructionist perspective [21], in which all information is already interpreted and the language used strongly influences our perceptions. For instance, if management is talking about increasing the customer satisfaction score or the QA Officer wants to decrease the failure rate of products, these can be seen as objective representations (the representational school) or intersubjective constructions of a temporary social reality [22], which reflects the conversational school.

The practical consequence of these intersubjective constructions is based on differences. Differences between point of views, perspectives, professional discourses, and opinions are therefore a (main) source for sense making. Sense making and sense giving are always co-created in interaction and in relationships between subjects. We construct our problem definitions, our views on "the" context and even our own role and identity as related to these subjects. Conversations in organizational life about differences do not only contain cognitive information, but also emotional and bodily experiences and deeply ingrained scripts or mental models [22]. Dealing with complexity of VUCA situations makes this highly relational or social side of complexity even more visible. Therefore, the purpose of a generative dialogue is not to reduce complexity to simplicity but to gain deeper insight by dealing with interesting and compelling differences. The notion of the complexity is therefore not (only) about a match between the amount of variety in the dialogue, and the complexity of a task in the world outside. For this, we would suggest an independent reality "out there." The complexity *is* the relation. It is the experience of differences *as* relation in the in-between.

Complexity (in Latin "plexus") means braided or entwined. The generative potential of a dialogue is directly linked to the capacity of the participants to be open toward differences between the participants. When participants in a generative dialogue are able to "tolerate" these differences, even if they disagree, to appreciate differences in-between and together start inquiring what is at stake for everyone, the group as a group becomes more alive and connected. This force in-between is what Hannah Arendt [23] refers to as *dunamis*. It implies a power or aliveness that comes from within. This connectedness opens the possibility for allowing even more complexity into the in-between of the dialogue. This kind of interaction only works when the participants can soften their solidifications (i.e., mental models, ego, defensive routines). It requires all participants to be open toward relevant differences and also

to investigate their own opinions and assumptions. This kind of dialoguing, however, will take time and often requires hard work from every participant. As a pay-off, the conversation will make a shift from a more "distance talk" about "objects" outside our self (i.e., "the" system, that "department," "those managers") toward a vibrant conversation in-between people in the here-and-now (i.e., my role in this conversation, my framing, my feelings, my behavior). Contributing to a generative dialogue is *not* about bluntly saying what comes into one's mind. Relating as a person, as a subject to another subject (instead to a distant object) is a matter of thinking aloud what you think would be *good* to do in a certain situation. This can be called the ethical aspect of everyday dialogue: it is attuned to the good. Not, for instance, devaluating the poor quality of a practice from a disconnected outsider's perspective but personally contributing to change the field in a direction that is meaningful and valuable for this practice. "Be the change," as Gandhi has put it. This manifest itself as a continuous process of co-creation and co-evolution: making space in dialogue, engaging positively, and being touched and transformed by the emerging quality

Bushe and Marshak [24] give an overview of what they call diagnostic organization development versus dialogical organization development (OD). **Table 1** (adapted from Ref. [24]) shows the differences as two extremes on a continuum, but of course, there are positions in-between. We assume that to become productive in a dialogue, participants should be able to switch from a diagnostic OD approach toward a dialogical OD approach.

Respect, open regard, and safe boundaries are important in dialoguing. Paying attention to, not turning away, not interrupting, discouraging long monologues, having the right to speak regardless of rank or gender, not resorting to the "act of blame" can keep a conversation going on [22]. These more social factors require a different psychological mind-set of the participants while dialoguing. Mostly meetings follow a strict agenda and timetable, work with notes, and have a chairman. Participation in these meetings is based on expertise, role, or function in the organization. We also know that not everything can be said in the meeting, but often more outside the formal meeting. It is questionable, if people really listen or have they already prepared an answer to your story without even trying to rephrase what you said. This common way of meeting is part of a socializing process and formed our way of doing things around here. In a changing organization, the dynamics and complexity, as described above, are quite different. These emergent, new, and unknown situations require to act differently. However, instead of adjusting our standard way of working, mostly we stick to habits and behavior that we are familiar with. It worked then, so it will work now. Dialoguing seems easy, but it requires hard work and a completely different socio-psychological mind-set (i.e., openness, safety, listing, time). Van den Nieuwenhof [22] found three (increasing) levels of negation: the negation of different perspectives (other frames of thought, other experiences), negation of the person (as not interesting, not valuable), and devaluation of the relation (I do not want anything to do with him). Affirmation, as the opposite of negation, is to recognize the worthy essence within the other. To affirm is to grant worth to or honor the validity of the other's subjectivity. This is not to say that we have to agree with the others, as that would be a duplication of stances and a loss of difference. To affirm is to grant worth to the subjectivity of the other and to the difference at the same time. Making space for the difference is making space for the other and for the relation; letting complexity come into the relation.

	Diagnostic OD	Dialogical OD
Influenced by	Classical science, positivism, and modernist philosophy	Interpretive approaches, social constructionism, critical, and postmodern philosophy
Dominant organizational construct	Organizations are like living systems	Organizations are meaning making systems
Ontology and epistemology	• Reality is an objective fact • There is single reality • Truth is transcendent and discoverable • Reality can be discovered using rational and analytic processes	• Reality is socially constructed • There are multiple realities • Truth is immanent and emerges from the situation • Reality is negotiated and may involve power and political processes
Constructs of change	• Usually Teleological • Collecting and applying data using objective problem solving methods leads to change • Change can be created by planned, and managed • Change is episodic, linear, and goal oriented	• Often dialogical or dialectical • Creating containers and processes to produce generative ideas leads to change • Change can be encouraged but is mainly self-organizing • Change my be continuous and/or cyclical
Focus of change	• Emphasis on changing behavior and what people do	• Emphasis on changing mindsets and what people think

Table 1. Contrasting diagnostic and dialogical organization development [6].

Change processes in organizations are often not very clear and literature regarding change management indicates roughly one third of the change projects to be successful and two thirds a failure [3, 25]. The organization and change context, the organizational culture, and differences between professional cultures make change projects a fuzzy and uncertain journey [7]. In order for participants to make sense in these messy change processes, we suggest the dialogue ladder as a "sensitizing device" [26] that can be useful to locate and utilize the differences in use of language and interpretations. As a result of differences, deconstruction of ossified meanings is made possible, and new meanings can arise. But, deconstruction can also be emotionally de-stabling, and fear can be a result. These differences can lead to tensions between people, but it is in these deeper layers of conflict that participants can become productive if they are able to switch from a diagnostic OD approach toward a dialogical OD approach. This does not mean changing the how and what, but changing the way of framing and thinking of participants. The productive tension between different language games in a dialogue may generate richer, more applicable, more context specific, and more valuable approaches [22].

Next, we will briefly describe seven levels of dialogue (**Figure 2**) which all differ on three aspects; first, on the type of relation, second on the concept of time and causality, and third on ethics.
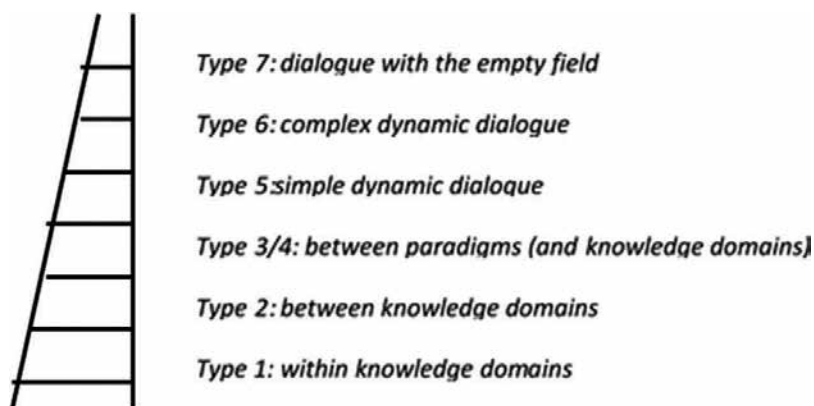
Figure 2. The dialogue ladder.

The levels on the ladder refer to increasing differences in the dialogue. We mention three differences that discern these levels. First, at the lower levels of the dialogical ladder, a speaker frames other people (e.g., the management team), structures (e.g., the sales department), groups (e.g., those service engineers), agreements, and causes as "objects." Hosking in Boonstra [17] calls this a subject-object relation. Organizations are seen and treated as clockworks or as simple organisms like plants with no rationality and will. The second difference is the use of concepts of time and causality. Types 1 and 2 dialogue mostly use concepts like "efficient" and "rationalistic causality" [27]. They refer to natural laws or the rational logic of models and analysis. In addition, there is a strong focus on negative feedback as a dampening force. The higher levels of dialoguing also take positive feedback into account, and consider dynamics as emerging from the system itself. Practically, this implies that within type 1 and 2 dialogues, a lot of correcting and control (negative feedback) can be heard in the conversations. In many organizations, "managing change" can be seen as an ongoing process of correcting and readjusting plans, schedules, agendas, priorities, budgets, resources, attitudes of people, etc. Going from *Ist* toward *Soll* is to go from one stable situation to a next stable situation and in-between there is lot of changes that need to be managed. Replacing an old culture with a new one, an old management style for something new, old-fashioned concepts for fashionable ones, etc. In the third place, dialogues can differ in their level of morality. Generative dialogue can be concerned about the right things to do, whatever *works*, but also about valuable or *good* things to do [20]. Many conversations between employees and managers or in-between these groups show little recognition and trust. Despite these, organizations still function rather efficient and effective, but this does not mean these organizations doing any *good*. Organizations should also act ethically and take social responsibility and environmental aspects into account. The higher levels on the dialogical ladder leave the traditional theories behind and arrive at completely new OD practices. **Table 2** gives an overview of the dialogue in seven types.

Each level of these dialogues mentioned in **Table 2** has its own complexity and dynamics. The progressive levels of difficulty might increase the generative an innovative potential, but

	Type 1	Type 2	Types 3 and 4	Type 5	Type 6	Type 7
Productive tension	Within one domain	Between knowledge domains within one paradigm	Between knowledge domains, within and between paradigms	Between knowledge domains and between paradigms	Between knowledge domains and between paradigms	Chaotic
Actors	Similar expertise	Differ in expertises, but similar "attitude"	Differ in values and worldviews	Differ in values and worldviews	Difference in values and worldviews lose significance	All not – knowing
Complexity	Little complexity	Comparing apples and oranges	Gap: relational complexity; coordination	Gap: relational complexity; co-production	Number of variables is or becomes too large to manage; co-creation	No clear variables, and no clear "interaction;" co-evolution
Dynamics	Efficient causality	Efficient and/or rational causality	Rational causality	Rational and/or formative causality	Formative and/ or transformative causality	Transformative causality
Dialogue	Practical	Differences are meaningful, but less practical	Confusion about objective and/or subjective dialogue (facts and opinions)	Dialogue starts to make a more personal appeal	Dialogue is exclusively personal and shifts to the here-and-now: emergence and fractal approach	Exclusively here-and-now: fractal approach
Group process	Smooth	Let us keep it simple	Tough, sticky Feeling intrigued	Complexity reduction Tendency to flee Possibility of becoming a "team"	Entering the discomfort zone, (strong) resistance or flow	Entering the discomfort zone, (strong) resistance, feeling bliss
Role of change consultant	Expert (content)	Decision-maker (content)	Mediator	Planned change expert	Process expert; fellow traveler	Change consultant as therapist or philosopher

Table 2. Overview of the dialogue types [4].

also requires more skilled participants. For instance, being open and straight forward requires "the skill" to not be afraid or fear repercussions from management. Tensions can become productive when we accept them in the first place and primarily do not try to solve the conflicts but rather bring them on the table and openly speak about it together. In organizational change, opinions should collide to make progress and to find eventually the best solutions at that moment in time. We refer here the theories from the complexity sciences [28]. We contribute to this bifurcation point of safety and fear when participants in a dialogue need to speak about conflicting perspectives. This aspect is of course well known in normal life but often under addressed in the complexity sciences, and we think it better explains why some tension in a dialogue is generative and why others are not.

The different types of dialogue are described by Nieuwenhof van den [22]. Central in this "ladder of dialogue" is the combination of knowledge domains and paradigms. We introduce these concepts briefly here. A knowledge domain can be seen as a profession (i.e., engineering, finance, marketing, psychology). In most organizations, employees are still grouped according their professional (or functional) domain. They know a lot about purchasing, marketing, sales, finance, or production. A paradigm can be seen as a dominant worldview. Next, we will elaborate on key elements mentioned in **Table 2**. Because this chapter is about changing language interaction is a key aspect in the ladder of complexity, we focus on (1) actors, (2) the group process, and (3) the role of the change consultant.

3.1. Actors in the different type of dialogues

The actors in a type 1 dialogue are talking with peers who are familiar with the field. For example,[1] a group of service engineers or team leaders with a technical background talking about a technical problem that needs to be solved. The participants understand each other well (i.e., within one domain), and there is hardly no need for clarification. In type 2 dialogues, the actors differ in expertise, but still remain within the same paradigm. In our example, an employee from the financial department joins the conversation. The technical problem, addressed by the service engineers, still has to be solved but there are some financial restrictions also which have to be taken into account. The diversity of arguments, based on differences in expertise, will highlight different aspects of the problem. The whole groups want to solve the problem, because they all acknowledge that customer satisfaction is important. However, the technicians might want a technical perfect solution, while the financial employee wants a solution with reasonable cost. This type of dialogue is experienced as correct, although less practical, and will take more time to come to a satisfied closure.

Taking the same example further toward a types 3 and 4 dialogue makes the group dealing more complex due to the introduction of another worldview or paradigm. The technical problem in our example can only be solved with the help of the supplier and the customer. Actually, to solve the problem, some co-production is needed. The service engineers can solve the problem when the supplier can give them some special equipment and deliver spare

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[1]This example is based on the Home Utilities case as described in Section 4 (see also Table 4).

materials on a short notice. The supplier is able to do this, but this will cost a certain amount of money. The financial employee does not accept these extra costs, because he sees the costs as outrageous of delivery of bad stuff in the first place. The service engineers argued that the costs to be made are not reasonable for this type of solution. The customer is also involved and proposes yet another solution that will give him less trouble at home while the service engineers solve the problem. Overall tension arises between the participants, and it seems that a quick solution of the problem is far away. People feel they have to compare apples and oranges (incommensurability). Participants, who are not used to deal with increasingly complex demands, often become reactive, take less responsibility for their results, and feel that they can interfere in the affairs of others. The whole conversation will become more emotional and requires empathic listening skills, and the ability to learn from other participants as well.

In type 5 dialogue, *causality* and *time* come into place. Given our example, the service engineers might ask the financial employee to give an estimate for the cost they can make. Instead of giving a budget, the financial employee first wants to know the detailed cost for solving the technical problem and after that, he can give a formal go. The service engineers can develop several scenarios to solve the problem (i.e., a technically perfect way, a very cheap way, and something in-between) but need to have information from the supplier about the specific cost for extra equipment and spare parts. Finally, the customers are not involved in this dilemma, and in the end, he has to give his customers satisfaction score on a scale of 1–5. The manager of the technical department, who is involved at this moment in the conversation, will get a quick bonus when the customer satisfaction score is 4 or higher. The effect of all (proposed) solutions and (desired) outcomes is somehow efficiently and rationally calculated and explained by the participants. This is based on the kind of an assumed interaction between the variables (i.e., price, customer satisfaction score, technical problem solved, acceptable cost) and the number of variables. In this example, these variables and their relations seem constant and reasonably clear to all participants, which is often not the case.

The sixth type of dialogue deals with very complex dynamics in the process of solving the "technical" problem. In our example, we add information from the Asset Department who is responsible for the technical infrastructure of electric and gas utilities in the homes of citizens. The Asset Department recognized that the problem was recurring every once and a while. In most of the situations, the solution of the service engineers seemed insufficient. The spare parts of the supplier were not adequate for a permanent solution, and a root cause analysis for this type of problem was not yet made. It was already clear that the problem could have different causes that might had to do with the outside temperature, the rainfall in a certain period, and the way citizens used their infrastructure at home. The Asset Department was trying to recognize patterns in this chaos, looking at a process unfolding itself. They saw that both the variables and their relationships were subject to change and unexpected transformations emerged (e.g., the problem occurred every once and a while). As the variability of the variables and their interaction increases, nonlinearity increases which makes the process and outcome unpredictable and unique.

Participants in this example are often not working closely together but are working dispersed over the (functional) organization. When more participants are involved in the conversation,

they must review their own, taken for granted, assumption about the "best solution" for the problem. In the group process, they all enter in a discomfort zone, but at the same time, the generative potential gets larger and larger. "Managing" such changes consist of working with relevant differences, providing the right boundaries (containment) and gaining insight into patterns in the unfolding process [29]. This so-called "formative causality" forms itself as it evolves [27]. This shifts the view fundamentally from planned action to careful and unprejudiced observation, from goal-oriented interventions to subject-subject relations, and an eye for spontaneous and emergent changes.

Finally, in the seventh type of dialogue, we enter the "empty field." This is the unknown, the "unconscious" says [30]. Change is seen as arising from a morphogenetic field [31], which we call the "empty field" because it lies outside the cognitive, practical, and emotional range of the participants. What people sometimes tacitly know is different from what they find hard to image or speak about. In conversations, people point at it as "that" or "it," as a "felt sense" [32], or as the "thought-unknown" [33]. In our example of the home utilities organization, a search starts for new products, other technical solutions, better materials, other ways to protect the electric and gas utilities against weather conditions, or even considering completely new ways of distributing energy. However, no one has any idea of what the solution might be or what steps have to be taken. The participants in our conversation cannot provide any answer to these questions because they are referring to old (known) concepts, have little experience, or are not sensitive enough to imagine "the new." Yet when there is a feeling that the group can figure it out, at that moment a dialogue can investigate the "that." Following a transformative logic [27], participants can refer to earlier experiences and use storytelling as a method to make connection with each other, to learn to feel at ease in not knowing and to search for workable elements in this specific situation together (Cooperrider and Srivastva in Woodman and Pasmore [34]).

3.2. The group process in different type of dialogues

What becomes clear in the example described above is that the group process starts with a simple meeting between service engineers discussing the possible solutions to solve the problem. The group dynamics are not complicated because the participants are talking and thinking from the same (technical) domain. In the second type of dialogue, for example, financials come into play adding another knowledge domain. Nevertheless, the problem is doable. Dealing with some uncertainty is simplified by reducing the complexity. This reduction denies the required complexity of our example leading to less suitable solutions, which is often taken for granted.

In types 3 and 4 dialogues, the participants experience a tougher situation where speakers appear to "come from different worlds," having trouble to understand each other, feeling more confused or even frustrated. They really need to bridge the gap between differences in knowledge domains and of possible paradigms. The uncertainty increases, and participants start to have difficulties with each other's viewpoints and with group relationships. Resistance might rise and openings to rather new viewpoints are hard to find. The group process is more dynamic, and it is hard to make progress at least that is what the participants often think.

The type 5 dialogue is complicated. Complexity and nonlinearity are often ignored in order to maintain clarity and to repress feelings of uncertainty. Simple models are used to reduce uncertainty. Participants speak in a distant voice *about* the change, instead of giving their personal impressions in the "here-and-now." This type of dialogue seems to be a kind of turning point. On the one hand, it is easier to go back to situations that are comfortable and known. On the other hand, using the uncertainty and diversity, participants can substantially contribute to each other's expertise and to the group as a whole. At the end, this will give a better solution for the problems to be solved.

In a type 6 dialogue, the participants experience the conversation as a part of a journey. Together, they are travelling and wondering about the situation of the problems on their way. This requires a group process in which participants are open, respectful, and willing to investigate each other (and their own) opinions and assumptions. These kind of conversations need time and are often less serious and more playful. Nevertheless, this type of dialogue requires hardworking of all participants and must not be seen as a funny, time-consuming experiment leading to nothing.

Finally, the seventh type of dialogue in which participants often need to tolerate a roller-coaster of uncertainty and remain in a discomfort zone for some time. The benefit of this type of dialogue is that a totally new horizon will arise that could not be foreseen by anyone at the start. Dialogues of this type require open-ended questions such as how do we co-create a challenging way of delivering home utilities for houses, how can we learn and improve our performances collectively, how can we organize "energy distribution" in our country? These "wide" and open questions invite participants to think "new" and forget about old ideas.

3.3. The role of the consultant in the different type of dialogues

Within the types 1 and 2 dialogues, the change consultant is mostly seen as an expert and decision-maker. Within our example, it might be the most experienced service engineer or the team leader with a technical background. In addition, the external technician is believed to come up with the best technical solution. In types 3 and 4 dialogues, the change consultant is less experienced in the typical (technical) content and act as a mediator between different positions. In this perspective, the group dynamics is the main focus of the consultant. In our type 5 dialogue, the consultant will act as an expert in a planned change approach knowing that there are of course different ways to reach the goal but one way is to be preferred over the other. Therefore, in our example, the change consultant will provide a best possible plan in which the different stakeholders have their say and the solution is acceptable by all of them. The change is realized by executing interventions according a planned timetable. The sixth type dialogue requires a process expert and a skilful fellow traveler who is able to express openly realistic doubts, fears, and uncertainties about the change process. Fear is not to be avoided but to be explored, trying to grasp its meaning. The change consultant does not really know how to realize the change objective but is able to facilitate the complex group dynamics and has the skills to guide the participants through the unknown trajectory of their trip. Finally in the seventh type of dialogue, the change consultant is a facilitator taking a more "therapeutical" or "philosophical" role. During the change process, the facilitator addresses

(existential) fears and sometimes, primitive defense mechanisms of the participants. The emphasis lies then almost entirely on the analysis of the here-and-now [22]. This kind of dialogue requires a very skilled facilitator and participants who are open to self-investigation, self-criticism, and have guts to show their inner feelings.

4. Practical cases

This section describes three cases in which we studied intensively the language use during interaction processes between participants in organizational change projects. The focus of this study (based on Ref. [7]) is in particular the language use of managers, engineers, and consultants and their specific professional discourse differences. The cases provide insights in how interactions and language use can be successful or how it can hamper productive collaboration in situations of organizational change. We use the three cases in a retrospective way and try to connect the findings with the different dialogical types as described earlier. The ladder of complexity was not a part in the original study by Pieterse [7].

4.1. Methodology

The methodology is used for all three cases and is based on a framework for the discourse analysis. The use of a semi-structured interview protocol provided data about the contextual (i.e., change and organizational context) aspects of the cases. Components of the discourse framework were a lexical and a syntactic analysis. The data consist of 96,016 written words (i.e., formal project documents) and 101,207 (oral) discourse words (i.e., formal and informal meetings). In total, 112 people were interviewed during 68 semi-structured interviews. Most interviews recorded provided over 25 hours of text. The speech act [35] analysis is performed on 122 utterances (4429 words) and attributed for 13 different syntactic measurement points. **Table 3** shows the syntactic analysis framework and specifies five speech acts supposed to be relevant for organizational change, two items for negotiation strategy and two items for communication support [11]. Finally, four conversation phases [36] were taken into account. (For more details see Ref. [7]).

The cases studied were all in the middle of an organizational change project involving management, (internal and external) consultants, and service engineers. In these projects, the service engineers were the object of change. The researcher performed a participative action research method for about 2 years in every organization. The ongoing change projects in the three cases were not the primary focal point, but it gave a setting in which interaction processes between the different professional discourses could be studied. By being in the organization as a participant doing also the research, we were able to grasp the social interaction, the typical discourse of professional groups, and the sense-making processes that took place both in a formal and mostly afterwards in informal gatherings. This approach gave insights that would never be able to find using a more quantitative research method. We conjecture that there is a possible researcher bias because it is impossible to observe a change process without being involved or influencing. **Table 4** gives the characteristics of the three case organizations using the typology of Mintzberg [37].

Speech acts [35]	Negotiation strategy and Communication support [11]	Conversation phase [36]
Assertives	*Noncooperative*	*Initiative phase*
Claims supported by evidence, true and false statements	This behavior shows noncooperativeness, and disagreement by using utterances that criticize, denies, disapprove, object, reject, show indignation and/or irritation	This phase relies on assertions, directives, commissives, and declarations
Directives	*Cooperative*	*Understanding phase*
Request, to get someone to do something (e.g., invitations, instructions, orders, and commands)	This behavior shows cooperativeness, agreement by using utterances that admit, confirm, inspire, give confidence, emphasize cooperation, and/or show goodwill	This phase is generally characterized by assertions and expressives. Claims are made, evidence and testimony given, hypotheses examined, beliefs and feelings explored, and contentions maintained
Commissives	*General*	*Performance phase*
Promises or natural responses to a request committing to a future action	These supporting kinds of speech acts use utterances that ask for understanding, confirmation, information to explain, request, stipulate and/or suggest	An interplay of directives (requests) and commissives (promises) spoken to produce a specific result
Expressions	*Meta communication*	*Closure phase*
An affective state (e.g., worries, apologies, personal problems)	This supporting kind of speech acts use utterances that conclude, close, engage, offer, promise, propose, remind, repeat, resume, and/or specify	This phase is characterized by assertions, expressives and declarations to bring about an end to the interaction process.
Declarations		
Create a new set of opening conditions.		

Table 3. Syntactic discourse analysis framework [7].

The findings of our study are described as follows; first, a perception about the organizational change results per case and second, the results of the professional discourse analysis. The change result of case 1 was out of the planned time, budget, and resources. It took the organization more effort as planned in the beginning, and the change was not successfully implemented. In case 2, the change project was within time and budget but implemented with limited functionality of the maintenance system. It was considered a partly successful change project. In case 3, the change approach was not strictly planned but more emergent. No time and budget restrictions were given upfront. We saw a gradual shift in conversations and accordingly in behavior of the service engineers.

When we look back at the cases now and consider the dialogical ladder, we can say that in case 1, the managers, consultants, and service engineers formed a diverse group of professionals having quite different values and worldviews. The knowledge domains seen as professional background were also diverse (e.g., ICT, HRM, change management, technicians). These differences of the actors forced them into a relational complexity with lot of tensions that made it hard to co-create. The situation in case 1 can be situated on level 3/4 of the dialogical ladder

	Case 1	Case 2	Case 3
Sector	Home Utilities	Aircraft maintenance	Housing association
Organization typology	Machine bureaucracy	Adhocracy	Professional organization
Focus of change process	Implementation of an innovative ICT tool (Tablet PC) for service engineers	Implementation of a MRO system (TRAX) for aircraft maintenance employees	Change in behavior of service engineers and area coordinators from a technical working attitude toward a customer-centered attitude
Number of employees	4100	400 (Staff) 1250 (cabin crew)	420
Employees involved in the change program	650	220	40
Organizational structure	Decentralized (regional and departmental)	Centralized (dispersed in departments)	Centralized (dispersed in districts)
Period of study	June 2008 until June 2009	Aug 2008 until March 2009	Oct 2008 until July 2010

Table 4. Characteristics of the case organizations using the typology of Mintzberg [7].

with this difference. The actors were not able to have a dialogue in which the tensions were made productive. Many project meetings, kick-off meetings, and informal gatherings ended in a discussion were facts, and opinions were mixed up. The service engineers wanted to solve problems in a simple and practical manner, while managers often asked for understanding but less practical guidance. It seems that in case 1, the actors were not able to make the tensions productive and cope with the social complexity. Instead, communication hampered, actions were delayed, and participants were less involved. All of this leading to an unsuccessful change result as mentioned above.

Case 2 was partly successful, although not all functionalities of the maintenance system were operational at the deadline of the project. The change program was a well-planned and managed project. A big difference compared to case 1 was that most of the project members were service engineers themselves. Some actors worked on the purchasing department or did inventory work. However, the project managers, most project members, and the key users all had quite the same professional background and related (technical) discourse. This case can be seen as a type 1/2 dialogue in which all members shared mainly one knowledge domain, had similar expertise and used practical wording in the conversations. The (external) learning consultants on this project were experts in their field and understood the professional discourse of the service engineers. The only difficult thing for the service engineers was giving training sessions on the new maintenance system for their colleagues. This role was out of their comfort zone and required special attention from the project management and learning consultants.

Case 3 was more successful, although the same professional groups had to interact in their organizational change process. This case can be positioned as a type 6 dialogue on the ladder of complexity. Different to case 1 was the change approach, which was not strictly planned,

but a more emergent change process. The management had not defined any phasing or planned activities upfront. The management provided a high-level vision, which had to be made specific by a diverse group of service engineers. The whole change process was set up as an open learning program and gave participants the opportunity to listen, to ask questions, to have informal gatherings in-between the training sessions, and to learn or even to readjust their individual thinking about how their work should be done. The sessions were not like traditional trainings, but were set up for information exchange, getting to know each other, and having open conversations in which personal reflections and emotions about the change process could be exchanged. During these sessions, trust and psychological safety increased within the group, which made it possible to deepen the conversations. This different change approach, together with the open mind of the participants, made it possible to create a situation where initial tensions could be made productive.

Table 5 gives an overview of the syntactic part of the discourse analysis in which 13 items of our discourse analysis framework were labeled and counted based on a selected set of utterances done per professional group and per case.

Table 5 focus on the service engineers (figures in bold) because in the original study, we wanted to explore this professional group during change projects and how their professional discourse interacts with the professional discourse of managers and consultants.

We positioned case 1 as a type 3/4 dialogue on the ladder of complexity. Case 2 can be seen as a type 2 dialogue, and case 3 can be characterized as a type 6 dialogue. As mentioned before, this is within retrospective. The original study by Pieterse [7] did not used the ladder of complexity.

Case 3 shows two service engineers who participated in the informal conversation. Because we focus on group level, instead of the individual level, we cumulated their utterances in order to compare with cases 1 and 2. It is clear that in the oral communication "expressives" (an affective state such as worries, apologies, personal problems) are being used. However, in cases 1 and 2, these kind of utterances have rather low frequencies compared to case 3. Obviously in case 3, there is more openness between the actors and it seems accepted to bring emotions to the workplace during interactions. This relates to a type 6 kind of dialogue in the ladder of complexity. In these types of dialogues, the actors differ in value and worldview. The dialogue is also making a more personal appeal and a need for expressing personal emotions.

Another aspect that should be mentioned is the phasing of the conversations. Case 1 is completely missing utterances that could be labeled as the "closure phase" (this phase is characterized by assertions, expressives, and declarations to bring about an end to the interaction process). This fits within a type 3/4 or 5 dialogue in the ladder of complexity. In those dialogues, the group process becomes tough, sticky, and there is a tendency to flee. Fleeing can be seen as letting things unspoken and actors go their own way without bringing the conversation to a good end. In case 3, all actors feel responsible to end the conversation in a productive manner. Both the speech acts and the conversation phasing might indicate how actors cope with the productive tension in their conversation, hence realizing adequate change result at the end.

Cases	Case 1 Home utilities			Case 2 Aircraft maintenance			Case 3 Housing association			Totals
Speech acts	Manager	Service engineer	Consultant	Manager	Service engineer	Consultant	Manager	Service engineer 1	Service engineer 2	
Assertives	9	10	1	14	9	1	4	9	3	60
Directives	2	4	8	2	1	5	2	2	1	27
Commissives	1	1	1	–	1	1	–	–	–	5
Expressives	1	5	–	6	1	–	6	12	4	35
Declarations	–	–	–	–	–	2	–	–	–	2
Negotiation strategy										
Non-cooperative	1	6	–	3	2	1	3	6	0	22
Cooperative	5	4	2	8	4	1	5	3	1	33
Communicative support										
General	5	7	7	9	4	3	4	2	1	42
Meta communication	3	2	1	6	4	4	4	13	3	40
Conversation phases										
Initiative	1	1	2	5	3	3	2	6	–	23
Understanding	8	16	6	9	9	1	10	12	5	76
Performance	6	3	4	3	1	2	1	1	–	21
Closure	–	–	–	–	1	3	3	4	–	11

Table 5. Overview of syntactic discourse analysis results across the cases [7].

The role of the consultants also differed in the three cases. In case 1, the change management was performed by internal consultants very familiar with a planned change approach. However, the mediating role was less addressed and during project meetings sometimes misunderstanding, confusion about objectives and a mixture of facts and opinions did hamper the conversation. Case 2 used two external learning consultants who mostly facilitated the change process. In fact, they worked as a mediator or process experts, while the case situation required a type 2 dialogue. The expert and decision maker role (both on content) were foreseen by the project manager of the case organization. In case 3, an internal and external consultant facilitated the learning and training sessions by taking a process expert role.

4.2. Results

As said before, the linking of the ladder of complexity to the findings of the three different cases is done in retrospective and can be seen as a reflection afterward. What are the overall results? First, we can conclude that the organizational context (i.e., structure, systems, procedures, and regulations) affects the way actors behave. In a mechanistic organization, it seems that there is less attention for social complexity, while in an organic organization this is seen as "fact" of daily (organizational) live. Second, the change approach is considered very important. The planned change approach mostly does not take social aspects in consideration. The plan is the main source and focuses on the majority assuming that every actor is at the same organizational time and pace. Third, we conclude that differences in professional cultures might hamper interaction processes due to the ability to cope with uncertainty, tensions, and fear. In general, we can conclude that the change result over the three cases is positive when the (organizational) context is person oriented and egalitarian. Furthermore, it seems that actors are more able to cope with social complexity in situations, where both uncertainty avoidance and the power distance between actors are low [7].

Of course, the individual and the psychological aspects of every person are not taken into account in this study, but we assume that real change requires the ability to reflect and learn about one's own belief and thinking preferences. Language plays a major role in including and excluding frames of reference, including and excluding certain type of information, selecting solutions and modes of actions, and so on. In a group interaction process, it is in most of the situations the responsibility of the manager or the consultant to facilitate the interaction dynamics. Management in these terms can be seen as a discursive practice in which "it is not clear how polyphony as such could contribute to change or how this could be managed" [38, p. 24]. Nevertheless, taking both the original study by Pieterse [7] and the ladder of complexity might lead to new and interesting research for the future. This will be discussed in the next section.

5. Discussion, conclusions, and future research

In this chapter, we introduced the dialogical ladder as a "sensitizing device" that might be helpful for managers, consultants, and all other participants that often work together in

organizational change processes. Often in these uncertain change situations, participants take positions based on their experiences, professional background, worldviews and "what has worked in the past" when problems had to be solved. We have discussed different paradigms regarding language (i.e., the representational and conversational schools) and change management (planned and emergent change). This was not done to take a stand and to claim one school better or more right than the other. The discourse analysis framework (**Table 3**) brings together some important aspects of communication. The speech acts, the negotiation and communication strategies, and the conversation phases are in fact developed and researched separately. But in real interactions, these three aspects come together and might be helpful for understanding what is happening in social interactions between actors with different professional backgrounds in an organizational setting such as change projects. **Table 5** shows simple frequencies of utterances labeled according the discourse analysis framework, but it does not give insight in the level of complexity of the conversations and the interaction processes. Therefore, we added the ladder of complexity in order to provide a richer picture of the three cases. By adding this second framework, in retrospective, we were able to combine the labeled frequencies with some aspects from the ladder of complexity. Although this is a theoretical exercise, we consider our propositions as quite useful and realistic.

In essence, we think it is important to see the differences in dialogues, both by using the discourse analysis framework and the ladder of complexity in a combined manner. Actors (i.e., managers and consultants) have to cope with these differences by making existing tensions between actors productive. The generative dialogue seems a good "format" but requires social and language skills of all participants and is often not very simple to realize in daily practice. This brings us to the point that not everybody in the organization is able to participate actively in this kind of dialogue. We think that a personal openness, vulnerability, and learning style are a key for successful results. This is not linked to a position in the organization or to a certain kind of function but linked to positions in the "language of change." To "see" that people reason from different starting points, and not to fear other expertise, worldviews or views on time and causality, can make dialogue much more richer and participant much more free. To realize that difference is nothing to be afraid of but can lead to more effective and mature relations.

To conclude, we give some guiding principles; first, having respect and create open and safe boundaries in which participants feel free to express themselves. This affirmation is to recognize the worthy essence of the other and respect others subjectivity. Second, taking time and create space in the dialogue. Participants have to letting the other "free," let him talk, take a pause, and rephrase thoughts. It means slowing down the conversation and exploring your own assumptions and those of others. In a very practical way, this means that meetings take time, agendas are not useful, a standard "role play" (i.e., the managers is the chairman, the expert is asked for his opinion, etc.) does not work in this dialogue. The third guiding principle is about the relational aspect. "The generative capacity of the dialogue is directly linked to the capacity of opening up to differences as differences in a relation" [22]. Finally, we see that dialoguing is much more than an abstract "language game," in which tacit knowledge, intuitions, and bodily experiences play their role. Emotions, stress, or a free flow of energy, excitement, and vital conversations can emerge during the dialoguing process. This requires

from participants to examine differences and go with the flow. This requires close attention to bifurcation points in the dialogue, where anxiety might take it over. Patience is needed not to overestimate the capacity of participants to contain their fears, and also to not to run away from a little discomfort too soon. This is not easy in organizations where we are mostly used to cover emotions with simple logic and simplistic rationality.

By writing this chapter, we also aim to gain interest in future research and deepen our understanding about dialogues, social interactions, and the sociolinguistic insights that can be useful. These elements are especially important in organizational change processes in a VUCA world. Therefore, we would encourage sociolinguistic research combined with change management and organizational theories in a practical setting using a multiple case study methodology. In addition, linguistics studies using ethnographic and narrative (qualitative) methodologies in an organizational setting can gain new insights. The scientific fields of organization and change management mention that communication is a key for successful change, but studies using linguistics are rare in this field. On the other hand, the scientific field of sociolinguistics is not very familiar with change management and organization theories as far as we know. These studies and the results can be very relevant for both practice and science itself.

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Application of Linguistic Analysis to Society, Policy Making and Education

Standard English for Empowerment in Multilingual Sub-Saharan Africa

Bernard Nchindila

Additional information is available at the end of the chapter

Abstract

Standard English for empowerment in sub-Saharan Africa is a complex issue for several reasons, chief of which is the slavery, colonial and neo-colonial legacies in which English was deliberately packaged by early British explorers of the region. In line with explorer legacies, English has been largely administered for both general and literary purposes, which have tended to cast this language as a British colonial crown jewel. Consequently, sub-Saharan Africa has used English for this limited educational purpose, ending up producing items the region does not consume and consuming items it does not produce. Using qualitative methods and critical discourse analysis (CDA) to analyse some of the archival material of one of the early British explorers to the southern part of the region—David Livingstone—the chapter presents some sociolinguistics findings. It then suggests how Standard English in content and language integrated learning (CLIL) can be used for mediating the ills of slavery, colonial and neo-colonial legacies.

Keywords: standard English, content and language integrated learning, sub-Saharan Africa

1. Introduction

Standard English is within the broader theories of language learning, particularly in the school context. Similarly, theories of second language learning draw on those of first language acquisition influenced by, among others, scholars such as Piaget, Vygotsky and Bruner [1]. However, second language acquisition can be realised in two different environments. The first one can be a native language-speaker environment and the second one can be a foreign-language speaker environment. An example of the native-language speaker environment is learning English as a second, an additional or foreign language in England, the United States

or Australia. An example of the foreign-language speaker environment is learning English as a second, an additional or foreign language in Asia, Africa and non-English speaking countries of Europe. The central characteristics of English as foreign language learning are the amount and type of exposure a learner has to English. Usually there is very little experience of the language outside the classroom, and encounters with the language are through several hours of teaching in a school week. This seems to be the case in much of multilingual sub-Saharan Africa. In the case of a global language such as English, there are opportunities for learners to encounter the language through videos, TV, computers and film even in rural areas where English may not be readily available.

Although there is much contestation about the meaning of sub-Saharan Africa, the notion is used to describe the region of the countries lying South of the Sahara Desert. In much of sub-Saharan Africa, English is essentially a foreign language that permeated the African culture as early as the time of slave trade and the eventual colonisation of most of the region. In much of sub-Saharan African, most of these critical school and educational resources are not readily available. Moreover, qualified staff needed to leverage the resources to the benefit of learners is seriously lacking. Compounding the problem is the reality that knowledge of a particular variety known as Standard English is necessary in a school speech community if learners are to be empowered to learn content.

2. Standard English for empowerment

What then is Standard English? In Ref. [2]:

> the prevailing attitude of L1 speakers as well as that of a sizeable majority of L2 speakers is still that 'good English' is synonymous with that of educated native speakers born and bred in the United Kingdom or North America [pp. 51–52].

By ascribing Standard English to educated L1 users of English, Ref. [2] echoes the idea that positions Standard English within a school context. It can therefore be deduced from this that Standard English can be learned as opposed to the innate theories of learning other English language varieties. However, discomfort still remains in the proposition that it is only English L1 users who are born and bred in the United Kingdom and North America who are capable of acquiring Standard English. The significance of this is that while placing premium on Standard English confers entitlement on educated English L1 users, such an entitlement is not extendable to those L1 users born and bred outside the United Kingdom and North Africa. With reference to this, Ref. [3] is even silent on the issue of geographical boundaries of the native speaker but refines the level of education of English native speakers, thus:

> Rather, an implicit, and frequently explicit, assumption has been that the universal target for proficiency in Standard English around the world is the set of norms which are accepted and used by highly educated native speakers of English [p. 67].

Although Ref. [3] also ascribes Standard English with native speakers, he helps to define what Standard English is and what it is not. For example, while Standard English aims to eliminate

language errors because it is enacted in a school learning sociolinguistic speech community, evidence of some errors in Standard English does not invalidate its legitimacy. The implication is that uneducated native speakers of English do not use what is referred to as Standard English. When it comes to the school speech community:

> *Standard English is an entry condition and the custodians of it the gatekeepers. You can, of course, persist in your own non-standard ways if you choose, but then do not be surprised to find yourself marginalised, perpetually kept out on the periphery. What you say will be less readily attended to, assigned less importance, if it is not expressed in the grammatically approved manner. And if you express yourself in writing which is both ungrammatical and badly spelled, you are not likely to be taken seriously. You are beyond the pale (in Ref. [2], p. 165).*

Although others may argue that other varieties of English have their own grammar, from what is stated in Ref. [2] above, it seems that it is Standard English that has the capacity to command the fixed rules of grammar. What is said in Ref. [2] regarding 'ungrammatical and badly spelled' in fact serves to illuminate undeclared practices in academia when it comes to attitudes regarding nonstandard English. Such a warning is worth paying attention to because it empowers an L2 also to aspire for acquiring Standard English. However, a possible limitation of that warning is that it may be based on a false assumption that those who persist in using nonstandard English actually know what Standard English is and they just opt not to use it. Seen from this perspective, a central question here is what does knowledge of a language such as English actually entail in a multilingual mother tongue context such as Africa? Although Noam Chomsky's classical views on what constitutes knowledge of a language have been challenged, they solidly back the view of knowledge of grammar. Likewise, some recent research of Ref. [3] has affirmed this position of knowledge of a language that

> *what one knows is a grammar, a complex system of rules and constraints that allows people to distinguish grammatical from ungrammatical sentences. The grammar is an idealization that abstracts away from a variety of so-called performance factors related to language use [p. 1599].*

The view that knowledge of grammar is central to knowing a language has continued to receive considerable support. The work of Ref. [4] which has also endorsed this view is of significance. Commenting on the role of communication in Communicative Language Teaching (CLT), Ref. [4] makes the point that language teachers have been skilled in bridging the gap between the classroom and the world through CLT. According to him, CLT has however tended to focus on language in use thereby concentrating on teaching *learners to do things with language* at the expense of teaching *learners the necessary language to do things with language*. What Ref. [4] says here can be interpreted to mean that learners need to be equipped with the language resource first in order for them to do things with language itself, instead of mere ability. In this regard, it is argued in Ref. [4] that CLT has tended to develop *abilities* in learners *to act on language* instead of first acquiring *the language resource itself* for them *to use when doing things with language*. The danger of this is that learners produced from CLT are even capable of using wrong language to attain their perceived goals or use their abilities to produce wrong language that they may not be aware is wrong altogether. Implicit in what is stated is that one can only distinguish grammatical from ungrammatical sentences from a mutually agreed upon standard. From an academic or school sociolinguistic perspective, that standard can only be Standard English when it comes to the English language. Thus, it is insisted that

> *Language teaching is ultimately teaching language. Grammar, lexis and phonology remain central, and an adequate command of these is as necessary as it has ever been for efficient and effective communication (see Ref. [4], p. vii).*

Therefore, Standard English for empowerment in multilingual sub-Saharan Africa is situated in sociolinguistics theory of language varieties within a speech community as theorised by Gumperz and Hymes [5], thus:

> *Wherever the relationships between language choice and rules of social appropriateness can be formalised, they allow us to group relevant linguistic forms into distinct dialects, styles, and occupational or other special parlances. The sociolinguistic study of speech communities deals with the linguistic similarities and differences among these speech varieties [p. 115].*

In Ref. [6], it is believed that a person's perceptions of the language characteristics of particular areas do not always accord with linguistic facts. I therefore, conceptualise a speech community in the formalised choices and rules of social appropriateness rather than geographical or regional boundaries. Although the concept of speech community is fiercely contested in sociolinguistics literature, I locate this concept in the theory of language varieties mainly because in much of sub-Saharan Africa, English is enacted in multilingual contexts. Within that realm, Standard English is positioned in the notion of disadvantage given the historical colonial realities of the sub-Saharan region. This is so because much as linguists are agreed that there is no particular language variety which is superior or inferior to another, the fact that not everyone within a language community is able to command all forms of varieties like others means that certain varieties occupy favoured positions. I therefore argue in this chapter that the linguistic similarities and differences of Standard English are available to English L2 users through content and language integrated learning (CLIL).

In his contribution to the seeming triumphalist attitude of the English, Crystal [7], who is a leading expert in applied English linguistics, has complicated the issue thus:

> *I am already in the fortunate position of being a fluent user of the language which is most in contention for this role, and have cause to reflect everyday on the benefits of having it at my disposal. A large part of my academic life, as a specialist in applied English linguistics, has been devoted to making these benefits available to others, so that the legacy of unfavoured linguistic heritage should not lead inevitably to disadvantage [p. xiii].*

Implicit in what Ref. [7] shares above is the view that non-native speakers of English maybe disadvantaged when it comes to their using English because the English legacy and heritage do not favour them. In fact, although Ref. [7] suggests that some L2 speakers can master English, he appears to imply that they cannot reach the level of mastery equivalent to users of English as a mother tongue when he says that:

> *If English is not your mother tongue, you may still have mixed feelings about it. You may be strongly motivated to learn it, because you know it will put you in touch with more people than any other language; but at the same time you know it will take a great deal of effort to master it, and you may begrudge the effort. Having made progress, you will feel pride in your achievement, and savour the communicative power you have at your disposal, but may nonetheless feel that mother tongue speakers have an unfair advantage over you [p. 3].*

Based on what Ref. [7] says above, paying attention to Standard English is necessary. Be this as it may, what Ref. [7] states that fluent use of the English language is contestable even among the English themselves should bring much light to bear on the reality that while knowledge of a mother tongue may put a particular user at an advantage, it is not sufficient to make one a specialist in the language. In fact, a further implication of what Ref. [7] says is that educated L1 users of English belong to a higher hierarchy than that of their non-educated counterparts. In reference to English, Ref. [8] state that

> *Despite its association with colonialism, some countries endeavour to maintain a British standard, rather than embracing their local variety. Many African and Asian Anglophones, of course, have a vested interest in maintaining the status quo and rejecting local varieties as emerging standards because it maintains their positions of privilege (see Ref. [8], p. 22).*

While Ref. [8] tie the African and Asian Anglophone to a 'British Standard', it is clear that they conceive that standard from an ecological sociolinguistic perspective, which fails to account for the place of Standard English in an academic or learning context. This is important because past research that has looked at the issue of Standard English has tended to conflate this issue with ecological sociolinguistics varieties such as British English, American English, Australian English or regional dialects of these countries. While such positions provide interesting ideas for an appreciation of notions of World Englishes, they mischaracterise what Standard English is. Writing from a South African sociolinguistic black context, Ref. [9] is critical of viewing native-speaker competencies as linguistic targets, arguing that

> *such targets in a second language setting only help to propagate the West-centric view that British or American English are normative and should be the ultimate exemplars of competence in EFAL/ESL environments such as the South African rural schools [p. 16].*

He however, explains that Standard English, like expertise, is learned though it may be relative and partial, positing that

> *In order to achieve expertise, one goes through processes of certification in which the teacher and the learner are judged against standards set by other people. The ability of the teacher and the learner to exercise command over the morphological, syntactic, phonetic and semantic features of English is indispensable for certification; it also ensures mutual intelligibility with other speakers from different locations as much as it ensures accrual of the much needed linguistic capital that characterises a hierarchized variety of English [p. 170].*

Although Ref. [9] seems to reduce learning to 'certification' and is unable to declare the 'other people' who should set linguistic standards, he appears to be supportive of Standard English as it is this 'variety' that brings about mutual intelligibility, is 'hierarchized' and confers linguistic capital to those who acquire it.

Within this context, Standard English empowerment is located within [10]'s conception of languages. As Ref. [11] notes, Ref. [10] conceived languages as

> *symbolic marketplaces in which some people have more control of the goods than others because certain languages or varieties have been endowed with more symbolic power than others and have therefore been given a greater value, e.g., standard languages, certain accents, a particular gendered style of speaking, a specific type of discourse [p. 6].*

I propose that Standard English falls in the category of a specific type of discourse because it is this variety that becomes standardised putting those who are able to acquire it at an advantage and those who are unable to at a disadvantage. According to Ref. [11], the purpose here is to "make decisions about matters involving language, such as the teaching of standard languages and the skills of literacy" [p. 20] in education.

3. Standard English versus World Englishes

The term "World Englishes" was pioneered in 1986 by Braj Kachru to describe the nativised and distinct varieties of English spoken in non-native countries [12]. Although little is known about how World Englishes are able to account for failure of acquiring Standard English, it seems that recognising World Englishes is fast gaining traction. Similarly, although reasons for the popularity of different varieties may range from results of failure itself to mother tongue interference, the picture is even more complicated by English L1 users who are fast warming up to the idea of World Englishes franchise for L2 users.

English L1 users have realised the need to have a frosty attitude towards Standard English so that they do not appear to privilege nuanced tenets of their language mindful of being accused of propagating language imperialism. However, little is known if this does not just suit research sustainability for L1 users since legitimising World Englishes for L2 users will have the opposite effects of making Standard English a preserve of L1 users in the first place, leading to a scarcity of L2 academics skilled in Standard English. Encouraging World Englishes may therefore have further consequences of sustaining English L1 user employability as only L1 users would legitimately have claims to such necessary skills as editing, and teaching phonetics and phonology, which require knowledge of Standard of English. A further problem of World Englishes seems to be that its genuine currency is not yet available. As earlier noted, World Englishes have frequently been stigmatised with pejorative race connotations or identities such as Black-South African English (BSAE), Black-American English (BAE) or African-American English (AAE), with conversely no evidence of White-South African English or White-American English, except British and American Standard English. AAVE is

> almost identical in cities such as Boston, New York, Detroit, Chicago, San Francisco, and Los Angeles and shows none of the changes that ar``e occurring in the white populations of these cities [see, for example, Ref. [13], pp. 506–508).

Ref. [13]'s views above significantly contextualise the AAE variety in racial identities rather than geographical boundaries. However, although Ref. [14] views AAE as a variety of Standard English, she explains that

> Attitudes toward AAVE have not been particularly kind. The general public rarely views AAE as a legitimate, grammatical system; instead AAE is often negatively evaluated as 'ignorant', 'wrong', 'improper'', and so on. These attitudes emerge through institutions, such as schools, where the stakes are high for students who speak AAE [pp. 405–406].

The high Linguistic stakes in schools which Ref. [14] refers to above provide a hint on what Standard English is all about. Ref. [11] takes a slightly different view that

> *AAVE, … is not a dialect of English but a creolized variety of English which still, for many people, has certain profound differences from the standard variety, differences which must be acknowledged if we are to make wise decisions in matters affecting the education of children [p. 344].*

Stigmatisation of L2 users of English in terms of race effectively means that L2 users of Standard English will have to contend with the consequences of discrimination, putting them under scrutiny as their English competence will constantly be doubted just because they are black. That is why difficult decisions will have to be made especially by L2 black users of English whether to take the route of using World Englishes at the written level or to continue aspiring for achieving Standard English. As Ref. [7] has argued, it will be necessary to develop what he calls an international standard of World Englishes for the purposes of mutual intelligibility even when the world settles for World Englishes.

4. African languages mother tongue instruction in multilingual sub-Saharan Africa

Since much of sub-Saharan Africa was influenced by colonial legacies that partitioned the region's countries from a linguistic/tribal perspective, a notion of much contestation in the context of using a medium of instruction in sub-Saharan Africa is a mother tongue.

Much of the research related to the medium of instruction in sub-Saharan Africa has tended to be critical of the assumption that an early start to learning English is automatically better, as no conclusive evidence exists [15]. Instead, it is often felt that early instruction in the mother tongue is automatically better. However, due to sub-Saharan multilingual and socio-economic outlook, significant challenges exist for any firm claim to a specific language as a mother tongue (MT) medium of instruction for all the learners in most school environments. Moreover, mother tongue medium of instruction in Africa seems to be motivated by mere common sense principles and practice underpinning the teaching of a language to young learners that see what ([1], p.xii) has termed "teaching children as an extension of mothering rather than an intellectual enterprise". Although at the centre of the discourse on language of education are the important issues of additive and subtractive bilingualism, MT or home language is shibboleth to mother tongue advocates. In other words, mother tongue in Africa seems to be perceived as a zero-sum game in which critical thinking, creativity and problem solving can only be achieved in mother tongue African languages, with a suspension of the power of bilingual or multilingualism, including Standard English. In fact, a mischaracterisation a popular language such as English has often suffered in some contexts is that it is not immediately seen as a mother tongue for some users. Those who have associated mother tongue with African languages only, for example, have tended to believe that critical thinking, creativity and problem solving have eluded African learners because they have acquired learning in foreign languages. Since this view is based on common sense, and not research evidence, mother tongue advocates neglect the fact that even in the English-speaking world where English is a mother tongue of most learners, learners have not automatically acquired Standard English because of their use of English as their mother tongue. There too, learners have had to grapple with creativity, critical thinking, critical literacy and problem solving

skills needed in fields as wide as mathematics, science and technology. The implication from the literature (see Refs. [2, 3]) is that Standard English is associated with educated L1 users of English who are not necessarily experts in English. The evidence therefore is that CLIL is more essential to Standard English acquisition than is English mother tongue proficiency.

Another argument that has been put forth by advocates of African languages mother tongue instruction is that because English is essentially a colonial language, it has a hegemonic potential of diminishing both the African identity and the African languages. Writing about the ambivalence of some users of English for whom English is not their own language and may feel that English threatens the existence of their own languages, Ref. [7] advises thus:

> *If you live in a country where the survival of your own language is threatened by the success of English, you may feel envious, resentful, or angry. You may strongly object to the naivety of the populist account, with its simplistic and often suggestively triumphalist tone…..These feelings are natural, and would arise whichever language emerged as a global language. They are feelings which lead to fears, whether real or imaginary, and fears lead to conflict [p. 3].*

What Ref. [7] states above is what is already known about attitudes to the English language. New intrigue can be gleaned from what Ref. [16] observes that

> *It is not just that Microsoft, Google and Vodafone conduct their business in English; it is the language in which Chinese speak to Brazilians and Germans to Indonesians.*

From this evidence, sub-Saharan Africa needs to move from the fear of consuming the English language to unlock the hidden potential of the English language for knowledge production in disciplines as wide as politics, economics, mathematics, science and technology, in addition to literary benefits.

5. CLIL

In Ref. [17]:

> *CLIL is an educational approach in which various language-supportive methodologies are used which lead to a dual-focused form of instruction where attention is given both to the language and the content:… [A]chieving this twofold aim calls for the development of a special approach to teaching in that the non-language subject is not taught in a foreign language but with and through a foreign language [p. 8].*

CLIL has also been "often seen as an umbrella term covering aspects of bilingual education, cross-curricular teaching, content-based teaching and ESP" (see, for example, Ref. [18], p. 275). Nevertheless, in a seminal work on CLIL, Ref. [19] places English at the centre of discourse by arguing that although CLIL is related to ESP, it is different in the sense that CLIL is best-suited for delivery in bilingual contexts.

> *Over the past two decades an increasing body of research has demonstrated that CLIL can enhance multilingualism and provide opportunities for deepening learners' knowledge and skills. CLIL has been found to be additive (one language supporting the other) and not subtractive (one language working against the other) (in Ref. [20], p. 1).*

From the above, it is clear that English in CLIL does not pose any danger to other languages as meaning is mediated through content by English L2 users. In Ref. [21], the challenge to science teachers working with learners through English is presented thus:

> *Science is, in itself, a language and each different science (biology, physics, chemistry) is a separate language [p. 32].*

It is posited (in Ref. [22]) that teachers of chemistry have to teach various terminologies such as words with high frequency in chemistry, specialised terms, and "phrases students can use to embellish chemistry language", [p. 7] including diagrammatical content in English.

6. Research methodology

Research reported about in this chapter was part of a larger longitudinal project of close to a decade. In terms of methodology, the work is influenced by that of Ref. [23] who says that sociolinguistics involves everything from considering "who speaks (or writes) what language (or what language variety) to whom and when and to what end" [p. 46]. Since Standard English is often viewed as a language variety involving educated users of the English language, it is situated in sociolinguistics. Within that sociolinguistics dynamic, a qualitative research methodology was used to investigate the role of Standard English in CLIL. To that end, an observation technique involving fieldwork was deployed.

Observations have long been part of dynamic approaches employed in sociolinguistics [24]. Therefore, observations are used here in the context of the evolving discipline of qualitative research methods. In observing an L2 learner, Ref. [25] uses Eleanor Duckworth's out-of-the ordinary assignment to her university students in which she asks them to watch the habit of the moon and record what they see in a journal.

> *She wanted to engage them with a phenomenon, some-thing of interest to observe that would provide the foundation for discussions about the nature of learning and teaching. The students, who were also teachers, reacted to the assignment as any class would: some found it puzzling, others found it irritating, others became quickly engrossed [p. 509].*

I use some of the archival material of the British explorer to sub-Saharan Africa, David Livingstone, as well as some of the abandoned colonial manufactured-machinery as findings based on historical facts. Writing about observations as practiced by explorers of the African content in the nineteenth century, such as David Livingstone, Ref. [26] makes the point that "observation was the key term in the lexicon of empirical science", however, "how and what to observe were far from self-evident". He goes on to say that:

> *the explorers then were trained to know "how to locate and purify water, make fire, set up camp, secure roads and build bridges,…. including saddlery, wagons, guns, traps and medicine" [p. 63].*

A succinct point to note is that observations for European scientists were not confined to a specific branch of knowledge because to be successful in life, a variety of knowledges of the world was and is still needed. Seen from this perspective, observations as used in the nineteenth century were underpinned by behaviourist theories of learning. A possible strength

of this European observation of the world from a behaviourist perspective was that it both allowed the Europeans to compare what they already knew with what they did not know and also permitted them to extend their knowledge of the world and science itself.

Although European explorers set themselves to gain knowledge of the world, the focus of their observations was to accumulate as much knowledge as possible about others in order to serve the European body and not vice versa. In the introduction to *the post-colonial studies reader*, Ref. [27] stress this point by explaining that at the height of British imperial power,

> *The most formidable ally of economic and political control had long been the business of 'knowing' other peoples because this 'knowing' underpinned imperial dominance and became the mode by which they were increasingly persuaded to know themselves: that is, as subordinate to Europe. A consequence of this process of knowing became the export to the colonies of European language, literature and learning as part of a civilising mission which involved the suppression of a vast wealth of indigenous cultures beneath the weight of imperial control [p. 1].*

Clearly, the observations as used by the Europeans were obtrusive, suppressive in nature and they were underpinned by the zero-sum game.

6.1. Tools of observation

Given that the observations were aimed at supressing Africa's sociolinguistic and scientific knowledge, I link the tools of observations used by the Europeans to imperial dominance, usually captured in the eye of the camera. Therefore, in order to suspend this form of European gaze, in addition to using a digital camera in capturing sociolinguistic vignettes to reflect the deliberate inequality between the imperial power and the indigenous African societies, I use metaphors of the snail, the turtle and the leech as the tools of observations. Thus, while the camera was used to capture key documents of the David Livingstone's archival material which are analysed using Critical Discourse Approach (CDA), the metaphorical tools of observation were used to enhance rigour or confidence in the gathering of data in an unobtrusive way. The data was collected from documents, leading to the categorisation of the findings in non-statistical ways. The deployment of the metaphors of the snail, the turtle and the leech as unobtrusive tools of observation is explained in what follows.

6.2. The Snail

One mundane creature that is used as a tool of observation is a snail. In her book entitled *Snails and Bivalves Teach*, Ref. [28] writes that

> *Snails and bivalves are a part of the diversity around us and have many features and characteristics that allow them to be used as a teaching tool for understanding the many different aspects of nature both outdoors and in the classroom. Snails and bivalves are good subjects for observation and experiments [p. 4].*

Building on the work of Ref. [28], I use the painstaking, slow movements associated with the snail as a metaphor of observation for illustrating care and rigour employed in this qualitative methodology in order to bring the sociolinguistic value of Standard English in CLIL to

the surface. I posit that the snail can serve as a prism to anchor the findings related to CLIL teaching across primary school. A different lens is proposed to sharpen the observation focus on CLIL teaching across secondary school. This is a turtle.

6.3. The Turtle

The wisdom of Turtle is that he always chooses to keep his head in until such a time that he calculates when to stick out his neck. This should come as a bad theory for postmodern theorists who seem to operate from the place of risk-taking. Tending to be attracted to the theories of rebellion and chaos, postmodern theorists thus seem to associate intelligence to obtrusive curiosity and difference. Post-postmodernists have tended to acknowledge an intelligent person as someone who is obtrusively aware of the surroundings she operates in, able to prance and preen, even if such attributes are no more than akin to the *hello factor*. However, Turtle, relies more on critical thinking and cognitive capacities than reckless speed. What may be unknown to postmodernists and post-postmodernists alike is that turtles have gathered and analysed knowledge of the world surroundings to such minutiae that they have been able to apply their time-honoured knowledge of the world effectively against the expectations of those immutable creatures who associate them with slow and mundane life. Because of the extreme care associated with the turtle, the turtle can serve as a prism to anchor the findings related to CLIL teaching across secondary school. Within qualitative methods, a different lens is required to complement the metaphor of the turtle beyond teaching Standard English using CLIL in secondary schools. This is a leech.

6.4. The Leech

A metaphor used in confronting English in CLIL as an observation tool for conceptualising the teaching of Standard English at tertiary level is that of the leech. For four decades, I have observed that Leech is a worm who usually lives in water and twirls itself silently to other creatures with whom it attaches to suck their blood. For Leech, water is its capsule that allows it to navigate to his/her prey. Leech is a tender animal whose sense of wisdom allows him/her to make a move only when it determines that the creature to which it wants to attach is unaware of the lurking danger. By the time the creature feels the itch, Leech has already sucked sufficient blood. However, though no literature exists if leeches have been used as delicacies by human kind, leeches are not just associated with being dependent on other creatures: they have also been used as medical instruments to remove blood from sick people by doctors. Leech's body has thus been used as a life-saving capsule for humankind.

Sub-Saharan Africa was categorised by some early European explorers as a region habited by people of inferior faculties. The teaching of English to the Africans was therefore tailored towards the social, religious and cultural emancipation of these inferior beings, using CLT. As already pointed out, CLT served a limited sociolinguistic fare communication which was insufficient to bring about sociolinguistic empowerment. What we still need to know is how to confront and address this reality by redefining and refining the boundaries of a constructivist approach to Standard English in CLIL. I, therefore, use the metaphor of the

leech as a lens to reimagine possible ways through which to reflect the knowledge withheld about Standard English in CLIL by the British explorers. There are definite advantages for exploiting this.

> *Much CLIL classroom practice involves the learners being active participants in developing their potential for acquiring knowledge and skills (education) through a process of inquiry (research) and by using complex cognitive processes and means for problem solving (innovation) (see Ref. [30], p. 5).*

What Ref. [29] state above can be interpreted to mean that CLIL hinges on the constructivist methodology. As Ref. [26] notes, the early explorers practiced observations whose "emphasis was generally on the passive reception of knowledge rather than popular participation in making knowledge itself" [p. 62] the result of which was that Africa has tended to produce what it does not consume and consume what it does not produce. Consistent with this paradox, many previous works on the role of English for wider communication in sub-Saharan Africa have tended to serve the limited labour of mimicking European social or anthropological behaviour. They have largely used English in literary productions of prose, poetry, drama and mechanical engineering enterprises of assembling, repairing and lubricating machines manufactured by Caucasian intellect and craftily modified by Asian intellect. Whilst I accept that this knowledge has served some purpose, I maintain that this knowledge has not been sufficient to cure the ills of the past. The metaphor of the calculus of the leech penetrating David Livingstone's after-life, sifting and sucking Livingstone's treasure trove in order to leverage the fortunes of Standard English the Africans were denied, therefore, can serve the purpose of refining our way of using Standard English for empowerment through CLIL. When it comes to the choice of the observation apparatuses used to strengthen rigour of the methods here, this work draws impetus from Ref. [28], who challenges us that "[e]verything that is useful does not have to look nice" [p. 17].

7. A critical discourse analysis (CDA)

The findings reported about in this chapter constitute a sociolinguistic document analysis based on historical facts of David Livingstone archival paraphernalia. Within a qualitative methodological paradigm, I apply a CDA lens to interpret the findings within the role of Standard English in CLIL. In Ref. [30]:

> *Critical discourse analysis (CDA) is a type of discourse analytical research that primarily studies the way social power abuse, dominance, and inequality are enacted, reproduced, and resisted by text and talk in the social and political context. With such dissident research, critical discourse analysts take explicit position, and thus want to understand, expose, and ultimately resist social inequality [p. 352].*

Archival research produces a significant amount of textual data, and thus is ripe for CDA methods. For example, the CDA approach was developed specifically to work with archival data in multiple modalities and genres across time, including news media, museum exhibits, television programs, letters, textbooks and other genres [31]. I frame Standard English within CDA because, as Ref. [31] note, "CDA routinely engages texts that reflect inequality

or other abuses of power" [p. 109]. Drawing on Ref. [32], Ref. [31] further argue, for example, that the development of CDA "and understanding of the tensions between African-American Vernacular English and Standard Edited English cannot be denied" [p. 112]. I therefore posit that both Standard English and the findings from the archival material of David Livingstone reflect deliberate inequality and can best be appreciated from a sociolinguistic perspective.

8. Findings

Dr. David Livingstone was born in 1813 in Blantyre, Lanarkshire in Scotland and has been appropriated by many African countries. He first penetrated Africa through South Africa and is credited to be the first European to see the Victoria Falls, one of the wonders of the world lying on the border of Zambia and Zimbabwe. David Livingstone observing the Mosioatunya Falls, which he had the influence of renaming as the Victoria Falls, jested thus:

> No one can imagine the beauty of the view from anything witnessed in England. It has never been seen before by European eyes…. but scenes so lovely must have been gazed upon by angels in their flight (see Ref. [33], p. 107).

Fiona Hyslop, one time Cabinet Secretary for Culture, Tourism and External Affairs of Scotland, described David Livingstone as "Embodying a thirst for education and knowledge combined with inventiveness, enterprise and a capacity for endurance, he made a significant contribution to our understanding of the world [34]. Livingstone died in 1873, at the age of 60, in Chief Chitambo's Village, near Lake Bangweulu in Zambia (then Northern Rhodesia).

In order to understand the value of the findings, it is important to put Livingstone's motives in their proper historical context. In Ref. [26], David Livingstone is documented as he strategizes with his officers thus:

> Habits of industry were to be cultivated, free labour was to replace slavery, the ethos of private property was to be promoted, and the moral influence of a well-regulated and orderly household of Europeans was to be encouraged [p. 86].

From the above, it is not difficult to understand that European explorers set to define the purpose of the life of an African as one *fit for living* and *not leading*, once slavery ended. Conversely, where, as Ref. [26] reports, evidence exists that British explorers acquired the science of making fire from the Africans, no research exists to show that the explorers shared their knowledge of industrial production in Western science, food production, technology or engineering with the Africans. Ref. [26] later describes David Livingstone's body as being "integral to his presentation as an explorer —it was represented in the field as being in perpetual motion, warring with the elements, scarred by the battle with Africa, yet resilient to the last" [p. 70]. It is clear then that the purpose of the observations was in turn to set the British traveller as "a resourceful leader of men, equally capable of exploiting local knowledge" [26]. This observation technique is akin to that of a leech in the sense that the leech approach to knowledge empowers the observer to emerge stronger than the observed.

Among several sphinxes of Livingstone's I found, once I opened the time capsule, were hand-written letters, one of which contained the following phrase:

The lust of gain in the master must always increase the hardships of the slave

Figure 1 contains the phrase.

One way of establishing that nuance has been as much part of the repertoire of the English language as both the British themselves and the corruption that has marked the sociolinguistic evolution of English itself, is to apply CDA to these findings. So rich is the English language that the surface structure of the modal verb *must* in David Livingstone's note can be interpreted to mean that he was in fact encouraging slavery. A careful scrutiny in fact reveals that although David Livingstone is credited for spearheading the abolition of slavery, he still believed in the superiority of his race. [26] quotes Livingstone giving instruction to his officers before an expedition to sub-Saharan Africa, thus, as follows:

> *We come among them as members of a superior race and servants of a Government that desires to elevate the more degraded portions of the human family [p. 86].*

From a morphological interpretation of the word *must*, it can be concluded from the above then that Livingstone was himself a slave driver and, therefore, a possibility exists that *must* in his utterance meant a *demand*. Yet, so nuanced was the English language used by David Livingstone that the deep structure of the word *must* could also suggest that David Livingstone was against slavery—once the reader takes the modal verb *must* to mean *does*. Ref. [35] quotes David Livingstone's instructions to his officers on the Zambezi River expedition of 1858, confessing the ill motives of the Europeans, thus, as follows:

> *The main objective of the Expedition ….is to extend the knowledge already attained of the geography and mineral and agricultural resources of Eastern and Central Africa, to improve our acquaintance with the inhabitants, and to engage them to apply their energies to industrial pursuits and to the cultivation of their lands with a view to the production of raw material to be exported to England in return for British manufactures [p. 103].*
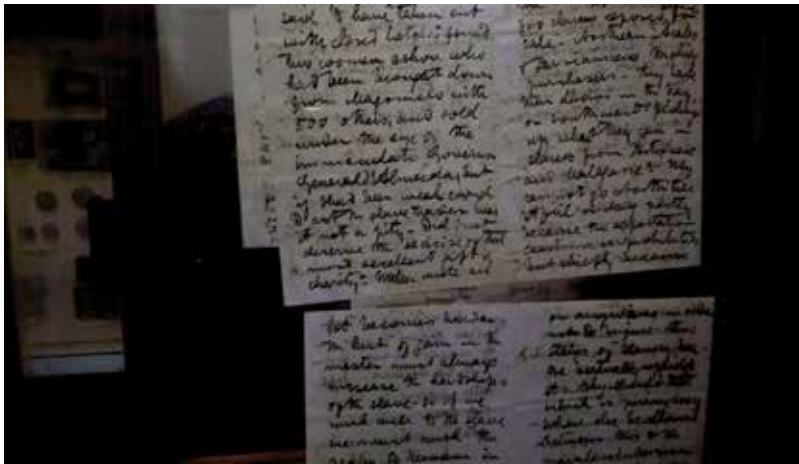

Figure 1. : Some of David Livingstone's letters.

The Zambezi River starts from the Kalene Hills of North-western modern Zambia (then part of central Africa) and passes along the Botswana and Zimbabwean borders with Zambia, through Mozambique to the Atlantic Ocean. In fact, although it is clear that British explorers knew the value of integrating art into knowledges as wide as politics, religion, science and technology or engineering, knowledge of industrialisation for an African was strictly limited to habit formation or social aspects and the limited literary scholarship. What Ref. [35] quotes is in fact available from Case number Two of Livingstone's handwritten letters dated 1858, innocuously archived at the Livingstone's Museum in Zambia (see **Figure 2**).

Africans were socialised into cultural exchanges through making acquaintances by way of religion and literature while they toiled their labour in industrial production of agricultural
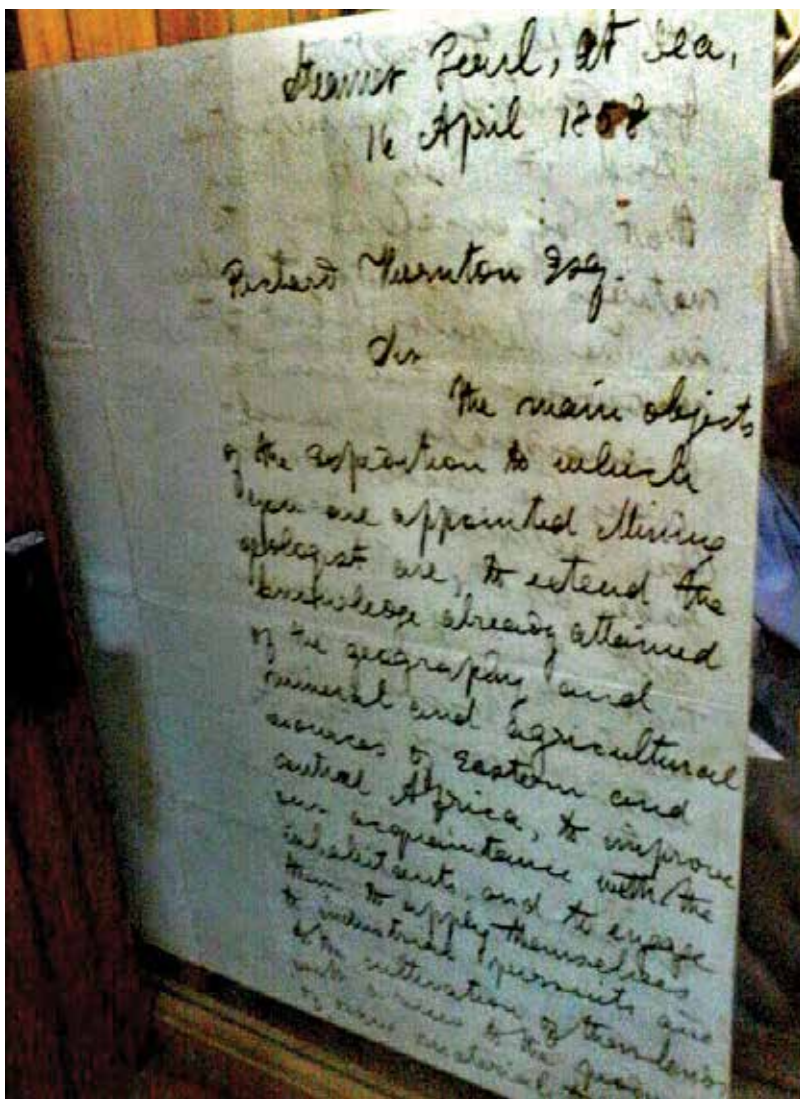

Figure 2. David Livingstone's letter dated 1858.

products and minerals, whose raw material was polished in England. Africans would consequently be rewarded with manufactured goods such as machinery, guns and clothes, which they did not know how to make.

Ref. [26] further points out that "these objects served an iconic function symbolising that potent combination of politics, religion and science which composed the Livingstone myth" [p. 71]. However, as far as the passing of the knowledge of science to Africans is concerned, what Ref. [26] refers to as the Livingstone myth was not a myth at all, as Livingstone, too, fulfilled the assignment of not communicating the knowledge of how to manufacture clothes from Africa's cotton and wool, engines from Africa's steel works and so on. Like many sub-Saharan African countries which obtained independence in the 1960s, Zambia became independent from Britain in 1964. The Livingstone Railway Museum is strewn with ancient British trains and steel works, manufactured in England, whose knowledge of manufacture remains a mystery to Zambians and Zimbabweans alike to this day, as envisioned by David Livingstone, as the Zambian town of Livingstone borders the Victoria Falls town of Zimbabwe. **Figure 3** illustrates this reality.

Figure 3. Abandoned steel works at the Livingstone's Railway Museum in Zambia.

David Livingstone's career as a medical doctor, explorer and Christian missionary and his handwritten reflections in his letters and notes in English are constitutive of the superior value of knowledge of CLIL in the contributions of great human beings to the understanding of the world around them, instead of a minimalist approach to scholarship. Clearly, such interpretations are only available with knowledge of Standard English.

Table 1 helps to complement the linguistic findings which reflect deliberate inequality.

Linguistic feature	Deliberate inequality
Figure 1: Writings from one of David Livingstone's letters	See Ref. [26], p. 86
In reference to [33], p. 107	See Ref. [26], p. 70
Figure 2: Livingstone's handwritten letter dated 1858, in case number two archived at the Livingstone's Museum in Zambia	Abandoned steel works at the Livingstone Railway Museum in Zambia [see **Figure 3**]

Table 1. Linguistic findings that reflect deliberate inequality.

The above findings have been analysed from a CDA perspective. A profitable way of interpreting them from a sociolinguistic perspective is that in a multilingual context, the concept of Standard English holds inherent power for militating disadvantage in a speech community, such as that of the English sub-Saharan Africa, particularly when Standard English is utilised from a CLIL perspective.

9. Conclusion

David Livingstone's career as a medical doctor, explorer and Christian missionary and his handwritten reflections in his letters and notes in English are constitutive of the superior value of knowledge of CLIL in the contributions of great human beings to the understanding of the world around them, instead of a minimalist approach to scholarship. Previous works have tended to dwell on the historicity of recounting and appropriating greatness of European explorers. Most have even followed the footsteps of Morton Stanley who had unrivalled gift for self-publicity. Instead of focusing on locating David Livingstone in Africa when he was believed to be lost, Ref. [36] egoistically shifted the focus of his exploration onto himself in his infamous book: *How I found Livingstone,* and his famous remark, *Dr Livingstone, I presume* [26]. Others have even pointed to the infelicities of the authors of African history. Bemoaning the ills of the colonial past has been the subject of much research offered by both African political and literary laureates. Here, I use Livingstone's life as a canvass for investigating Standard English in CLIL for sub-Saharan Africa. Therefore, the findings at the Livingstone Museum indicate that procuring the knowledge withheld by the Europeans from the Africans calls for mounting such rare intellectual lenses as the snail, the turtle and the leech. Conclusively, to pursue the place of Standard English in CLIL in the sub-Saharan African context is to invest one's intellectual power in the success of what appear on first sight to be irrelevant creatures such as snails, turtles and leeches, which have not received as much attention from world tourists as African elephants, monkeys, leopards, zebra and lions have. Lenses that tend to focus on the obvious are the ones the current work seeks to suspend.

One limitation in the findings reported in this chapter is that some of the observation lenses belong to the immerging research that contributes to our understanding of the ways in which rigour can be achieved in qualitative research methods. These lenses are to be viewed in the metaphorical sense in which they are construed rather than literally.

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The Characteristics of Language Policy and Planning Research: An Overview

Prashneel Ravisan Goundar

Additional information is available at the end of the chapter

Abstract

This chapter has been compiled to provide an overview of the language policing and planning (LPP) field, particularly for new researchers who would like to pursue their MA or PhD. It aims to explore the following: the genesis of LPP from the 1950s to date, type of research questions pertinent to the field, methodology that can be applied, substantial literature review and case studies that have been carried out in LPP, ethnography of language policy and planning, the historical analysis approach and authorities in the field of LPP such as Hornberger, Johnson and Ricento.

Keywords: language policing and planning (LPP), ethnography, research instruments, historical analysis approach

1. Introduction

Language policing and planning (LPP) is one of the fastest growing subdisciplines of applied linguistics [1]. The LPP field was formed in the early 1960s by language scholars interested in solving the language problems of new, developing and/or post-colonial nations.

As claimed by many to be the pioneer in the field of LPP, it was Haugen who introduced the term language planning in 1959. Haugen defined language planning as "the activity of preparing normative orthography, grammar and dictionary for the guidance of writers and speakers in a non-homogenous speech community" [2]. What Haugen described was later categorized as status planning [3], corpus planning [3] and acquisition planning [4].

2. The emergence of language policy and planning as a field of applied linguistics

As emphasized earlier, LPP is a new field of study which is growing rapidly but researchers have found LPP structures from the World War II era. Ricento [5] "traces the evolution of LPP research since World War II in three phases with their respective socio political, epistemological and strategic concerns." It is argued that the 1950s–1960s was an era of decolonization and state formation during which LPP research was carried out under a structured paradigm that was oriented towards problem solving [1].

2.1. The 1950s–1960s era

The LPP field came into existence from this period and many linguists emerged to provide solutions of LPP-oriented issues in light of the colonial ruling globally. Johnson [2] argues that "during this era, many linguists were recruited to help develop grammars, writing systems and dictionaries for indigenous languages and, out of this, an interest in how best to develop the form of a languages, i.e. corpus planning grew." Lin [6] shares her perspective on the development of LPP. She states that "language policy and planning (LPP) as an interest for academics emerged in the 1950s, and 1960s has largely been 'problem-oriented' that responded to the needs of the newly established states; these polities had just gained independence from their former colonial powers" [7].

It is stipulated that early researchers in LPP were technical in their approach, seeing their task as one of planning, standardizing, regulating, containing or managing linguistic diversity for the national development agendas; these would include planning for spreading a standardized national language as well as modern economic development [1]. Moreover, Hornberger and Johnson [8] claim that while early research offered various macro-level frameworks in order to account for and guide national language planning, the latest critical methodologies focus on how language policies can be hegemonic by delineating minority language education.

Finally, Johnson [2] explains why much of the earlier works in language planning has had negative feedback. "Initial language planning work has been critiqued for various reasons—as it was exclusively focused on deliberate language planning done by governing states, because the work was subjugated by a structuralist or positivistic epistemology and because the frameworks disregarded the socio-political context in which language planning takes place" [2].

2.2. The 1970s–1980s period

During the 1960s–1970s, LP was seen as a non-political, non-ideological, pragmatic and a technicist paradigm. Its overt objective was to solve the immediate language issues of the newly emergent post-colonial states in Africa, Asia as well as the Middle East. Furthermore, status language concerns at this time, thus, focused in particular on establishing stable diglossic language contexts in which majority languages (usually, ex-colonial languages and most often English and French) were promoted as public languages of wider communication [9].

On the contrary, Johnson [2] argues that "it is challenging to precisely and/or cohesively characterize the work during this period as interest became more prolix that extended beyond the corpus/status distinction, and many language planning academics began to question the practicality of previous models of language planning" (p. 30). He further explains that it was during this time whereby positivistic linguistics paradigms and structuralist concepts were increasingly being challenged among various disciplines. The critical linguistics and sociolinguistics examined previous approaches that attempted to divorce linguistic data from the sociocultural context in which it was created. Therefore, these two related, nevertheless diverse, areas of research have facilitated in shaping the LPP field [2].

Therefore, Hymes suggested that what needs to be accounted for in any acceptable theory of language users as well as language use is a speaker's communicative competence, which takes into account not only the linguistic ''competence'' as defined by Chomsky but also the sociolinguistic knowledge to interact applicably in particular sociocultural contexts [2].

2.3. 1990s to current expansion of frameworks

Current developments in LPP further focus on the agency of local social actors in the policy-implementational spaces [8]. Each of these theoretical developments carries with it different methodological and epistemological stances [1].

Johnson [2] argues that the critical shift in linguistics and sociolinguistics ultimately influenced the field of language planning and overtly integrated into critical language policy in the 1990s, but prior to that, there were at least three crucial developments:

(a) The attention moved away from "language planning" being understood exclusively as something obligatory by governing bodies to a broader focus on activity in several contexts and layers of LPP.

(b) An increasing interest in language planning for schools, including the introduction of acquisition planning by Cooper [4] to the original status/corpus distinction.

(c) An increased interest in the sociopolitical and ideological nature of LPP.

3. Pertinent research questions

Various questions can be derived from the issues that concern language, its maintenance and its growth. The following are the suggested research questions that researchers may take up as part of their MA or PhD curriculum.

(a) What processes are involved in language planning and policy in a polity?

   This question examines the process that is undertaken in creating a language policy in a country, society or state. Researchers can search through archival documents such as meeting proceedings, debates on the creation process as well as draft copies of the language policy.

(b) How is a particular language policy being enacted in the schools?

This question deals with the notion that a language policy exits in a country but whether it is being enacted properly or not in schools, either in the primary or secondary sector.

c) What is the correlation between language issues of a country and its LPP?

The language issues that arise in a country could be attributed to the LPP. This question examines first, the language issues then it analyses the language policy and how it is related to the language issues.

4. Ethnography of language policy and planning

The term Ethnography can be defined as the scientific description of customs of individual people and cultures. Ethnography research plays a major role in language policy and laguage planning (LPP), multilingualism and language education researches (Some of the experts in the field include [2, 5, 8–12]).

One of the crucial researches in this field was carried out by Hornberger and Johnson [8], which is cited in recent LPP researches. In this article, the authors initiate the need for more multi-layered and ethnographic approaches to language policy and planning (LPP) research by emphasizing on two examples of how ethnography can irradiate local interpretation and implementation. They propose ethnographic data collected in two distinct institutions. Both of these perform as transitional agencies between national language policies and local educational initiatives [8].

Analysing from long-term ethnographic work in each context, the researchers present pieces from spoken and written discourse that bring light on the opening up or closing down of ideological and implementational spaces for multilingual language education policy as well as practice. Using examples they illustrate that ethnographic research can, figuratively speaking, slice through the layers of the LPP onion [13] to unveil agentive spaces whereby local actors implement, interpret and often resist policy initiatives in varying and exclusive ways.

Davis explains that even though critical approaches, such as the historical structural approach, provide a logical base for LPP research, it lacks a methodology for gathering data. However, she suggests that ethnography can offer a copious description of language planning within communities, schools and other social institutions. Hornberger and Johnson [8] and Canagarajah [12] add that ethnography can help build LPP models and inform policy-making.

Furthermore, Hornberger and Johnson [8] agree with Davis that ethnographies of language policy offer unique insights into the LPP processes through broad descriptions of policy interpretation and implementation at the local level. Hornberger and Johnson [8] further clarify the ideology and implementation of ethnographic researches by stating "Ethnographic language policy research offers a means for exploring how varying local interpretations, implementations, negotiations and perhaps resistance can pry open implementational and ideological spaces for multilingual language education" (p. 511).

The research instruments that were used in Johnson's multi-sited ethnographic study between 2002 and 2005 of language policy in the School District of Philadelphia included participant observation, recorded interviews, recorded naturally occurring conversation, historical legal

analysis and textual analyses [8]. Consequently, his research used intertextual analyses to look at spoken and written discourse throughout the various layers of language policy development, interpretation and implementation.

To add on, Canagarajah [12] claims that ethnographers may supplement participant observation with surveys, questionnaires and interviews and may use audio and video taping, field notes or digital media to "capture" data. Whatever means are used, ethnographers present a broad description of concrete details and narratives in their reports, enabling readers to see language practices in all their contextuality and variability [12].

5. The historical-structural approach

A wide range of topics that can be investigated using historical-structural research methods can make it difficult for beginning researchers to decide what to include in a research plan [1]. A useful structure for establishing historical-structural study is illustrated in **Table 1**. This structure takes on the traditional divisions between the language-planning processes of status

Language planning processes	Examples of micro-level analysis (involves 'bottom-up' level of planning)	Examples of macro-level analysis (involves 'top-down' national government policies)	Examples of historical-structural factors
Status planning	Multilingual discourse practices in classrooms and schools Implicit language policies in families Translation and interpretation in the police, court and other state institutions	Monolingual ideologies of language in official policy statements Constitutional provisions for official multilingualism Political self-determination in minority-language communities	History of colonialism Linguistic imperialism Linguistic stratification in the job market The role of language in elite closure Language and national identity
Corpus planning	Codification Functional and terminological elaboration Linguistic purification programs New varieties of English and other languages of wider communication	Language documentation Multi-modal literacies The rise of new indigenous literatures	Standardization and "accountability" in education Movements for authenticity and cultural identity Ethnolinguistic nationalism
Acquisition planning	Content of curriculum, textbooks and materials Standardized testing and washback Indigenous pedagogies in schools	Movements for indigenous curriculum and pedagogies International cooperation among linguistic-rights movement	Maintenance of colonial educational systems in post-colonial states Availability of resources and influence of funding sources for textbooks, materials and teacher training Globalization and English language policy Discourse of the instrumental value of English

Note: Adapted from Tollefson [14].

Table 1. Descriptive framework of historical-structural research.

planning, corpus planning as well as acquisition planning and between micro and macro levels of analysis [14].

Corpus planning can be defined as those aspects of language planning which are primarily linguistic and, hence, internal to language [15]. Some of the example of these aspects that are related to language planning includes orthographic (the way in which words in a language are spelled) innovation, including design, harmonization, change of script and spelling reform; pronunciation; changes in language structure; vocabulary expansion; simplification of registers; style and the preparation of language material [15]. Whereas status planning is concerned with the environment in which the language is used, for example, which language is the "official language" or the "national language" of a country.

According to Donakey [16], acquisition planning is concerned with language distribution, which can involve providing opportunities to use a particular language to increase the number of users. Furthermore, Tollefson states that historical-structural factors may apply in all the planning processes at all the levels.

6. Conclusion

In a study that investigates language policy and planning (LPP), it is pivotal to comprehend what the researchers take up in their scholarship. Hult and Johnson [1] clarify this particular point by stating that LPP researchers are concerned with the creation, interpretation and appropriation of policy on language status, corpus or acquisition in particular contexts—we seek to understand, illuminate and influence policy-shaped/policy-shaping texts, discourses and practice.

Furthermore, LPP researchers often take up the "what" of language policy as it plays out in education, focusing on policy and planning around language teaching and learning or language in learning and teaching [1]. This, in turn, constitutes the fields which could be investigated, for example, policies on language learning and instructional practices in classrooms at elementary, secondary or tertiary levels; on language acquisition and use in classroom interaction; or on method of assessing what a language learner knows and can do. Hult and Johnson [1] summarize this perspective by stating that context is crucial to analysing, interpreting and generalize findings.

7. Future directions

Language planning and policy (LPP) research falls into the field of sociolinguistics which is a branch of applied linguistics. Sociolinguistics is the basic grounding needed for scholars to engage in LPP studies. The terminology that is vital or the background knowledge that is required for LPP studies can only be derived from sociolinguistics. Therefore, it is suggested that students actively involve themselves in this before engaging in LPP research.

To sum up, this chapter has outlined the characteristics of language policy and planning research, the type of questions pertinent in this field. The article has also discussed some methodology

which can be employed in conducting future studies. Moreover, those who are unfamiliar with the terminology used in the LPP field should have become acquainted with these.

Glossary

Acquisition planning	It is concerned with language distribution, which can involve providing opportunities to use a particular language to increase the number of uses
Corpus planning	It can be defined as those aspects of language planning which are primarily linguistic and, hence, internal to language [15]
Macro-level analysis	It involves 'top-down' national government policies
Micro-level analysis	It involves 'bottom-up' level of planning that includes private initiatives such as local groups
Status planning	It is concerned with the environment in which the language is used for example, which language is the "official language" of a country or the "national language". Which language should be used in schools? Which language(s) should be used in the media?

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Critical Discourse Analysis Perspective on Norwegian Public Health Nursing Curriculum in a Time of Transition

Berit Misund Dahl

Additional information is available at the end of the chapter

Abstract

Discourse analysis is an area of social linguistics, which can advance social theory in the direction of language. Public health nurses are to perform health promotion and disease prevention work on an individual and population level. By identifying how features of different discourses are constructed and maintained, combining linguistics tools and social science perspectives, the purpose was to provide an understanding of the health promotion and disease prevention discourse in the public health nursing curriculum to reveal governmental strategies for public health nursing education in a time of transition. Fairclough's three-dimensional model of critical discourse analysis that consists of the analytical dimensions social events, social practices, and social structures was carried out. There is a linguistic-discursive dialectic between the dimensions. The analysis revealed four discourses in the curriculum text: a contradictory health promotion and disease prevention discourse; a paternalistic meta-discourse; a hegemonic individual discourse; and a hegemonic discourse for interdisciplinary collaboration. The results indicate a hegemonic disease prevention discourse, while the health promotion discourse being more disguised. The analysis revealed how language functions ideologically, and in line with the sociolinguistics, how the role of the language in the curriculum text can have consequences for the social work of public health nurses.

Keywords: critical discourse analysis, curriculum, disease prevention, health promotion, public health nursing, sociolinguistics

1. Introduction

Critical discourse analysis (CDA) emphasizes how language can function ideologically and how to identify hidden meanings in a text. Discourse analysis is an area of social linguistics,

which can advance social theory in the direction of language. Data from a study where we used CDA on the curriculum of Norwegian public health nursing partly forms the basis for this chapter. The purpose was to reveal the governmental understanding and expectations of how the public health nursing profession should perform their work and to reveal possibly underlying meanings about health promotion and disease prevention discourses in the text [1].

Public health nurses are to perform health promotion and disease prevention work on an individual and population level [2]. The role of public health nurses has changed. Traditionally, public health nurses were experts, with a "top-down" approach toward their service users. They performed mostly controls, inspections and told the population how to live healthy. This is in line with disease prevention strategies. Now the public health nursing role has changed to a "bottom-up" approach. It is an empowering role, where the public health nurse and the service users are dialogue partners. Emphasis is on revealing the resources of the service users in line with a health promotion strategy.

There are various forms of performing discourse analysis. The discursive psychology approach maintains that individuals are both products of discourse and produce discourses in social interactions. Laclau and Mouffe's discourse theory on the other hand assumes that discourses construct the social world in meaning, and this meaning is constantly in change. In CDA, the aspect is that discourse is just one of many facets of social practice [3]. In this case, Fairclough's methodology and analyzing method of CDA were found suitable. Fairclough has developed a useful concept of tools for analyzing text, which contributed to map the relation between the various microdiscourses in the curriculum text and a wider macrosocial discourse of public health nursing.

Discourse analysis is an area of social linguistics, which can advance social theory in the direction of language. CDA in the present shape asserts that the world is both socially and discursively constructed [4]. Fairclough includes microreadings of text with macro-social perspectives. It is about analyzing the patterns, the structure of the language, to identify the linguistic-discursive dimension of social phenomena, and processes of change in society [3].

In critical discourse analysis, we combine analyzing tools from linguistics with theoretical perspectives from social science. Combining linguistics tools and social science perspectives can reveal how language functions ideologically and how the language contributes to maintain power relations in society [5].

The chapter describes the public health nursing field, the methodology of CDA, and presents the results of a study using CDA.

2. Background

Norwegian public health nurses are authorized nurses with one year continuing studies of health promotion and disease prevention on the fields of child health clinics and school health services. Their main target group is children, young people and families. Almost 100% of the families attend the service. They shall particularly focus on health promotion and primary prevention strategies on individual and population level. They work with immunization, weight/

length control and advising about healthy living. In youth health centers, they among other issues prescribe prevention, insertion of contraceptive coil; perform pregnancy tests, and tests for chlamydia. The environmental health is about advising in health issues and immunization when travelling abroad, tuberculosis work, and preventing diseases as HIV and Hepatitis. Health services for refugees can include health consultations and examination, advising in health conditions, psychosocial work and immunization. The Norwegian government has given the PHNs a mandate to work with universal and health promotion strategies [2].

A literature review on research on CDA related to nursing curriculum revealed only a few hits. A CDA study of the syllabus of nursing education had focus on perspectives and underlying ideological principles in the sociological contribution to nursing curricula. The CDA was a good tool to reveal rich source of data. The researchers found that the biggest challenge was to challenge the ideologies that was constructed and embedded in the syllabi [6]. An article using CDA focused on the links between discourse, power, and elements of social processes, in line with Fairclough's methodology. The researchers studied British national newspaper representations of the academic level of nurse education and found that nurses lack a voice in the national press. They maintained that discourses do not exist in isolation, they are part of broader social discourses, and where nurses have little input into the construction of newspaper discourse [7]. Rogers & Shaenen focused on the use of CDA method when making a critical, integrative review of literacy education. They found the CDA method used in 76 literacy-focused studies, including curricular design [8]. They reflect on three decades of CDA in literacy studies. What they revealed was that there has been an increase in researchers using CDA in literacy education research. They revealed a diversity of approaches around contexts and that the reviewers were acknowledged their role as researchers in a reflexive way when performing CDA. They found that the participants in the reviewed studies mostly struggled against dominant ideologies, and many articles called for social action, both on microlevel and macrolevel. The researchers maintain this finding reject the understanding of CDA that it has no plan for constructive alternatives and social action [8].

From the research found, related to CDA method, we can sum up that CDA can be a relevant tool in analyzing text critically. Hence, the aim of this chapter is to demonstrate how CDA analysis can reveal underlying meaning in a text. The purpose of the study was not to study the curriculum document in depth, but to analyze possible dominant and disguised discourses in the text, to reveal underlying governmental principles for how public health nurses should promote health and prevent diseases.

3. Critical realism and sociolinguistic theory

Fairclough has his roots in a critical discourse analysis tradition. He has developed his methodology and analyzing method over the years, and his philosophy of science is close to critical realism. Critical realism is not as relativistic as social constructivism. Not all representations of the world are equally good, a critical realism defender would say there are some representations that can constitute better knowledge of the world than others [4].

The movement from which Fairclough is affected is the sociolinguistic direction. Sociolinguistics is the study of the relationship between language and society. The emphasis is on the role of language in communication. Fairclough [4] maintains that critical discourse analysis is part of a broadly conceived social linguistics. In the terms of Fairclough to reveal the truth of a text, one must analyze the dialectic between structure and action.

The attention is on the effect of the society on the language. Fairclough defines discourse as the use of language as a social practice and not only as an individual activity [9]. He makes use of the concept discourse about both orally and written language. This is what the structuralist linguist Saussure name parole or the situational language. In the understanding of Saussure, parole is an individual activity not suitable for being analyzed [10]. Socio linguists have put forward criticism of Saussure and maintain that the language is socially created and not individually [9].

There is an increasing emphasis on language in recent social theory but still a failure in showing in social research how language figures in social life [4]. Hence, a theorization of social language can contribute to a dialectic between social structure and action. We can see critical discourse analysis as a part of a broader developed social linguistics.

Fairclough's draw on Foucault in the understanding of the subject and object as discursively created. Fairclough's focus includes a broad approach to language and text. Here, he separates from Foucault who is not engaged in the meaning of the language in the discourse and rejects the need of a text analysis. Rather, he refers to a macro-sociological analysis [3]. Where Foucault sees the subject almost as a victim of the discourse, the subject in Fairclough's view is an active participant in the change processes in the language and text interpretation. The active role of the subject brings about possibility for change. A critical attitude and possibilities of influence are fundamental in a critical discourse analysis. A way to understand Fairclough and Foucault is that they both find that the subjects constitute the discourse, but they differ in vital respect. Fairclough denies the structuralist view of Foucault and maintains that Foucault emphasizes the structure at the expense of the actor. A structuralist analytical procedure is about reduction and generalization of the text. Leaning on Foucault the curriculum represents a view within a given time, which will influence and determine the interpretation of the text. Fairclough advocates on his side a greater interaction between discourse and society.

The text embeds the ideology, and it is about identifying what lies behind the immediate "common-sense" understanding. The hidden ideology relates to the concept of hegemony, which Fairclough links to discursive power structures. Power relations maintain and change through struggles for hegemony between discursive and social practices. Authority and ideology are in the optics of Fairclough associated with struggles for hegemony. The ideological discursive struggles contribute to maintain the dominant relations. His opinion divides from Foucault, who understands power as a creative and productive force that permeates all discourses.

4. Method

Critical discourse analysis as method has suitable tools to develop the analysis and to describe important findings and perspectives to the research. Three dimensions of social life form the

analysis: the abstract social structure, the concrete events, and the social practice, which mediates the relationship between the two first dimensions.

4.1. Design

Fairclough has developed his design and analysis of text from a former three-dimensional conception of discourse that consisted of the analytical dimensions text, discursive practice, and sociocultural practice [9]. Fairclough maintains that one can still use this concept; however, he has developed the analyzing parts and given those new names and partly new content, more in line with critical realism theory [5]. The "new" dimensions are the basis in the present study of the curriculum of Norwegian public health nursing. It can be useful to highlight some main concepts which were fond suitable as tools to describe central approaches and results in the study (**Table 1**).

Critical discourse analysis sees concrete social events and abstract social structures as part of social reality [4]. As mentioned above, Fairclough distinguishes between three dimensions in his understanding of critical discourse analysis: social events, social practices, and social structures. In the social structures lie the potentialities for action. The social events dimension is where the actual actions take place. The social practice domain controls the performance of different events. This means that there is a dialectic between the three dimensions (**Figure 1**).

Text	The written or spoken language produced in a social event
Genre	Use of language associated with a particular social activity or work, for instance, interview genre
Style	How text figures in the identification of people; ways of being; production of social life
Discourse (abstract noun)	Language use conceived as social practice
Discourse (count noun)	Way of signifying experience from a particular perspective; ways of representing
Order of discourse	Totality of social practices of an institution, and relations between them; a specific configuration of discourses, genres and styles
Intertextuality	A text draws on elements and discourses of other texts; for instance, the influence of history on a text, and a text's influence on history
Interdiscursivity	Shifting articulations of genres, styles and discourses in specific texts; a form of intertextuality
Ideology	Ways of representing aspects of the world that contribute to establishing or/ and maintaining power relations and dominance. Ideology is often in the unsaid and implicit in the text
Power	Power and discourse are different elements in the social process. Power is both dominant and more invisible in the text
Hegemony	Processes for dominance in orders of discourse and social struggles. Ideology is associated with power as hegemony

Table 1. Definitions based on main concepts in Fairclough's critical discourse analysis.
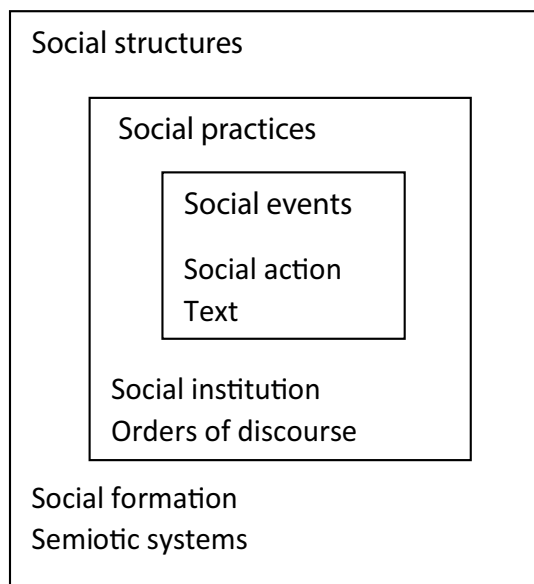
Figure 1. Model inspired of Fairclough's linguistic-discursive dialectic dimensions for analysis of social reality.

4.2. Sample

The national curriculum for public health nursing educations in Norway [11] was the field of study. Regulation for public health nursing education was not part of the analysis. The authority and directing perspectives of the government form the basis for the curriculum text. The Ministry of Education and Research produced the curriculum in 1998 and slightly revised it in 2005. It consists of a general section with a historical perspective and an argumentation for the need of a national curriculum, and a section, which describes the claims and expectations concerning the social task and knowledge basis for public health nursing profession. The curriculum defines the public health nursing field to nearby professions.

4.3. Data analysis

4.3.1. Social events—social action—text

The dimension of social events is about social actions on the microlevel, the concrete level [4]. Emphasis is on analyzing the linguistic-discoursal elements of a text, the verbal interactions. The way the language is used can unveil which institution produced the text. In the present case, we have a governmental document, the educational curriculum.

To unveil the "hidden" meaning in the document, the first step was a linguistic approach to language and text analysis. The attention was both on form and on meaning, through symbols as words or longer text sequences, which per Fairclough is socially motivated and can illustrate a political agenda. The text analysis included four areas or levels: choice of word/vocabulary, grammar, cohesion, and text structure. To explain how the curriculum constructs

different types of discourses can visualize ideological struggles. Focus was here also on strength of the statements, coherence, and intertextuality [9]. The social institutions determine the social actions, and this dimension is the social practice dimension of the analysis.

4.3.2. Social practices—social institution—order of discourse

The dimension of social practice relates to social institutions. An institution includes both ideological norms and discursive orders. Faircolough maintains a discourse is just one among many aspects of any social practice [3]. Hence, the institution constructs subjects ideologically and discoursally, and the institution itself is a sort of ideological community and speech community [4]. To analyze the institutional dimension, one must reveal the linguistic-discoursal element of orders of discourse (level of practices). Orders of discourse are the totality of social practices of an institution and relations between them, and they are relatively stable. In the present case, the analysis is of an educational order of discourse, and the focus is on a specific configuration of genres, styles, and discourses in the curriculum text. Fairclough maintains that there is a textual moment in any social practice that includes the categories of genre, style, and discourse (as a count noun). The genre of a text reveals how the text produces and reproduces for instance a social activity that constitutes different forms of social relations at work. The style can identify people and their ways of being. The question of discourses is about how people have ways of representing the world. Different discourses are different representations. Social practice is organized into networks based on different forms of social relations, identifications as different representations, and these common practices, for instance, an educational practice is networked into a common field. The category of intertextuality refers to textual aspects of the articulatory character of social practice [4]. The production process of the curriculum occurs in a particular way inside established limits, and we can make a de-construction of the text to different positions.

4.3.3. Social structures—social formation—semiotic systems

The social structure dimension is about investigating the semiotic systems, the linguistic-discoursal element of language, which is the language use (codes, norms) in the text. It is about how language interaction is determined by and has effect on social structures. The highest level of social structure is social formation, which is on the macrolevel. The social formations determine the institution. However, in the institution, there is a dialectic relation to the actions and the formation, where the micro and macrolevel (actions and formation) influence on the practice. In line with Fairclough, the institutional dimension manifests the social formation and the social actions [4]. The analysis of the curriculum is about revealing the ideology basis of the text, and what discourses have hegemony, which is a social struggle for dominance. Hegemony is here also connected to a meta-discourse, where different forms of hegemony structure the meaning of words and the relation between words [4]. A critical text analysis can reveal power dimensions in the curriculum text, which can have influence on the understanding of the public health nursing education.

5. Results

Analysis of the curriculum revealed four features of discourses related to the research question: a contradictory health promotion and disease prevention discourse, a paternalistic meta-discourse, a hegemonic individual discourse, and a hegemonic discourse for interdisciplinary collaboration.

The analysis started with a language analysis to get a deeper understanding of the text and reveal underlying structures. The writing style was factual prose, and metaphors and value-laden words were almost absent. The language was precise, with little conflicts regarding the interpretation. The grammar or sentence structure had great statement force and use of present tense. The consequence was a reinforcement of request and requirements of form and content in the curriculum: *"The public health nursing education shall help students acquire relevant knowledge of the work to improve public health"* [11, p. 5]. The curriculum had a formal and confirming expression in a third-person perspective: "…*is it decided*…". The authors hold an authoritarian position, which was enhanced by the use of professional terminology:"…*acquire skills in planning, implementing and evaluating measures*…" [11, p. 5]. The use of modal auxiliary as "shall," "must," "should," "may" in the text has significance for the strengthening of the statements. There was an extensive use of "shall" in the first part, regarding the rationale for the curriculum. An outline of the four discourses follows.

5.1. A contradictory health promotion and disease prevention discourse

Contradictory discourses here refer to a contradiction in visibility between the health promotion and disease prevention discourse in the text. The education should place "*special emphasize*" on "*knowledge about and understanding of children and adolescents growth and development, and factors that are beneficial to their health.*" Simultaneously students should consider "*risk of disease and injuries.*" The analysis indicated that health promotion and disease prevention strategies had equal status in the text. On the other hand, the result showed a dominant disease prevention discourse when analyzing a list of seven central themes for public health nursing work that followed. Three themes dealt with both health promotion and disease prevention: "*main strategies, challenges and dilemmas in health promotion and disease prevention work,*" and four were biomedical areas to prevent disease: "*disease perspective,*" "*prevention strategies,*" "*information,*""*nutrition,*""*epidemiology,*" "*environmental hygiene, accident and injury prevention*" [11, p. 6–7]. A separate chapter named health promotion and disease prevention work of public health nursing could be expected to highlight both working strategies. Nevertheless, emphasize was on disease prevention work, and underlined problem solving priorities: "*psychosocial problems, repetitive strain injuries, injury/ accidents, asthma/ allergic, cardiovascular diseases, cancer and infectious disease*" [11, p. 4].

The curriculum pointed out that different historical and cultural meanings of the health concept should be emphasized [11, p. 6], but the health concept was not further defined. One can distinguish between a narrowly health concept, understood as "*absence of disease,*" and an extended health concept, based on WHO's definition from 1948:"*a state of complete physical,*

mental and social well-being and not merely the absence of disease" [12]. We can link the first to biomedical knowledge and the latter to social scientific knowledge. The result indicated that the narrow and the wider health concept had equal status in the curriculum.

The students were to acquire evidence-based knowledge: "*shall know current research*" [11, p. 7] and "*interpret and apply research results*" [11. p. 9]. The nurses' ethical guidelines emphasize that nursing shall be knowledge based [13]. Nevertheless, the curriculum also described the need for practical knowledge and experience, and that students should develop their ability to work in line with a health promotion and disease prevention perspective. The description of priorities in health promotion and disease prevention work emphasized "*problem*," "*suffering*," and "*disease*" [11. p. 4]. This harmonizes with a disease prevention discourse. The health promotion discourse was almost absent.

It was apparently a dominant health promotion discourse when it came to the description of the public health nursing field of work, but the prevention discourse showed through. This is confirmed by the fact that the biomedical knowledge was highlighted, in that disease prevention strategies got substantially more space when the areas under each main topic was explained. The critical text analysis revealed that the more invisible disease prevention discourse had a power position in the text and hegemony over the health promotion discourse.

5.2. A paternalistic meta-discourse

A paternalistic discourse here refers to the identification of a discourse in the curriculum text associated with the traditional expert role of public health nurses. To use the term meta-discourse means a summing up of the discourses in the text, to examine the purpose of the discourses. What are we to understand by for instance the participation discourse that follows below?

The health promotion strategy that emphasizes service user participation has gradually increased in public health. Political documents highlight collaboration, participation, and to reveal recourses of service users [14]. This shift from a medical discourse linked to disease prevention and paternalistic ideology, to a health promotion discourse and a coping perspective, was hardly noticeable in the curriculum. The curriculum stated:"*the study shall emphasize service user and community participation*" [11, p. 6]. To use the concept "*participation*" could indicate that public health nurses should work with health promotion strategies toward the community. However, participation on a population level was mainly touched upon related to "*identification of risk-factors*" in the environment and "*participate in the problem-solving work*" [11, p. 5]. The analyzing result indicated the public health nursing tasks related to community, and population level was mainly limited to environmental health and expressed in disease prevention strategies.

A service user perspective linked to participation was constructed in the text, where the students should"*stimulate the service users attention on and manage to protect own health*"…"*strengthen the initiative of the population*" [11, p. 5]. Concepts as "*dialog*" and "*participation*" [11, p. 8] pointed out the significance of a service user perspective and could have contributed to generate a dominant discourse of participation. However, emphasis on concepts like recourse thinking, coping strategies and empowerment-ideology was absent. Analyzing the service user participation in

the text revealed instead an expert discourse: "*It shall be emphasized that the students develop an understanding of the power and control-aspects associated with the helper-role…*" [11, p. 8]. The use of "*helper-role*" increases a dependence relation. We here identify a meta-discourse linked to a paternalistic expert ideology, which appeared to be a dominant discourse in the curriculum text.

5.3. A hegemonic individual discourse

The hegemonic individual discourse refers to a dominant discourse in the text that emphasized an individual perspective and not a population perspective in the description of public health nursing work.

The result indicated public health nurses was to interact on an individual and family basis: "*It is thus increased demands on ability to collaboration and interaction on and together with children, young people and their families*" [11, p. 5]. The cohesion or coherence between the sentences, for instance, the use of conjunctions ("*thus*", "*and*") showed an argumentative structure in the text, and it hardly opened for argumentation. Use of the concept "*demand*" gave an association to power and order, which indicated a discourse of power in the text. The curriculum text opened for collaboration with the service uses but revealed no further emphasis on health promotion strategies related to quality of life on a population basis. The result suggested that the individual discourses in the text were about health promotion and disease prevention, whereas the population discourses related to health promotion strategies were absent in the curriculum. We could have expected that the thoughts from the Ottawa Charter [12], advocating local communities as arenas for health promotion had been more visible in the text.

5.4. A hegemonic discourse for interdisciplinary collaboration

We can identify a discourse of collaboration in the curriculum, enhanced by:"…*the necessity that tasks are solved across sector boundaries shall be emphasized*" [11, p. 7]. This is in line with guiding principles for the health and social sector, that is, to develop the interdisciplinary collaboration [15]. The use of "*shall*" emphasized a strong statement force and a hegemonic use of power. The public health nurse was earlier, together with the doctor, the only professional working with health aspects in child health clinics and school health services. Now the service engages new groups as physiotherapists, midwives, child welfare officers, and other professionals. The curriculum stated, "*The work demands interdisciplinary and intersectoral collaboration*" [11, p. 5]. The text had an argumentative form: "*Today's health problems and social challenges… need for innovation and multi-disciplinarily…*" [11, p. 3]. It referred to the increased emphasize on health promotion and disease prevention in governmental documents, and that the health promotion—and disease prevention work gradually has entered many public and private sectors.

6. Discussion

A text is both socially structuring and socially structured [4]. Fairclough points out that we cannot automatically reproduce a discourse. However, the curriculum is a specific social practice open for change and which can need a reformulation to new positions if health and social

political goals and development in society indicate this [11]. In line with the sociolinguistic theory, Fairclough [4] advocates a greater interaction between discourse and society. Transferred to the public health nursing field, this is in line with the goals of World Health Organization, who is claiming for nursing educational programs to act as agents for change in a constant changing health care [16].

The analysis has explored how governmental strategies for the public health nursing profession can come to expression in the curriculum, and produce ideological statements and guidelines for public health nursing educations. The curriculum points out the specific public health nursing work and knowledge basis, which will be of importance in maintaining the professional borders of public health nursing. A profession is characterized by a particular knowledge field, and Abbott [17] relates the boundary drawn around one's own profession to a power strategy. The curriculum represents the content, which marks the boundaries for public health nursing profession. The results indicate that a discourse about health promotion is constructed and maintained in the curriculum; however, the empowerment and coping perspective were absent. This weakens the power of the health promotion discourse. Following Fairclough, power and ideology have a link to hegemonic struggles [9]. The result revealed a disease prevention discourse and indicated this to be a hegemonic power discourse.

The result identified service users in a helper role, positioned as a weak group. They are in need of help from an expert nurse in a power position. Foucault is concerned about the relation between power and knowledge, where knowledge is internal the power relation. According to Foucault, the power is everywhere, more, or less hidden, and it is about social control and disciplining the dissidents [18]. Public health nurses can appear as disciplining agents seeking to control the life of the service users by telling them how to live their lives. This position can bring about ethical dilemmas related to contradictions between the empowering and expert role of nurses [19]. Fairclough maintains that changes in power relations between discursive practices can be elucidated through new ways of articulating the concept of knowledge and content [4]. The traditional relation between public health nurses, and the service users has in many ways entered a new language or a new mode, disguising the traditional direction. The discursive position as disciplining-agent harmonizes with the "top-down" paternalistic discourse especially recognizable from the early days of public health nursing work. Public health nurses are required to follow the official recommendations for the service, which then must reflect the actual practice. This dominant position disclaims core values and can lead to professional and societal resistance discourses [20].

We can argue that the disease prevention perspective has hegemony in the curriculum, and that public health nursing educations must be aware of this in order to challenge it.

Since the 1980s, there has been a gradually change from a biomedical discourse, associated with disease prevention strategy, to a health promotion recourse perspective in Norwegian governmental documents. The public health nursing work has changed with social change from emphasis on epidemiological and pathogenic factors to recourse thinking and salutogenic factors. The salutogenic theory relates to the individual level and is about how to stay healthy by strengthening positive factors [21]. Primary prevention strategies and not health promotion strategies were highlighted in the text. This is not in line with the Norwegian public health nurses' community

mission, stating that public health nurses are to practice both health promotion and primary prevention work [22]. Resource thinking was almost absent in the text, in spite of a revision of the curriculum as late as in 2005, when these were common concepts in Norwegian governmental documents [15]. This is informed already by the Ottawa Charter of 1986 [12] assuming health as a resource for everyday life. This result is enhanced by the fact that the Ottawa Charter was not referred to in the text. When the notions of empowerment and resource thinking are absent, and the population perspective is hardly touched upon, this causes limitations to the health promotion discourse in the curriculum. This study indicates that we need to highlight health promotion in public health nursing, being an agent for quality of life.

The analysis has pointed out a power position in the curriculum illuminating inter-professional collaboration. A defined knowledge basis of the nurses' constructs the boundaries toward collaborators. At the same time, when public health nurses know and feel secure in their role, this creates possibilities for interprofessional and interdisciplinary collaboratin. In line with governmental expectations, we can maintain that primary prevention and health promotion should be the strategies of public health nursing work. Secondary and tertiary prevention has a problem focus, and nurses should detect and refer deviations from normality to more specialized services. Public health nurses could then contribute to improve and extend quality of life on a broad public health arena.

Consequently, this study indicates a need for clarity of public health nursing educational basis. To meet the challenges and needs that come with social change, the curriculum has to be examined [23]. When clarifying the health promotion and disease prevention strategies in public health nursing and by questioning and debating other guiding documents for public health nursing, this can develop a joint understanding of the content of the education. Further, this can provide a qualified work force in public health to meet the requirements of the society.

6.1. Limitations

This critical text analysis is just one of the several readings. In CDA, one discourse is not more valuable than another, where the analysis seeks to identify discourses and their effects [24]. It is a cultural production, where we bring our preunderstanding of the field into the CDA analysis [8]. Being a public health nurse myself, working in the public health nursing education can be both a strength and a limitation in the analyzing process. Strength in the way that I have knowledge of the content of the public health nursing education. Limitation in the way that this knowledge can make me blind for variations in the curriculum text. Fairclough maintains that one has to be sensitive to what position and resources one has oneself to do analysis [25]. To acknowledge this position as a researcher, and by using the analyzing tools of the CDA, can contribute to make the necessary distance and critical entrance to the text.

7. Conclusion

The purpose of this study is to illuminate how critical discourse analysis can be a purposeful method in revealing possible dominating discourses and underlying meaning in a text. The example from the analysis of the curriculum text revealed different features of discourses related

to health promotion and disease prevention strategies in public health nursing. The analysis is different representations of orders of discourses in the curriculum, and present four contrasting features of discursive practices. The study suggests how analysis of curriculum discourses can illuminate shifting perspectives in public health. The analysis emphasizes a display of social and educational practices in the curriculum. The results indicate that the disease prevention discourse had hegemony, both on an individual and a population level. The health promotion discourse is more disguised and on an individual level. The analysis indicates that the role of the language in the curriculum text can have consequences for the social work of public health nurses. From a sociolinguistic perspective, we can maintain that a revision of the curriculum is needed, to clarify how public health nurses are to work and meet the population for the purpose of promoting health and preventing disease. It is a need for further research on public health nursing practice.

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New Approaches to Sociolinguistics: An Emphasis on Communicative and Cognitive Aspects of Language Use

Time-Series Analysis of Video Comments on Social Media

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Minoru Yoshida and Kenji Kita

Additional information is available at the end of the chapter

Abstract

In this study, we propose a method to detect unfair rating cheat caused by multiple comment postings focusing on time-series analysis of the number of comments. We defined the videos that obtained a lot of comments by unfair cheat as 'unfair video' and defined the videos which obtained without unfair cheat as 'popular video'. Specifically, our proposed method focused on the difference of chronological distributions of the comments between the popular videos and the unfair videos. As the evaluation result, our proposed method could obtain higher accuracy than that of the baseline method.

Keywords: video comments, shared videos, comment analysis, time-series analysis

1. Introduction

With the recent proliferation of mobile devices such as smartphones and tablets, a wide variety of videos has become easily accessible on the Internet. Video sharing sites have been utilized for various purposes to share private activities or the public relations activities of companies or to distribute the latest news. Nicovideos [1], one of the most popular video sharing sites in Japan, uses its original system to rank its videos according to the total number of plays, the total number of times the title has been added to the users' favourites list (called 'my list') and the total number of comments annotated to the videos.

Unfortunately, evaluations under this system can be intentionally distorted by dishonest users who want to influence the evaluation of a specific video by using multiple accounts. Such

manipulation can dishonestly seek to improve a video's ranking in an effort to have it attract more attention. That is to say, it could be used to create a bandwagon effect that produces increased viewing. To combat such efforts, a new evaluation method, one that is more effective and goes beyond computing a simple numerical value, is necessary.

In this study, we propose a method to detect ratings of cheating caused by dishonest multiple comment postings, focusing on a time-series analysis of the number of comments accumulated by the video. We define videos that receive a substantial number of comments as a result of unfair cheating as unfair videos; videos that appear to be relatively free of such manufactured comments are defined as popular videos. Our proposed detection method focuses on differences in the chronological distributions of comments for the two video classifications—popular videos versus unfair videos.

In the Japanese Internet culture, there are terms or expressions specific to an Internet community that appears to be slowly sinking in with the broader community of Internet users. For example, on the anonymous message board *2 channel*, users often use *2 channel* words, many of which have been adopted as general Internet slang. On the video sharing site *Nicovideo*, viewers can post a comment to the videos. Various words related to animation, music or video games are often used in these comments, interpretations of which have appeared in *Nikoniko daihyakka*. Indeed, Nicovideo has developed an independent culture populated by individuals who use these expressions.

In our study, we pursued the idea that generalization of these expressions beyond their domain is required. As the services and communities involved are liquid, the expressions are constantly increasing and changing. Because of this, analysis of the content of user comments may be necessary, requiring the conversion of the comments into semantic primitive form in order to conduct an analysis of word distributed representation. However, because some domain-specific expressions are neologisms not defined in an existing dictionary, it is not always effective to treat these expressions as semantic primitives.

In the case of distributed representation, it is necessary to train some quantity of corpus, which can be expensive since there is a cost to updating training data repeatedly for adaptation to new expressions. Our proposed unfair video detection method is independent of the culture specific to the video sharing site, as it analyses the quantitative variation of comments in viewer's feedback to the video. In this method, it is effective that the statistical approach to language information be the same as the analytic approach used for Internet flaming or Internet trend. In the field of sociolinguistics, there are many studies focusing on a language feature by unit of community or attribute. However, on the Internet, the cultural barriers fall year by year, and there are language expressions that are imported from various cultures which messily exist. In such a situation, it is effective that the analysis model uses a domain-specific dictionary or corpus; however, it is difficult to decide the parameters to be applied for each domain. Therefore, we should discuss the effectiveness of simply treating a language that acts as a numerical value.

2. Related works

2.1. User-centric type content delivery using PageRank algorithm

To improve a video's quality of experience (QoE), Yoshimura and [2] proposed a method that uses a score based on the PageRank algorithm as a video evaluation parameter. The method uses link information such as author information and publicly opened favourites lists (*my lists*).

This method judges videos with higher relevance as more beneficial. However, both author information and publicly opened *my lists*, which are used to score a video, share the same problem: the author can manipulate the evaluation of the video by using multiple accounts.

2.2. Detecting videos with social novelty using Nicovideo log data

Hirasawa et al. [3] defined a video that 'is not yet known socially but would interest many people if it is recommended' as a video with 'social novelty'. To discover these videos, the researchers focused on three features:

- Video content: directly expresses the content of a video based on tags annotated to the video.

- Comments: used to indicate viewer opinion based on comments posted on the video.

- Viewing activity: represents users' viewing actions based on the number of video plays, the number of comments and the number of *my list* registrations, etc.

The study's authors proposed a method to estimate social-novelty videos by machine learning, using these three features. They focused on the tag: 'the video should be evaluated higher', which is annotated when 'although the video's quality is good and interesting, the video has not been played many times and not been widely known' and evaluated the videos using a feature analysis of the videos with the tag. They confirmed that videos annotated with the 'should be evaluated higher' tag were commented on with many positive words. However, because the tags on Nicovideo can be edited by the video's author himself/herself, it is possible for the author to remove appropriate tags or annotate non-related tags. In addition, because the video author can set the configuration to prevent viewers from changing the tags, a video's evaluation can become improperly inflated.

An example of the Nicovideo interface is shown in **Figure 1**. In the video display area, comments posted for a scene in the video are indicated moving from right to left. Comments are reflected and indicated in real-time; older comments posted more than a certain period of time from their posted dates/times are not included.

2.3. Content quality analysis on social media

Eugene et al. [4] focused on analysing the quality of User Generated Content (UGC) on social media and proposed a method to automatically analyse the content's quality by calculating a

Figure 1. Replay interface GUI of Nicovideo.

value defined as a 'quality score'. In this study, the authors considered the interaction between the content creator and the users and estimated the quality of question and answer on the question/answer (QA) site. As in QA, the questions and their answers are described in natural language; both the questioner and the answerer can be the content generators.

In contrast, our study deals with videos posted to a video sharing site and considers the comments posted by viewers. While creators post their videos to the site, users (viewers) are able to watch the videos, post comments and add their favourite videos to their *my lists*. To estimate content quality, the trend of such viewer actions can serve as a useful indicator. However, because it is difficult to improve content quality in the short term, cheating or dishonest manipulation is an ever-present temptation.

3. Comment data posted on video

3.1. Definition of unfair video

The unfair videos dealt with in our study are those which receive a remarkably high number of plays or comments, even though their contents are relatively poor (without any change in the picture displayed or the sound heard, as shown in **Figure 2**). Although it is not easy to evaluate the quality of a variety of video contents, having a tag on the video to identify whether the video is fair or unfair might allow us to use such a tag for the evaluation of content quality.

By being (undeservedly) highly ranked, unfair videos receive more attention from viewers than they otherwise would. This increased attention can sometimes result in many viewers submitting negative reports to the site manager, who will, in response, delete the offending video. Therefore, in devising our study, we believed that there would not be very many unfair videos among those in the higher ranks (based on comments and plays). In addition, we chose not to examine unfair videos whose contents violated copyright laws.
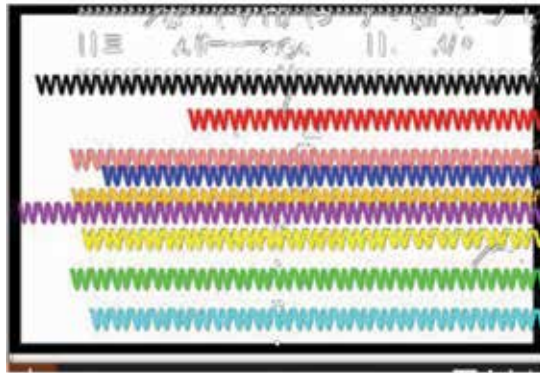
Figure 2. The screen shot of unfair videos (in the 15th rank).

3.2. Relevance of popular videos and unfair videos

3.2.1. Transition of the comment numbers after the video was uploaded

We calculated the number of the comments posted on both popular videos and unfair videos. We used Nicovideo dataset [5]. **Figure 3** shows the ratio of the comments on each day since the video was uploaded. The horizontal axis indicates the elapsed days and the vertical axis indicates the comment rate. The rate of comment (CR_i) is calculated by Eq. (1).

$$CR_i = \frac{cf_i}{\sum_{t=1}^{N} cf_t} \tag{1}$$

Here, cf_i and cf_t indicate the number of comments after i days or after t days from the day the video was uploaded. N indicates the maximum number of elapsed days in the analysis. In **Figure 1**, we set the N value to 20. As shown in the graph, the comment rate of the popular videos begins to decrease after 20 days. This seems reasonable as users tend to submit their comments when they view the video for the first time. For this reason, we decided that it would be sufficient to acquire the comment data after 7 days from the time the video is uploaded.

3.2.2. Character string analysis of the video comments

Viewers on the Nicovideo site are able to post their comments using a maximum of 75 characters at any one time. To find basis for judging whether a video has been unfairly evaluated, we analysed videos that received a large number of comments, calculating the length of the character string of the comments posted for both the popular and the unfair videos. The results are shown in **Table 1**.

Overall, the comments tended to be written in under 15 characters. As indicated in the table, for the popular videos, over 83% of the comments were written in under 15 characters; for the
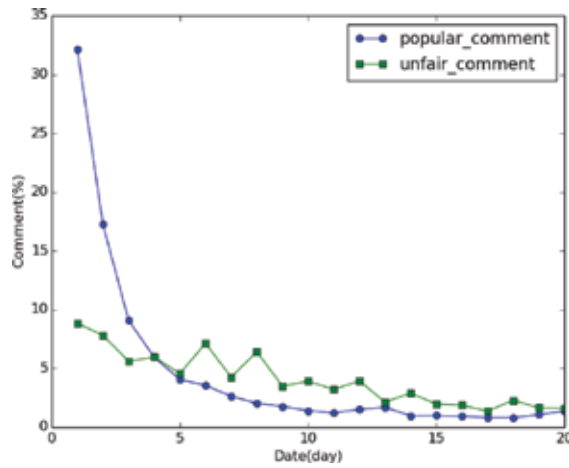
Figure 3. Transition of the comment numbers on each day since the video was uploaded.

Length	Popular	Unfair
$0 < L \leq 15$	83.6%	98.4%
$15 < L \leq 30$	14.3%	0.7%
$30 < L \leq 45$	1.6%	0.3%
$45 < L \leq 60$	0.4%	0.4%
$60 < L \leq 55$	0.1%	0.2%
Total number of comments	3,920,203	5,089,784

Table 1. The rate of comments written with under 75 characters on the popular/unfair videos.

unfair videos, over 98% of the comments were written in under 15 characters. **Table 2** shows the breakdown of these under-15-character comments.

Indeed, many comments were written in under five characters. For the popular videos, approximately 70% of the comments were written in under 10 characters. From these results, it is clear that comments tend to be written in short sentences, making it difficult to judge whether a video is 'fair' or 'unfair' solely from the meanings of the comments posted for it.

Length	Popular	Unfair
$0 < L \leq 5$	35.0%	99.3%
$5 < L \leq 10$	42.2%	0.4%
$10 < L \leq 15$	22.8%	0.3%
Total number of comments	3,277,234	5,010,393

Table 2. The rate of the comments written with under 15 characters on the popular/unfair videos.

3.2.3. Entropy analysis of the comments

As mentioned in the previous section, we attempted to analyse the quality of the comments to demonstrate the difficulty of judging the 'fairness' of a video from the meanings of the comment sentences. We used information entropy as an index.

Information entropy [6] has been defined in information theory. It is a measure applied to an event that rarely happens. If an event's entropy value is high, it is a rare and important event. If the entropy value of a particular event is higher than that of some other event, it can be inferred that the higher valued event includes more information.

We calculated the information entropy value of the characters, words, parts of speeches and primitive semantics of the words used in the comments and analysed the difference between these values for the popular videos and the unfair videos. The entropy equation of video X is shown in Eq. (2). P_i indicates the appearance probability of the character, word, part of speech or primitive semantics.

$$H(X) = -\sum_i P_i log P_i \tag{2}$$

To divide the comments into word units, we used MeCab, a Japanese morphological analyser [7]. To judge the primitive semantics, we used four kinds of dictionaries: Goi-Taikei (a Japanese lexicon) [8], Word-Classification Lexicon [9], Japanese WordNet [10] and the EDR Concept Dictionary [11].

As the analysis target, we manually prepared 100 popular and unfair videos, and calculated the entropy of character/word/part of speech/primitive semantics. The average/maximum/minimum entropy values are shown in **Table 3**.

As can be seen in the table, the entropy values were uneven, depending on the video. However, the entropy values of the unfair videos were lower, on average, than the popular video entropy values. Because the entropy of primitive semantics was calculated using an existing thesaurus, which means that it was unable to handle the latest buzz terms, it is possible that important or meaningful words were ignored. Given these results, we concluded that we can classify unfair/popular videos by using entropy values as a feature.

3.2.4. Relation between the comment posted date and the comment posting scene

Figure 4 shows the distribution of comments for the popular videos. **Figure 5** shows the comment distribution for the unfair videos. In each case, the vertical axis indicates the date of the comment's posting, while the horizontal axis indicates the position of the posted comment.

There are clear differences between the two graphs

- For the popular videos, the number of comments decreased gradually, day-by-day. On the other hand, for the unfair videos, the number of comments decreased at a certain time of the day. Furthermore, the days with many comments and the days with few comments were distinctively distributed.

- For the popular videos, the scenes at which the comments were posted showed little variation; on the other hand, for the unfair videos, the scenes at which the comments were

Category	Avg/Max/Min	No. of comments	Avg. of comment length	Word entropy	Char. entropy	Pos. entropy	Sem. entropy
Unfair	Avg.	62344.70	21.97	3.97	3.51	2.18	7.32
	Max	4008986	50.18	9.41	5.11	3.79	9.69
	Min	1001	1.07	0.72	0.02	0.80	1.10
Popular	Avg.	18800.64	10.05	5.93	4.25	3.54	9.27
	Max	29915	17.28	6.49	5.38	3.93	9.70
	Min	10536	6.94	5.03	2.57	2.85	8.76

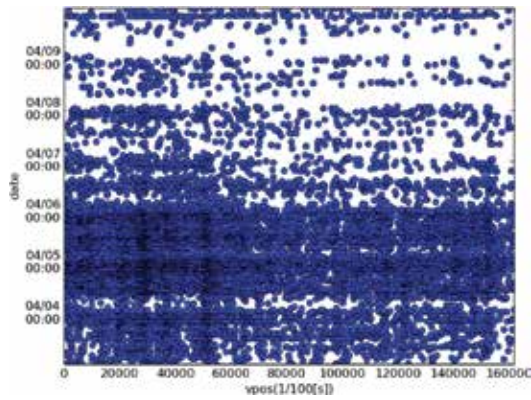**Table 3.** Analysis result of each kind of entropy.

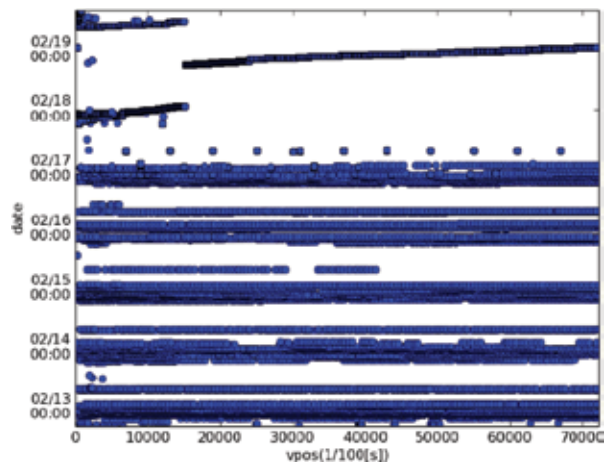**Figure 4.** Comment distribution of a popular video.

Figure 5. Comment distribution of an unfair video.

posted varied widely. Given these two tendencies, we based our method for detecting unfair videos on the chronological fluctuation feature of the comments.

4. Proposed method

4.1. Extraction of unfair detection basis

As already mentioned, we concluded that popular videos and unfair videos had distinctive differences in comment posting dates and the degree of variation in the scenes at which the comments were posted.

Based on the information obtained from the videos that we examined, we attempted to determine a method to extract unfair videos from a video database. Below are the steps we followed to determine a basis for identifying the unfair videos (**Figure 6**)

1. We prepared training data for unfair/popular videos that received a large number of comments.

2. We prepared comment data from the training data and extracted the dates when the comments were posted and the scenes where the comments were posted.

3. We sought to find a basis to judge unfair/popular videos based on the posting dates and posting position.

4.2. Judgement by time-series data

We attempted to find useful information with which to judge whether a video is popular or unfair by examining the fluctuations in the number of comments on a day-to-day basis. Firstly, we split the video into various segments chronologically. We then counted the number of
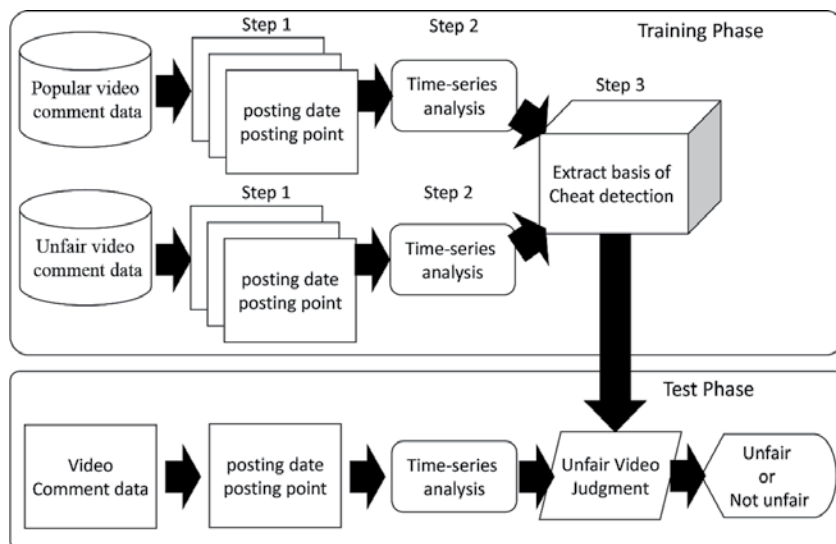

Figure 6. Flow of the training phase and test phase to judge unfairness.

comments posted in each segment for each day and calculated the correlation coefficient between neighbouring dates.

4.3. Calculation method for correlation coefficient

Using the comment data, we calculated the correlation coefficient $r_{x,x+1}$, for $x = 1, 2, 3,..., 6$, where x is the number of days since the video was uploaded, as detailed below (see **Figure 7**)

1. The comment data obtained x days from the date that the video was uploaded was divided into N equal segments according to the length of the video, as shown in **Figure 8**.

2. The number of comments, $C_{x,n}$, was calculated for each segment (x, n).

3. The average of $C_{x,n}$ $(n = 1, 2, 3,…, N)$ is defined as $\overline{C_x}$; the correlation coefficient $r_{x,x+1}$ was calculated from Eq. (3).

4. A threshold value to judge whether the video is popular or unfair was determined for the correlation coefficient for each neighbouring date, up to 7 days from the date the video was uploaded. A threshold is the value of the boundary line between two categories. In this study, we classify videos as either over-threshold or under-threshold by establishing the threshold of the coefficient of correlation.
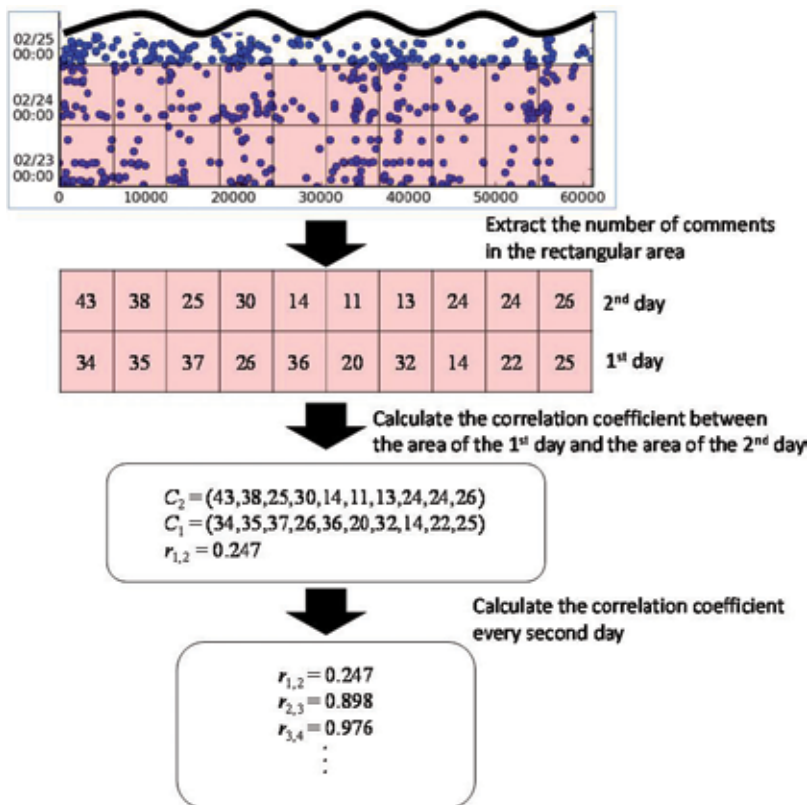

Figure 7. Calculation of correlation coefficient by analysing chronological data of the comment numbers.
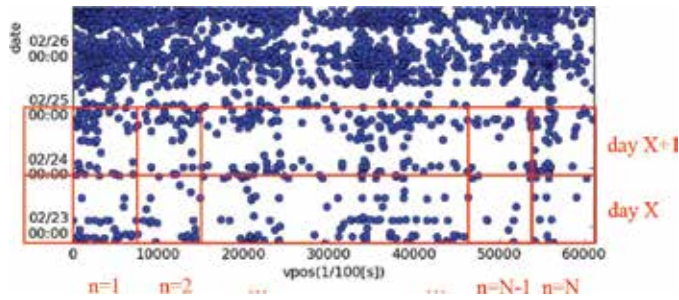
Figure 8. A method to extract comment distribution data chronologically.

$$r_{x,x+1} = \frac{\frac{1}{N}\sum_{n=1}^{N}(C_{x,n} - \overline{C_x})(C_{x+1,n} - \overline{C_{x+1}})}{\sqrt{\frac{1}{N}\sum_{n=1}^{N}(C_{x,n} - \overline{C_x})^2}\sqrt{\frac{1}{N}\sum_{n=1}^{N}(C_{x+1,n} - \overline{C_{x+1}})^2}} \tag{3}$$

Based on the comment data posted for the popular/unfair videos, we plotted the number of comments posted on the xth day on the vertical axis and the $(x+1)^{th}$ day on the horizontal axis, as shown in **Figure 9**. The colours of each point indicate the elapsed days (1–6). The more the points appear near the diagonal line from upper right to lower left, the higher the correlation of the number of comments becomes. As shown in figure, in the case of the unfair video, there was very low correlation, while in the case of the popular video, there was clear positive correlation.

We proposed the following two types of judgment methods using features of the maximum/minimum/average of the correlation coefficient $r_{x,x+1}$ (x = 1, 2,…, 6) obtained from each video comment set

- Calculate the correlation coefficients as described above. From the minimum values of the correlation coefficients, use the maximum value to determine the judgement threshold T_u according to Eq. (4) and use it in judging the unfairness of the video. Eq. (5) shows the calculation of the judgment result for the unfair video $label_i$, where the minimum value of
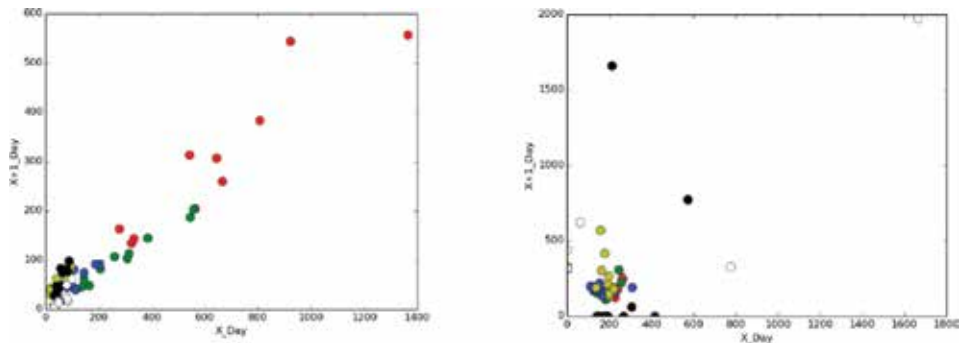

Figure 9. Similarity of the comment numbers posted on the videos.

the correlation coefficient of video i is r^i_{min}. Video i is an unfair video when $label_i = 0$; video i is not unfair video when $label_i = 1$.

$$T_u = max(r^1_{min}, r^2_{min}, ..., r^M_{min})$$
(4)

$$label_i = \begin{cases} 0 & if \ r^i_{min} \le T_u \\ 1 & if \ r^i_{min} > T_u \end{cases}$$
(5)

- Convert the maximum/minimum/average values of the comment correlation coefficient of video i in each of the elapsed days areas into the vector $\vec{R}_i = (r^i_{max}, r^i_{min}, r^i_{avg})$; use a support vector machine [12] to classify popular and unfair videos. Support vector machine (SVM) is a machine learning algorithm. SVM calculates the hyperplane that divides a feature space for binary classification. The method has a generalization capability by using the selection basis of max margin learning and the kernel method, which treat non-linear relationships among the features. SVM is effective in high dimension space; in general, the more the training data the less the bias and the better the chance that a good classification model can be constructed. This method is often used for pattern recognition or text classification.

5. Experiment

5.1. Experimental data

The number of videos included in the experiment is shown in **Table 4**. The average number of comments posted to the videos is shown in **Table 5**.

5.2. Selection basis of unfair video data

The following conditions were used to select unfair videos for the experiment

Condition 1.   The number of comments is larger than the number of plays, and the number of comments is over 10,000.

Condition 2.   Satisfying Condition 1, the number of the viewers who registered the video in *my list* is less than 1000.

Condition 3.   Despite the fact that the video does not contain a motion picture or any sound, a large number of comments are posted.

Condition 4.   Although the video shows only one still picture and the same sound is repeated, a large number of comments are posted.

When the number of comments is larger than the number of plays, the implication is that each viewer posted a comment at least once. If the video satisfies this condition, it is highly likely that viewers posted multiple comments for one play; therefore, we set Condition 1. Since it is

	Training data	Test data
Popular video	100	65
Unfair video	100	65

Table 4. The number of experimental data.

	Average number of comments
Popular video	18801
Unfair video	40573

Table 5. The average number of comments.

difficult to increase the number of *my list* registrations without at least one viewing, we set the threshold for the number of *my list* registrations at a relatively small value.

5.3. Selection basis of popular videos

Popular videos were defined as videos previously ranked in the top 50 on Nicovideo's official site [1].

5.4. Baseline method: comment contents based method

As our baseline method, we chose a method to binary-classify a video as either popular or unfair from the contents of the comments. Existing studies on the document classification task often use a method that calculates word weights as a score based on term frequency or global document frequency, using them as a bag-of-words feature value in machine learning.

Ebata et al. [13] calculated the importance value of a video using term frequency-inverse document frequency (tf-idf). Our study also uses morpheme as a minimum unit to express a comment's content and uses tf-idf [14] as the feature value. Tf-idf is an abbreviation of term frequency-inverse document frequency. This is a measure that considers two word characteristics: high-frequency in the document (high TF word), which means it is important; and strongly related to the document's topic. It is often difficult to distinguish a document's topic by words which appear in multiple documents.

For our baseline method, we applied a machine learning method that binary-classified popular/unfair videos by training feature using a support vector machine (SVM). Because general document classification tasks often use the number of words of a particular kind as a dimension and importance value, we used the tf-idf-based machine learning method as our baseline method. The calculation of tf-idf follows Eq. (6) through Eq. (9).

Here, d indicates the set of all comments posted to a video; t indicates the words included in comment set d. The appearance frequency of word t in document d is expressed as $n_{t,d}$; N indicates the total number of videos in the training data and $df(t)$ indicates the number of

documents including word t. The feature vector $\vec{m}_d$ for each video is calculated based on the tf-idf value $w(t,d)$. The feature vector $\vec{m}_d$ is trained by SVM.

$$tf(t, d) = \frac{n_{s,d}}{\sum_{s \in d} n_{s,d}} \tag{6}$$

$$idf(t) = \log\left(\frac{N}{df(t)}\right) + 1 \tag{7}$$

$$tfidf(t, d) = tf(t, d) \times idf(t) \tag{8}$$

$$\vec{m}_d = (w(t_1, d),\ w(t_2, d),\ \cdots,\ w(t_N, d)) \tag{9}$$

To produce another baseline method using comment contents, we applied a method in which the feature quantity is obtained by using comment entropy analysis. Because the scales of the comment entropy values differ depending on the basis units (character/word/part of speech/ primitive semantics), we used the feature quantity scaled in advance.

5.5. Preliminary experiment

We conducted a preliminary experiment to examine the judgment method using a correlation coefficient threshold. We calculated correlation coefficients from the training data shown in **Table 4**, then calculated the average value, the maximum average value and the minimum average value based on the correlation coefficients, as shown in **Table 6**.

As the table indicates, there were substantial differences between the minimum values of the popular videos and those of the unfair videos. **Table 7** shows the judgement result of the test data using the minimum value as the feature.

Video type	Average	Averaged maximum value	Averaged minimum Value
Popular video	0.979	0.993	0.848
Unfair video	0.778	0.972	0.496

Table 6. Average correlation coefficient.

	Threshold	Detection rate	False detection rate
Proposed method	0.5	84.8%	0%
	0.6	93.8%	0%
	0.7	98.5%	1.5%
	0.8	100%	10.7%
tf-idf + SVM	—	75.8%	1.0%

Table 7. Unfair detection rate and false detection rate.

Method		Unfair video detection rate	False detection rate
Baseline method	Tf-idf + SVM	0.726	0.025
	Entropy + SVM	0.970	0.030
Proposed method	Coefficient + threshold	0.991	0.015
	Coefficient + SVM	0.890	0.070

Table 8. The result of cross validation test of unfair video detection.

From this result, it was found that in the range of threshold values of 0.6–0.7, the unfair videos were detected in less than 10% of the cases. On the other hand, the popular videos were detected in over 90% of the cases. We also found that the proposed method using the correlation coefficients achieved a higher unfair detection rate than the comment content–based judgment method.

5.6. Evaluation experiment based on cross-validation

We used the 100 popular/unfair videos from the preliminary experiment and evaluated the following four methods

- Baseline method

    - tf-idf + SVM

    - Entropy feature + SVM

- Proposed method

    - Method based on the threshold of the time-series correlation coefficient

    - Machine learning method using the maximum/minimum/average value of correlation coefficient as feature

The results of the leave-one-out cross-validation test are shown in **Table 8**. We used the Radial Basis Function (RBF) kernel for the SVM kernel parameter. In the proposed method, the number of image segmentations used to calculate the correlation coefficient was set at 10.

We found that the unfair video detection rate for the baseline method was 72.3%, while the rate for the proposed method based on the correlation coefficient was approximately 99%. However, in the case of the baseline method, the false detection rate of popular videos was only 0.5%, while the false detection rate for the proposed method was 1.5%. This result confirmed that our proposed method was effective for unfair video detection.

6. Discussions

In the evaluation experiment using the cross-validation test, the baseline method (tf-idf + SVM) had an average detection rate of 72.3%, which was not particularly high. This might be caused

by the fact that there were many comments in which the character strings were short and their meanings were nonsense. To improve the comment contents–based method, we would need a way to extract for analysis only those comments that make sense according to a certain standard.

On the other hand, the performance of the judgment method using the entropy feature was equivalent to the performance of the method using the correlation coefficient vector. This result indicated that the entropy feature was able to express the features of the comments on the unfair/popular videos without using time-series information.

In the preliminary experiment, which examined the judgment method based on the correlation coefficients, when the threshold of the correlation coefficient was set at 0.60, only 4.2% of the unfair videos were detected. To illustrate the problem, in cases where not-so-high and not-so-low correlation coefficient values were continuously calculated, when all the values were larger than 0.60 but smaller than 0.65, the video was suspected of being unfair, but the proposed method was unable to identify them as such.

Figure 10 shows additional experimental results for the SVM-based judgment method that used the maximum/minimum/average correlation coefficient as the feature. The value of N (number of segments) was set at 3, 5, 7, 10, 15, 20, 25 and 30. When the number of segments was small, the detection error rate was relatively large. When the number of segments was 20, the detection error rate reached it minimum value. On the other hand, when the segment number was 25, the unfair video detection rate reached its highest value—0.97. It appears that the larger the segment number, the higher the unfair video detection rate becomes.

In all, 1332 unclassified videos were classified into unfair/not unfair by the proposed method using the split number 30. **Figure 11** shows the classification results for each category annotated to the video. The results show that there were categories that were subjected to being judged as unfair.
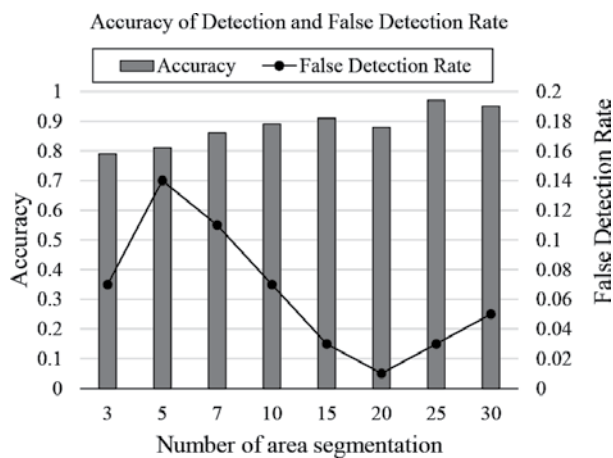

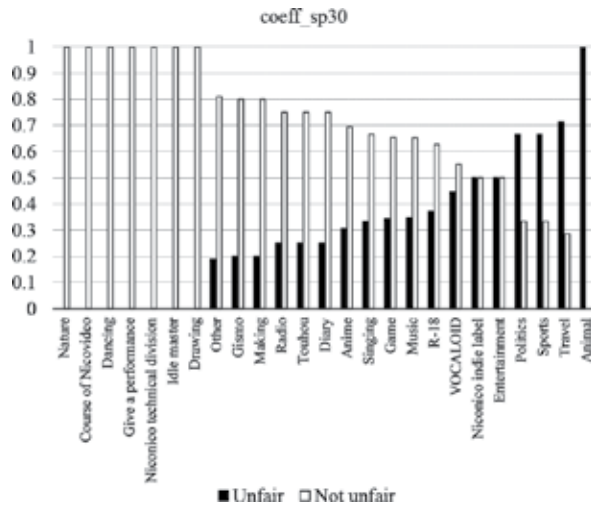**Figure 10.** Accuracy of detection and false detection rate.

Figure 11. Unfair/not unfair rate for each video category.

7. Conclusion

We proposed a method to detect unfair videos—videos whose rankings were falsely influenced—among the videos uploaded to a video sharing site. We focused on differences in the comment distribution tendencies between the unfair videos and what we termed popular videos (videos whose rankings were not falsely influenced). The play time of the video was divided into N segments, and the number of comments extracted from each segment was used as a feature. The correlation coefficient between neighbouring elapsed dates was calculated, and the unfair videos were detected by applying a judgment threshold for the minimum correlation coefficient value.

Our proposed method did not focus on the quality of a comment's content; rather it focused on the specificity of comment postings by unfair (fraudulent) users. In our evaluation experiment, we found that the proposed method was able to detect unfair videos with 90% accuracy by extracting the video feature based on a time-series analysis of comment data, irrespective of the number of comments.

It should be noted that in this study, we targeted unfair videos that were obviously unfair. Therefore, it is not clear that the threshold of the proposed method can work for less obvious unfair videos or in-between videos that are not popular but not unfair, because their patterns of comment posting are likely to be different. In our experiment, we calculated the correlation coefficients from the time-series distribution of comments and determined threshold values to classify the videos. However, the proposed method lacks versatility because the method is specific to the comment distribution of Nicovideo.

It is likely that a more versatile method could be developed by using other features such as the quality of contents or comment content similarities. In future studies, we plan to develop an

automatic video evaluation basis that focuses on the degree of the match between the sense of the video and the content of the comments.

Acknowledgements

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Experimental Approaches to Socio-Linguistics: Usage and Interpretation of Non-Verbal and Verbal Expressions in Cross-Cultural Communication

Xiaoming Jiang

Additional information is available at the end of the chapter

Abstract

Social context shapes our behavior in interpersonal communication. In this chapter, I will address how experimental psychology contributes to the study of socio-linguistic processes, focusing on nonverbal and verbal processing in a cross-cultural or cross-linguistic communicative setting. A systematic review of the most up-to-date empirical studies will show: 1) the culturally-universal and culturally-specific encoding of emotion in speech. The acoustic cues that are commonly involved in discriminating basic emotions in vocal expressions across languages and the cross-linguistic variations in such encoding will be demonstrated; 2) the modulation of in-group and out-group status (e.g. inferred from speaker's dialect, familiarity towards a language) on the encoding and decoding of speaker's meaning; 3) the impact of cultural orientation and cultural learning on the interpretation of social and affective meaning, focusing on how immigration process shapes one's language use and comprehension. I will highlight the significance of combining the research paradigms from experimental psychology with cognitive (neuro)science methodologies such as electrophysiological recording and functional magnetic resonance imaging, to address the relevant questions in cross-cultural communicative settings. The chapter is concluded by a future direction to study the socio-cultural bases of language and linguistic underpinnings of cultural behaviour.

Keywords: brain, cross-cultural communication, culture, dialect, in-group advantage, non-verbal behaviour, prosody, social norm

1. Introduction

Human language is deeply grounded in social interactions, and the use and understanding of various linguistic forms are socially constrained. One of the most intriguing questions that experimental socio-linguists ask is how different aspects of society, which include cultural norms, expectations and contexts, constrain the way language is used and how the language use exerts its impact on society. Among these societal factors, culture defines the shared commonalities within groups of individuals [1, 2] which refer to the social conventions and behavioural habits that are learned through interaction with a collectivity of individuals [3]. The relationship between culture and non-verbal behaviour is stated by Ref. [4] that variations between cultures in the perceived significance of social interactions lie in the norms for decoding and displaying expressions (such as the *Cultural Display Rules*), casting a critical role of culture in the language use. These display rules define appropriate or inappropriate expressions of speaker meanings [5] and dictate when, how and to whom individuals should express their meanings [6]. To maintain interpersonal harmony and avoid breakdown in interpersonal communications, individuals within a certain cultural group actively and automatically use this norm to decode linguistic (verbal) and paralinguistic (non-verbal) expressions [7, 8]. While the history of socio-linguistic studies heavily relies on descriptive and qualitative analysis (e.g. conversational analysis), a growing recent trend that incorporates multi-disciplinary and multi-methodological approaches has arisen to quantify socio-communicative phenomena [9–11]. This chapter addresses one of these research lines, discussing non-verbal and verbal expressions from the perspectives of cross-linguistic/cross-cultural variations, inter-group communicative mechanisms and individual differences.

2. Cross-linguistic and cross-cultural differences in language use and interpretation

The analysis of pitch, intensity, rhythm and speed of the acoustic signal (acoustic analysis) has been performed to characterize the vocal correlates of non-verbal expressions in the prosody and the impact of language or culture on the encoding of vocal expressions. Pell et al. compared differential acoustic measures in seven vocal expressions (surprise, happiness, anger, sadness, fear, disgust and neutrality) with four different languages, including Canadian-English, German, Hindi and Arabic [12]. 'Pseudo-utterances'[1] were produced by professional actors who were given script scenarios to elicit target expressions and were then rated by independent groups of native speakers of these languages for the accuracy of these expressions. The acoustic analysis based on the perceptually valid expressions highlighted the mean fundamental frequency (how high the pitch is) and speech rate (how fast the speaker sounds) dissociate different types of expressions, with emotional expressions sounding lower and less dynamic in pitch and faster in speaking rate, across languages. The mean level and variation

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[1]Pseudo-utterances were created in such a way that the lexical items were replaced by the meaningless words while the phonological structures were preserved in the utterance.

of the expression are crucial in predicting the specific level of expressions. These findings demonstrate culturally universal mechanisms underlying expression encoding.

To show the constraint of culture on the decoding of non-verbal expressions, Liu et al. [13] measured the brain responses with electroencephalograms when native Chinese and Canadian-English speakers judged the expression from pairs of a pseudo-utterance and a face. Culture constrains the ways of encoding non-verbal expression in the voice and the face, and may consequently impact how our brain decodes certain expressions from multiple modalities [14]. The participants were asked to either focus on the voice or the face, simulating an inter-personal situation when one's attention is deployed to different modalities of communication. The expression in the voice (fear and sadness) was either congruent or incongruent with that of the face, forming a variant of 'Stroop'[2] paradigm in experimental psychology which is suitable to observe the cultural difference [15, 16]. Cultural differences were found in both the response accuracy and the brain response towards the expression pairs. The incongruent pairs led to a reduced accuracy and an enhanced N400 (a negative brain response after the onset of the pair of stimuli) relative to the congruent ones, with the changes larger when the listener's focus was directed to the voice than to the face for English speakers and not different between instructions for Chinese speakers. These findings highlight a stronger interference from the face in the English speaker even when attention was directed away from that channel, consistent with earlier findings showing a heightened sensitivity towards vocal cues in the eastern culture and towards visual cues in the western culture [17].

3. Language use in and out of culture

The universality of decoding non-verbal expression across cultures and languages was demonstrated by a communicator's intact ability to recognize expressions from the tone of voice in his or her foreign language that was commonly used in a disparate culture [18]. In this study, expression-laden utterances (e.g. *I ate a fish*) were produced by native American-English speakers and were presented to both the English speakers and Shuar-Spanish bilinguals from Amazonian Ecuador. The Shuar speaker was able to recognize the target expression from American-English utterances at above the chance level, although their recognition accuracy was slightly inferior to the native speaker [18]. These findings suggest the capacity of individuals to communicate across distant cultural boundaries.

A similar finding was shown by Thompson and Balkwill [19] who compared the recognition accuracy of English speakers when they decoded sentence expressions (of anger, joy, sadness and fear) in English, Chinese, German, Japanese and Tagalog. Listeners reached at least 30% of the accuracy rate to judge the expression which was above the chance level of 25%. The average accuracy was highest in judging one's native language, lower in German and Tagalog, and was lowest in judging Chinese and Japanese, suggesting impedance of cultural

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[2]The stroop effect was taken as the interference in the reaction time of a task. The naming of the colour of a word which is not congruent with the meaning of the word (e.g. 'red' printed in blue) takes longer time and is less accurate than naming of a congruent word.

variance that reduces one's performance in judging the expression types. More importantly, acoustic features (mean and standard deviation of $f0$, and mean and standard deviation of intensity) were associated with different expression types (e.g. the higher means of $f0$ indicates joy and anger while lower means of $f0$ indicates sadness and fear) in a systematic manner across languages and cultures, demonstrating a culture-universal mechanism in encoding non-verbal expressions.

Another study specifically investigated the role of speech rate and silent pause in the evaluation of expression in speech samples between cultures [20]. The effect on one's ability to decode non-verbal expressions was studied in a more primitive form of non-verbal expression, that is, vocalizations (or affective bursts) from one's own and unfamiliar cultures. One-minute monologues of emotionally neutral content were acted out by native Hungarian speakers with vocalizations of emotion (e.g. laughter), and the vocal samples were subsequently shortened (by 21 or 50%) or lengthened (by 18 of 50% of the original length of the utterance) acoustically to create voices with faster or slower speech rates. These samples were rated by both Hungarian (in-group) and German (out-group) speakers on the emotionality. German raters considered Hungarian speakers to be sadder, angrier, less positive and more scared than the native speakers of Hungarian, suggesting that the linguistic familiarity and/or the acoustic parameters affect the decoding of expressions from the voice. Regardless of the cultural groups, lower speech rate and longer pauses led to increased ratings of sadness and scare, and reduced ratings of happiness and positiveness. A culturally universal role maybe involved in explaining the consistent role of the durational parameter in the expression perception.

Culture-specific mechanisms of decoding non-verbal expressions were shown as imbalanced recognition accuracy in judgement between different cultures (e.g. superior in one's own and inferior in others' culture). Normally, one shows a benefit of recognizing speaker meaning from those who shared the cultural identity or group membership. Koeda et al. [21] examined the perception of non-verbal vocalization expressions in one's native and non-native culture. Native Japanese and Canadian speakers were asked to judge the intensity (level of strength of the expression), valence (pleasantness of the expression) and arousal (level of experience) of the vocalizations produced by Canadian-French speakers. Compared with the Canadian speakers, Japanese listeners produced reduced intensity and lowered negativity ratings in the anger, disgust and fear expressions and reduced positivity ratings in the pleasantness. These findings suggest the existence of 'cultural display' in an eastern culture which impedes the perception of the prosodic pattern of expressions in the western culture in both positive and negative expressions.

The impact of in-group versus out-group perception is also evaluated when listeners judge vocalizations in their own and other's culture. Native British-English and Himba speakers (from northern Namibian, speaking in a minority tribal language) judged five basic emotion expressions (anger, disgust, fear, sadness and surprise) and four positive higher order social emotive expressions (achievement, amusement, sensual pleasure and relief) from their own language and the language of the other [22]. Across all basic emotions, both groups recognized the expressions from both their own culture and the culture of the other group. The vocalizations of achievement and sensual pleasure can only be recognized in the native

language. These positive affective vocalizations facilitate social cohesion within groups, and therefore the communication of the positive vocalization maybe restricted to in-group members with whom social connections are established [22]. However, amusement was recognized regardless of the cultural group, suggesting that the 'laugh-like' vocalizations may be universally associated with the feeling of enjoyment of physical play.

Some affective features of the non-verbal expressions impede the outcome of perceiving out-group emotions. Laukka et al. [23] compared the recognition rates of vocalizations of eight different expressions spoken by professional actors of India, Kenya, Singapore and USA with Swedish listeners. This comparison did not involve an in-group perception condition (Swedish listeners judge the vocalization in Swedish), therefore eliminating the potential confounding effects of in-group versus out-group perception (all language being judged were 'out-group' relative to the listener). Regardless of cultural type, a wide range of positive (happiness, interest, lust, relief, serenity and positive surprise) and negative expression (anger, contempt, disgust, fear and sadness) could be recognized with relatively high accuracy rate. However, expression types related with self-consciousness revealed relatively low recognition rate across culture (shame, guilt and pride). These findings suggest that the self-related concept may interact with the cultural effects on the perception of non-verbal expressions conveyed in non-native languages.

The reduction in the recognition efficiency of expressions from 'pseudo-utterances' also revealed an interference from expressions in the out-group culture. Three relevant studies with different paradigms support the 'Dialect Theory' [24, 25], stating that 'cultural dialect' (distinct manners of speaking and communicating in distinct cultures) modulates the perception of non-verbal cues. The culturally relevant cues in a non-verbal dialect benefit the recognition of expressions and enhance accuracy rates while the culturally irrelevant cues in the dialect interferes with the recognition process and reduces accuracy rates.

In the first study by Pell et al. [26], Argentina Spanish listeners were asked to explicitly judge the expression from pseudo-utterances of six basic emotions and a neutral expression spoken by their native speakers, and by speakers of other unfamiliar languages (i.e. German, Canadian-English and Arabic). The listener achieved a mean recognition accuracy above around four times of chance level (~50% and with each individual expression correctly judged above chance level), regardless of the language. More importantly, the recognition rate was increased when their native language was judged than the unfamiliar ones.

Testing on a different cultural sample, Paulmann and Uskul [27] invited Chinese and British-English speaker groups to judge emotional pseudo-utterances spoken in Chinese or British-English, forming in-group (Chinese speaker perceived Chinese utterances and English speakers perceived English utterances) and out-group perception cases (Chinese speakers perceived English and English speakers perceived Chinese utterances). The culture-universal and culture-specific accounts of processing non-verbal information are tested. The culture-universal account would assume that the acoustic variation embedded in the language would be sufficient to allow listeners of in-group and out-group to accurately judge the expression from that language. The culture-specific account will be supported by a clear 'in-group advantage' of more accurate response in one's native than other's language. Seven different

expressions (of basic emotions) were included. Both accounts obtained evidence that (1) both in-group and out-group speakers hit the target expressions much above the chance level (supporting culture-universal account) and (2) there existed an in-group benefit in some emotions in each of the language group even when the same set of primary acoustic variables was identified to recognize the expressions (supporting culture-specific account).

One study examined the implicit perception of voice by using Facial-Affect Detection Task ('FADT' [28]). In the 'FADT' paradigm, the listener was asked whether a facial expression is emotional upon encountering a face following a pseudo-utterance, which expressed an emotion congruent or incongruent with the subsequent face. Without explicitly asking about the expression in the voice, the listener was able to differentiate the pseudo-utterances by showing a 'congruency' effect, meaning that their response accuracy was lower and the response time was more reduced when the incongruent face was judged [29]. This finding suggests the implicit processing of the expression from the utterance. Based on this finding, Pell and Skorup [28] compared pseudo-utterances produced by Canadian-English and Arabic speakers when the native English speaker judged the face following the voice, while manipulating the delay between the voice and the face (short 600 ms vs. long 1000 ms). With enough time to activate the speaker identity (1000-ms delay), the incongruent condition revealed more errors no matter when the speaker was perceiving an in-group or out-group voice as compared with the congruent condition. However, with the time of exposure to the voice more limited, the listener was less sensitive to the congruency between voice and face, making equal numbers of errors when processing the incongruent and congruent condition, suggesting that the activation of meaning of a vocal expression from a non-native language requires more time.

These experiments included a group of speaker judging the expressions from either their native or non-native culture with limited exposure to them. Two questions remain unanswered. Firstly, it is curious whether the relatively high accuracy of detecting speaker meaning in the non-native language is specific to the group of listener being tested or can be generalized to other listener group from the same dialect group judging the same languages. Secondly, is in-group advantage a dynamic process which can be learned from exposure to the target culture or is it a more stable and less changing process which is mainly determined by the specific phonological and prosodic features of the in-group and the out-group languages.

4. Language proficiency and cultural immersion impact language use

In order to address these questions and to examine how fast and efficient the expression can be judged, an auditory-gating paradigm was used when listeners from two language groups (Canadian-English and Hindi) were simultaneously tested on their native and the other language (Canadian-English and Hindi [30]). Pseudo-utterances were spliced into five different intervals from the utterance onset, creating short pieces of 200, 400, 500, 600 and 700 ms, and full-length utterances. Listeners judged the expressions from four categories in native language (English judged by English speakers and Hindi judged by Hindi speakers), foreign language (Hindi judged by English speakers) and second language

(English judged by Hindi speakers). The listener responded more accurately and more efficiently (achieved a reliably high accuracy with less amount of auditory information) towards the native than the non-native language, even when they showed proficiency towards that second language (Hindi speaker judging English utterances). The higher level of proficiency in oral comprehension (speaking and listening) of English for Hindi speakers predicts higher recognition accuracy and more efficiency of judging the expression from that language, therefore reducing the in-group advantage. These data further provided support of the 'Dialect Theory', such that culturally consistent cues in a non-verbal dialect facilitate the recognition of emotional expressions from the in-group and culturally inconsistent cues in the dialect hamper the recognition process.

To further delineate the effect of cultural learning (or the acquisition and maintenance of the cultural display rules) on the decoding process, they conducted a follow-up study to compare the brain responses in Chinese immigrants to Canada (living in Canada for at least 6 years) with the native Canadian-English and native Chinese speakers (living in Canada for less than 1 year) [31] with a same experimental paradigm across three groups (as in Ref. [13]). The rationale for these comparisons is that if cultural learning affects the listener's decoding of non-verbal expressions, the pattern of the behavioural or neural response of the immigrant group (who has been exposed to the Canadian-English culture for at least 6 years) should show resemblance to Canadian-English groups. The result demonstrated a limited influence of culture. The immigrant group revealed a reduction of accuracy when the face of the speaker was ignored, a pattern which was shown also in native English group. However, the enhanced N400 in the incongruent voice-face pairs was not modulated by the attentional focus, a pattern similar to the native Chinese speaker but different from the native English speaker who exhibited a more pronounced N400 change when their attention was directed away from the face. These findings suggest a progressive adaptation of neurocognitive processes underlying the processing of non-verbal information from multisensory modalities, with behavioural adaptation preceding the neural plasticity.

The impact of cultural learning on the decoding of expressions was also studied by directly comparing the recognition accuracy between groups of native speakers, second language speakers (L2) and foreign language speakers of target expressions [32]. Three listener groups, the Estonian native speakers, the Russian native speakers who lived in Russia and the Russian speakers who lived in Estonia, completed web-based experiments in which spoken sentences, which conveyed different expressions (joy, anger, sadness and neutrality) in the tone of voice, were judged with online platforms outside the lab setting. Spoken sentences were intoned in prosody either congruent or incongruent with the sentence content (…*we feel much more comfortable here than in Narva* in joy expression). All listener groups judged the expressions above the chance level and the native and the L2 Estonian speakers reached twice chance level. Russian speakers who lived in Estonia reached a significantly lower accuracy than Estonian speakers only in joy and neutrality, and a significantly higher accuracy than Russian speakers living in Russia in anger, joy and neutrality. These findings provide a case when the decoding of expression depends on both culture and cultural learning, implying that social norms of using non-verbal expressions are learned through social interaction and exposure to the target language.

These studies cannot differentiate the physical properties of stimuli and cultural norms implied in the cross-cultural differences in the display and recognition of expressions. For example, the cultural display, the norms for displaying and decoding emotions which is culturally dependent, reflects the ability to control and decode the expression, and consequently affects social interactions [33]. Cultural learning may root from the exposure of physical properties in encoding expressions from the culture or the adoption of a convention of who, when and how to communicate. The differentiation of the two factors has valuable implications for cross-cultural communication in multiple domains, including business, education and legal application.

One study with machine learning simulation aims to make the first attempt to isolate the impact of physical properties of auditory stimuli from that of cultural norms that affect the perceptual-acoustic classification of vocal expressions [34]. In this study, acoustic features were extracted from short utterances expressing 11 typical emotions (anger, contempt, fear, happiness, interest, neutral, sexual lust, pride, relief, sadness and shame), produced by 100 professional speakers from 5 English-speaking cultures (Australia, India, Kenya, Singapore and USA). Machine-learning simulation models were trained to recognize the patterns of expression types that differentiate in fundamental frequency, vocal intensity, formants and voice quality and temporal characteristics. The models were further employed to classify expressions based on the patterns of the acoustic features from the same or different cultural groups. In general, the classification rates by machine-learning models were above chance levels in cross-cultural conditions, and were enhanced in models tested in the same culture than in the different culture (e.g. between USA and India). In-group and out-group classification rates did not differ between expressions produced in Australian and American-English. These findings demonstrate that vocal expressions share characteristics across cultures and culture dialects exist in expressive vocal style. Given that the subjective bias in recognizing the expression from a different culture was unlikely to affect the classification rate, greater (or lower) recognition rates from in-group (or out-group) culture may result from greater exposure to and larger familiarity with the culturally specific expressive styles.

5. Future directions

One of the promising aspects of continuing this line of research is to study how cultural dimensions (e.g. individualistic vs. collectivistic) modulate the use and decoding of the non-verbal expressions. Hofstede (1983) proposed the cultural dimension theory which explains the impact of culture on the values of its members and that how these values relate to their behaviour. Dimensions of cultural variability include Individualism-Collectivism, Power Distance, Uncertainty Avoidance, Masculinity-Femininity, Long-Term-Short-Term Normative Orientation and Indulgence-Restraint [35, 36]. Suggested to be the meaningful predictors of cultural variations in display rules during communications of non-verbal expression, the scores on the individualism-collectivism dimension are seldom experimentally tested [31]. Highly individualistic culture encourages outward displays of expression that exaggerates the strength of the feeling while within the highly collectivistic culture, the expression of

emotion is controlled and evaluated against the relationship between the self and the others [37]. One study reported the recognition rate of native Persian speakers (who were living in Iran) in judging expressions of six basic emotions from their own culture [38]. Sentences with emotional lexical contents were articulated in a congruent tone of voice, rendering the availability of expression-related cues in both verbal and non-verbal channels. On average, above 95% accuracy was reported for this cultural group which was known for their higher scores in Hofstede's individual-collectivism dimension [39] (https://geert-hofstede.com/). Although this study did not compare groups at different ends of the cultural orientations, a between-study comparison showed a reduced rate in judging expression by the German (~70% [40]) and Canadian-English groups (~83% [12]) who are culturally more individualistic, and a reduced rate in judging Chinese groups who are culturally more collectivistic (~73% [41]), as compared with native Persian speaker groups. These between-study comparisons did not yield consistent results and could be confounded by many factors. These factors include (1) the number of expressions included in a forced-choice task, (2) whether only non-verbal or both non-verbal and verbal cues were available for detection and (3) differential acoustic features of speakers in different groups, and other cultural variables that co-vary with the listener and the speaker.

A related question is how social variables interact with culture in affecting the decoding of non-verbal expressions. Biological sex of the listener has been suggested to differentiate in the ability to recognize the expression of speaker meaning, with females more sensitive to the socially relevant information in non-verbal cues [42] and more likely to combine non-verbal and verbal cues to form an integrated meaning [43], especially when their attention was not explicitly directed to do so. In two electro-encephalogram (EEG) studies, positive and negative words, which were produced in either happy or sad tone of voice (creating congruous and incongruous prosody conditions), were evaluated for their emotional lexical meaning while the prosody was ignored (explicit task instruction) or judged for the congruency between the prosody and lexical meaning (implicit task instruction [43–45]). German speakers judged German expressions [44, 45] and Cantonese speakers judged Cantonese expressions [46]. Regardless of culture, sex differences were present only when non-verbal cues were ignored, with a larger late-positive brain response in the incongruent than the congruent prosody conditions present only in female judges. These findings suggest a culturally independent mechanism of the involvement of biological sex in the decoding of non-verbal and verbal expressions.

The mechanisms of encoding and decoding of culturally relevant non-verbal cues in the intercultural communication setting are also of great interest to the socio-linguistic aspect of studies on multiculturalism/multilingualism [47]. Although socio-linguistic researchers have intensely used attitudinal surveys to reveal the positive or negative stereotype ('stigma') that is associated with the language-related identity (Bresnahan, Ohashi, Nebashi, Liu, Shearman, 2002), more recent research has been focused on how the neurocognitive system is adapted to process the stereotype-implying accent information. For example, Bestelmeyer et al. [48] scanned the listener's brain when they passively listened to the digit numbers vocally expressed by the speaker sharing the regional dialect (Southern-English or Scottish-English) or not (American-English). Two groups of participants were either in native Southern-English or in Scottish-English accent.

An adaptation paradigm was used when the vocal stimuli from the same or different dialect were repeatedly presented to the listener and the change of the neural responses was captured. The neural activity in amygdala, which was typically activated in the emotional reaction, was strengthened when the same dialect was presented, while the activity in the same region was reduced when a different dialect was presented. These findings suggest a heightened social relevance perceiving the speaker who uses the language which symbols the same geographic, ethnic and social status.

The accurate decoding of non-verbal expressions has crucial impact on native as well as non-native language processing. The vocal expression is used to resolve lexical ambiguity in a second language. Hanulíková and Haustein [49] reported that the German speaker who learned English as a second language was more likely to judge the English 'sadness-neutral' homophone ('banned/band') to have a sad meaning when it was spoken in a sad tone of voice. However, both English L2 learner and native English speakers were equally capable to judge the English 'happiness-neutral' homophone ('flower/flour') to bear a positive meaning when it was produced in a happy tone of voice. Some emotional meaning of lexical ambiguity is resolved by the tone of voice and by the native status of the listener. These findings highlight the great potentials of experimental investigations in the socio-cultural bases of language and linguistic underpinnings of cultural behaviour.

Acknowledgements

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This book gives an interdisciplinary perspective on how the language use is shaped by and evolves with human society and how in turn social activities are constructed by the way how language is organized and communicated. With a contribution from multiple neighboring scientific disciplines, this book characterizes fundamental mechanisms, represents wide applications, and introduces state-of-the-art approaches in the modern sociolinguistic research. Three unique questions are asked and addressed by eight independent chapters: (1) the diversity and dynamics of the language use in multilingualism, human development, and organizational change; (2) the application of linguistic analysis to society, policy planning, and health education; and (3) the new approaches to sociolinguistics with an emphasis on communicative and cognitive aspects of language use.

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