

Research Article

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Theory of ecology of pressures as a tool for classifying language shift in bilingual communities

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Abstract: This article examines the stage of language shift in Tlaxco (Santiago Tlaxco), a bilingual Nahuatl-Spanish-speaking community in Puebla, Mexico. We employ the theory of ecology of pressure framework to identify and analyze the pressures that favor or deter language maintenance of Nahuatl and categorize the level of language shift. The research data were drawn from 207 completed census questionnaires in 50 homes. Our findings show that Nahuatl is vigorous and used in the home and the community. Nahuatl is the preferred language of communication with adults and the older generation, while Spanish is commonly used with and among the youth. Based on these results, we conclude that Nahuatl continues to thrive in the community, with the risk of Spanish gradually replacing Nahuatl as the preferred language of communication across all age groups if the current youth population does not follow the current language use pattern as they enter adulthood. This study is one of the first to analyze the sociolinguistic situation of Tlaxco (Santiago Tlaxco). The findings, which are discussed in conjunction with other qualitative and observational studies, also provide a snapshot of a community at the potential early stage of language shift.

Keywords: Indigenous language shift and maintenance, bilingualism, Nahuatl, Spanish, Tlaxco (Santiago Tlaxco), Mexico

1 Introduction

While Indigenous peoples make up less than 10% of the world's population, they speak more than 60% of the world's languages. With most of the world's more than 6,500 spoken languages facing extinction and endangerment by the end of this century (2,100), with a moderate estimate of 50% and pessimistic estimates of 90–95%, Indigenous languages (ILs) are considered the most at risk (Hale et al. 1992, Nettle and Romaine 2000, United Nations Department of Economic and Social Affairs n.d.). In this study, we follow a broad understanding of Indigenous peoples, similar to the United Nations (n.d.), as individuals or peoples who “have in common a historical continuity with a given region prior to colonization and a strong link to their lands [and] maintain, at least in part, distinct social, economic and political systems. They have distinct languages, cultures, beliefs and knowledge systems, are determined to maintain and develop their identity and distinct institutions and [...] form a non-dominant sector of society.” The use, maintenance and revitalization of ILs continue to be global issues which have seen the engagement and coordination of Indigenous peoples, communities and nations, local, national and global organizations, governments at various levels,

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and other stakeholders. In recognition of global IL endangerment, the United Nations proclaimed 2019 as the International Year of ILs and 2022–2032 as the International Decade of ILs to highlight the need for urgent action worldwide to address this important issue. The scientific and social concern for IL shift and collective efforts have resulted in language policies, community language programs, language documentation initiatives, research, increased non-Indigenous awareness, calls to action, networks of scholar-practitioners, and activists and many Indigenous individuals, peoples, and communities leading language maintenance projects (Leonard 2023).

Our study focuses on the situation of ILs in Mexico and the sociocultural factors that promote their use, practice, development, and maintenance. There are 68 spoken ILs, with 364 varieties in Mexico, with Nahuatl, Maya, and Tseltal having the most speakers (*Instituto Nacional de Lenguas Indígenas* [INALI] 2015, *Instituto Nacional de Estadística y Geografía* [INEGI] 2020). In the 2020 population and housing census, 23.2 million people, aged 3 years and older, self-identified as Indigenous, which represents 19.4% of the total population in this age range, with 7.4 million of them (6.1% of the total population) speaking an IL (INEGI 2022). A language endangerment assessment conducted by INALI (2015) found that all 68 ILs were at some level of risk of disappearing as about 50% of 364 varieties were in critical (73), severe (43), or mid-level (73) danger based on the total number of speakers, the number of youth speakers, and where they are spoken. No IL has achieved national or institutional status in Mexico; that is, none is used in education, work, mass media, or government nationally nor used and maintained by formal institutions beyond the home and community (Lewis and Simons 2010, Eberhard et al. 2023).

We employ the theory of ecology of pressure (TEP) framework (Terborg 2006, Terborg 2016, Terborg and García Landa 2011, 2013) to identify and analyze the pressures that favor or deter IL maintenance, using Nahuatl spoken in Tlaxco (Santiago Tlaxco) as a case study. Nahuatl is the most spoken IL in Mexico, with more than 1.6 million speakers and 30 varieties, of which 15 are at no immediate risk of endangerment. This language is spoken in multiple states including Puebla, Hidalgo, Veracruz, San Luis Potosí, Guerrero, México, Tlaxcala, Morelos, Oaxaca, Durango and Michoacán de Ocampo. The variety spoken in Tlaxco (Santiago Tlaxco) is the Northern Puebla one, which is considered at no immediate risk of endangerment. We follow Leonard's (2023) proposal that more studies on language shift should highlight the agents by asking, "Who or what is oppressing these language communities?" (79). Similarly, we ask the questions, 'What are the pressures promoting or deterring Indigenous language?' and 'What insights do they provide about the sociolinguistic situation of language maintenance/shift in the community?' Next we provide an overview of the TEP framework, its application in the Nahuatl-Spanish-speaking community, the insights gained, and next steps and future directions.

2 TEP framework

We provide an overview of the TEP (Terborg 2006, Terborg and García Landa 2011); refer Terborg and García Landa (2013) for a more in-depth description of the TEP framework. TEP starts from the premise that communication is a core human action that can be impacted by language shift, "the gradual replacement of one's main language or languages, often labelled L1, by another language, usually referred to as L2, in all spheres of usage" (Pauwels 2016, 18). Language shift is considered as both a process, occurring over one or more generations and/or across different domains of use, and an outcome, when the language is no longer spoken (Pauwels 2016). Most studies on language shift focus on the outcome rather than the process since the latter cannot be easily determined. There have been several scales of vitality aimed at assessing language endangerment and predicting language shift based on certain factors including the Graded Intergenerational Disruption Scale (Fishman 1991), the Language Vitality and Endangerment framework (UNESCO Ad Hoc Expert Group on Endangered Languages 2003), and the Expanded Graded Intergenerational Disruption Scale (Lewis and Simons 2010). Intergenerational transmission is considered to be one of the key factors necessary for language maintenance. Gomashie and Terborg (2021) discuss in depth the multi-faceted indicators or factors that these scales use to measure the vitality of a language as no one factor can determine its vitality. Including different factors provides more enriched perspectives into the linguistic situation. While scales of vitality come with limitations in terms of the scope of factors, measurability, and context, they can be useful tools for identifying areas of language use and maintenance that need reinforcement and support (Gomashie and Terborg 2021).

TEP offers both a qualitative and a quantitative component to assess factors which favor or deter language maintenance, primarily factors such as the proportion of speakers within the total population, intergenerational transmission, trends in existing language domains, community members' attitudes, and environmental factors. For this study, we focus on the quantitative component. The TEP has its foundations in linguistic ecology, defined as “the study of interactions between any given language and its environment” (Haugen 1972, 325). This suggests that interactions are in constant, dynamic movement in a given environment, leading to little to significant modifications in the said environment. Acknowledging that linguistic ecology has many directions depending on the interpretations of the authors who use the concept (e.g., Mufwene 2001, Ludwig et al. 2018), TEP is more concerned with various forces that influence a(n) (un)balanced system, e.g., linguistic environment, toward different directions and trends. Hence, the central idea of TEP is that speakers in a linguistic contact situation experience different pressures that drive them to undertake a particular linguistic or communicative action in choosing or using one language over another. The choice to speak or not to use a language does not occur in a vacuum, as socioeconomic, psychological, political, and cultural realities play a role. Many studies in the language ecology or ecolinguistics field generally support that there is an interdependence within and between the linguistic and environmental/societal ecosystems, sometimes leading to uni-/bi-/multi-directional influences and contact-induced changes, competition, and selection of certain languages over others (Bastardas-Boada 2019, Haugen 1972, Mackey 1980, Mufwene 2001, Kibbee 2003, Ludwig et al. 2018). TEP aims to develop theoretical and methodological tools to analyze the shift of minority languages as well as to understand the causes, processes, and effects of such shift. The TEP framework is particularly suited for bilingual contexts and has been primarily employed in Indigenous communities.

Many researchers have utilized TEP to identify the factors favoring language shift or language maintenance and to measure the degree of language shift in Indigenous communities in Mexico. Previous research has investigated several ILs including Cora (Pérez Alvarado et al. 2018), Mazahua (Gómez-Retana et al. 2019), Totonac (Neri Flores 2018), Zapotec (Guerra Mejía 2016), P'urhépecha (Rico Lemus 2015), Otomí, Matlatzinca, Atzinca, and *Mixe* (Trujillo Tamez et al. 2007), and Nahuatl (Garrido Cruz 2015, Gómez-Retana 2019). Some positive factors identified in these studies which favor the use and maintenance of ILs include intergenerational transmission and positive linguistic attitudes while negative factors such as negative mainstream attitudes and the dominant position of Spanish as the language of power, mass communication, education, labor, and socioeconomic prospects deter their use. These results are similar to those reported by INALI (2012) on the causes of language shift in Mexico. Together, these studies offer a comparative body of work, which provides insights into the sociolinguistic situation of language maintenance/shift in Indigenous communities.

2.1 Components of TEP framework

The key interconnected components of TEP are *interests*, *pressures*, *actions*, *state of the world*, and *utmost common routine (UCR)*, which interact with and influence each other (Terborg and García Landa 2013). In this subsection, we explain each component with examples. TEP proposes that:

- (a) *Interests* may emerge from the needs, ideologies, values, and beliefs of the speakers, which result in speakers feeling certain pressures that could lead to certain linguistic actions. For example, in a bilingual Nahuatl-Spanish speaking community where the younger population generally prefers to use Spanish, the *interest* of some youth to learn or use Nahuatl could be related to communicating with their extended family and older community members, engaging with Nahuatl culture, developing and strengthening Nahuatl cultural identity, fostering a sense of belonging, promoting the Nahuatl language, and recognizing and exploring economic opportunities of knowing an IL.
- (b) These interests lead to *pressures* (i.e., pressure arises from interests). These youth, motivated by the value and belief systems, may feel positive pressure to learn or communicate in Nahuatl at home and with older generations in the community and to participate in events and activities to preserve and promote their cultural identity, knowledge, and traditions.

- (c) This positive pressure could result in the *action* of learning or communicating in Nahuatl, i.e., human action is the result of pressure. Youth with little or no knowledge of Nahuatl may embark on a language learning journey by taking a course, learning from elders, or immersing themselves in a Nahuatl language environment. Other Nahuatl-speaking youths may actively choose to use the language with monolingual and bilingual speakers in familial and community settings.
- (d) Actions, pressures, and interests occur in a *state of the world*, also known as the context or environment. This *state of the world*, which provides a context for every action, is dynamic and constantly modified by actions and *vice versa*. For example, some of the reasons why many youths prefer to speak Spanish are due to the predominantly Spanish-medium educational system, higher socioeconomic power, its global status, family language policies, and widespread discriminatory attitudes toward ILs. Their choice to predominantly use Spanish reinforces the language's dominance.

For methodological purposes, TEP breaks the *state of the world* into *communicative competence*, *common routine*, and UCR. It encompasses the environment in which language use takes place, including the dynamics of languages in contact, speakers' individual linguistic knowledge or ability (i.e., *communicative competence*), the social interactions between speakers motivated by different interests and pressures (i.e., *common routine*), and the broader social, political, economic, cultural, and historical factors. Here communicative competence refers to individual linguistic knowledge, while common routine extends beyond speakers' individual linguistic knowledge and is interested in collective and social language choice and use in a conversation depending on the topic, context, and domains (Terborg and García Landa 2011, Terborg and Velázquez 2019). A language becomes the UCR in a language community when it is the most frequently used or preferred language in interactions. While the paper focuses on the UCR of a community, it should be noted that UCR can be determined at different levels, e.g., between two or more individuals or groups, within a certain age group, within a social network, etc. Figure 1 shows the different components of the TEP framework and how they influence each other.

- (e) UCR is the most used language in a community. It provides insight into the language shift/maintenance dynamic of a community. To determine the UCR of a community, speakers' linguistic knowledge and language use are assessed. Knowing the UCR in a language contact situation sheds light on the pressures

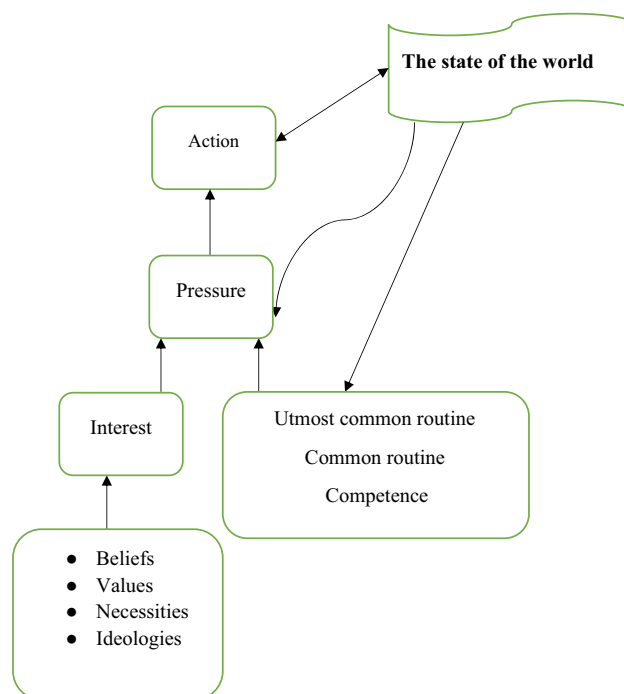


Figure 1: Ecology of pressures (Figure adapted from Terborg and García Landa 2013, 231).

that speakers experience when they opt for one language over the other. Importantly, the UCR provides the opportunity to observe the phenomenon of language shift across time in a community.

TEP offers a formula to calculate the UCR of a community by comparing the values of knowledge and use of two languages in contact (refer Section 3 for how to calculate the UCR). With the calculated value of UCR (maximum of 100 points), the degree of language shift can be measured and classified into five cases (Terborg 2016). Case A refers to a community where the IL has a UCR value of 100 (the maximum), and the more widely used language nationally and with official status, power, and influence, which is Spanish, has a UCR of 0. The community is still monolingual and has no linguistic contact yet. Case B describes a community where there has been initial contact between the Spanish language and a slight variation/shift in the UCR of the IL. Case C represents the situation where there has been a change in the UCR from the IL to Spanish in the community. In Case D, the UCR of the IL is used in some social networks, especially among older people. Finally, Case E represents a situation where there is a significant number of Spanish monolinguals in the community. In Case E, the majority of speakers of the IL prefer the Spanish language and also use Spanish predominantly in conversations with other speakers of the IL.

To sum up TEP, communicative actions result from pressures, which in turn originate from interests (i.e., needs, ideologies, attitudes, values, and beliefs) and the state of the world or environment (i.e., UCR). All these different interests and the state of the world/environment can be classified as pressures, which either favor or deter the use of languages. Communicative actions are shaped by the environment – broader linguistic, socioeconomic, political, cultural, and historical factors – and *vice versa*. In Section 3, we focus on calculating the UCR using a TEP-based questionnaire to gather insights into the language shift/maintenance dynamics of a Nahuatl community. In Section 4, we discuss the results in conjunction with the other pressures and other studies on the community.

3 Methodology

3.1 Instrument

A basic questionnaire developed by Terborg and García Landa (2011) based on TEP was administered in the community of Tlaxco (Santiago Tlaxco). The questionnaire covers sociodemographic details, knowledge and use of Nahuatl and Spanish, the level of education, the ability to read and write in both languages, and work-related travel outside the community. This questionnaire can be expanded to include other questions but for the purposes of this project, we focused on the reported language knowledge and use. To gather this information in the questionnaire, we asked participants to rate how they speak Nahuatl and Spanish by choosing among four options, namely, well (W), a little (L), only understand (U), and do not speak the language (N). Here ‘well’ refers to the speaker being able to hold a conversation in the language and ‘little’ indicates the speaker struggles to hold a conversation in the language. We acknowledge that, just as with many rating scales, there is an element of subjectivity as one speaker’s perception of ‘well’ or ‘a little’ can differ from another’s. It is not uncommon for speakers of languages to underestimate their level of fluency or proficiency, as in the case of second language speakers and youth speakers in front of older speakers. However, we choose to use the national census format of data collection and rely on the reporting and agency of the participants. Each participant did the reporting for themselves and for their family or people residing in their home. We also asked respondents to indicate the language(s) (Nahuatl, Spanish, or both) that they used in communicating with the four different generations: children (12 years and younger), adolescents (13–18 years), adults (19–60 years), and older people (61 years and older).

The questionnaire was administered orally and primarily in Nahuatl by a trained bilingual research assistant who was a community member of Tlaxco (Santiago Tlaxco). It was applied in a census format as it was administered to only one person per family/home. For example, in a home where five family members (e.g., a mother, a father, a daughter, two grandparents) resided, the bilingual research assistant would administer the questionnaire to one member (e.g., the mother) on her linguistic knowledge and use, and also ask her to report on the linguistic knowledge and use of her other family members. Hence, the mother would complete

Table 1: Distribution of participants based on age and gender

Group	Population	Male	Female
A (3–20 years)	81	40	41
B (21–40 years)	68	32	36
C (41 years and above)	58	25	33
Total	207	97	110

five questionnaires, one for herself and four for the family members in the home. Terborg and García Landa (2011) have developed formulae to calculate the perceived language knowledge (PK) and perceived language use (PU) drawn from the data in the questionnaire to determine the UCR of the community:

$$PK = \frac{(3W + 2L + 1U + 0N)}{3(T)} \quad PU = \frac{(2IL + 1BOTH + 0SL)}{2(T)}$$

where PK, the first part of the UCR, can be calculated individually for both languages based on the number of people who speak them well (W) is multiplied by 3, the number of respondents who speak them a little (L) is multiplied by 2, and those who only understand (U) is multiplied by 1, and the number of respondents who do not understand or speak either language is multiplied by 0. The sum of the speakers' language ability is divided by the total number (T) of the population under study, which is multiplied by 3, to generate the value for PK. This PK value is multiplied by 100 for presentation purposes, thus the maximum PK value is 100 and the minimum value is 0.

Respondents were also asked to indicate the language(s) (Nahuatl, Spanish, or both) that they used in communicating with the different generations: older people (61 years and older), adults (19–60 years), adolescents (13–18 years), and children (12 years and younger). PU was calculated using the above formula where the number of people who speak only Nahuatl, the IL is multiplied by 2, the number of respondents who use both Nahuatl and Spanish is multiplied by 1, and those who choose to speak only Spanish (SL) is multiplied by 0. The sum of the speakers' language use is divided by the total number (T) of the population under study, which is multiplied by 2, to generate the value for PU. This PU value is multiplied by 100 for presentation purposes, thus the maximum PU value is 100 and the minimum value is 0.

3.2 Participants

In total, there were 207 completed questionnaires administered in 50 homes. Tlaxco (Santiago Tlaxco) has about 401 homes according to the 2020 population and housing census. Participants were divided into three age groups based on the justification of Terborg and García Landa (2011) that there should be an equilibrium in age groups: group A (3–20 years), group B (21–40 years), and group C (41 years and older). Table 1 summarizes the characteristics of the participants based on their age and gender.

Group A comprised 39% of the participant population, group B 33%, and group C 28%. Of the 207 participants, 53% were female compared to 47% who were male. This higher female representation occurred in all three age groups. The youngest participant was 3 years old while the oldest was 69, giving an age range of 66 years.

4 Results

4.1 Linguistic knowledge of Nahuatl and Spanish

When asked whether they spoke Nahuatl, 88% of the respondents reported speaking it, 4% reported speaking it a little, 3% only understood it, while 5% could neither speak nor understand it. Thus, the overwhelming

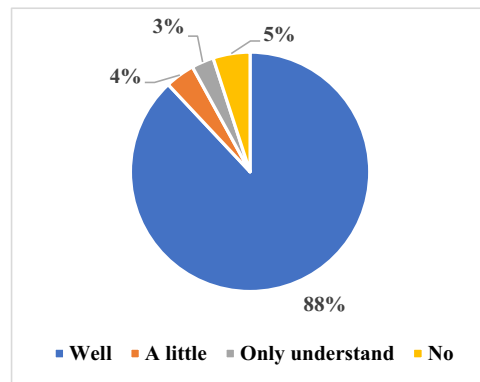


Figure 2: Knowledge of Nahuatl.

majority of the population (95%) had either an active or passive competence in Nahuatl. Of the ten participants, representing 5% of the population, who could neither speak nor write Nahuatl, eight were in group A, with the youngest being 4 years of age and the oldest 18 years of age. The other two participants without knowledge of Nahuatl were in group B, aged 27 and 31 years. There were no participants in group C without knowledge of Nahuatl. With regards to the Spanish language, 87% of the participants indicated that they had a good working language of Spanish, 6% spoke it a little, 1% only understood it, and 6% neither spoke nor understood it. Apart from the 12 participants, representing 6% of the population, who were Nahuatl monolinguals, over 90% had some form of linguistic competence in Spanish, be it active or passive. Ten Nahuatl monolinguals were in group C, from ages 41 to 69. A surprising result was that there was a 12-year-old participant who could neither speak nor understand Spanish. The other non-speaking Spanish participant was a 38-year-old in group B. Figures 2 and 3 show the percentages of linguistic knowledge of Nahuatl and Spanish, respectively.

These results indicate that over 85% of the participants can speak Spanish and Nahuatl, showing that Tlaxco is a bilingual community. Tables 2 and 3 show the linguistic knowledge of Nahuatl and Spanish by age and gender, respectively.

It can be seen from Table 2 that the older participants (group C) were all Nahuatl speakers (100%) compared to the younger participants (group A, 74%). We see an opposite pattern for Spanish where 95% of the young participants speak Spanish compared to 69% for the older group. The mid-age group (group B) showed the most balanced bilingualism, with 96% indicating they speak Nahuatl well and 93% who speak Spanish well.

Table 3 shows that over 80% of the two genders speak Nahuatl and Spanish well. However, 9% of men had no knowledge of Nahuatl compared to only 1% of women. The male participants surpassed their female

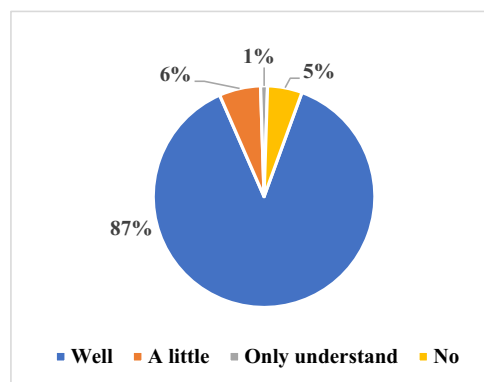


Figure 3: Knowledge of Spanish.

Table 2: Knowledge of Nahuatl and Spanish by age (in percentages)

Age group	Language	Well	A little	Only understand	No
Group A	Nahuatl	74	9	7	10
	Spanish	95	3	1	1
Group B	Nahuatl	96	1	0	3
	Spanish	93	6	0	1
Group C	Nahuatl	100	0	0	0
	Spanish	69	10	4	17

Table 3: Knowledge of Nahuatl and Spanish by gender (in percentages)

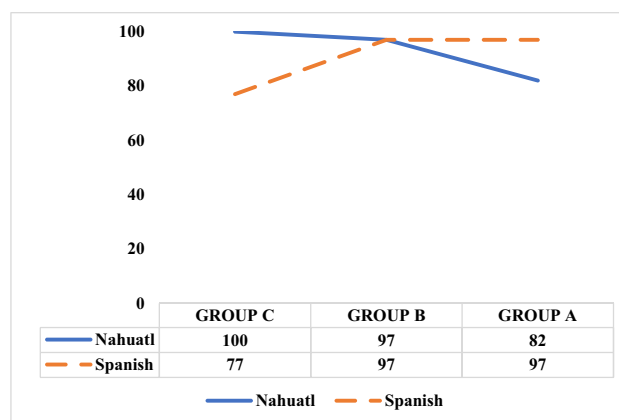
Gender	Language	Well	A little	Only understand	No
Female	Nahuatl	90	5	4	1
	Spanish	83	8	2	7
Male	Nahuatl	87	2	2	9
	Spanish	92	3	1	4

counterparts in speaking Spanish well (92 vs 83%). Having provided an overview of the participants' linguistic knowledge of Nahuatl and Spanish, including their distributions by age and gender, we can calculate the PK of the community for both Nahuatl and Spanish.

4.2 Perceived knowledge

Using the formula for PK and the raw scores of linguistic knowledge, Figure 3 shows the PK values for Nahuatl and Spanish for the three age groups.

From Figure 4, we note that the PK value for Nahuatl was 18 points lower for the young group (group A) than the older group (group C). In contrast, the PK value for Spanish for the young group was 20 points higher than that for the older group. The mid-aged group (group B) had a Nahuatl PK value that was close to that of the older group (97 vs 100, respectively), and a Spanish PK value that was the same as that for the younger group (97). Thus, the mid-aged group showed the most balanced bilingualism of the three age groups.

**Figure 4:** Perceived knowledge values for Nahuatl and Spanish for the three age groups.

Referring to Figure 4, the PK values for Nahuatl and Spanish for the three age groups serve to demonstrate the movement or change in UCR from one language to another across the generations. Terborg (2016) proposed four possible scenarios where both languages may converge, diverge, or intersect. For Terborg (2016), knowing the PK values provides insights into the language shift-maintenance situation of a community, especially when language shift begins to occur. In the first scenario, the PK value for the IL is 100 while that for Spanish is 0. In the second scenario, there is a minor dip in the PK value for Nahuatl, especially for the youngest generation, but it is still close to 100 while the Spanish value begins to rise slightly from 0, from oldest generation. The youngest generation usually has the highest PK score for Spanish, but it is not near their IL score. The third scenario shows a shift in the UCR from the IL to Spanish for certain generations, especially the youngest. As both languages intersect, the community portrays an active bilingual society, with the middle generation (group B) showing a stable bilingualism (i.e., the intersecting point), followed by a downward trend in the knowledge of the IL among the youngest generation and an upward trend in the knowledge of Spanish. Figure 4 illustrates the third scenario where the middle age group represents the most balanced bilinguals, while the youngest group shows the least Nahuatl knowledge. The fourth scenario shows Spanish as the UCR with a PK score of 100 while the IL shows a downward trend in PK score especially among the youngest generation, with a gap between both languages.

When PK values were analyzed by gender (Figure 5), we noted that the Nahuatl PK value of both genders in the older group was 100, indicating that all members of this group had a good working knowledge of Nahuatl. However, in the mid-aged group (group B), there was a 7-point difference between the men and women, with the latter having a score of 100. There was a similar difference between the males and females in the young group (group A), with the males having a score of 78, trailing the females by 8 points. Thus, in both the young and mid-aged groups, women showed a more dominant linguistic knowledge of Nahuatl than men.

The reverse, however, is the case for PK values for Spanish in groups B and C as illustrated in Figure 6. The men in these two groups had more linguistic knowledge of Spanish than women, with the most pronounced difference in the older group (group C) where there was a 14-point difference compared to 5-point difference between genders in the mid-aged group (group B).

The only group where women had more linguistic knowledge of Spanish was the young group (group A), although it was a minor 2-point difference. Overall, the men in group B and women in group A had the highest PK values in Spanish with 99 and 98 points, respectively. We move on to calculate the scores of PU of Nahuatl and analyze them by gender and age groups.

4.3 PU

Knowing the PU provides insights into the UCR, complementing the PK values, we calculated the PU of Nahuatl for the three age groups toward four different generations in the home environment in order to gain

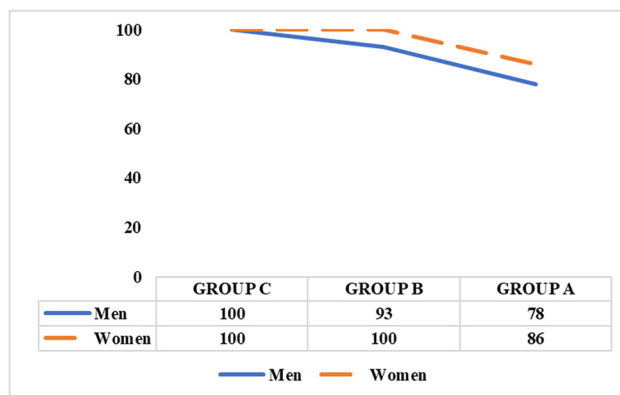


Figure 5: Perceived knowledge values for Nahuatl among men and women.

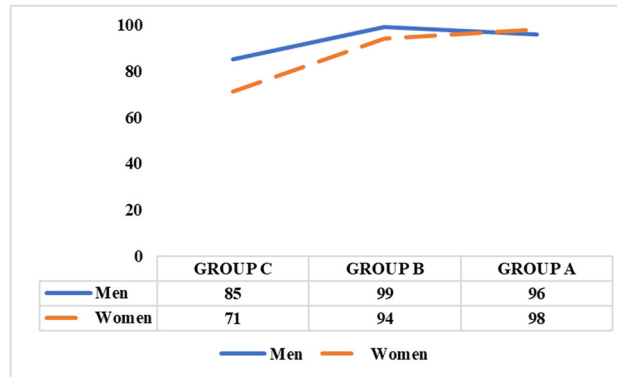


Figure 6: Perceived knowledge values for Spanish among men and women.

information about intergenerational transmission of Nahuatl. From Figure 7, the general trend among the three age groups was to use more Nahuatl with the senior and adult generations and less Nahuatl with youth and children.

The older group (group C) used Nahuatl the most with all four groups at home while the young group (group A) used it the least. The young group's use of Nahuatl with children was only 35 points, half of the older group's score with children. Although the mid-age group's PU score with children was higher than that of the young group, it was only 49 points. Even for the older group which used the most Nahuatl with children, there was a 28-point gap between their use of Nahuatl with seniors and children (98 vs 70, respectively).

When we analyzed the individual groups' PU score for Nahuatl from the perspective of gender, there were no significant differences between men and women in groups A and C. The men and women in these two groups performed similarly, with women having slightly larger PU scores for Nahuatl than men with all generations except adults (group C with 1–3-point increase over men and group A with 1–5-point increase over men) as illustrated in Figures 8 and 9.

As shown in Figures 8 and 9, there was a major difference between men and women of the mid-aged group (group B) in their use of Nahuatl with the four generations. Women in this group used Nahuatl more often than men at home; there was a 13-point gender difference with seniors, a 12-point difference with adults, an 18-point difference with the youth, and a 15-point difference with children. These results indicate that mid-aged women

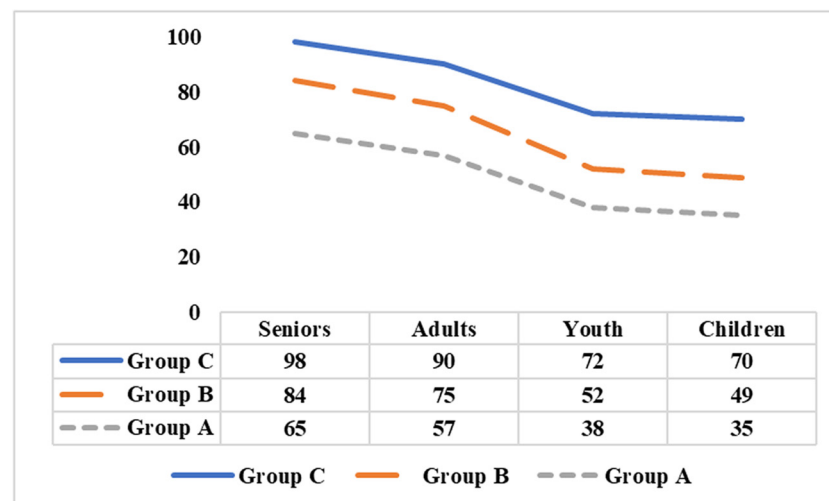


Figure 7: PU of Nahuatl among the three age groups.

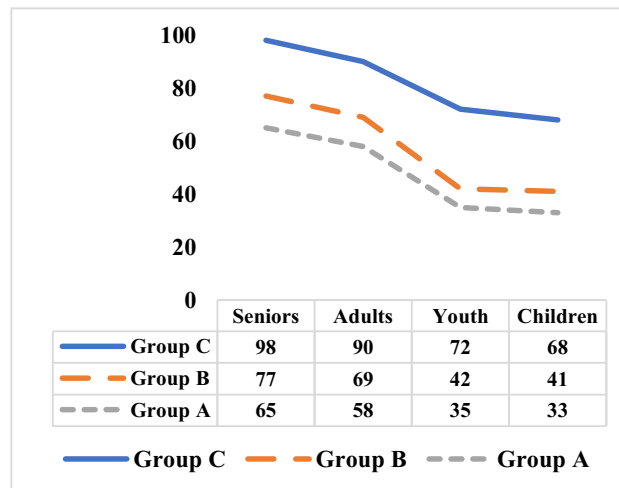


Figure 8: PU among men.

(ages 21–40) play a more important role in the intergenerational transmission of Nahuatl than men of this age group.

5 Discussion

The objective of the study is to examine the pressures influencing language maintenance/shift of Nahuatl in Santiago Tlaxco, focusing primarily on the linguistic knowledge and use. The analysis helped to determine the UCR of the community. From our results on linguistic knowledge, Tlaxco is a vibrant bilingual community with at least 80% of the population speaking both Nahuatl and Spanish. This places the Nahuatl variety spoken among the 185 out of 364 varieties of ILs at no immediate risk of disappearing. While the knowledge of Nahuatl is widespread among the three age groups, a large proportion of the population also speaks Spanish, leading to a language contact situation where both languages co-exist or compete in spheres of usage. Both languages can co-exist in a stable bilingualism where Spanish usage continues to expand as it enjoys prestige as the language of socioeconomic prospects or upward mobility nationally and Nahuatl use is maintained as the UCR for

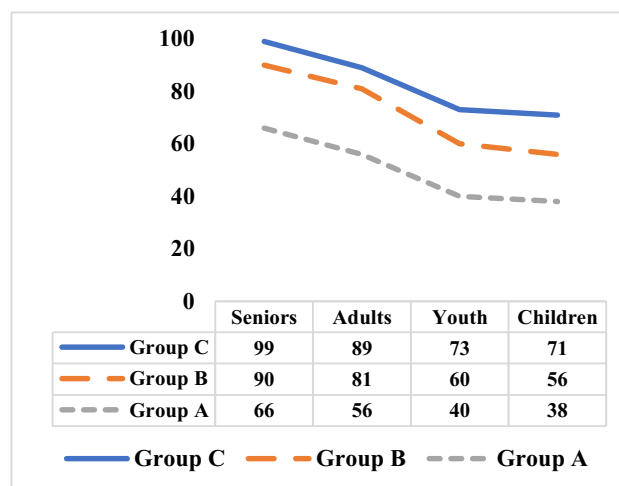


Figure 9: PU among women.

adults. As Nahuatl continues to be the preferred language among adults and older generations, there will be an immersion-like environment and a wealth of living speakers for the younger generations who prefer Spanish in communicating. In the worst-case scenario, the current linguistic situation fits Case C of Terborg's classification of language shift, where Spanish is gradually replacing Nahuatl as the language of the UCR.

Employing this TEP-based quantitative tool provides insights into the linguistic situation, especially how UCR acts as a pressure in favor or against the use of a language. To complement the UCR and shed light on other pressures such as needs, ideologies, values, and beliefs, additional tools (qualitative, quantitative, and observational) can be employed for a more in-depth analysis. With the results of the study such as age correlating with Nahuatl use, i.e., the younger the generation, the less Nahuatl was used in communicating with them, additional studies were conducted about youth language choices and attitudes, adult language practices and attitudes, and family language policy in the community (Gomashie 2021, 2022, 2023a, b). The findings from these studies indicate that young people mostly spoke Nahuatl with older adults, making the presence of older adults in the home and community an integral part of language transmission and maintenance. Even when there is a break in the parent generation transmitting the IL to the child generation, the grandparent generation plays a critical role in transmitting the language (Gomashie 2022). The role of grandparents has been documented in other Nahuatl contexts in Contla, Tlaxcala, and Huauchinango (Messing 2003, 2009, Gómez-Retana 2019, Garrido Cruz 2015) and minority language contexts (Braun 2012). The need to communicate in Nahuatl for the youth is related to family and cultural well-being. In contrast, the need to communicate in Spanish is associated with the socioeconomic, professional, and educational capital of the dominant language. Some researchers have recommended that language efforts aiming to increase the prestige, vitality, and importance of ILs in the young generation should go beyond focusing on them as a cultural, identity or ethnic marker to highlighting their socioeconomic, professional, educational, and sociopolitical advantages (Gynan 2011). For adults in the community, the need to use Nahuatl is primarily due to the ease of communication.

We noted positive and negative pressures for speaking Nahuatl in Tlaxco (Santiago Tlaxco) regarding values, ideologies, and beliefs. Most adults and youth reported that it was important for them to speak Nahuatl well. Nahuatl was important for their community; they liked speaking Nahuatl and its use in schools. While positive attitudes toward Nahuatl do not necessarily translate to language use (Choi 2003), they may show a cultural or emotional bond to a language. They can be a positive catalyst or pressure for language transmission, learning, and maintenance. While it takes a family or community to maintain a language, the example of the revitalization of Myaamia, a language thought to be sleeping, spearheaded by Darly Baldwin, shows that sometimes it only takes one person (Hinton 2001). As mentioned earlier, positive pressures do not always result in the action of speaking a language. For example, a father who expressed great pride in his Nahuatl language did not speak it with his daughter at home. In this family, the mother and father both privileged the child's agency in learning Nahuatl; it was the child's choice to speak or learn the language (Gomashie 2023b). Other studies have found a similar trend, e.g., parents in Paraguay who favor the use of Guaraní in schools but speak only Spanish with their children at home (Choi 2003) or linguists, activists, and advocates of ILs who do not transmit the language at home (Córdova-Hernández 2015, Messing 2003). Negative attitudes, beliefs, and ideologies may likely deter the use of ILs. In our community of study, one parent did not want her children to learn Nahuatl due to societal discrimination, purist linguistic attitudes in the community, and the fact that she considered Nahuatl to be an adult language.

Another formerly monolingual speaker of Nahuatl was pressured to learn Spanish because of a discriminatory and traumatizing experience at the hands of Spanish speakers. After learning Spanish, this speaker decided not to transmit Nahuatl to her younger siblings to prevent them from experiencing a similar situation. While this speaker continued to use Nahuatl with adults – friends, family, and community – her experience with the non-Indigenous speakers have shaped her belief that children must learn and master Spanish and opt to learn Nahuatl when they are older or adults. Similarly, the current state of the world, where many Indigenous communities have experienced decades of systemic and targeted eradication of their languages, has been a negative pressure toward the use of ILs. For example, survivors of the residential school system in Canada, where colonizers denigrated ILs and took inhumane, punitive actions against children exercising their linguistic rights, may experience trauma, which could lead to the perception or belief that their

languages are not valued and relevant (Truth and Reconciliation Commission of Canada 2015). Considering that this state of the world privileges certain languages over others, it is no surprise that some languages are considered incomplete or inferior. As a result, speakers may feel immense pressure to disassociate from their IL which increasingly symbolizes negativity such as lack of respect and equality and decreased socioeconomic advancement (Gomashie 2020). This pressure could result in speakers taking the action not to speak their IL nor to transmit or teach it to future generations. If this cycle of not using and transmitting a language continues, motivated by the state of the world, the community is more likely to experience language loss, where the other more privileged language becomes preferred for communication.

Additionally, the educational system is Spanish-centric as Spanish is predominately the language of instruction. Even in bilingual intercultural schools in the community, Nahuatl is rarely used as the medium of instruction or taught as a subject (Sandoval Arenas 2017). Some challenges of intercultural schools include the general lack of resources, a limited number of Indigenous-speaking teachers, and inappropriate teaching materials such as textbooks with dialectal differences. Some teachers are assigned to a Nahuatl-speaking area that uses a different language variety than they speak. This state of affairs reinforces the position of Spanish as the language of literacy while the challenges of effectively including ILs in schools may foster the misconception that they are reserved for traditional and informal contexts. This example demonstrates a gap between a positive government policy of intercultural bilingual education in Mexico and the pragmatic teaching and application of ILs in schools.

We have observed a monoglossic ideology in Tlaxco, privileging Spanish over Nahuatl, with the latter considered more of a ‘*dialecto*,’ not a complete language (Gomashie 2023a, b). One elderly Nahuatl speaker made the point that if ILs are so valued, why are intercultural bilingual schools mostly found in Indigenous communities? Why does not the government make it a policy for schools in all areas to include ILs in their curricula? As certain speech varieties, such as standard and literate varieties, are valued over non-standard ones, the latter are devalued and their use is limited. Younger speakers have reported being insecure in speaking Nahuatl in front of elders due to their low level of competency. They were often corrected for making errors and code-switching in both languages. While the elders mean well, their purist language attitudes can deter using Nahuatl. Another belief is that bilingualism harms children’s cognitive and learning abilities, suggesting that children should learn one language at a time (Kupisch and Rothman 2018, King 2000). When parents choose which language to transmit, they usually pick the one considered to be high-status and most useful in mainstream society (Hansen 2010). Various studies on the values, ideologies, and beliefs of speakers in Indigenous communities, including those in Tlaxco have reported that adults, parents, or families who perceive learning and speaking ILs as detrimental to children’s education and socioeconomic prospects are less likely to transmit the language to future generations (Gomashie 2020, 2023a, b). Similarly, families who believe the myth that bilingualism impedes the cognitive and linguistic abilities of children are more likely to use Spanish, the language of wider communication nationally, than Nahuatl.

6 Conclusion

The findings in the current study, complemented by the follow-up studies, underline the importance of the grandparent generation for the maintenance of Nahuatl, as all three age groups tend to use Nahuatl more frequently with them. It also highlights parents’ important role in intergenerational transmission and how their beliefs, ideologies, and attitudes can influence their family language policy. Should parents decide not to transmit Nahuatl to the younger generations, the community will end up with monolingual Spanish youth speakers and/or youth speakers with a receptive ability in Nahuatl.

As the current study shows, just as there were more women than men across the three groups with linguistic knowledge in Nahuatl, there were generally more women who used Nahuatl than their male counterparts in interactions at home. This is an encouraging result as women are the primary caregivers in the community and this favors language maintenance. Almost all the women reported that they were primarily responsible for care of the children at home, making them the principal agents of intergenerational

transmission. The follow-up studies share some reasons or pressures for the lack of language transmission which include the myth of simultaneous bilingualism being harmful to children, personal trauma of discrimination, negative mainstream attitudes, recognition of Spanish as the language of socioeconomic opportunities, education and labor, child linguistic preferences, and the belief that Nahuatl is a language of adults.

Therefore, the TEP approach provides an overview of the various factors that promote or deter the language maintenance of ILs. By focusing on linguistic knowledge and use, we provide a snapshot of a bilingual community balancing the use of their two languages, and potentially at an early stage of language shift. The UCR as a pressure acts both in favor and against the language maintenance of Nahuatl. On one hand, the young generation may feel pressure or be motivated to use Nahuatl to communicate with the older generations. On the other hand, the older generations may be pressured to use Spanish, the language of UCR for the youth, when talking with the young generation. We also demonstrate how different pressures such as needs, ideologies, values and beliefs sometimes work for or against the maintenance, use, and promotion of ILs. This study also lays the foundation for future studies on Nahuatl in the region, especially using in-depth interviews, questionnaires, and participant observation to focus on the pressures motivating participants' language choices. It also indicates how the TEP framework could be employed in other bilingual Indigenous contexts outside Latin America.

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