Research Article

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Nahuatl, selected vitality indicators and scales of vitality in an Indigenous language community in Mexico

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Abstract: Scales or measurements of vitality propose various factors to assess the degree of endangerment of a language. Using these measurements offers important insights into the maintenance of a language and identifies the areas in need of support. The current study employed seven scales to assess the vitality of Nahuatl in the language community of Puebla, Mexico. Data on the selected vitality indicators, absolute speaker population, and intergenerational language transmission were collected through questionnaires on linguistic knowledge and home language use. Results showed that five out of the seven scales characterized Nahuatl as not at an immediate risk of endangerment as it had speakers in all age groups and was spoken at home by them. However, there was need for more emphasis on transmitting Nahuatl to the younger generations who made up the majority of the non-Nahuatl speaker population and were more likely to use Spanish than Nahuatl. The approach taken by this study will be of value when assessing other communities facing language endangerment and seeking language maintenance and revitalization.

Keywords: language vitality, Nahuatl, scales of vitality, language endangerment, speaker population, intergenerational language transmission

1 Introduction and background

Despite the diversity of languages in the world (7,102 according to Ethnologue's estimates), the majority of them are spoken by a small fraction of the world's population. For example, more than half (3,943 languages) are spoken by only 8 million people compared to 394 languages by 5.9 billion speakers and 2,765 languages by 357 million speakers (Romaine 2017). Speakers face both negative and positive pressures to use their language(s): the relative effect of such pressures can lead to the endangerment or maintenance of their language(s) (Terborg and García Landa 2011, 2013). UNESCO (Brenzinger et al. 2003) differentiates between internal and external pressures resulting in language endangerment. An example of an internal negative pressure could be the absence of positive attitudes by community members toward their own language, while external negative pressures could arise from cultural, religious, economic, educational, or military forces. Both types of pressures could interact in any given linguistic situation resulting in the abandonment of one's language, especially in language contact situations where the minority languages are perceived as a liability or a social disadvantage by their speakers. Speakers may choose to shift to another language for multiple reasons including "overcoming discrimination, to secure a livelihood, and

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enhance social mobility, or to assimilate to the global marketplace" (Brenzinger et al. 2003: 2). The causes of language endangerment are complex, and many possible reasons have been posited including lack of intergenerational language transmission, community members' lack of affinity with the language, use in limited domains, lack of new domains, oppressive assimilationist policies, declining number of speakers, and lack of literacy in the language (INALI 2012).

Research on language endangerment has covered questions and themes such as why speakers stop transmitting their language or the factors causing language endangerment, how to assess the vitality of a language, the importance of maintaining or saving a language, and how to combat language endangerment (Crystal 2000; Dupris 2019; Hale et al. 1992; Hinton et al. 2018; McCarty 2008; Nettle and Romaine 2000; Skutnabb-Kangas 2018). The present study focuses on assessing the language vitality of Nahuatl, one of the 68 Indigenous languages in Mexico. Nahuatl was the language of the ancient Aztecs and is currently spoken by more than 1.5 million speakers. While being the most spoken Indigenous language in Mexico, Nahuatl is widely distributed, with most speakers concentrated in the Huastec region (which covers the states of Hidalgo, Veracruz, Puebla, Tamaulipas, San Luis Potosí, Guanajuato, and Querétaro), especially the Sierra Norte de Puebla (northern mountainous regions of the state of Puebla). The localities in the Sierra Norte de Puebla are of interest for the study of language vitality as they could provide insight into the factors that favor the shift and maintenance of Indigenous languages. One such locality is Santiago Tlaxco, which is located in the municipality of Chiconcuautla, where the use of Nahuatl is vigorous. The 2010 national census reported that 83% of the population (1,695 habitants) in Santiago Tlaxco, aged 5 and older, can speak Nahuatl and 76% are bilinguals, who can speak both Spanish and Nahuatl. The high number of speakers of Nahuatl in Santiago Tlaxco makes this village a good case study for language vitality.

Several scales have been proposed to assess the degree of endangerment or language vitality of any given language, based on a variety of factors. While there is a general consensus that no single factor can determine the vitality of a language, measuring the different factors offers important insights into language maintenance (Langlois and Turner 2014; UNESCO Ad Hoc Expert Group on Endangered Languages 2003). In the present study, two vitality indicators are examined: intergenerational transmission and the absolute number of speakers. They were selected because they are considered two of the important factors in assessing the vitality of a language and offer an opportunity for quantitative and comparative analysis with other languages. Intergenerational transmission is often cited as the most important factor in many language vitality scales because "[t]he health of a language quite obviously depends on the youngest generation" (Fishman 1991; Lee and Van Way 2016; Romaine 2017: 47; UNESCO 2003). With regard to speaker numbers, it is one of the easily accessible pieces of information provided on languages in national census data and language databases such as the Catalogue of Endangered Languages (ElCat), UNESCO's Atlas of the World's Languages in Danger, and Ethnologue. While having large speaker numbers does not necessarily guarantee language survival, those languages with a small number of speakers are thought to be at greater risk of disappearing (Amano et al 2014; Lee and Van Way 2016). These two factors are assessed with seven scales of vitality, four of which are usually applied in the global context (e.g., Ethnologue's EGIDS, UNESCO's LVE, ELDIA's EuLaViBar, and Fishman's GIDS) and three in a local or country context (scales used in Norris 2006 and Canadian Heritage 2005 in the Canadian context, and a scale used by INALI 2012 in Mexico). These different language vitality scales, their contributing factors, and critical assessments are briefly outlined in the next section. It is important to bear in mind that language vitality scales are primarily intended to diagnose the health of a language in order to create awareness to decision-makers, policy makers, stakeholders, communities, individuals, speakers, and potential speakers. Dołowy-Rybińska (2017) suggests that they "should not be used for predicting the future of any language" but rather for indicating the tendencies or patterns that result in language endangerment. In reviewing the seven scales, the study adopts the caveat of UNESCO's Language Vitality and Endangerment (LVE) framework by stating that "[n]o single factor alone can be used to assess a language's vitality or its need for documentation. Language communities are complex and diverse; even assessing the number of actual speakers of a language is difficult" (Brenzinger et al. 2003: 7).

2 Scales of vitality

2.1 Graded intergenerational disruption scale (GIDS)

One of the pioneering scales of vitality is Fishman's (1991) GIDS, an 8-level (or staged) scale based on language use in different domains. For this scale, intergenerational transmission is the most critical indicator of the health of a language. At stage 8, the riskiest stage of language vitality in the GIDS, only the grandparent and older generations are speakers of the language. This stage corresponds to the critically endangered status of the LVE scale. At stage 7, the parent generation is beyond child-bearing age and does not transmit the language to the younger generations. This stage corresponds to the severely endangered status of the LVE scale. At stage 6, the most crucial stage, there is intergenerational transmission as the language is spoken by all generations and acquired as a first language, similar to the safe status of the LVE scale. Stages 1–5 focus on language use in multiple domains such as literacy in home, community and school, language of instruction in schools, work, government spheres, and mass media. For a threatened language to reach stage 1, the highest stage, it is used in the spheres of education, work, mass media, and government services at a national scale. The factors influencing the GIDS can be summarized as:

1. intergenerational transmission
2. mass media use
3. language use in education/language of instruction
4. literacy use
5. age of speakers
6. language of work
7. official or governmental use.

The GIDS has been criticized for not "provid[ing] an adequate description of all of the possible statuses of a language" (Lewis and Simon 2010: 106). To address this weakness, these authors devised an expanded version of GIDS (EGIDS) that includes two more stages at the lower end (after stage 8) such as "dormant" and "extinct," and one additional higher stage (above stage 1) termed "international."

2.2 LVE framework

Similar to GIDS, the UNESCO Ad Hoc Expert Group on Endangered Languages (Brenzinger et al. 2003) proposed the LVE scale, with six degrees of endangerment, namely extinct (6), critically endangered (5), severely endangered (4), definitely endangered (3), vulnerable (2), and safe (1). This assessment was based on nine factors (Brenzinger et al. 2003: 17):

1. intergenerational language transmission
2. absolute number of speakers
3. proportion of speakers within the total population
4. shifts in domains of language use
5. response to new domains and media
6. materials for language education and literacy
7. governmental and institutional language attitudes and policies (including official status and use)
8. community members' attitudes toward their own language
9. type and quality of documentation.

The most important factor for this scale is intergenerational transmission; hence, a language is considered safe if there is no disruption in its transmission across all generations. A language is considered still vulnerable even if it is spoken by most children because its use is restricted to specific domains. A definitely endangered language is no longer being learned by children as a first language at home. With regard to a

severely endangered language, the use of the language is vigorous among the grandparent and older generations but restricted among the parent generation. A language is considered critically endangered when the grandparent and older generations are the remaining speakers and their language use is partial and infrequent at best. The last level of endangerment on the LVE scale is an extinct language, one with no speakers.

While UNESCO assigns an individual 5-point scale for each of the nine factors, it does not provide an overall vitality score for any language. However, it allows for a more fine-grained analysis than other scales such as the ElCat which does provide an overall vitality score based on the four factors of intergenerational transmission, absolute number of speakers, speaker number trends, and domains of use (Lee and Van Way 2016; Romaine 2017). Another critique offered of the LVE is that sometimes data are not available for all the nine factors as Lewis (2005) found in his assessment of 100 languages in five global regions using this framework. This study noted that Africa had the least amount of data for analysis, in contrast to Europe and the Pacific region. This result speaks to the broader methodological issue affecting all language vitality scales that some languages are under-documented. Some of the factors used in LVE are not explained completely. For instance, the LVE framework does not specify whether the absolute number of speakers includes both monolingual and second language speakers (Lewis 2005). Additionally, while UNESCO considers that the attitudes of community members and government officials are important, it ignores the impact that attitudes of non-community members or mainstream society have on language endangerment (Dołowy-Rybińska 2017). The negative attitudes of dominant culture and resultant discrimination could influence community members into devaluing their language on one hand or being indifferent to its loss on the other hand. Another critique of the LVE framework is its failure to explain the quantifiers it uses in its descriptions such as a few, some, many, and most. While “no one” and “all” are self-explanatory, the other terms are not; it would be helpful to know what the percentage equivalents of these quantifiers are.

2.3 Expanded GIDS (EGIDS)

Lewis and Simon (2010) developed the EGIDS, a 13-level scale currently used by Ethnologue to classify the health of languages, from the perspective of language revitalization, not language loss. The EGIDS, an adaptation of Fishman’s GIDS, is a synthesis of UNESCO’s LVE, Fishman’s GIDS, and Ethnologue’s five-level scale. This previously used five-level scale of Ethnologue centered primarily on the number of first language speakers. The five categories (Lewis 2009) were extinct (no speakers left), dormant (no speakers left but strong ethnic identity with the language), nearly extinct (very small number of speakers), second language only, and living (majority of the population are first-language speakers). The EGIDS assesses the vitality of language based on five main questions. The first question is about the current identity function of a language and the possible answers are historical, heritage, home, and vehicular functions. The second question concerns the official use of a language, be it international, national, regional, and not official. Question 3 asks whether intergenerational transmission occurs at home. Question 4 enquires about the literary status of a language, whether it is at an institutional or incipient level or it has no literary status. Question 5, closely related to question 3, seeks to identify who the youngest generation of speakers are: great grandparents, grandparents, parents, or children. The 13 levels of language vitality (from the highest to the lowest vitality) are international (0), national (1), regional (2), trade (3), educational (4), written (5), vigorous (6a), threatened (6b), shifting (7), moribund (8a), nearly extinct (8b), dormant (9), and extinct (10).The factors of EGIDS emphasize language use, particularly the speakers and functions of the language (Eberhard et al. 2020) and are outlined as:

1. the speaker population
2. the ethnic population; the number of those who connect their ethnic identity with the language (whether or not they speak the language)
3. the stability of and trends in that population size

4. residency and migration patterns of speakers
5. an estimate of when the last speaker died (in the case of extinct languages)
6. the use of second languages
7. the use of the language by others as a second language
8. language attitudes within the community
9. the age range of the speakers
10. the domains of use of the language
11. official recognition of languages within the nation or region
12. means of transmission (whether children are learning the language at home or being taught the language in schools)
13. non-linguistic factors such as economic opportunity or the lack thereof.

In spite of being considered currently as the "most comprehensive tool available for assessing language endangerment globally, regionally, and country-by-country," EGIDS does not include important factors considered in LVE such as the attitudes of community members, language documentation, the absolute number of speakers, and governmental and institutional language attitudes and policies (Romaine 2017: 49). Similar to LVE, it suffers from the lack of availability of adequate language information including the recency of speaker numbers as it tends to rely heavily on national census data.

2.4 European language vitality barometer (EuLaViBar)

Another global scale of vitality is the European Language Diversity for All (ELDIA) project's EuLaViBar. The EuLaViBar questionnaire assesses language vitality by focusing on language use in four areas (capacity, opportunity, desire, and language products) across four dimensions (legislation, education, media, and language use and interaction) (Spiliopoulou Åkermark et al. 2013). The dimensions of EuLaViBar can be described or broken down into the following variables or factors (Spiliopoulou Åkermark et al. 2013: 4):

1. community members' attitudes toward their own language and its speakers
2. community members' attitudes toward other languages and their speakers
3. cross-generational language use
4. domain-specific language use
5. existence of legal texts in the investigated minority language
6. existence of media
7. intra-generational language use
8. language acquisition
9. language maintenance
10. language of instruction
11. legislation regarding education
12. media use and consumption
13. mother tongue
14. role of languages in the labor market
15. self-reported competence
16. support/prohibition of language use.

The ELDIA Language Maintenance Scale has five levels, ranging from 0 to 4. At the most critical level (0), language maintenance is categorized as severely and critically endangered where language use is infrequent; this fits the critically endangered status of the LVE scale and is similar to nearly extinct (8b) status of EGIDS. An acutely endangered language (level 1) is used actively but in limited contexts, while a threatened language (level 2) has a declining trend in language use and transmission. At level 3, language

maintenance has been achieved somewhat. Not only is intergenerational language transmission achieved, its use extends beyond the home domain to other functions and contexts. At the final level (4), the language is used in many contexts and enjoys broad social and institutional support.

EuLaViBar, just like GIDS, LVE, and EGIDS, tends to privilege formal education and literacy over other forms of education. It does not consider that many languages, especially Indigenous languages, may not be used in schools or exist in written formats. There are languages where orality or oral traditions are the norm.

2.5 Country-level scales

The three scales reviewed here have been used in the North American context, namely Mexico, Canada, and the United States. They are predominately quantitative in nature and are mainly based on speaker statistics, geographic distribution of speakers, and language use. The first scale is Norris's (1998, 2006), which draws upon Kinkade's (1991) classification of Indigenous languages in Canada, with five main levels: already extinct, near extinction, endangered, viable but with a small population base, and viable with a large population. A nearly extinct language only has a few elderly speakers and is considered beyond revitalization. An endangered language may still be spoken by some number of speakers and may be revitalized depending on the interest of the community and the availability of educational programs, although it is no longer being learned as a first language by children. A viable language with a small population (more than 1,000 speakers) is associated with speakers who strongly identify with the language. A viable language with a large population size is considered flourishing. Norris's analysis is based on the following factors:

1. age range of speakers
2. size of speaker population
3. size of second language speaker population
4. size of mother tongue population
5. intergenerational transmission (language use at home).

This particular scale is descriptive in nature as it solely focuses on the speaker statistics which could be advantageous for comparison with other languages. The information it provides could be seen as the starting point for a more in-depth analysis which seeks to explain the reasons for language endangerment or declining speaker numbers on one hand, or the viability or flourishing of a language on the other hand.

The second scale of vitality, designed for the United States context and also commonly used in language surveys at the community level in Canada, is Bauman's (1980: 13) scale (Canadian Heritage 2005) which classifies a language as flourishing, enduring, declining, obsolescent (or critical), or extinct. Bauman (1980) proposed a corresponding retention strategy for each status ranging from prevention and expansion for flourishing and enduring languages, respectively, to fortification, restoration, and revival for declining, critical, and extinct languages, respectively. Flourishing languages are spoken by speakers of all ages, with some speakers being monolingual in all communicative domains including literacy and new domains. Enduring languages also have speakers of all ages, with the majority, if not all, being bilinguals, with little or no literacy in the language. The other language, usually considered the more socially prestigious or more economically viable language, is used exclusively in some domains. A declining language has more older speakers than younger, and the latter may not be fluent in the language while the youngest speakers of a critical language are the adult population. An extinct language has no speakers. Bauman's classification (1980) is based on the following factors:

1. age of speakers
2. number of speakers
3. language domains
4. new domains
5. literacy acquisition.

While Bauman's scale goes beyond speaker numbers to include usage in domains, it also makes literacy an important factor. However, the factors it considers are not wide-ranging enough (in contrast to the LVE and EuLaViBar) to offer a detailed analysis of the linguistic situation.

The third scale of vitality was developed by the National Institute of Indigenous Languages (Instituto Nacional de Lenguas Indígenas [INALI] in Spanish) of Mexico, which identifies four levels of risk of endangerment facing languages and their linguist variants, namely very high (critically endangered), high (severely endangered), medium (vulnerable), and not immediate (enduring) in the country, based on three indicators:

1. total number of speakers
2. number of younger speakers
3. geographical distribution of language.

In the INALI classification, a linguistic variant has a very high risk of disappearing if its speaker population represents less than 30% of the linguistic communities in which it is spoken. The total speaker population of a high-risk language may represent over 30% of its communities but its younger generation is less than 25% of the total speaker population. For a medium-risk language, the total speaker population represents over 30% of its communities, of which the younger speakers are more than 25% of the total speaker population. A language at no immediate risk is spoken in more than one locality where the total speaker population represents over 30% of the total population, of which more than 25% are younger speakers. The INALI scale is primarily concerned with classifying the risk of endangerment and does not assess the underlying factors contributing to endangerment as it solely focuses on speaker statistics and the geographical range.

At the core of all these classification systems is the importance of intergenerational language transmission, i.e., if the language is passed on from one generation to another. That is not to say the other factors are not also important and do not influence intergenerational language maintenance. The above-mentioned systems may consider intergenerational language transmission from different factors. While GIDS and the LVE scale specifically name intergenerational language transmission as a variable, it can be assessed as the age range of speakers and means of transmission with EGIDS, cross-generational language use, language acquisition, and mother tongue with EuLaViBar, the age range of speakers and home language with Norris/Kinkade, the age of speakers in Bauman's scale, and the number of younger speakers (aged 5–14) in the INALI classification. The general conclusion is that language use at home by different generations, especially the children and youth, is a good indicator of language vitality. Additionally, all of these scales incorporate speaker population as a factor even though some such as EuLaViBar and EGIDS do not explicitly mention it. In the current study, the vitality of Nahuatl in a rural community of Santiago Tlaxco is assessed with the selected factors of speaker population and intergenerational language transmission, using these just reviewed scales.

3 Methodology

To assess the vitality of Nahuatl in Tlaxco (the preferred name for Santiago Tlaxco), a community with a population of 1,695 (INEGI 2010) in the municipality of Chiconcuautla, in the state of Puebla, Mexico, data collected from three language surveys were used. This study is part of an ongoing project to assess the vitality of Indigenous languages such as Nahuatl in remote communities. Tlaxco is one such community where no sociolinguistic studies have been conducted. Hence, the project seeks to contribute to the knowledge on Nahuatl vitality through means of linguistic questionnaires, interviews, and participant observation. In the current study, we report on data relevant to the scope of the current study from these linguistic questionnaires used in the project. All questionnaires were administered in the fall of 2019. The first linguistic questionnaire was undertaken as a sub-project of the Department of Applied Linguistics at the Universidad Nacional Autónoma de Mexico (UNAM) in Mexico City, Mexico, while the second and third

linguistic questionnaires were sub-projects of the Department of Languages and Cultures at the University of Western Ontario in London, Canada.

3.1 Data sources

3.1.1 Linguistic questionnaire I

The first questionnaire was administered for the first time in this community and included two questions relevant to this scope of the paper: (i) knowledge of the two languages, Spanish and Nahuatl, and (ii) language use at home. In this questionnaire, respondents were asked if they spoke Nahuatl. If they could conduct a conversation in Nahuatl, they selected yes. Other options were "speak Nahuatl a little," "only understand Nahuatl," and "neither understand nor speak Nahuatl." Respondents had to indicate which language(s) they used with the four generations (children, adolescents, adults, and seniors) at home. The three options were using Nahuatl, Spanish, or both languages. Table 1 shows an example of the items used in this questionnaire. In all, 207 questionnaires were completed in 50 homes, with the youngest respondent aged 3 and the oldest 68. The questionnaire was administered in an oral census format, primarily in Nahuatl. In the 50 homes visited, only one person answered for family members' linguistic knowledge and language use patterns.

The responses on the first question "do you speak the following languages?" count toward the factor of speaker population assessed in the present study, while the second question concerning language use at home is an indicator of intergenerational transmission.

3.1.2 Linguistic questionnaire II

This questionnaire collected data on the language use and attitudes of 62 youth (aged 12–17) in the same community, primarily from the junior and senior high schools. Fifty-one of them were bilinguals while the rest were monolingual speakers. The questionnaire was administered in Spanish and participants usually completed it by themselves. Respondents indicated whether they could conduct a conversation in Nahuatl and self-rated their linguistic proficiency in the language. They also indicated which language(s) (Nahuatl, Spanish, or both) they used with 21 interlocutors in varying degrees of proximity. The present study focused on the results of family or home language use. In all, there were eight categories reserved for family members (father, mother, younger sisters, younger brothers, older sisters, older brothers, grandparents, and other relatives). Table 2 shows an example of the questionnaire items.

The number of participants who answered counts toward the absolute speaker population, while the language use with several interlocutors at home represents the factor of intergenerational transmission.

Table 1: Language questionnaire I

(1) Do you speak the following languages?				
Language	Yes	A little	Only understand	No
Nahuatl				
Spanish				
(2) When at home what languages do you use speak with				
Children (up to 12 years)				
Adolescents (13–18 years)				
Adults (19–60 years)				
Elderly (61 years and older)				

Table 2: Linguistic questionnaire II

	Which language(s) do you use with your		
	Spanish	**Nahuatl**	**Both**
1. Mother			
2. Father			
3. Younger brothers			
4. Younger sisters			
5. Older brothers			
6. Older sisters			
7. Grandparents			
8. Other relatives			

3.1.3 Linguistic questionnaire III

This questionnaire is similar to that used to examine youth's language use and attitudes (language questionnaire II). The major difference is that the focus of this questionnaire was adult participants (aged 18 and above), hence it mostly covered different family members compared to language questionnaire II, as shown in Table 3. Language use at home had ten categories, namely their spouse, spouse in front of children, children (aged 0–5, 6–12, 13–18, above 18), parents, grandparents, siblings, and other relatives, with three language options: Nahuatl, Spanish, or both.

The scores for each category are summed up to indicate the home language(s). Eighty adults participated in the study, which was either administered orally in Nahuatl or Spanish, depending on the participant's preference. The questionnaire also covered language use in non-family contexts and linguistic attitudes, which are outside the scope of the present study.

3.2 Respondents

When the number of participants who participated in the three surveys was combined, the total was 349. However, the data were cross-checked to avoid counting a participant twice since some participated in two surveys. Six adolescents participated in the first and second surveys and 34 adults participated in the first and third surveys. In such a situation, the results for the more recent survey were included in this study. Additionally, nine children under age 5 were excluded from the present study because one of the criteria of

Table 3: Linguistic questionnaire III

	Which language(s) do you use with your		
	Spanish	**Nahuatl**	**Both**
1. Spouse			
2. Spouse in front of children			
3. Children (0–5)			
4. Children (6–12)			
5. Children (13–18)			
6. Adult children			
7. Parents			
8. Grandparents			
9. Siblings			
10. Other relatives			

INALI (2012) considers language vitality based on the number of young speakers, from ages 5 to 14. In all, there were 300 respondents, divided into four age groups: 5–14, 15–29, 30–44, and 45 and older. Table 4 summarizes the characteristics of the participants by age and gender.

3.3 Data coding and analysis

To find the speaker population of Nahuatl, only the number of people who reported speaking Nahuatl in questionnaire I and those who could conduct a conversation in Nahuatl in questionnaires II and III were considered. Second, a uniform coding strategy was needed owing to the fact that all three questionnaires assessed home language use with different number of interlocutors: four in questionnaire I, eight in questionnaire II, and ten in questionnaire III. A response was coded as "Nahuatl" or "Spanish" if a respondent used the respective language exclusively at home with all interlocutors. It was coded as "both" if the participant used both languages exclusively with interlocutors, or used them with some interlocutors, or used Nahuatl with some interlocutors and Spanish with others. Given that the "both" category has more options than the other categories ("Nahuatl" and "Spanish"), two more categories ("mostly Nahuatl" and "mostly Spanish") could be created from it. While using both languages at home, if the participant used more Nahuatl than Spanish, it was coded as "mostly Nahuatl" and if more Spanish than Nahuatl was used, it was coded as "mostly Spanish." The "both" category could be revised to only include responses where Spanish and Nahuatl use was evenly distributed among interlocutors, or using both languages always or most of the time. The results of the selected vitality factors of the Nahuatl speaker population and intergenerational transmission are presented in the next section.

4 Results and discussion

4.1 Absolute speaker population

Of the 300 respondents, the overwhelming majority (273) (91%) reported they could conduct a conversation in Nahuatl. Among the speakers,

- 64 were aged 5–14: 77% of the youngest population spoke Nahuatl
- 87 were aged 15–29: 92.5% of the young adult population spoke Nahuatl
- 50 were aged 30–44: 98% of the adult population were Nahuatl speakers
- 72 were aged 45 and older: all (100%) of the middle-aged and senior population spoke Nahuatl.

Based on these results, Nahuatl is spoken by all generations and across all ages, an indicator that intergenerational transmission has occurred. In Table 5, the vitality of Nahuatl is shown as assessed by different scales based on speaker population.

Table 4: Participants characteristics by age and gender (*n*)

Age range	Population	Male	Female
5–14	83	39	44
15–29	94	39	55
30–44	51	24	27
45 and older	72	27	45
Total	300	129	171

Table 5: Nahuatl language vitality in Tlaxco (by absolute speaker population)

Scale	Vitality	Description (adapted)
UNESCO	Unsafe	Nearly all speak Nahuatl
Fishman	Safe[a]	Nahuatl has speakers across all generations
EGIDS	Vigorous	Cross-generational speakers can use Nahuatl in direct interactions between and within themselves
EuLaViBar	Enduring/flourishing[b]	Nahuatl language transmission to younger generations is achieved
Norris	Viable	Nahuatl has many speakers under the age of 50
Bauman	Enduring/flourishing	Nahuatl has speakers of all ages
INALI	Medium risk	The youngest speakers of Nahuatl make up less than 25% of the speaker population

[a] Safe is used to represent Fishman's stage 6, considered the most crucial stage. [b] Enduring and flourishing are used to represent the two safest levels on EuLaViBar where language maintenance is achieved.

From Table 5, it is observed that five scales or measurements (Fishman, EGIDS, EuLaViBar, Norris, and Bauman) classified Nahuatl as either safe or stable in Tlaxco because the language has speakers in all age groups. However, the remaining two scales (UNESCO and INALI) gave less favorable assessments of vitality. The UNESCO scale considers a language "unsafe" if "nearly all" speak it but does not indicate which percentage of the absolute speaker population qualifies as "nearly all." By this standard, the vitality of Nahuatl is unsafe even though it is spoken by 91% of the participants in Tlaxco. In the case of the INALI classification, Nahuatl is at medium risk of disappearing from Tlaxco because the younger speaker population is less than 25% of the absolute speaker population. In the present study, the younger speaker population (aged 5–14) made up 23% of speaker population. However, what the INALI classification overlooks is that some language communities may have a smaller youth population than others, making the 25% criterion harder to reach. In the current study, the youngest generation only made up about 28% of the total participants.

4.2 Home language or intergenerational language transmission

For the participants in this study, using both Nahuatl and Spanish at home was the preferred choice for the majority. The distribution is as follows:

- 61 respondents (20%) used only Nahuatl at home
- 27 people (9%) used only Spanish at home
- 212 (71%) used both languages at home.

The 27 people who only used only Spanish at home were those who could not conduct a conversation in Nahuatl. Our findings indicate that most speakers (91%) used only or some Nahuatl in their interactions at home, indicating intergenerational transmission of this language. Dividing home language use into five categories expands on the "both" category as follows:

- 61 respondents (20%) used only Nahuatl at home
- 57 respondents (19%) used mostly Nahuatl at home
- 27 people (9%) used only Spanish at home
- 35 people (12%) used mostly Spanish at home
- 120 (40%) used both languages at home.

When the results are analyzed by age, the general trend was to use both languages at home among the different age groups with the exception of persons aged 45 and older whose home language was evenly distributed between Nahuatl and both languages (see Table 6). Less than 10% of the younger generations, below 30 years old, spoke only Nahuatl at home, compared to 20% of 30–44 age group and 50% of 45-and-

Table 6: Language use at home in different age groups (*n* (%))

	5–14	15–29	30–44	45+
Nahuatl	7 (8%)	8 (8.5%)	10 (20%)	36 (50%)
Spanish	18 (22%)	8 (8.5%)	1 (2%)	0 (0%)
Both	58 (70%)	78 (83%)	40 (78%)	36 (50%)
Total	83 (100%)	94 (100%)	51 (100%)	72 (100%)

older group. Two-thirds of the participants who could not speak Nahuatl ($n = 27$) were in the 5–14 age group ($n = 18$). This finding is a cause of concern if younger and older generations are compared because almost all who could not speak Nahuatl were younger than 30 years of age.

Even when home language use is distributed across the five categories (only Nahuatl, mostly Nahuatl, only Spanish, mostly Spanish, and both), the majority of participants below age 45 used both languages: 41% of the youngest generation, 54% of the young adult population, and 35% of the adult population. Only 24% of the middle-aged generation used both languages. When the data for "only Nahuatl" and "mostly Nahuatl," on one hand, and "only Spanish" and "mostly Spanish" on the other hand, are combined, it indicates the trend toward the home use of each language (Figure 1).

The results from this figure indicate that while the older generations (30 years and older) tend to use Nahuatl predominately at home, the youngest generation (younger than 15 years) used it the least, followed by use in the 15–29 age group. The declining trend of Nahuatl use among the younger generations could affect the long-term maintenance of the language. Based on these results, Nahuatl is one of the home language(s) for participants of all ages, who use it exclusively or alongside Spanish, an indicator that intergenerational transmission had occurred. Language vitality can also be assessed by using the criteria of home language use and intergenerational transmission. These results are presented in Table 7.

From Table 7, some of the vitality classifications are not clear cut such as that of INALI and Norris, because they do not specifically consider language use in domains. As already mentioned, INALI considers the factors of geographical distribution, speaker population, and age of speakers, while Norris mainly judges the viability of a language on the size of the speaker population. When comparing the vitality ratings in Tables 5 and 7, there is a correlation between the selected factors of absolute speaker population and the home language or intergenerational transmission. Speakers of Nahuatl did use it in communication with family to some extent. Using the seven scales has shed light on the perspective of the factors that were included in each classification. The common conclusion drawn from using all the vitality scales is that for a language to be maintained, it needs speakers of all ages who use it and transmit it to future generations.

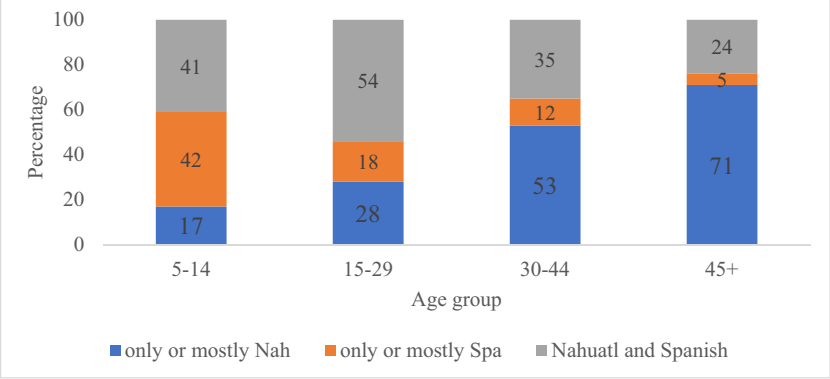

Figure 1: Home language use by age group.

Table 7: Nahuatl language vitality in Tlaxco (by home language/intergenerational language transmission)

Scale	Vitality	Description (adapted)
UNESCO	Unsafe	Most but not all children speak Nahuatl at home
Fishman	Safe[a]	Family members in different generations communicate in Nahuatl
EGIDS	Vigorous	Speakers in the generations use Nahuatl in direct interaction among themselves
EuLaViBar	Enduring[b]	Nahuatl language transmission to younger generations is achieved and many speakers have developed sustainable bi/multilingualism
Norris	Viable	Nahuatl has many speakers under the age of 50 and is spoken in an isolated community
Bauman	Enduring	Nahuatl has speakers of all ages, most are bilingual. The other language is sometimes used exclusively at home
INALI[c]	Medium risk	The youngest speakers of Nahuatl make up less than 25% of the speaker population

[a] Safe is used to represent Fishman's stage 6, considered the most crucial stage. [b] Enduring is used to represent the second safest level on EuLaViBar where language maintenance is achieved somewhat. [c] INALI does not consider language use in different domains. Its main focus is on the number of speakers. It suggests that speakers would use the language.

5 Conclusions and implications

This study analyzed the vitality of Nahuatl in Tlaxco from the perspective of two factors: absolute speaker population and home language use/intergenerational language transmission. Using seven scales to assess language vitality, Nahuatl in Tlaxco was either characterized as (1) unsafe or at medium risk of endangerment because it was not spoken by all in the community and did not have enough young speakers or (2) safe or enduring because it had speakers in all age groups and was spoken at home. Using these seven scales showed how the same data could be interpreted differently based on the criteria of each scale. The differences in assessment indicate that scales should be applied to a language community depending on the vitality factors under study and/or the goals of the project. An example is that scales such as INALI or Norris will not be a best fit for assessing community members' language attitudes since these scales do not specifically consider this factor in their criteria.

Vitality scales come with limitations in the scope of factors they include and their capacity to quantify certain factors. Some scales such as UNESCO's LVE scale and ELDIA's EuLaViBar come with the caveat that they should be adapted to the language community under study. Additionally, UNESCO points out that no single factor alone can determine language vitality while ELDIA cautions that its scale should only be used to identify the current status of language maintenance in need of reinforcement and not as a predictor of the future vitality of a language. In spite of the limitations of these scales of vitality, they can be useful tools in diagnosing the status of languages. In this study, they helped identify the areas of Nahuatl language maintenance in need of support.

Our results show that there is still need for some work on the home front to transmit the language to the younger generation, especially when non-Nahuatl speakers tend to be prevalent in that generation as found in this study. In an increasingly bilingual population like Tlaxco's, where participants report using both Nahuatl and Spanish, the use of Nahuatl in daily communication and intergenerational transmission needs to be emphasized to ensure a stable bilingualism. The broader implication for language maintenance is that activists, scholars, linguists, communities, and other organizations and stakeholders should look beyond the speaker statistics when assessing the vitality of a language. For instance, in the case of Tlaxco, the results that 77% of the youngest population (aged 5–14) and 92.5% of the young adult population (aged 15–29) spoke Nahuatl, with higher percentages reported for the older populations, paint a picture of a community with a strong Nahuatl presence; one not in an immediate need of maintenance or revitalization. However, a nuanced look at the use of Nahuatl at home or with family, considered one of the most critical domains of language maintenance, reveals a different interpretation or assessment. The finding that less than 10% of the youngest and young adult populations use only Nahuatl at home is not an encouraging statistic for the vitality of Nahuatl. If the health and future transmission of a language depends on its

youngest speakers, then Nahuatl is at some level of risk if they do not use it often at home. Any language maintenance project should emphasize the actual use of minority languages such as Nahuatl, at least in the home. This is particularly important because Spanish, the dominant and de facto national language of Mexico, is already used in all spheres of language use including education, politics, military, literacy, and labor. The focus on making the home the haven for minority languages should be the first and critical step in any language maintenance effort. While the presence of minority languages in other domains such as education, media, literacy, work, and government or official use should be the ultimate goal of every minority language as it signifies its expansion and fortification in mainstream society, securing its use in the home and community should take precedence. Such an approach is the quickest, most cost-effective, bureaucracy-free, and most hands-on way, which can be undertaken by community members, the primary stakeholders of any language maintenance efforts.

Additionally, the current study has implications for the application of scales of vitality, especially the assessment of some factors such as intergenerational transmission. For instance, scales such as LVE, GIDS, EGIDS, and INALI determine intergenerational transmission based on the speaker numbers of the youngest generations but as the current study has shown, these numbers only show part of the picture. A more comprehensive assessment of intergenerational transmission should consider language use at home or with family members as was undertaken in this study. Another factor or variable underlying every scale of vitality is the acknowledgement of a language contact situation or bi/multilingualism in the language community, state or country. If speakers were living in monolingual societies without contact with other languages from other societies, the issue of language endangerment would not arise. With that being said, the role of bi/multilingualism should be highlighted in scales of vitality as it could provide insight into the dwindling or declining use of minority languages. As seen in this study, language use at home in bilingual societies is not a simple case of using different languages with family members, for example, Spanish with one's mother, and Nahuatl with one's father. Speakers can use both languages with individuals at home. However, reporting only on the usage of both languages at home does not reveal the dynamism, relationship, or balance between two or more languages in a contact situation. For instance, the results of language use at home showed that the option of both languages for communication was the most preferred across the age groups with the oldest group (aged 45 and older) using it 50% of time and the youngest (aged 5–14) 70% of time. The collective result raises the question, in language vitality studies, whether both languages exist in equilibrium or if the more dominant language is gradually supplanting the minority language. A breakdown of bilingual usage at home showed that speakers used both languages equally most of time (40%), followed by mostly Nahuatl (19%), and mostly Spanish (12%). This breakdown provides a fuller picture of the bilingual situation and could assist in identifying trends in language use in other domains.

To conclude, scales of vitality are important tools to assist researchers and communities in identifying the possible factors that affect the health of a language. While these scales have certain limitations as indicated in this paper, they provide an important framework upon which researchers can adapt, build upon, or modify to fit the goals of their research and the needs of the linguistic community. For communities planning to maintain and revitalize their languages, one of the key steps for success is to conduct research to identify the areas in need of support. With the assessment of multiple scales of vitality, communities can develop and initiate effective language programs and strategies best suited to their goals and objectives.

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