

Color Me Bitter: Crossmodal Compounding in Tzeltal Perception Words

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ABSTRACT Within a given language and culture, distinct sensory modalities are often given differential linguistic treatment in ways reflecting cultural ideas about, and uses for, the senses. This article reports on sensory expressions in the Mayan language Tzeltal, spoken in southeastern Mexico. Drawing both on data derived from Tzeltal consultants' responses to standardized sensory elicitation stimuli and on sensory descriptions produced in more natural contexts, I examine words characterizing sensations in the domains of color and taste. In just these two domains, a limited set of basic terms along with productive word-formation processes of compounding and reduplication are used in analogous ways to produce words that distinguish

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particular complex sensations or gestalts: e.g. in the color domain, *yax-boj-boj* (*yax* ‘grue’ + *boj* ‘cut’), of mouth stained green from eating green vegetables, or, in the taste domain, *chi’-pik-pik* (*chi’* ‘sweet/salty’ + *pik* ‘touch’) of a slightly prickly salty taste. I relate the semantics of crossmodal compounds to material technologies involving color and taste (weaving, food production), and to ideas about “hot”/“cold” categories, which provide a cultural rationale for eating practices and medical interventions. I argue that language plays a role in promoting crossmodal associations, resulting in a (partially) culture-specific construction of sensory experience.

KEYWORDS: Tzeltal, crossmodal, language of perception, color, taste

Introduction



Perception is a canonically psychological event: stimuli are responded to by our sense organs and interpreted in our brains as private experiences. Yet we are often moved to communicate about these private experiences, and for humans it is language that provides, however inadequately, the core means to do so. But how exactly does language capture these internal experiences such that they can be communicated to someone else?

One approach to this issue involves looking at the linguistic structure of the words a particular language has to express different sensations. Languages differ in how they code different aspects of sensory experience, with some perceptual domains more finely divided into named categories than others (e.g. ‘red’/‘green’/‘blue,’ etc. or ‘salty’/‘sweet’/‘bitter,’ etc.). This observation prompts one to ask further: Are there formal characteristics that distinguish the words for different sensory modalities, and if so, are these equally distributed across the different modalities? Do differences in form relate to the expressibility of different sensory domains – are some more “ineffable”? less expressible? less verbally discriminable? (Levinson and Majid n.d.). In other words, are there some senses for which there is no linguistic coding, or where it is restricted or coarse with respect to the number of terms, the patterns of modification that apply, or the consistency of usage across speakers?

This article looks at the domains of color and taste in Tzeltal, surveying their linguistic expression and asking whether there are formal characteristics that distinguish color and taste words from those for other sensory modalities. As we shall see, there are.

Data

The data on which this article is based were collected in the Tzeltal Mayan community of Tenejapa in the highlands of Chiapas in southeastern Mexico. This is a rural community of largely subsistence corn farmers, with a population of around 28,000. Despite increasing contact with the outside world over the last twenty years, most households are still largely monolingual, with some Spanish used, especially by younger people, outside the local community.

Linguistic data were collected, in Tzeltal, using standardized sets of sensory stimuli (Majid 2007); these are described in Majid and Levinson (this issue). The two sets relevant here are a standard set of eighty color chips and a set of five standardized tastes: sweet, salty, sour, bitter, and umami (monosodium glutamate). The tasks were run with thirteen Tzeltal consultants, seven men and six women, whose ages ranged from twenty-nine to fifty-five. Further elicitation was conducted to establish the morphological and syntactic properties of linguistic forms used in sensory descriptions. I also searched written texts and a large database of Tzeltal conversational and narrative texts for naturally occurring color and taste descriptions.

Categories of Taste and Color in Tzeltal

Codability is a measure of the efficiency with which a sensory experience may be communicated to others (Lenneberg and Roberts 1956: 20). It is related to the vocabulary structure of a language, to whether there are dedicated words for particular sensations or whether instead one has to use more indirect means, for example, labels for the sensory source ('like X'), or metaphors (e.g. 'high'/'low' for pitch). Codability can be measured in terms of number of responses (a measure of differentiation of the semantic field with different terms), consistency across speakers, and forms of modification which allow finer discrimination of categories. According to these criteria, taste and color are the most codable domains in Tzeltal.

Examination of the linguistic resources that underlie codability reveals that taste and color are also the domains that are the most alike lexically and morphologically in Tzeltal. In both domains there is a widely-agreed-upon core set of basic terms for sensory qualia, unlike the terms predominantly used in the domains of shape, texture, or sound. "Basic" terms are characterized by Berlin and Kay (1969) as monolexicemic, short (consonant–vowel–consonant (CVC) roots, in the Tzeltal case), applicable to wide range of percepts, and psychologically salient. In Tzeltal, only in the two domains of color and taste are there clear-cut sets of "basic terms" labeling qualia. For color there are five basic terms: *ijk* 'black,' *sak* 'white,' *tzaj* 'red,' *k'an* 'yellow,' *yax* 'grue [green and blue].'¹ For taste there are three basic terms: *chi* 'sweet/salty,' *paj* 'sour,' *ch'a* 'bitter,' and an additional three for flavor: *sup* 'dry puckery,' *ya* 'hot spicy,' *xin* 'stinky/greasy' (e.g. meat).²

Note that the term *chi'* covers both sweet and salty tastes; it is used equally to talk about the taste of coffee ('is it sweet enough?') and the taste of beans ('too salty'). 'Sweet/salty' is a crosslinguistically common semantic conflation in taste terms (Majid and Levinson 2008). Note also that the Tzeltal basic color terms exhaust their sensory domain (leaving no unlabeled areas of the color spectrum), but taste terms do not. Many tastes are described simply as *bujtz'an* 'tasty' or *ma ba bujtz'an* 'not tasty,' without specifying the quality of the experience.

Core sensations (highly codable, Brown and Lenneberg 1954), e.g. focal red (the "best exemplar" of the red term) or core salty (NaCl) are described with the sensory root, e.g. *k'an* 'yellow,' *ch'a* 'bitter,' in nominal, adjectival, or verbal form, as in *ya xk'anubix ta ste'el* "It [corn] has **yellowened** [ripened] on the stalk," or *tulan sch'aal kajpej yu' ma'yuk yaskalul* "The coffee is really **bitter** because there is no sugar in it."

To characterize intermediate or non-core exemplars, these basic roots are modified in some way. Exactly *how* they are modified depends on the sensory domain. Languages use different kinds of modification to express different sensory properties: e.g. color hue vs. brightness, or intensity vs. intermediate non-focal sensation, as in English *grass-green* (hue) vs. *light/dark green* (brightness) vs. *greenish* (intermediate non-focal green). Tzeltal provides four basic patterns of modification (or "templates") for perception expressions; these were overwhelmingly the forms used in response to elicitation. Two of these patterns are widely applicable, and not restricted to sensory domains.

The first template indicates something about the intensity of the experience or the goodness of fit, for example, *jteb tzaj* 'a little bit red,' vs. *batz'il tzaj* 'true red.' This is a general template and applies across all the senses and indeed in non-sensory domains (e.g. 'very difficult,' 'a bit angry'). The second template is formed by reduplicating the sensory root and adding the suffix *-tik*. This is a form of hedging, as in English *-ish*. For example, the term *tzaj* 'red' would become *tzaj-tzaj-tik* 'red-red-AJ' (i.e. reddish) or *xin* 'greasy' would become *xin-xin-tik* 'greasy-greasy-AJ' (like meat, or soap). This adjective-reduplication pattern of Template 2 is again a very general process for hedging on any adjective, not only sensory ones ('biggish,' 'oldish,' 'longish'). Adjectives in both Template 1 and 2 modify the goodness of fit of the sensory quality being described in relation to the core, prototypical exemplar of the category, without characterizing the quality more specifically.

The other two modifier templates are restricted to the domains of color and taste, and both provide a way of specifying more precisely the quality of a non-focal sensation. Template 3 provides more precision by combining two sensory qualities from the same domain (e.g. *sak s-tzaj-al* 'white, its-redness,' meaning pale red, or *sup*

x-cha'-al 'puckery its-bitterness.' It is formed by taking an adjective and adding a possessed noun "A its-Bness" (i.e. partly A, partly B).

Template 4 compounds a basic sensory root with another (usually verb) root drawn from a non-sensory domain, in one of two ways. Template 4a is a form of crossmodal compounding with the suffix *-an*, well-recognized in Mayanist literature (see Berlin 1963 for Tzeltal; Haviland 1991 and Haviland n.d. for Tzotzil; Bricker 1999; and Le Guen, this issue, for Yucatec). Template 4b, a compound plus reduplication (repetition of the second root), has not been reported for Tzotzil or Yucatec Maya. This is the template we will focus on here, as it is the one that applies across descriptions in the domains of both color and taste, but not in other sensory domains.

Restricting ourselves to Template 4, modification by compounding in color and taste, we may now ask: How did consultants label the stimuli in these two domains? Four of the thirteen consultants predominantly used one of the five basic color terms for everything, and did not use any compounds (they were, in other words, lumpers not splitters when categorizing the color stimuli with a linguistic label). Three other consultants used compound forms with the color-compound-specific suffix *-an* (pattern 4a), either by itself as a color label or as a modifier of another color term. Template 4a is specialized to color compounds; it has no application in the domain of taste.

The terms using Template 4a picked out non-focal colors among the color chip array, but differently for different consultants, and it was used only with the roots for 'white' and 'black.' Three distinct compounds followed Template 4a, one each for each of the three consultants. Two of these discontinuously covered dark brown-grue-purple chips (*ik'-som-an*, from *ik'* 'black' + *som* 'hide,' and *ik'-sut'-an*, from *ik'* 'black' + *sut'* [unanalyzed root]). The third, *sak-lik-an*, a compound of the root *sak* 'white' with the root *lik* 'to carry/lift from above,' covered various pink shades. All of these fall outside the focal ranges of the basic color terms.

Much more commonly used in the Tzeltal data – by eight different speakers in the color domain – is the reduplicated compound root, Template 4b. This was used with all five basic color terms compounded with seven different roots. Examples include *ik'-som-som* 'black' + 'hide,' 'grayish brown, dark blue or brown'; *sak-tan-tan* 'white' + 'ash' 'tan, grayish'; *sak-pak-pak* 'white' + 'stick-on,' e.g. face of an ill person, 'pale face'; *sak-lik-lik* 'white' + 'carry,' 'washed out, very pale color,' 'shades of pink'; *yax/tzaj/sak-el-el* 'grue/red/white' + [unanalyzed root], 'light blue/green, extending into pinky blues'; *k'an/tzaj/ik'/yax-ch'ol-ch'ol* 'yellow/red/black/grue' + 'pour liquids,' e.g. of refresco (soft drink) colors.

These compounds elicited with color chips (i.e. colors abstracted away from specific objects) are comparable to color compound terms found in Tzeltal texts, for example *yax-boj-boj xix a'wej yu'un*

(*yax* 'grue' + *boj* 'cut') 'your mouth turns green from it [eating green vegetables]', or *tzaj-boj-boj yej antz* 'the woman's mouth is red-cut-cut' (with lipstick). This is a fairly productive compounding process, with other such compounds found especially in talk about plants and about illnesses. They also emerge in mockery, teasing, and narrative (see Haviland n.d. for Tzotzil examples). The semantics of these compounds capture crossmodal sensations, combining concepts of color with concepts of, for example, reflectivity, intensity, vitality, shape, texture, or consistency.

In the taste domain, four terms with the same modification template (4b) were used by three different consultants; all were in response to the taste of umami (monosodium glutamate), perhaps reflecting its non-focal nature as a taste. Examples include the following: *chi'-paj-paj-tik y-ik* (< *chi* 'sweet/salty' + *paj* 'sour') 'sweet/salty sour-sour its-taste' ('like oranges'); *chi'-xin-xin-tik* (< *chi* 'sweet/salty' + *xin* 'greasy') 'sweet/salty greasy-greasy'; *chi'-pik-pik-tik* (< *chi* 'sweet/salty' + *pik* 'touch') 'sweet/salty touch-touch' (e.g. umami); *sik-lo'-lo'-tik x-xin-al* (< *sik* 'cold' + *lo* 'eat soft fruit' 'cold-soft-soft its-greasiness,' i.e. 'a bit greasy, but with a bit of sugar in it,' 'like Alka-Seltzer.'

Why Color and Taste?

Despite taste having the fewest stimuli (five) in our elicitation tasks, and color the most (eighty), the responses, and the morphological resources, look remarkably similar, in contrast to those in the other sensory domains.³ What motivates the parallel use of these compounding modifications in color and taste, as distinct from other sensory modalities? Sharing these properties of linguistic form suggests that there may be something analogous in color and taste sensory experiences, or at least in how categories of color and of taste are construed, that motivates parallel expressions in the two domains.

Color and taste, as psychological experiences, do not seem to share much in common, in comparison to the other senses. Color is perceived from a distance, but for taste we need contact with the mouth, and the psychophysical underpinnings of color and taste are not the same.

Is there, then, an ethnographic explanation? Are there cultural reasons for picking out specific colors, specific tastes for crossmodal linguistic elaboration?

In Tenejapa, where people are primarily subsistence farmers, both technology and art are tied to the functional requirements of an agricultural lifestyle. Indigenous music with traditional instruments (harp, guitar, flute, violin) is performed by specialist experts using a limited set of rhythms and tunes; there seems to be no cultural impetus for elaboration of an auditory descriptive vocabulary in music. Weaving is the major form of artistic expression for women, and there is a developed terminology for characterizing

textile textures and patterns (Branstetter 1974), but color choice in traditional textiles is highly limited and there is no indigenous use of dyes or paints. Other traditional crafts – making net bags, gourd bowls, tools, houses – involve no color choices. Where then are color terms actually used?

One context for color words is in distinguishing species in the natural world: natural kind distinctions (e.g. *yaxal ch'o* 'grue mouse,' *tzajal chuch* 'red squirrel') and varieties ('blue corn,' 'red corn'), patterns of chicken coloring (e.g. *tzajbelantik spat* 'mixed with brown on back'), patterns of leaf coloring, foliage, and other ethnobotanical distinctions (cf. Berlin et al. 1974). Color words are also used in discussing the state (health, maturity) of one's cornfield or other crops. Another arena is that of clothing: in weaving and embroidery, the one manual craft that involves color choices, color terms apply to patterns, to what yarn to buy for weaving, the quality of grue in skirt fabric, and the colors of manufactured sweaters, blouses, shirts, etc.

Contexts for describing tastes obviously center on food and its preparation; they are also relevant in indigenous medicine. The local cuisine is fairly limited, composed of tortillas, beans, squash, chilies, and some wild varieties of green leaves, with chicken, eggs, and beef reserved for special occasions. Traditionally, local game (birds, rodents, deer) would have been caught, but this is now rare in this densely populated area. Corn gruel, coffee, soft drinks, and (for some) home-brewed corn beer and liquor are the locally available drinks. Concerning this range of foods, people talk in detail about tastes; adequate and appropriate usage of salt, sugar, chilies, and local herbs (e.g. mint) and condiments (e.g. ground-up pumpkin seeds), are routine matters for discussion.

There is, however, one cultural elaboration related to taste: the "hot/cold" dichotomy well known in Latin America (Messer 1987; Foster 1994), which permeates categories of food, drink, medicine, and many aspects of the natural world (e.g. sun – hot, moon – cold, fire – hot, earth – cold, men – hot, women – cold). This classification constrains what can be eaten with what, and what can be consumed when one is ill. Examples of these contrasting categories of foods provided by one family in the early 1970s (Brown 1979) illustrate the contrasts: "cold" foods were said to include corn gruel, bread, brown sugar, water, black and white varieties of corn, turkey, pork, apples, and lemons. "Hot" foods include tortillas, rice, white sugar, salt, yellow and red corn varieties, chicken, beef, chili, bananas, and oranges. Attributions of "hot" and "cold" to foods are notoriously variable and context sensitive, but the logic of hot/cold that motivates this categorization is systematic: metaphorical "temperature" has to do not with heat per se but with energy and power (the "hot" items), which must be kept in balance with "cold" items in the diet and in medical treatment in order to maintain health.

The "hot/cold" contrast, as described by Vogt (1976) and Gossen (1974) for the neighboring Tzotzil communities, motivated Classen

(1993) to argue that, for the Tzotzil, temperature is the master sense in terms of which all other sensations (including color and taste) can be expressed or translated; indeed, she claimed that the Tzotzil have a “thermal cosmology.” This portrayal of a temperature-based “world view” is accurately attuned to a theme of symbolism in ritual and prayer in Tzotzil (and indeed, Tzeltal) cosmology. But the metaphor has limited, if any, applicability to the realm of everyday sensations as examined through language.

In today’s Tenejapa, ritual symbolism and practices have changed along with increased contact with the wider Mexican culture. “Hot” and “cold” categories still influence diet and medicine, but there is no evidence of an overarching symbolic-temperature construal in the language of perception. All the senses are important in their own arenas, and crossmodal sensory experience is very salient. Certainly the basic taste and color terms I am addressing here are not expressed (or translated) in terms of “heat.” There is one place where it turns up: the ‘cold’ term *sik* can compound with some taste terms, as in *sik-lo’-lo’* ‘cold’ + ‘eat.soft.things-REDUP,’ applied to the taste of umami.⁴ Interestingly, there is no analogous compounding with a ‘hot’ term (e.g. *kixin* ‘warm’ or *k’ajk’* ‘hot’) to specify tastes, perhaps because this end of the spectrum in the taste domain is preempted by *ya* (‘hot/spicy’). Neither of these terms (*sik* ‘cold’ vs. *ya* ‘hot,’ applied to food) necessarily indicate physical temperature as opposed to symbolic temperature or associated taste sensations. In non-metaphorical contexts, physical temperature terms (*sik*, *kixin*, *k’ajk’*) can obviously be applied to characterize the physical temperature of foods.

In sum, the elaboration of these two domains of color and taste and the use of these particular linguistic mechanisms in comparable ways can be loosely related to the material technologies (weaving, food production) that motivate descriptions of color and taste sensations, and to ideas about metaphorical “hot”/“cold” categories in this community.

Conclusions

Tzeltal speakers use a particular form of compounding, often cross-modally, to describe sensory experiences in the domains of color and taste, but not in other sensory domains. These compounds allow finer discriminations of color and taste distinctions, often combined with other sensory properties such as shape, texture, or surface properties. They reflect a cultural preoccupation with complex sensory “gestalts” evident in other areas of the lexicon, “gestalts” which lend themselves to affective and vivid description and are especially prevalent in mockery, teasing, and narrative.

Lexicalization patterns of words referring to perception reflect culturally specific ideas about, and uses for, the different senses. Language may thus play a role in creating perceptual categories (e.g.

with *sik* 'cold' in its application to taste) and in promoting crossmodal associations (e.g. with compounds).

These observations suggest that categories labeled in language do not just reflect our biological sensory equipment but are shaped by cultural preoccupations, resources, and experiences, a point stressed in recent anthropological work on the senses in different cultures (Stoller 1989; Howes 1991, 2004, 2009). This cultural shaping may be what underlies the finding that the Tzeltal data provide no support for the common assumption that vocabulary expressing the proximal senses (touch, taste, smell), which require contact between the stimulus and the perceiving body, is more "ineffable" than vocabulary associated with the distal senses (vision, hearing), which do not. In any case, it seems that a two-pronged approach is required to explore the expression of the senses in comparative perspective: (a) through language, for access to the categories, degree of communicability, discriminability (granularity of categories), and cross-speaker agreement, and (b) through cultural practices, habits, and use of the senses. The former requires a method of elicitation using standardized stimuli abstracted from real-object contexts; for the latter we need observations of naturally occurring usage and ethnographic description of cultural practices that make use of particular senses.

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Notes

1. There appears to be emerging consensus on a sixth term *tzajal chi'in* 'red potato,' which was widely used in our color elicitation task for purple hues.
2. There is also a term extended from another domain (temperature): *sik* 'cold' or 'cold-tasting.'
3. Tzeltal has a rich vocabulary for distinguishing shapes and spatial configurations that draws on a different set of linguistic resources (positional roots). In contrast, there are hardly any sound-specific terms for characterizing basic parameters of sound; speakers rely heavily on two basic oppositions (*ch'in* 'small' i.e. high pitch and *muk'* 'large' i.e. low pitch) as well as general adjectives applicable across other domains (*k'un* 'soft,' *tulan* 'strong/hard,' *jich'il* 'thin'). There is, however, an elaborate set of expressions for distinguishing different styles of speaking,

which have both an auditory and a visual aspect (Stross 1974). A third repertoire (affect verbs) is used in motion descriptions, which may also incorporate sound and/or visual properties. Smells are overwhelmingly described by the source of the smell.

4. Note that a similar association with sensory terms and “hot”/“cold” categories is found in Yucatec Maya (Le Guen, personal communication). Yet the crossmodal semantics of the two domains is culturally specific, and differs in these two communities (Yucatec Maya compounds conflate color and texture, but not taste, with “cold” terms).

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