The expression of texture in P’urhepecha: initial observations

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The expression of texture in P'urhepecha: Initial observations

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ABSTRACT: Alongside taste and smell, touch has long been considered one of the 'lower' senses in much of western thought (Classen 1997). However, more recent research indicates that this ranking is not absolute, but that the cultural importance of the senses and their role in constructing worldview is relative, and thus variable (San Roque et al. 2015). Winter (2019: 191) also remarks that touch is high in semantic complexity because it is a frequent source domain in cross-modal language use, for instance, *rough voice*. Nevertheless, the language of touch has largely been ignored in linguistic description (cf. Essegbey 2013). This paper specifically investigates the language of texture in P'urhepecha, an isolate spoken in western Mexico, focusing on terms obtained by employing the "texture booklet" (Majid et al. 2007). Responses revealed two main morphosyntactic strategies: (i) terms formed from a root that expresses a texture, further subdivided into adjectival and verbal forms, and (ii) a variety of comparison constructions that can be broadly translated by 'like' in English. Ten roots were employed overall, but three of them dominated: *ch'era-* 'rough', *sanu-* (and its variant *sunu-*) 'woolly', and *pitsï-* (and its variant *pichi-*) 'smooth'. These describe all ten of the stimulus materials, whereas the minor, less frequent roots, had narrower reference. While further investigation is needed to gain a better understanding of this lexical domain, our preliminary study of texture terms in P'urhepecha adds to the very few sources that have investigated this area of linguistic inquiry, and also deepens our knowledge of the complex morphology and contact-induced features of the language (cf. Chamoreau 2012).
KEYWORDS: Language of texture; adjectives; P'urhepecha; comparative constructions; language contact

RESUMEN: Junto al gusto y el olfato, tradicionalmente el tacto ha sido considerado uno de los sentidos "menores" en gran parte del pensamiento occidental (Classen 1997). Sin embargo, investigaciones más recientes indican que esta clasificación no es absoluta, sino que la importancia cultural de los sentidos y su papel en la construcción de nuestra visión del mundo es relativa y, por lo tanto, variable (San Roque et al. 2015). Winter (2019: 191) por su parte observa que el tacto es altamente complejo semánticamente porque con frecuencia sirve como una fuente del lenguaje intermodal, por ejemplo, *voz áspera*. Aun así, el lenguaje que se refiere al tacto por lo general ha sido ignorado en las descripciones lingüísticas (cf. Essegbey 2013). En este trabajo se investiga específicamente el lenguaje de la textura en p'urhepecha, una lengua aislada del oeste de México, enfocándonos en los términos obtenidos mediante el "cuaderno de texturas" (Majid et al. 2007). Las respuestas revelaron dos estrategias morfosintácticas principales: (i) términos formados a partir de una raíz que expresa una textura, subdivididos en formas de tipo adjetival y de tipo verbal, y (ii) diversas construcciones comparativas que se podrían traducir por 'como'. En total, diez raíces fueron empleadas por los participantes, pero tres de ellas predominaron: *ch'era-* 'rasposo', *sanu-* (y su variante *sunu-*) 'lanudo', and *pitsï-* (y su variante *pichi-*) 'liso'. Estas raíces describen los diez materiales del cuaderno de texturas, mientras que las raíces menores, las menos frecuentes, tuvieron una aplicación limitada. Aunque se requiere más investigación para comprender mejor este dominio léxico, nuestro estudio preliminar de los términos de textura en p'urhepecha se agrega a los poquísimos trabajos que se han enfocado en este campo lingüístico y asimismo amplía nuestro conocimiento de la compleja morfología del p'urhepecha y de sus rasgos inducidos por el contacto con el español (cf. Chamoreau 2012).
PALABRAS CLAVE: Términos de textura; adjetivos; p'urhepecha; construcciones comparativas; contacto entre lenguas

1. Introduction

1.1 The language of touch

Despite being fundamental to how human beings explore the world, touch, alongside taste and smell, has long been considered one of the 'lower' senses in much of western thought (Classen 1997). This is reflected in the fact that vision and hearing have received greater attention in the linguistic literature (cf. Sweetser 1990; Evans and Wilkins 2000; Vanhove 2008; Guerrero 2010). However, more recent cross-cultural anthropological and linguistic research indicates that such a ranking is not absolute, but that the cultural importance of the senses and their role in constructing worldview is relative, and thus variable (San Roque et al. 2015). Moreover, Winter (2019: 191) remarks that touch is high in semantic complexity because it is a frequent source domain in cross-modal language use, for instance, *sharp pitch*, *rough voice*, and *smooth melody*. Nevertheless, with a few exceptions, the language of touch has largely been ignored in linguistic description. The most relevant exception is Essegbey (2013), who explores touch ideophones in Nyagbo, a language of the Kwa family, spoken in the Volta region of Ghana. Essegbey's paper deals with the semantics and use of the vocabulary of texture, employing the "texture booklet" from Majid, Senft, and Levinson (2007) in interviews with a total of three native speakers of Nyagbo. In this way, he finds that there are only four terms to refer to these textures; two ideophones with a more generic meaning and two with a more restricted meaning. He concludes that the former are the only widely-used terms to describe different textures in Nyagbo.

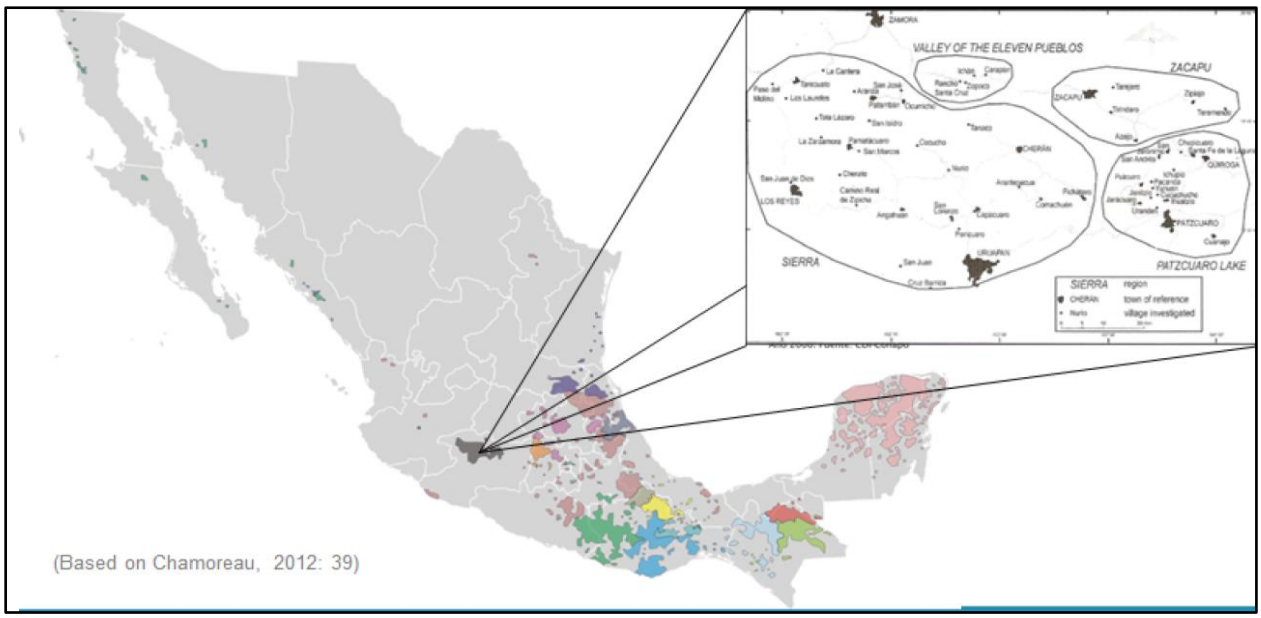
Given the paucity of linguistic studies about texture, it is of great interest for the advancement of the field to explore the morphosyntactic and semantic resources devoted to its description in more languages. Thus, in this paper we investigate the language of texture in P'urhepecha, an isolate spoken in Michoacán, western Mexico. As is the case for Essegbey's (2013) work on texture ideophones, our paper focuses solely on the area of haptic perception corresponding to the perception of surface texture, as perceived by lateral hand or finger motion (Majid et al. 2007: 33). More specifically, haptic surface touch refers to the touch that can be experienced by, for instance, running one's fingertips over a given surface, allowing the experiencer to ascertain the object's material and its feature attributes, such as softness or wetness (Katz 1925, as cited in Majid et al. 2007). This paper therefore does not consider other properties associated with touch, such as temperature (see contributions in Koptjevskaja-Tamm (2015) for typological studies specifically relating to temperature, and Kashkin and Vinogradova (2022) on surface textures in 15 languages), or the cross-modal work on textural iconicity (see Winter et al. 2022). In particular, our investigation centres on the terms elicited by the standardized "texture booklet" mentioned above (Majid et al. 2007) and considers their semantics and morphosyntactic properties.

The forthcoming sections are as follows: Section 2 presents some key typological characteristics of the P'urhepecha language, focusing on the morphosyntactic features most relevant to the present paper; Section 3 discusses the methodology used to collect the data; Section 4 presents and discusses our findings, including the different morphosyntactic and semantic strategies observed, as well as the use of borrowings from Spanish; and Section 5 contains the conclusions.

2. The P'urhepecha language

P'urhepecha is a polysynthetic, agglutinative language isolate, majorly spoken in the Mexican state of Michoacán (see Map 1). It exhibits nominative-accusative alignment and possesses a system of cases, which include the nominative, objective (marking both direct and

indirect objects), genitive, and locative. It is a postpositional language and has an extensive inventory of suffixes, but no prefixes. P'urhepecha is verb-final, although some varieties exhibit verb-initial word order. Pre- and post-colonial language contact has been considered a possible influencing factor in this development (cf. Chamoreau, forthcoming).



Map 1. Location of P'urhepecha speakers in Michoacán, Mexico

Various open-class word categories can be identified in P'urhepecha, such as verbs, nouns, adverbs, and adjectives. Verbs present elaborate morphology, with the full verbal template stretching to 12 slots following the root (Chamoreau, forthcoming; Friedrich 1984). The extensive derivational possibilities of verbs include causative, directional, applicative, iterative, and spatial locative suffixes, among others. Some of these possibilities are illustrated in examples (1a) and (1b).

(1a) *Kapach'utapasti Juanu atarakuechani garrafonirhu*
kapa-ch'u-ta-pa-s-ti
flat-based.container.upside.down-SP.LOC.bottom-CAUS-CENTRIF-PERF-3.S.ASRT

Juanu	atarakua-echa-ni	garrafoni-rhu
Juan	cup-PL-OBJ	water.container-LOC[1]

'Juan went on placing the cups upside down on the water container.' (Gómez Bravo, p.c.)

(1b) *Exep'erant'aakaksï inchatiru jimpo*

exe-p'era-nt'a-a-ka=ksï	inchatiru	jimpo
see-RECIP-ITER-FUT-1/2.S.ASRT=1/3.PL.S	evening	INS

'We'll see each other in the evening.'

[1] We use the following abbreviations in this paper: 1 first person, 2 second person, 3 third person, ADJ adjective, ASRT assertive, CAUS causative, CENTRIF centrifugal motion, DEM demonstrative, DIM diminutive, FORM formative, FUT future, HAB habitual, HES hesitation particle, HUM human, INS instrumental, ITER iterative, LOC locative, NF non-finite, OBJ objective, PERF perfective, PL plural, PROG progressive, PRS present, PST past, PTCP participle, RECIP reciprocal, REFL reflexive, S subject, SF stem formative, SP spatial, STA stative, UNDET undetermined, VBZR verbalizer.

Many nouns are formed by adding a nominalizing suffix to the verbal root, for instance, the very productive *-kua* (*pireni* 'to sing' > *pirekua* 'song', *t'ireni* 'to eat' > *t'irekua* 'food', etc.). Derivation also involves the process of root reduplication in verbs, adjectives, and nouns (see Section 2.2 below). Given the preponderance of adjectival constructions (including those with reduplication) in the elicited responses, in the rest of this section we will present a brief overview of P'urhepecha adjective formation, followed by a discussion of reduplication.

2.1 Adjectives

Capistrán Garza (2013) claims that there are only two basic adjectives in P'urhepecha - *sapi*[2] 'small' and *t'arhe* 'big' - and that most adjectives originate from verbal roots or bases that are modified by the addition of one of a number of derivational suffixes, namely *-sï*, *-pu*, *-ri*, *-ti*, or the resultative past participle ending *-kata*. Adjective-like meanings can also be conveyed by adding the present participle *-rini* or the stative past participle *-tini* to a root,[3] such as in *pitsï~pitsï-p'a-tini* 'smooth'.

There is an interesting difference between the suffixes *-ri* and *-ti*, with respect to the roots they attach to: for the most part, *-ri* is directly added to simple roots (i.e, those not followed by any intervening morphological or phonological material), whereas *-ti* is attached to roots that, in the great majority of cases, have been augmented by the suffix *-pi*, or its variant *-pe*, (of difficult interpretation; see also Capistrán Garza 2013: 61).[4] The following are a few examples of adjectives in *-ri* and *-ti*: *k'ame-ri* 'bitter', *p'ame-ri* 'hot (in terms of taste, like spicy)', *ch'era-pi-ti* 'rough', *xarhi-pi-ti* 'sour', *jorhe-pi-ti* 'hot', *ts'aua-pi-ti* 'thin', *ts'ira-pi-ti* 'cold', and *xunha-pi-ti* 'green'.

In particular, Capistrán Garza (2013) considers forms in *-ri* and *-ti*, which are the most numerous, to be derivations from stative forms of inchoative verbs, such as *téri* 'sweet' < *téni* 'to become sweet', *k'éri* 'big' < *k'éni* 'to become big', *charhapiti* 'red' < *charhapini* 'to become red', and *xarhipiti* 'sour' < *xarhipini* 'to become sour'. Furthermore, these forms also exhibit some of the grammatical functions of stative verbs in P'urhepecha, in that they can take inflectional morphology, as in example (2). Note that, in this example, Capistrán Garza (2013) does not gloss the suffix *-pi* but connects it to the root *charha-* with a + sign, and ascribes to both combined an inchoative reading.[5]

(2) *Tiamu* *charhapixapti*
tiamu charha+pi-xa-p-ti[6]
iron redden-PROG-PST-3.ASRT
'The iron was getting red.' (Adapted from Capistrán Garza 2013: 58)

[2] Note that adjectives can also form the basis for derived nouns, as in *tataka sapichu* 'boy', lit. 'boy small', where *-chu* acts as a kind of formative nominalising element.

[3] Note that Chamoreau (forthcoming) labels *-kata* as the passive past participle and *-tini* the active past participle. Since the terms active and passive are rather general, and also refer to other aspects of the grammar, we choose to use the more specific terms resultative and stative.

[4] Chamoreau (2009: 233) characterizes *-pi* as an element that "relate[s] to a verb expressing a quality" (trans. by the authors), and provides the following examples: *thuri* 'black' > *thuri-pi* 'to be black', *xarhi* 'acidic' > *xarhi-pi* 'to be acidic', *charha* 'red' > *charha-pi* 'to be red'. Note that Chamoreau's (2009) translation of *xarhi* 'acidic' is best rendered in English as 'sour'.

[5] However, not all authors or speakers translate these forms with *-pi* as inchoatives. The most comprehensive (historical) dictionary of P'urhepecha translates *urapeni* as the stative 'blanco estar' (to be white) and *uraperani* (with the added causative suffix *-ra*) as 'blanco, hazer algo' (to make something white). *Blanquear algo* 'to whiten something' is listed as *thupumarani*, from the root *thupu-* 'ash(es)' (Warren 1991: 649).

[6] The suffix *-ti* here is a suffix that appears in verbs as the inflectional morpheme marking the third person assertive mood, and it is different from the derivational suffix *-ti* that appears as an adjective formative, following *-pi*.

Friedrich (1984: 66) includes what he terms the four basic colours (black, white, red, and green) and basic qualities, such as tasty, strong, and lazy, in his sixth and last class of verbal roots. He states that these roots are thematized by the aforementioned suffix *-pi* or by a spatial locative suffix, as in the examples *winha-pi-ti* 'strong' and *winha-nharhi* 'strong-sighted' (lit. 'strong-SP.LOC.face'), both from the root *winha-* relating to strength. A full treatment of word classes, including whether to classify forms such as *charhapiti* 'red' as adjectives or verbs, is far beyond the scope of this paper. It is thus sufficient to state at this point that we consider forms in *-pi-ti* as adjectives, alongside those in *-ri* and *-sï* (see below), as well as the basic forms *sapi* and *t'arhe*, and contrast all of these together with verbal forms (see Section 4.1.2).

It is worth noting, however, that the set of suffixes proposed by Capistrán Garza (2013) as deverbal in adjectival formation is also found in the formation of nouns. For instance, *-sï*, as in *k'arhi-sï* 'dry, thin', also appears in *kaua-sï* 'hot pepper' and *tsurup-sï* 'onion'; *-pu*, as in *tamapu* 'old',[7] is found in *tsutu-pu* 'bag' and *k'uiri-pu* 'person'; *-ri*, as in *tepa-ri* 'fat', appears in *tsí-ri* 'corn' and *iurhitski-ri* 'young woman'; and *-ti*, as in *turhi-pi-ti* 'black', is seen in *uarhi-ti* 'woman' and *acha-ti* 'man', amongst others (see also Chamoreau 2000: 317-318). Such a distribution seems to indicate that these suffixes cannot be classified solely as adjectival and/or deverbal but may also be involved in noun derivation. The existence of the nouns mentioned here underscores the fact that various word formation processes in P'urhepecha are not yet well understood and require further investigation.

2.2 Reduplication

Another word formation process that has received little scholarly attention, despite its frequency and productivity in P'urhepecha, is that of reduplication (cf. Chamoreau 2000: 324-325). Friedrich (1984: 66) states that initial reduplication (i.e. reduplication of the root) principally conveys repetition (2a), but it can also give an intensification meaning (2b), or refer to a ubiquitous or wide distribution (2c). Some instances of reduplication also seem to be onomatopoeic, as in (2d).

(2a) *k'wanik'wanitani*
k'wani~k'wani-ta-ni
throw~throw-CAUS-NF
'to throw up repeatedly' (Adapted from Friedrich 1984: 66)

(2b) *meremerek'uni*
mere~mere-k'u-ni
shine~shine-SP.LOC.hand-NF
'to be very brilliant' (Adapted from Friedrich 1984: 66)

(2c) *p'unip'unik'uni*
p'uni~p'uni-k'u-ni
blow-blow-SP.LOC.hand-NF
'to blow off all over (as when dusting)' (Adapted from Friedrich 1984: 66)

[7] This form can also be translated as 'very used, old, previous', but said of objects not people (J. Márquez Trinidad, personal communication).

(2d) *Xaxa sesi inde kurhindani*[8]
xa~xa sesi inte kurhinta-ni
chew~chew well DEM bread-OBJ
'Chew this bread well!' (Adapted from Chamoreau 2000: 324)

Reduplication can be full or partial, such as in *xunh-xunha-pi-ti* 'very green' < *xunhapiti* 'green' (Friedrich 1984: 66). In addition, it should be noted that nouns can be formed from a reduplicated root, such as the deverbal noun *pire~pire-me-kua* 'humming' < *pire~pire-me-ni* 'to hum', where the root *pire-* 'to sing' is expanded with the spatial locative suffix *-me* (or *-mi* in some varieties), referring to the mouth area (García Marcelino, personal communication). Furthermore, some non-onomatopoeic nouns appear to be formed from a reduplicated root as well, such as *mimi* 'brother' and *pipichu* 'chicken', with some also containing an epenthetic /n/ between the replicated elements, as in *tsuntsu* 'pot' or *chencheki* 'donkey' (Chamoreau 2000: 325).

As will be observed in our findings, a reduplicated root can also combine with the postposition *jasï* 'class, type' or *-sï*, a grammaticalized form of *jasï*, to construct adjective-like words (see Section 4.1.1). In relation to this, Friedrich (1984: 66) presents reduplication built with one of six consonants and what he terms the stativizing suffix *-hási* (*jasï* or *-sï*) as one of the seven types of reduplication in P'urhepecha, as in *opo~opo-k-jasï* 'swollen (of the entire body)', from the root *opo-* 'large, round'. More examples can be found in his unpublished root dictionary (Friedrich, unpubl. ms.), such as: *jarha~jarha-rh-jasï* 'to have lots of holes' (< *jarha-* 'to dig'), as well as terms without the inserted consonant and only the suffixed form of *jasï*, as in *eche~eche-sï* 'very watery' (< *eche-* 'to fall from above and dissolve or disintegrate') and *jorhe~jorhe-sï* 'very hot' (< *jorhe-* 'hot'). Likewise, Meneses Eternod and García Marcelino (2018) introduce the partially reduplicated word *xú-xunha-sï* (from the root *xunha-* 'green'; recall the partially reduplicated form given above) in their P'urhepecha textbook in relation to colour terms, but do not provide a translation into Spanish, nor any further information about its usage or construction.

3. Method

The data presented in this paper were collected using the Language of Touch stimulus kit (here referred to as the "texture booklet"), developed by researchers at the Max Planck Institute for Psycholinguistics in Nijmegen, The Netherlands (Majid et al. 2007). This task formed part of a wider project – "The Language of Perception" – in which vocabulary and expressions for all five senses were elicited using a variety of purpose-designed stimuli. The goal of the texture booklet is to investigate whether a language possesses dedicated lexical items for encoding textures, and to identify how much consistency there is between participants, that is, within a given community (idem., p. 33).

Our study took place in the villages of Carapan, Tacuro, and Zopoco in the region known as the Cañada or Eraxamani of the P'urhepecha territory in Michoacán, Mexico. The twelve P'urhepecha speaking participants in the study were presented with a texture booklet containing ten pages, each displaying an oval sample of one of the following ten textures: felt, beads, fur, jagged fabric, feather, plastic sheet, curved ridges (wide spacing), cork, rubber (yoga mat), and straight lines with small spacing. The booklet was covered with a large piece of cloth (shawl or similar) so that the participant could not see what was on the pages and then was asked in relation to each texture *Na p'ikuak'ukuarhiki?* 'How does it feel [in the hand]'? The participants ran their fingers over the different textures and responded to this question.

[8] After homorganic nasals, voiceless stops are voiced, as in /t/ > [d] here.

Some textures elicited multiple responses, hence why the total is more than the sum of participants per stimuli. Responses (n = 143) were audio recorded and transcribed into Excel, and later coded according to the type of lexical item and/or construction used.

4. Findings

In this section, we present the different strategies adopted by the P'urhepecha participants when describing the materials in the texture booklet. We divide these according to morphosyntax (Sections 4.1 and 4.2) and semantics (Section 4.4), and also deal with loanwords from Spanish separately (Section 4.3).

4.1 Morphosyntactic strategies

Two main types of response can be observed in the data collected. The first type comprises terms formed by a root that expresses a texture, from which multiple verbal and adjectival forms can be derived. The second includes a variety of comparative constructions, which can be broadly translated as 'like' in English; see Figure 1 for a visualization. We will present each of these strategies in more detail in the following subsections.

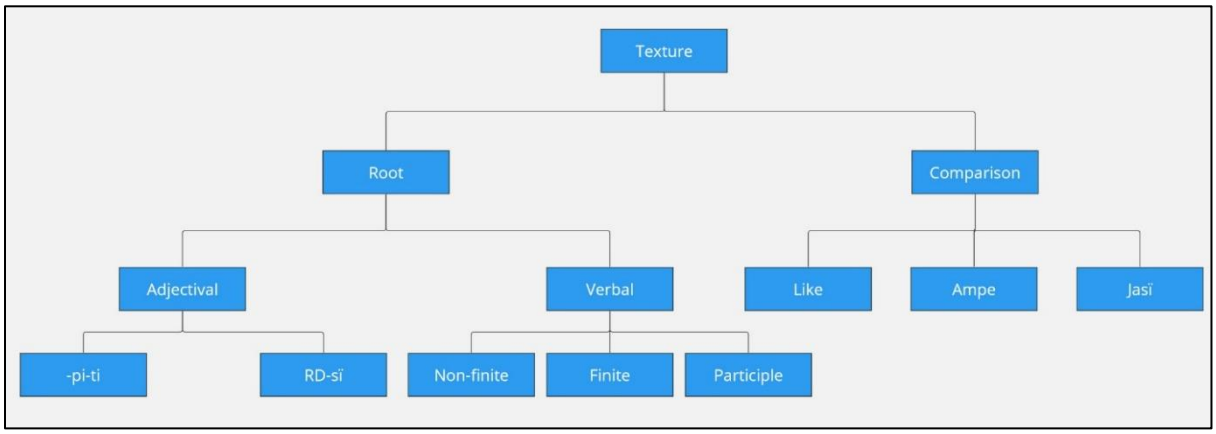


Figure 1. Overview of morphosyntactic strategies for describing texture

Table 1 provides an overview of the strategies adopted, as outlined in Figure 1, and the frequency of occurrence in the data collected.

Table 1. Frequency of response for each morphosyntactic strategy

Morphosyntactic strategy	**Number of tokens**	**Percentage of total responses**
Adjectival		
-pi-ti	62	43%
~RD-sï	25	17%
Verbal		
Non-finite	21	15%

Finite	3	0.02%
Participial	3	0.02%
Comparative		
Eska, como, como eska	18	13%
Ampe	5	0.03%
Jasï	6	0.04%
Total	**143**	**100%**

4.1.1 Adjectival strategies

Adjectival forms comprised 87 (60%) of the total number of responses. As indicated in Section 2, a large number of adjectives - or property concept words - in P'urhepecha are formed by adding the derivational suffixes *-pi* and *-ti* to a root denoting said property. Indeed, 62 (72%) of the adjectival forms provided displayed this morphology (example 3), with the remaining 25 (28%) using the under-described reduplicated (or partially reduplicated) root + *-sï* strategy (example 4). Note that elements borrowed from Spanish are underlined.

(3) *ch'erapiti siempri*
ch'era-pi-ti siempre
rough-ADJ-STA always
'Still rough'

(4) *it'u sanusanusï*
i=t'u sanu~sanu-sï
DEM=also woolly~woolly-type
'This (one) also woolly'

Despite the combination *-pi-ti* being the most common adjectival strategy in our data, as well as having received more scholarly attention, we would argue that it has still not been sufficiently investigated to be able to label its components convincingly and uncontroversially (see Section 2.1). Moreover, the less popular outcome - root reduplication plus *-sï* - has been rarely covered in the literature on P'urhepecha grammar, yet it is clearly also important. The fact that it occurs 25 times in this relatively small dataset seems to indicate that this strategy warrants further attention. See Table 2 for an overview of which roots occur with each of the adjective formation strategies.

Table 2. Frequency of tokens of texture roots with the two adjectival formation strategies, *-pi-ti* and *~RD-sï*

Root	**Meaning**	***-pi-ti* (n)**	***~RD-sï* (n)**
sanu-/*sunu-*[9]	woolly	15	8
ch'era-	rough	22	11
pitsï-/*pichi-*	smooth	23	5
k'irhi-	round and wobbly	0	1
tenha-	taut, tight	1	0
tsopo-	holey	1	0
Total		62	25

We can observe that adjectives in *-pi-ti* occur about twice as frequently as those involving reduplication plus *-sï* with the roots *sanu-/sunu-* 'woolly' and *ch'era-* 'rough', and almost five times as frequently with the root *pitsï-/pichi-* 'smooth'. The final three roots in Table 2 (*k'irhi-*, *tenha-*, and *tsopo-*) only account for one adjective each, so little can be said regarding their 'preference' for either strategy. Note also that, out of the roots obtained, *pera-* 'sandy' and *cheku-* 'prickly, scratchy' do not appear in any adjectival formation, but only in non-finite verb forms.

4.1.2 Verbal strategies

Three types of verbal strategies are attested in the texture dataset: non-finite verb forms (n = 21), as exemplified in (5); finite verb forms (n = 3), as in (6); and past stative (*-tini*) (n = 1) and present participles (*-rini*) (n = 2), which represent the least employed strategy, as in (7a) and (7b), respectively.

(5) *Isïk'u ch'erapini*
isï=k'u ch'era-pi-ni
like.this=only rough-ADJ-NF
'It's only rough like this' (lit. 'only be rough like this')

(6) *Ka ari k'irhik'ukuarhisïndi*
ka ari k'irhi-k'u-kuarhi-sïn-ti
and this roundish+wobbly-SP.LOC.hand-REFL-HAB-3.S.ASRT
'And this is roundish and wobbly'

(7a) *Isïk'u pitsïpip'atini*
isï=k'u pitsï-pi-p'a-tini
like.this=only smooth-ADJ-SP.LOC.large.bounded.space-PST.PTCP
'(It is) Only smooth like this'

(7b) *It'u menderu pitsïpip'arini*
i=t'u menteru pitsï-pi-p'a-rini
DEM=also once.again smooth-ADJ-SP.LOC.large.bounded.space-PRS.PTCP
'This once again also being smooth'

[9] *Sunu-* and *pichi-* are infrequently occurring variants of *sanu-* and *pitsï-*, respectively.

With 27 tokens in total, the verbal strategies occur less than two-thirds as frequently as the adjectival ones, despite non-finite verb forms being commonplace in the language more broadly, especially in narratives (Chamoreau 2016).

4.2 Comparative constructions

Besides the root strategies surveyed above, the second principal means employed by the participants to describe textures in P'urhepecha are comparative constructions. Within this relatively large class (n = 29), we have identified three subtypes: (I) 'Like' constructions, introduced by P'urhepecha *eska* 'like', Spanish *como* 'like', or *como* and *eska* juxtaposed (always in this order), followed by a noun, adjective or (in just three instances) a non-finite verb form that behaves in an adjective-like manner, (II) '*Ampe*' constructions where the P'urhepecha nominal *ampe* 'thing, what' follows a P'urhepecha noun or Spanish borrowing, which may also be introduced by *eska* or *como*, and (III) '*Jasï*" constructions in which a noun is predicativized by the suffixes *-e* and *-ni* and followed by the postposition *jasï* 'type, class, kind, characteristic', which may also be introduced by *como*.

4.2.1 'Like' constructions

Exemplifying subtype I, the constructions in (8a-8b) below contain the native element *eska* 'like', whereas the ones in (9a-9b) present the Spanish borrowing *como* 'like, as', with a similar function, indicating that the texture in question "feels like" the complement noun or adjective. Thus, in both cases a comparison is established between the given texture and another object or quality, presumed to be of similar characteristics. Again, borrowings from Spanish are underlined.

(8a) *eska espirali*
eska espirali
like spiral
'Like spiral(s) [of a notebook]'

(8b) *eska pitsïpini*
eska pitsï-pi-ni
like smooth-ADJ-NF
'Like smooth'

(9a) *como ch'ech'erasï*
como ch'e~ch'era-sï
like rough~rough-type
'Like rough'

(9b) *como lisitu*
como lisu-itu
like smooth-DIM
'Like smooth'

In (10a-10b) we observe constructions where both *como* and *eska* are employed side by side. The complement of the combination of *como* and *eska* is either a noun or an adjective, which again serves as a point of comparison against which the texture being described is judged.

(10a) *como eska libretecha*
como eska libreta-echa
like like notebook-PL
'Like notebooks'

(10b) *Como eska k'irhik'irhisï p'ikuarhik'ukuarhisïndi*
como eska k'irhi~k'irhi-sï
like like roundish+wobbly~roundish+wobbly-type

p'ikua-rhi-k'u-kuarhi-sïn-ti
feel-SF-SP.LOC.hand-REFL-HAB-3.S.ASRT
'It feels (in the hand) like roundish and wobbly'

4.2.2 '*Ampe'* constructions

The constructions in (11a-11c) exemplify subtype II, which includes *ampe* 'thing, what', postposed to a noun, either native to P'urhepecha or borrowed from Spanish, in order to draw a comparison between the texture in question and the kinds of things included in the class denoted by said noun. As part of the same construction, we frequently notice the presence of *eska* (11a) and *como* (11c). We should also observe that there is a clearly uneven distribution in favour of Spanish borrowings (vs. P'urhepecha native terms) as companions to *ampe*. In our data, we only found one instance of a native P'urhepecha noun followed by *ampe* (example 11a), and this response also contains *eska*. In all other cases, *ampe* appears after a noun borrowed from Spanish, which seems to indicate that it might also be used as a way to integrate the foreign term or mark the noun as non-P'urhepecha. Indeed, other recent examples collected outside of the present study, such as *pasteli ampe* 'cake thing' and *pai ampe* 'pie thing', lend support to this hypothesis.

(11a) *I p'ikuarhik'ukuarhiti eska ch'kari ambe*

i	p'ikua-rhi-k'u-kuarhi-ti	eska	ch'kari	ampe
DEM	feel-SF-SP.LOC.hand-REFL-3.S.ASRT	like	wood	thing

'This feels (in the hand) like wood'

(11b) *Es vidrio ambe jukanharhiti*

es	vidrio	ampe	juka-nharhi-ti
it.is	glass	thing	put.on-SP.LOC.face-3.S.ASRT

'It feels like [lit. puts on its surface] it is glass'

(11c) *como tapeti ambe p'arhini*

como	tapeti	ampe	p'arhi-ni
like	rug	thing	touch-NF

'Like touching a rug'

4.2.3 '*Jasï*' constructions

The examples in (12a-c) illustrate constructions where the postposition *jasï* 'type, kind' follows a verbalized noun, again establishing a comparison between the noun and the texture in question. Similarly to the examples with *ampe*, the function of *jasï* appears to be that of delimiting the class of items that can be considered as falling within the semantic scope of the noun. And, as with *ampe*, we may also find *como* included in the same construction (12c).

However, we found no instances of *jasï* accompanied solely by *eska*, which points to the predominance of the borrowed *como* over the native *eska* in our results.

(12a) *Ank'ueti sanusanusï ma teleni jasï*

ank'u-e-ti	sanu~sanu-sï	ma	tela-e-ni	jasï
HES-VBZR-3.S.ASRT	woolly~woolly-type	one	cloth-VBZR-NF	type

'It is, um, woolly like a kind of cloth'

(12b) *Pelajini jasï*

pelaji-e-ni	jasï
fur-VBZR-NF	type

'It is a kind of fur'

(12c) *Como cobertorini jasï ma*

como	cobertori-e-ni	jasï	ma
like	blanket-VBZR-NF	type	one

'It is like a kind of blanket'

In our data we also found the following complex construction, exemplified in (13a-13b), featuring the juxtaposition of both *jasï* and *ampe*, accompanied by *como* (13a), or even by the double-marked *como* + *eska*, all in the same construction (13b). Such examples clearly illustrate the mixed nature of a number of the available comparative constructions in P'urhepecha and underscore the fact that the contact with Spanish is influencing the language in ways yet to be fully determined.

(13a) *Como bolitaeni jasï ambe*

como	bol-ita-e-ni	jasï	ampe
like	ball-DIM-VBZR-NF	type	thing

'It is like a kind of small ball'

(13b) *como eska marapentk'u ima ank'uni jasï ambe*

como	eska	marapent=k'u	ima	ank'u-ni	jasï	ampe
like	like	sometimes=only	DEM	HES-OBJ	type	thing

'Like sometimes only, um, that, not sure, type thing'

Observe that, as noted before, in examples (10a-10b) and (13b), we see not only the simultaneous use of Spanish *como* and P'urhepecha *eska* in a double marking function (cf. Thomason 2001), which has become common in present-day P'urhepecha (Mendoza 2022), but also the juxtaposition of P'urhepecha forms, as in *jasï ampe* (13a-13b). Indeed, 18 of the comparative structures obtained (62%, thus more than half) are mixed constructions containing material with both Spanish and P'urhepecha origins. This notable diversity of comparative constructions points to the multiplicity of grammatical resources that P'urhepecha draws from in the expression of haptic touch, since it can display all-native resources or, due to its intense contact with Spanish, hybrid strategies that provide the speakers with a wider linguistic repertoire. It is also pertinent to observe that the distribution of *como* and *eska* is rather uneven, with *como* being a more common element in these types of constructions.

4.3 Spanish loanwords

Given the intense language contact situation in Michoacán, and our findings in Section 4.2, it is unsurprising that the participants' responses contain various terms with Spanish origins. Thus, there were 23 tokens of Spanish loanwords elicited, including both nouns (n = 21) and adjectives (n = 2). These are illustrated in examples (14a) and (14b), respectively.

(14a) *peluchi ma, sanusanusï*
peluchi ma sanu~sanu-sï
plush.toy one woolly~woolly-type
'A plush toy, woolly'

(14b) *Nena arhip'irini ya p'orhe jimbo? Como lisitu*
nena arhi-p'i-rini ya p'orhe
how say-OBJ.HUM.UNDET-PRS.PTCP already P'urhepecha

jimpo como lisu-itu
INS like smooth-DIM
'How do you say it in P'urhepecha? Like smooth'

These kinds of examples, as well as those seen in the previous section, clearly demonstrate the extensive influence that Spanish has exerted on P'urhepecha, with terms such as *lisitu* < *lisu* 'smooth' + *-itu* (DIM) (< Spanish *liso*) and *peluchi* 'plush toy' (< Spanish *peluche*) having entered its lexicon, the latter most likely rather recently (see also Section 4.5). Yet it should be highlighted that not all of the stimuli elicited an equal number of loanword descriptions. In fact, jagged fabric, cork, and rubber (yoga mat) were always described using fully native P'urhepecha lexical material. Table 3 provides an overview of the number of Spanish nouns and adjectives used for each stimulus, in descending order of frequency.

Table 3. Frequency of Spanish loanwords per stimulus

Stimulus	Source nouns	Source adjectives	Total
beads	6	0	6
curved ridges (wide spacing)	4	0	4
felt	3	0	3
fur	3	0	3
feather	2	1	3
plastic sheet	2	1	3
straight ridges (small spacing)	2	0	2
jagged fabric	0	0	0
cork	0	0	0
rubber (yoga mat)	0	0	0

Having presented the morphosyntactic strategies used by the participants, let us now turn to the semantics of the responses.

4.4 Semantics

There were ten roots used in the total of 114 elicited responses that contained roots. On the basis of frequency, we divided these into major and minor types (number of tokens in brackets). Note that we have grouped *pitsï-* and *pichi-* together, and *sanu-* and *sunu-* together, where the second member of each pair is the infrequently occurring variant.

Major roots

1. *ch'era-* 'rough' (40)
2. *pitsï-/pichi-* 'smooth' (39)
3. *sanu-/sunu-* 'woolly' (27)

Minor roots

1. *k'irhi-* 'roundish and wobbly' (3)
2. *ch'eku-* 'scratchy, prickly' (2)
3. *pera-* 'sandy' (1)
4. *tenha-* 'taut, tight' (1)
5. *tsopo-* 'holey' (1)

There is little one-to-one correspondence between the root used and the texture stimulus. Jagged fabric and plastic sheet are the only textures that were described by means of a single root, namely *ch'era-* 'rough' in the case of jagged fabric, and *pitsï-* 'smooth' for plastic sheet. However, *ch'era-* is also the major descriptor for straight ridges and cork and a minor one for rubber, curved ridges, fur, and felt. Moreover, *pitsï-/pichi-* is most frequently used for rubber, feather, and beads, and as a minor descriptor for straight ridges, curved ridges, and cork. The root *sanu-/sunu-* 'woolly' is most frequently employed to describe fur and felt, but is also a minor descriptor for rubber, cork, and feather. The frequency of the roots used to describe each texture is summarized in Figure 2.

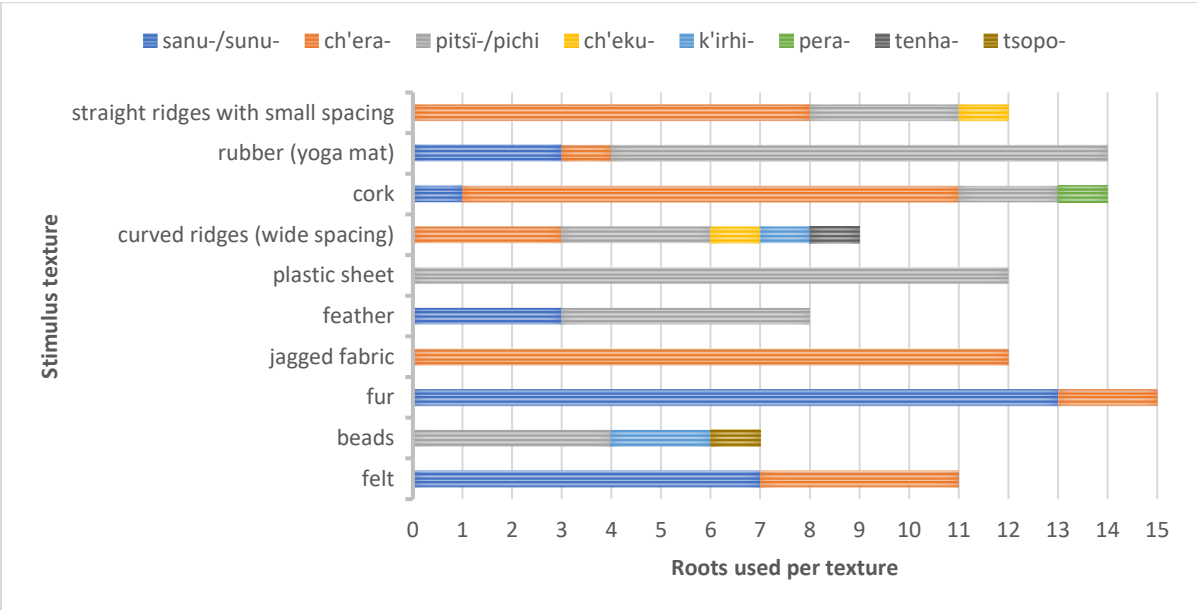


Figure 2. Frequency of roots used to describe each texture

Note that all materials, except curved ridges, have a dominant root description, even if more than one root can be employed to describe a single stimulus. As illustrated in Figure 3, the consistency in texture naming varies from completely consistent (i.e. only one root is used), as in the case of plastic sheet and jagged fabric, to highly inconsistent, as in the five roots found to describe curved ridges (wide spacing).

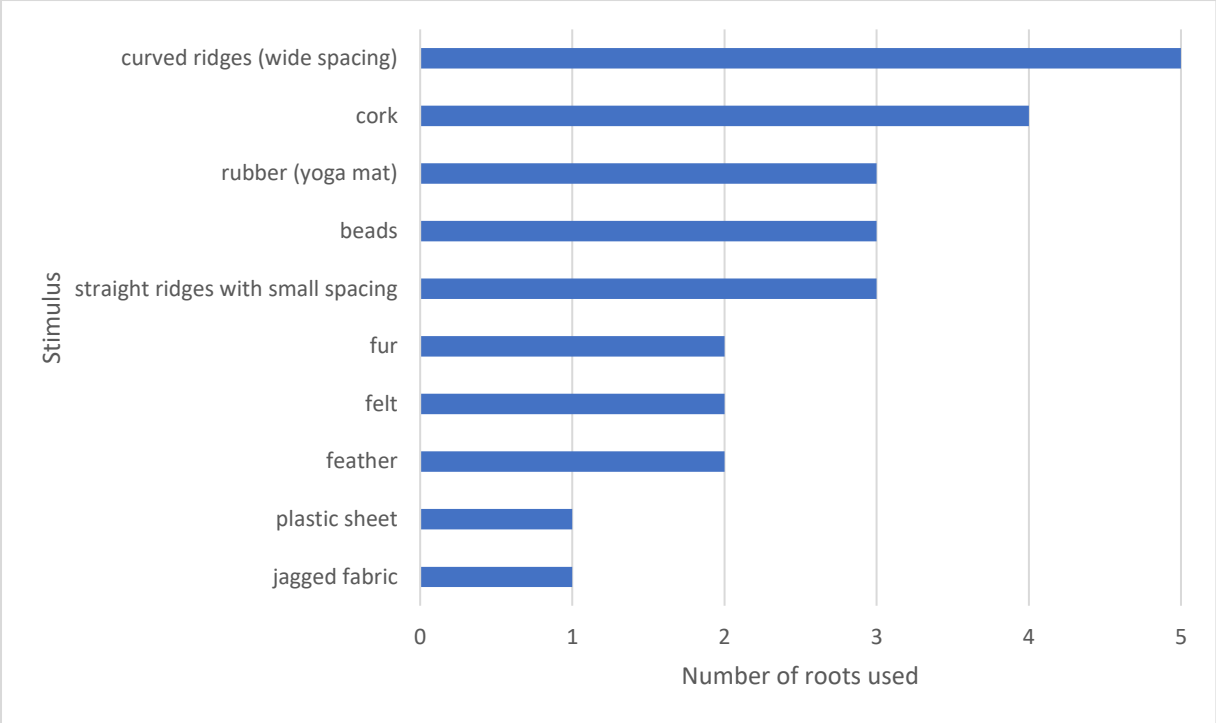


Figure 3. Number of roots used to describe each texture stimulus

It is also notable that three roots dominate the description of all ten stimuli, accounting for 90% of all root-based responses. These roots are *ch'era-*, *pitsï-/pichi-* and *sanu-/sunu-*, where the first two are associated with seven different stimuli each, and the latter with five stimuli (see Figure 4). Together they cover all ten of the stimuli. This is reminiscent of Essegbey's (2013) study, which found that only four Nyagbo terms are employed to describe all the stimuli (see Section 4.5 for further discussion).

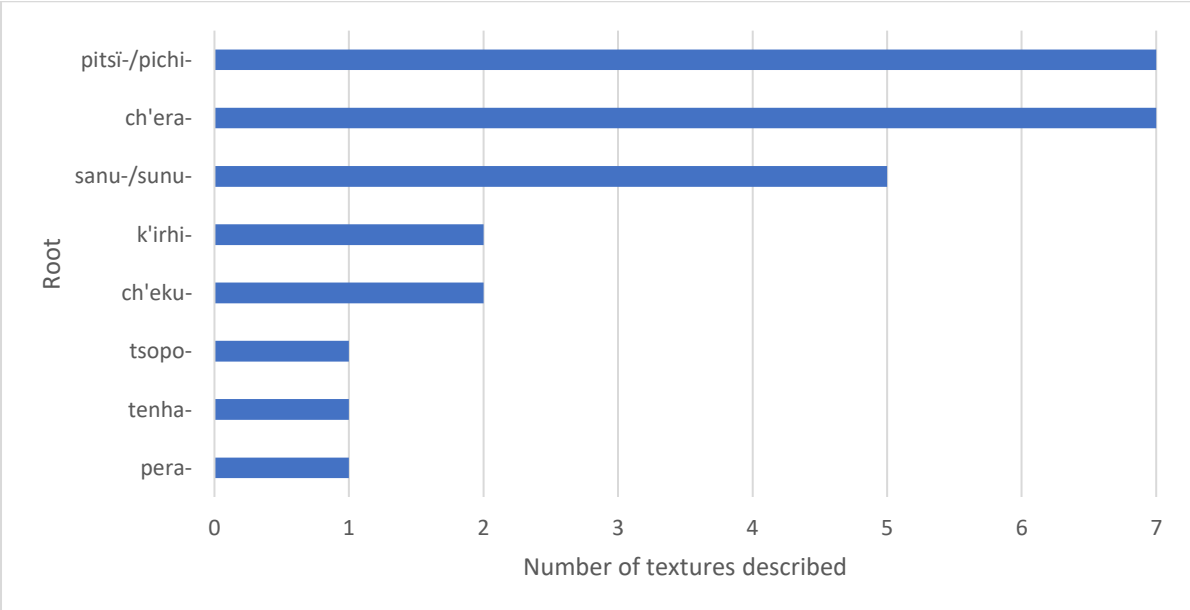


Figure 4. Number of textures described by each root

Ch'era- 'rough' is used to describe felt, fur, jagged fabric, curved ridges, cork, rubber, and straight ridges; thus, despite its association with some rough materials, it can also seemingly be employed to refer to a smooth material, such as rubber, or a fluffy material, such

as felt or fur. In a similar vein, *pitsï-/pichi-* 'smooth' is found in the description of beads, feather, plastic sheet, curved ridges, cork, rubber, and straight ridges, not all of which seem to be smooth in nature. *Sanu-/sunu-* 'woolly' seems to show more consistency in reference, however, being associated with felt, fur, feather, but also (more unexpectedly) cork and rubber (see Figure 5). Therefore, any semantic characterization of such multifaceted roots remains elusive, at least until more research is conducted.

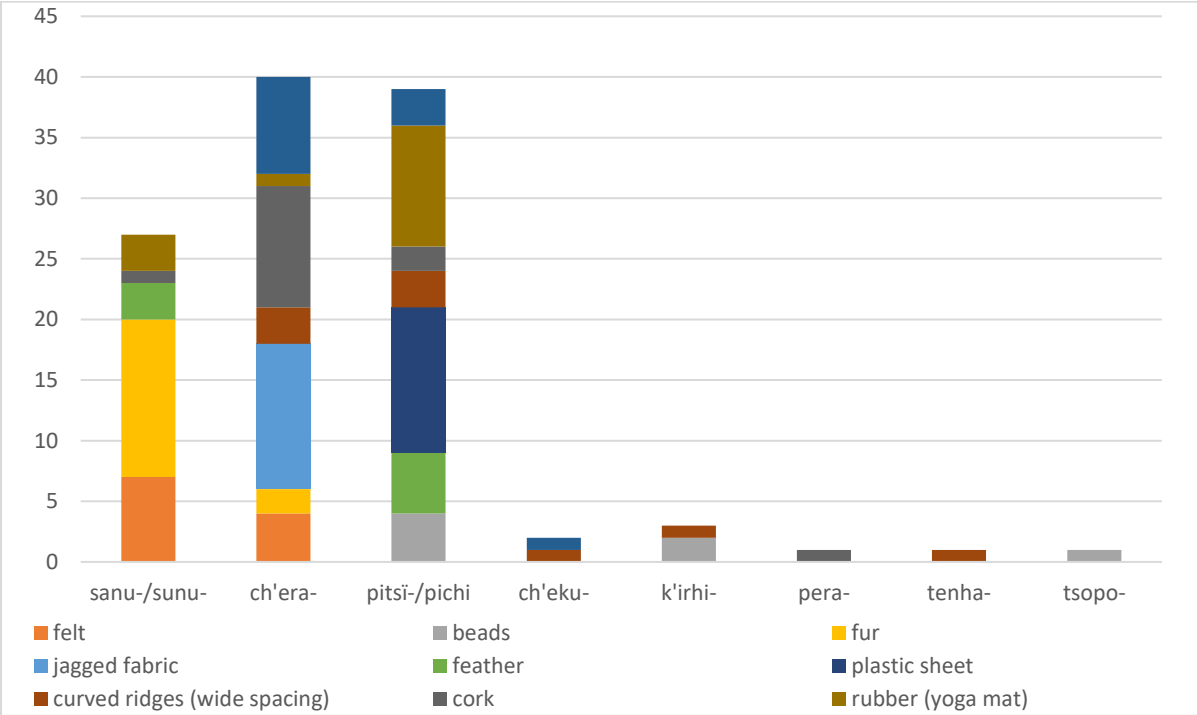


Figure 5. Textures described by each root

There are four roots that appear only once in the responses, each one associated with a different texture. These are *pera-* 'sandy' for cork, *sunu-* 'woolly' (a variant of *sanu-*, which we have included in the *sanu-* responses) for feather, *tenha-* 'taut, tight' for curved ridges, and *tsopo-* 'holey' for beads. The remaining roots, *ch'eku-* 'scratchy, prickly' and *pichi-* 'smooth' (a variant of *pitsï-*, which has also been grouped together with *pitsï-*), occur twice each to refer to straight ridges and curved ridges, and straight ridges and cork, respectively, while *k'irhi-* 'roundish and wobbly' describes beads (twice) and curved ridges (once). Additionally, it is worth highlighting that two of these roots - *tenha-* and *k'irhi-* - do not refer to textures as such, but to properties of tension and shape.

4.5 Discussion

In this section, we make a number of observations regarding the results presented in the previous four subsections. In terms of semantics, the ten stimulus materials coincidentally elicited ten different roots, although three roots in particular - *ch'era-* 'rough', *pitsï-/pichi-* 'smooth', and *sanu-/sunu-* 'woolly' - accounted for the vast majority of the responses. These three major roots were employed to describe all the materials presented; thus, they show no one-to-one correspondence with the individual textures. In contrast, we elicited five minor roots, which were used each in relation to one specific material or at most two (see Figure 4 above). Given this evident imbalance, we may want to contemplate whether core or basic texture terms can be identified in P'urhepecha, as is the case with colour terms (cf. Berlin & Kay 1969), which also end in the suffix combination *-pi-ti* (e.g. *xunha-pi-ti* 'green'), as

described in Section 2. Moreover, it remains unclear why two materials are described by only one root (namely, plastic sheet (*pitsï-*) and jagged fabric (*ch'era-*)), while a material such as curved ridges is described by a total of five roots. Therefore, further research is needed regarding what drives the diversification in the number of roots employed to describe a given material, as well as the core meaning of such roots.

At the morphological level, although *-pi-ti* is the most frequent adjective-formation strategy, it remains an open question why this construction and the reduplication plus *-sï* construction can both be employed with the same root. Nonetheless, irrespective of the strategy employed, the same three roots dominate in the description of all texture stimuli: *ch'era-*, *pitsï-/pichi-*, and *sanu-/sunu-*. In this sense, the responses of the P'urhepecha participants appear to resemble those of the Nyagbo study (Essegbey 2013), since both rely on a small number of forms to describe all textures presented. Furthermore, in P'urhepecha, what we have classified as major and minor roots may describe the same texture. This suggests that the lexical domain of haptic touch in P'urhepecha is more extensive than this initial study has demonstrated, and thus merits more detailed investigation. Such future research could include collecting more naturalistic data from speakers of other varieties of P'urhepecha, as well as specialists in a craft or technique that involves considerable manipulation of different materials, such as weavers, potters or cooks, and also from non-specialists. Comparing specialist and non-specialist knowledge and its encoding has been conducted in the study of olfactory language, and has been shown to differ (e.g. Croijmans & Majid 2016). Its application to the language of haptic touch could also be considered in the future.

In contrast to the study on olfactory language in P'urhepecha (Bellamy 2021), the data in the present study contain relatively few loanwords from Spanish (n = 22). This may indicate that the stimuli were more natural or appropriate to elicit native lexical items or combined P'urhepecha-Spanish constructions. However, the relative abundance of comparative constructions in our results - many of which include Spanish borrowings - could possibly be taken as an indication that speakers are more comfortable comparing some of the textures in the booklet to textures they are more familiar with overall. Consequently, they employed comparative constructions rather than root-based forms.

It is also notable that many of these constructions exhibit syntactic double marking, involving the juxtaposition of the Spanish borrowing *como* 'like' and its P'urhepecha counterpart *eska* (i.e. *como eska*), with a function very similar to the simple structure with *eska*.[10] Such double markings have become rather frequent in P'urhepecha and are a reflection of the intense and prolonged contact between these two languages (Mendoza 2022), which have coexisted since the early 16th century (Warren 2007). Thus, the conspicuous presence of *como* and other Spanish borrowings in P'urhepecha (*lisitu*, *bolita*, *peluchi*, etc.) is not surprising and underscores the continuous influence of Spanish as the dominant societal language in Mexico.

Finally, in future work it would be worth considering the extent to which these texture roots can also be used to describe other senses, as in Winter's (2019) 'rough voice' example. We could explore whether such roots can refer to textures and visual appearance as well as taste or feel in the mouth. For example, the root *p'orho-*, referring to the feel of holes in clothes, was not attested in our data but seems to indicate that depth of material may also play a role. With this research, we are merely scratching the surface, as it were, of the domain of haptic touch in P'urhepecha.

[10] Other examples of the same phenomenon are: *bien sesi* 'well' (lit. 'well well') and *mas santeru* 'more' (lit. 'more more'), where the first element comes from Spanish and the second one from P'urhepecha (Mendoza 2022: 146).

5. Conclusions

The aim of this study was to investigate the language of texture in P'urhepecha. To this end, twelve P'urhepecha speakers from Michoacán were presented with the "texture booklet" elicitation tool (Majid et al. 2007). This method revealed two main morphosyntactic strategies: 1) Root-based strategies, and 2) Comparative constructions. The root-based strategies can be further divided into adjectival and verbal strategies, where reduplication occurs frequently. The comparative structures typically feature 'like' in Spanish (*como*) or in P'urhepecha (*eska*), followed by a noun or adjective that serves as the basis for the comparison. In addition, these constructions exhibit double marking via the juxtaposition of the Spanish and the P'urhepecha terms (i.e. *como eska*), which appears to be a common occurrence in intense language contact situations, as is the case between these two languages. Thus, our preliminary study of the language of texture in P'urhepecha constitutes another step in the investigation of this little-researched area of linguistic inquiry, in a language that evidently still requires considerably more research in order to fully understand its morphological and semantic richness.

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CRediT – Taxonomy of Academic Collaboration Roles

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The authors declare no conflict of interests.

Authors' contribution
KB conducted the interviews with Maria de la Luz Ribera Rodríguez, KB and MM analyzed the responses and wrote the paper.

Ethics in research with human beings
Informed consent was obtained from all participants.

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