

# PLURACTIONAL DEMONSTRATIONS\*

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## 1 Introduction

The term *ideophone* is used to pick out a distinguished class of words in a language that specialize in depicting sensory imagery (Dingemanse 2011, p. 25; 2012).

- Consider the following example of the ideophone *tsok'* in Tselal.

(1) pura ch'il-bil-Ø, **tsok'** x-chi-Ø ta mantekat  
 just fried-PERF-B3 IDF:sound.start.to.fry NT-say-B3 P lard  
 just fried, it goes *tsok'* in the lard (Pérez González 2012, p. 162)

- First, according to the definition, ideophones pattern together as a class separate from the rest of the lexicon:

- **special morphology**—e.g., *tsok'* is a bare CVC root complement of a verb in (1). This is impossible for all other kinds of roots in the language, which would at least have to bear some kind of inflection here.
- **special syntax**—e.g., bare ideophone roots like *tsok'* can *only* appear in this syntactic frame. Their distribution is thus much more restricted than other roots in the language.
- **special phonology**—none here, but it is extremely common for the domain of ideophones to exhibit phonemes and phonotactic possibilities not attested elsewhere in the language's lexicon (Dingemanse 2012).

- Second, according to the definition, ideophones have a distinctive semantics in virtue of depicting sensory imagery:

- **sensory semantics**—e.g., *tsok'* in (1) evokes the *sound* of the event. Sound is most commonly depicted, followed by movement, and then visual patterns (see Kilian-Hatz 1999, p. 35–41 and Akita 2009, p. 20–32).

- **strikingly specific semantics**—e.g., *tsok'* is not just the sound of frying, but that particular sound when something first plops into a hot oil. There are plenty of others even more striking: *chij* 'the sound of small hard things moving inside of a container', etc. (Pérez González 2012, p. 309).
- **depiction**—e.g., there is an intuition in the literature that expressions like *tsok'* do not *describe* events of perceiving the sound of something hitting hot oil, but instead either *perform* the sound of something hitting hot oil or invite the hearer to *imagine* experiencing the sound of something hitting hot oil (Dingemanse 2011; Kita 1997; Nuckolls 1995).

The literature on the formal semantics of ideophones is scarce. This is, I think, due to two challenges:

- ( $\alpha$ ) It is not at all clear how to formalize the distinction between *descriptive meaning*, which is at the foundation of truth-conditional semantics, and *depictive meaning*, which ideophones seem to traffic in.
- ( $\beta$ ) The idiosyncractic specificity of ideophone meaning and their restricted (morpho)syntactic distribution presents obstacles for doing formal lexical semantics—in particular, it's hard to compare them with expressions from more familiar categories and it's hard to determine their type.

The goal of this talk is to address both of these problems, and in doing so, begin to develop a formal semantics of ideophones that can account for their meaning and compositional properties.

- ( $\alpha^*$ ) Davidson to appear provides a novel, unified account of quotation and a variety of iconic phenomena in sign language in terms of a *demonstrations*—a special type of communicative event that stands in a similarity relation with the event demonstrated.

- I extend her analysis and use it to provide a formal foundation for the semantics ideophones, in particular, one that can address the difference between description and depiction that lies at heart of problem ( $\alpha$ ).

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( $\beta^*$ ) While pluractional meaning is often idiosyncratic, it has been under appreciated that many ideophones have pluractional semantics (i.e., they make reference to plural events). Since pluractionality is fairly well understood (e.g., Hofherr and Laca 2012; Wood 2007, etc.), it provides exactly the hook into problem ( $\beta$ ) that we need.

- We can group ideophones by the variety of pluractionality they exhibit, and then provide templates that generalize over particular items to capture this aspect of ideophone meaning.
- Along these lines, I show there are at least two broad types of ideophonic pluractionality and their form supports the demonstration-based analysis à la Davidson to appear.
- The first, which I call *demonstration-external pluractionality*, involves a speaker using an ideophone to do a plurality of demonstrations that characterize a plurality of events.
- The second, which I call *demonstration-internal pluractionality*, involves a derived ideophone that can be used in an atomic demonstrations to characterize a plurality of events.

With this backdrop, here is the structure of the talk:

§2 introduces the very idea of pluractionality and pluractional ideophones.

§3 introduces Davidson's to appear demonstration-based account of quotation.

§4-§5 analyzes *demonstration-external pluractionality* through a case study of ideophones in Tseltal (TZH, Mayan).

§6 analyzes *demonstration-internal pluractionality* in through a case study of ideophones in Upper Necaxa Totonac (TKU, Totonacan).

§7 concludes.

## 2 Pluractionality and pluractional ideophones

Before providing a detailed formal treatment of pluractional ideophones, I first want to introduce the very idea of pluractionality and show that ideophones can have pluractional semantics.

- Pluractionality, very broadly, is a grammatical category expressing plural reference to events (Cusic 1981; Newman 1990; Wood 2007, among others).
- For instance, partial reduplication in Kaqchikel and total reduplication in Karitiana derives verbs that cannot be satisfied in single-event scenarios.

(2) Kaqchikel  
 a. Xe'in-tz'et-**etz'a** ri sanik.  
 INFL-see-**VC'a** the ant  
 'I glanced at the ants repeatedly.'  
*False if I just looked at them once.* Henderson 2012

(3) Karitiana  
 a. Ōwā naka-kot-**kot** sypomp opokakosypi.  
 kid 3.DECL-break-**break**.NFUT two.OBL egg  
 'The kid broke two eggs.'  
*False if the eggs broke simultaneously.* Müller and Sanchez-Mendes 2007, ex. 19

- These derivations are often called pluractionals or pluractional morphology.
- The task then is to find pluractional morphology in the ideophone domain.

Sections §3 and §4 presents two case studies from the Mesoamerican languages Tseltal and Upper Necaxa Totonac, and so I'll focus on those language here. I'm confident, though, that pluractional ideophones are extremely common crosslinguistically.

- First, note that there are examples of ideophones that are true in single-event scenarios. They provide the base case against which the derived pluractional forms can be identified.

(4) Tseltal  
 a. teme **t'ul** x-chi-Ø k'oyel=e  
 if IDF:droplet.form NT-say-B3 arrive.there=ENC  
 'if it arrives in the form of a droplet (lit. saying **t'ul**)' Pérez González 2012, p. 163

b. **t'or** xchi i x-bajt-Ø  
 IDF:wood.sound NT-say-B3 ICP ICP-go-B3  
 'When a tree goes down it goes **t'or**.' Pérez González 2012, p. 164

(5) Upper Necaxa Totonac  
 a. **patf** maka-wán  
 IDF:sound.small.stone.fall hand-say  
 'The pebble falls **patf**.' Beck 2008, ex. 16a

b. **te:ɬ** ik-ta-wi:ɬ ka-s'ewíwí antsa  
 IDF:sound.hit.ground 1SG.SUBJ-INCH-sit PLC-cool here  
 '**Te:ɬ** I plopped myself down here where it's cool.' Beck 2008, ex. 15a

In Tseltal, one type of pluractional ideophone is formed via total reduplication of the ideophone.

- As with Karitiana verbal reduplication in (3), the reduplicated ideophone has a pluractional reading—it rules out single-event scenarios, as the translation shows.

(6) Tseltal

- a. x-t'oj-t'on-Ø,                      **t'oj-toj-toj**                      x-chi-Ø  
 NT-IDF:wood.sound-EXPR3    IDF:wood.sound-RED-RED    NT-say-B3  
 'The sound of hollow wood every little bit goes **t'ojt'ojt'oj.**'                      Pérez González 2012, p. 166
- b. x-puj-pon-Ø                      ya j-pas-tik    klabar tabla aw-il-Ø  
 NT-idf:hollow.sound-EXPR3-B3    ICP a1p-do-PL hit    table A2-see-B3  
 te    **t'en-t'en-t'en**                      x-chi-Ø    aw-il-Ø=e  
 COMP IDF:sound.hit.table-RED-RED    NT-say-B3    A2-see-B3=ENC  
 'It sounds like giving blows to a hollow object, it's like when we hit a table, see how it goes **t'ent'ent'en.**'                      Pérez González 2012, p. 189

The situation in Upper Necaxa Totonac is interesting in that there are two reduplicative templates for pluractional ideophones.

- First, as in Tseltal, full reduplication can be used with ideophones to mark pluractionality.

(7) Upper Necaxa Totonac

- a. **patf-patf**                      ta-maka-wán  
 IDF:sound.small.stone.fall-RED    3PL.SUBJ-hand-say  
 'The pebbles fall **patfpatf.**'                      Beck 2008, ex. 16b
- b. mat **te:t-te:t**                      li:ta:ti:tá:                      tsamá: misín  
 QTV IDF:sound.hit.ground-RED    bounce.on.bottom this    jaguar  
 'the jaguar bounced around on its rear end'                      Beck 2008, ex. 15b

- Second, there is a partial reduplication process (-CV) that also derives pluractional ideophones.

(8) Upper Necaxa Totonac

- a. lam 'fire flaring up'  
 lamama 'coals glowing red'
- b. kuʃkuʃ 'kocking on something'  
 kuʃuʃu 'tapping quickly on something'
- c. teʃeteʃe '(sound) water coming out in bursts'  
 teʃeʃe '(sound) water rushing out of a pipe'                      Beck 2008, p. 14

-CV ideophone reduplication thus looks like the Kaqchikel partial reduplication in (2) for verbal pluractionality.

- In addition, while both are pluractional, there appears to be a difference in meaning between ideophones that have undergone total reduplication and those that have undergone partial reduplication.
- This already suggests that there are already at least two subtypes of ideophonic pluractionality, which will be discussed further in §6.

### 3 Demonstration-based theory of quotation

When thinking about direct quotation, we usually think about *verbatim* quotation, where the act of quotation concerns the words used—e.g., suppose Mary says (9).

(9) I play guitar.

- Mary can then be quoted as in (10), where words alone ensure that the quotation is felicitous.

(10) Mary was like "I play guitar".

While this is maybe the most common situation, *be like*-quotation can be felicitously used to replicate a variety of aspects of an event.

- For instance, words can be used to "quote" an agent's behavior or inner monologue, even if those particular words are not used.

(11) My cat meows loudly and paces around its food bowl.

- a. My cat was like "feed me!"                      Davidson to appear, ex. 21

- It is also possible to use *be like*-quotation to mimic an agent's facial expressions or intonation.

(12) John says, while pouting, I'll never get into SALT.

Speaker A: Did you hear John say he'll never get into SALT.

Speaker B: Yeah, he was all like :(

(13) John says, in a whiny voice, I'll never get into SALT.

Speaker A: Did you hear John say he'll never get into SALT.

Speaker B: Yeah, he was all like "[in a whiny voice] My paper won't get in."

Davidson's to appear proposal, following earlier work by Clark and Gerrig (1990), is to say that verbatim quotation is merely a special case of what we see in (11)-(13).

- The theory that unites them says that all quotation involves the performance or demonstration of an event.
- One can demonstrate or perform an event by performing the words that occur in it—i.e., verbatim quotation—but one can also perform all sorts of aspects of the event, including intonations, facial expressions, thoughts, etc.

The downside to this kind of theory is that, as we will see, we have to radically under-specify the truth conditions for quotative sentences.

- But, given facts like (11)-(13), as well as those we see in the previous literature (e.g., Clark and Gerrig 1990), this might just be a bullet we have to bite.
- The upside is that Davidson to appear shows that the demonstration-based theory allows for a unified account of quotation and two phenomena that pervade the grammars of sign languages, namely verbal classifier predicates and role shift.
- In this vein, the present work can be seen as further supporting the demonstration theory of quotation.
  - In particular, I show that demonstrations, as they are formally conceived in Davidson to appear, are exactly what we need to understand how ideophones *depict* instead of *describe*, which was one of our starting puzzles.
  - This is true, even though I will argue that using an ideophone does not amount to direct quotation (that is, they are distinct phenomena). To see this, though, I first need to present the details of Davidson’s to appear theory.

## The Logic of Demonstrations

Note that while this section is heavily based on Davidson’s work, I have altered some things and made assumptions about the domains of events, demonstrations, and linguistic expressions that she might not agree with. When it’s clear that I have diverged from her work, I note it in the text.

The core idea in Davidson to appear is that there is a distinguished subset of events, namely a class of events with communicative intent she calls *demonstrations*.

- Davidson to appear gives demonstrations their own type  $\delta$ , and while not formalized, the intended interpretation is that  $\delta$  is a subtype of  $\epsilon$ —the type of events.
  - This could be implemented in some variety of lambda calculus with subtyping, like  $F_{<}$  (see Retoré 2014) or TCL (see Asher 2011).
  - I don’t go this route because I don’t need all the power these systems provide, and the resulting models become fairly complicated.

- The trade off, of course, is that I will need additional quantifiers, relations, etc. over new types, but I think the result is manageable.

With the previous discussion in mind, the backdrop for the account is lax many-sorted type logic.

- Lax just means (i) we do not require domains for sorts to be disjoint, and (ii) equality (and only equality) is type agnostic—e.g.,  $\sigma = \sigma'$  is a formula even if  $\sigma$  and  $\sigma'$  are terms with different types.

Here are the highlights of the setup.

- the domain of individuals of type  $e$  is the powerset of a designated set of entities IN minus the empty set:  $D_e = \wp^+(\text{IN}) = \wp(\text{IN}) \setminus \emptyset$
- the domain of events of type  $\epsilon$  is the powerset of a designated set of events EV minus the empty set:  $D_\epsilon = \wp^+(\text{EV}) = \wp(\text{EV}) \setminus \emptyset$
- the domain of times of type  $\tau$  is the powerset of a designated set of times TM minus the empty set, and is additionally partially ordered by  $\prec$  (temporal precedence):  $D_\tau = \wp^+(\text{TM}) = \wp(\text{TM}) \setminus \emptyset$
- the domain of demonstrations of type  $\delta$  is powerset of a designated set DM  $\subset$  EV minus the empty set:  $D_\delta = \wp^+(\text{DM}) = \wp(\text{DM}) \setminus \emptyset$

I want to think of demonstrations as events under a particular guise that allows certain constructions—like *be like*-quotatives or ideophone constructions—to extract their communicative intent.

- atomic individuals and atomic events are the singleton sets in  $\wp^+(\text{IN})$ ,  $\wp^+(\text{EV})$ ,  $\wp^+(\text{DM})$  respectively; they are identified by a predicate **atom** (which I’ll apply to individuals, events, and demonstrations disambiguated by context)
- the “part of” relation  $\leq$  over individuals / events / times / demonstrations (disambiguated context) is set inclusion over  $\wp^+(\text{IN}) / \wp^+(\text{EV}) / \wp^+(\text{TM}) / \wp^+(\text{DM})$ :  $a \leq b$  iff  $a \subseteq b$
- the sum operation  $\oplus$  (disambiguated by context) is set union over  $\wp^+(\text{IN}) / \wp^+(\text{EV}) / \wp^+(\text{TM}) / \wp^+(\text{DM})$ :  $a \oplus b := a \cup b$
- $\theta$ -roles are functions of type  $\epsilon e$  from events (type  $\epsilon$ ) to individuals (type  $e$ ), e.g., TH is the theme role, AG is the agent role, etc.
- The temporal trace function  $\tau$  is a sum-homomorphism from events to times.
- I assume all event predicates and theta-role functions are cumulatively closed, suppressing  $*$ -notation.

Finally, following Potts 2007, I include a domain of linguistic entities. It is these entities that are uttered in a act of quotation.

- $D_\mu$  (disjoint from all other domains) is the domain of well-formed linguistic entities of type  $\mu$ .
- It will not matter so much for this work, but these linguistic entities are potentially quite complex. For instance, Potts 2007 takes them to be a triple with  $\langle \text{PHONOLOGICAL REPRESENTATION, SYNTACTIC CATEGORY, DENOTATION} \rangle$ .
- I will write individuals of type  $\mu$  with  $\lceil$ Quine corners $\rceil$  and talk about them for simplicity's sake as if they were just strings.

It is now possible to give an account of *be like*-quotation.

- I'm going to focus on cases like (10) where the demonstration is made via a linguistic expression. This is because it is more similar to case of ideophones, which always involve a linguistic expression.
- I'll call these *quotational demonstrations*

Davidson to appear treats quoted expressions like “I play guitar” as denoting demonstrations—i.e., entities of type  $d$ —namely a demonstration involving the words “I play guitar”.

- Diverging from Davidson to appear, I propose to unpack this representation slightly.
- I don't think the words used in a demonstration should be identified with that demonstration. Instead, the words used are the theme of the relevant communication event—recall that demonstrations are just a subtype of event.
- Let us then define a new version of the theme theta role, namely  $\text{TH}_\delta$ , which is a function of type  $\delta\mu$ , a function from demonstrations to well-formed linguistic expressions.

We can now treat quotational demonstration using an operator like (14), where **demo** is a relation that holds between  $d$  and  $e$  just in case  $d$  reproduces aspects of  $e$ .

$$(14) \quad \text{Q-DEMO} \rightsquigarrow \lambda u \lambda d \lambda e [\text{TH}_\delta(d) = u \wedge \mathbf{demo}(d, e)]$$

Following Eckardt 2012, which treats *hereby* in performative utterances as denoting the contemporaneous event of information exchange, I take *like* to denote the ongoing demonstration event (diverging from Davidson to appear).

$$(15) \quad \textit{like} \rightsquigarrow d_n \text{ (the ongoing act of information exchange in the utterance)}$$

Finally, following Davidson to appear, the “be” in *be like*-quotation introduces the external argument—namely the agent of the event being demonstrated.

- Putting it together we can compositionally derive the meaning of expressions like *Mary was like “I play guitar”* as follows:

$$\begin{array}{c} \text{Mary was like “I play guitar”} \\ \lambda e [\text{AG}(e) = \text{M} \wedge \text{TH}_\delta(d_{13}) = \lceil \text{I play guitar} \rceil \wedge \mathbf{demo}(d_{13}, e)] \\ \text{Mary} \quad \lambda x \lambda e [\text{AG}(e) = x \wedge \text{TH}_\delta(d_{13}) = \lceil \text{I play guitar} \rceil \wedge \mathbf{demo}(d_{13}, e)] \\ \text{M} \\ \text{was} \\ \lambda V_{e\iota} \lambda x \lambda e [\text{AG}(e) = x \wedge V(e)] \quad \lambda e [\text{TH}_\delta(d_{13}) = \lceil \text{I play guitar} \rceil \wedge \mathbf{demo}(d_{13}, e)] \\ \text{like} \quad \lambda d \lambda e [\text{TH}_\delta(d) = \lceil \text{I play guitar} \rceil \wedge \mathbf{demo}(d, e)] \\ d_{13} \quad \text{Q-DEMO} \quad \text{“I play guitar”} \\ \lambda u \lambda d \lambda e [\text{TH}_\delta(d) = u \wedge \mathbf{demo}(d, e)] \quad \lceil \text{I play guitar} \rceil \end{array}$$

After existential closure we get the following translation for *Mary was like “I play guitar”*.

- $\exists e [\text{AG}(e) = \text{M} \wedge \text{TH}_\delta(d_{13}) = \lceil \text{I play guitar} \rceil \wedge \mathbf{demo}(d_{13}, e)]$
- which is true just in case there is an event  $e$  whose agent is Mary and the current demonstration event whose theme is the linguistic entity “I play guitar” reproduces aspects of  $e$
- As discussed above, the particular relationship between the *be like*-quotation and what it quotes can be quite loose.
- In this case, because the demonstration event, which must reproduce aspects of  $e$ , has the linguistic object  $\lceil \text{I play guitar} \rceil$  as its theme, a speaker might reasonably (defeasibly) infer that  $e$  is a speaking event in which  $\lceil \text{I play guitar} \rceil$  is uttered.
- Though this inference must be defeasible—e.g., see (11)

To see how this analysis extends to other constructions that can be used to perform quotation, consider *say*, which we can treat as adding an additional requirement that the demonstrated event is one of saying:

$$(16) \quad \begin{array}{l} \text{a. } \textit{Mary said "I play guitar"}. \\ \text{b. } \exists e [\text{AG}(e) = \text{M} \wedge \text{TH}_\delta(d_{13}) = \lceil \text{I play guitar} \rceil \wedge \\ \quad \mathbf{demo}(d_{13}, e) \wedge \textit{say}(e)] \end{array}$$

The lexical content of the verb *say* further restricts the kind of events that  $d_{13}$  is able to faithfully demonstrate to those that involve an event of saying.

- This correctly accounts for the fact that (16) cannot be used to report the cat's behavior in (11) (if the cat's name were Mary). It is more restrictive than *be like*-quotation.

- One might worry that without a *like*, there is nothing to introduce the demonstration event.
- I believe that there is a covert *like* in examples like (16), which can be observed in naturally occurring examples, making it much like *hereby* with performative verbs—e.g., *I (hereby) promise to study semantics*.

- (17) ... and then she said like “I did study abroad, but aside from that, I did home stays several times and stuff.” (Rimer, Mori, and Poulton 2014, p. 633)
- (18) He said like, “They’re talking, everything’s going to be fine, just calm down.” (Davies 2008)

While there is much more to say about *be like*- and standard quotation, I merely want to lay out a basic account of quotation in the style of Davidson to appear.

- This lays the foundation for an account of ideophones, which is the focus of this work.
- In particular, it will allow us to see differences between quoting and using ideophones, which are both crucial and not immediately recognizable.

## 4 Ideophones in Tselal

This section has two goals:

- First, I will extend the demonstration-based account of quotation presented in the previous section to provide an account of ideophones, exemplified by Tselal.
- I will then investigate a prediction of this account, namely that one should be able to make multiple demonstrations with an ideophone to demonstrate a plural event.
  - I will show that this prediction is correct, and one finds demonstration-external pluractionality—e.g., the use of a plurality of ideophone demonstrations to demonstrate a plural event.
  - Moreover, the temporal structure of these plural demonstration will constrain the kind of plural events demonstrated.
  - The result is that not only does Tselal exhibit fine-grained correspondences between varieties of pluractional derivations and varieties of pluractional demonstrations, but the analysis can immediately account for these correspondences.

Recall that the basic ideophone construction in Tselal looks like (19).

- (19) pura ch’il-bil-Ø, **tsok’** x-chi-Ø ta mantekat  
just fried-PERF-B3 IDF:sound.start.to.fry NT-say-B3 P lard  
‘just fried, it goes *tsok’* in the lard’ (Pérez González 2012, p. 162)

It has two core properties, which I will elaborate in turn.

- There is a bare (uninflected) root/stem—*tsok’*
- The root is embedded under the reported speech predicate—*chi*

The space of roots/stems that appear in the basic ideophone construction is well-structured.

- First, it is important to note that Mayan languages make a categorical distinction between roots of a particular category, which are always of the form CVC, and derived stems of that category.
- For example, one often finds that CVC roots of category X can occur in certain morphosyntactic configurations that derived stems of category X cannot.

What I want to show is that Tselal ideophones are organized along this root/stem paradigm exactly like other lexical categories in the language—i.e., nouns, verbs, adjectives.

- First, we find CVC ideophones—ideophone roots—that are specialized as such.
- That is, they appear in the basic ideophone construction, but cannot be inflected as if they were a root of another category.
- For instance, *tsok’* in (19) is clearly a CVC ideophone, but it cannot be used as if it were a root of another category, which I’ve exemplified in (20) for the category transitive verb.

- (20) \*ya j-**tsok’**-Ø te chenek’=e.  
ICP A1-fried-B3 DET bean=ENC  
Reading sought: ‘I’m going to fry the beans.’ (Pérez González 2012, p. 162)

But just like with more familiar lexical categories, there are ways to explicitly derive a root from another category into a derived ideophone stem.

- For instance, there is a derivation -u / -i (phonologically conditioned) that turns transitive verbs or positional roots into ideophones.

- (21) Chep-**u** x-chi-Ø ta j-jol.  
POS:filled.bag.thrown.down-IDF NT-say-B3 P A3-head  
(Being hit will a filled bag), it went **chepu** on my head. (Pérez González 2012, p. 166)

- (22) Lek-Ø xan teme ay-Ø orita jax-u x-chi-Ø  
 good-B3 again if exist-B3 quickly VT:scratch-IDF NT-say-B3  
 k'axel.  
 DIR:passing  
 'It's much better if slips by rapidly going **jaxu**' (Pérez González 2012, p. 167)

Crucially, you cannot use these roots in the basic ideophone construction without first deriving them.

- For instance, (23) is ungrammatical. The root *chep* is just not an ideophone root.

- (23) \***Chep** x-chi-Ø ta j-jol.  
 POS:filled.bag.thrown.down NT-say-B3 P A3-head  
 Reading sought: (Being hit will a filled bag), it went **chepu** on my head.

Finally, as is common with other lexical categories, there are a non-trivial number of roots that are polycategorical. Consider  $\sqrt{jik}$ .

- Unlike  $\sqrt{chep}$  it can appear underived in the basic ideophone construction, as in (24).
- But unlike other root ideophone, like  $\sqrt{tsok}$  in (20), it can be inflected as a transitive verb without derivation, as in (25).

- (24) **jik'** x-chi-on=nax ta jik'ubajel jun-jun-ajk'  
 IDF:inhale/choke NT-say-B2=just hiccup one-one-moment  
 You went **jik'** by the hiccup repeatedly (Pérez González 2012, p. 163)

- (25) ya j-**jik'**-Ø j-mats'  
 ICP A1-TV:inhale/choke-B3 A1-pozol  
 I choked on my pozol. (Pérez González 2012, p. 163)

Summarizing, what we find is that:

- There are CVC roots that can occur in the basic ideophone construction (i.e., they correspond to ideophone stems), but belong to no other lexical category.
- There are ways of deriving ideophone stems from roots of other categories.
- Some roots are belong simultaneously to the class of ideophone stems as well as others (almost always a transitive verb).

These morphosyntactic facts place strong constraints on the space of possible analyses of ideophones.

- First, that fact that one cannot use arbitrary roots in the basic ideophone construction shows that ideophones cannot be reduced to quotation.

- The reason is that practically anything can be quoted—e.g., “The monster was like *chakatubatz'a*”
- If ideophones were mere quotations of an event, that is, the event made a sound that roughly corresponds to the sound of the root in question, then why can't one say (23), even though one can quote the root as in (26)?

- (26) “**chep**” x-chi-Ø te alal=e.  
 POS:filled.bag.thrown.down NT-say-B3 DET baby=ENC  
 The baby said “chep”. (Jaime Pérez González, p.c.)

Given that making a demonstration by way of an ideophone is not mere quotation, whatever differentiates ideophonic demonstrations and quotational demonstrations is part of the compositional semantics.

- We want the -u / -i derivation to derive an expression with the kind of meaning that allows it to be used as an ideophone from a expression whose meaning is incompatible with such a use.

#### Interlude on Onomatopoeia

As is common in languages with rich systems of ideophones, there is a clear distinction in Tseltal between “onomatopoeic” and “non-onomatopoeic” ideophones.

- While many of the ideophone roots might be sound symbolic (especially with post-hoc knowledge about what they mean), many aren't (e.g., one couldn't guess that *chepu* depicts the sound of a sack of things hitting something).
- The onomatopoeic ideophones, like those below, more directly mimic the sound of what they depict.

- (27) ts'iririr “birdsong”

- (28) tat'umt'um “sound of a drum”

These ideophones are distinct in a variety of ways, though.

- They are not of the CVC root form.
- Even specialized ideophone roots, while not usable as verbs underived, can be explicitly derived into verbal stems with special morphology. In contrast, onomatopoeic ideophone prohibit derivation.
- In this way, onomatopoeic ideophones are outside the grammatar in ways that CVC root ideophones are not.
- While I won't discuss this here, I think they should be handled more like quotative demonstrations instead of ideophonic demonstrations.

Finally, ideophones and verbs share a deep connection—polycategorial ideophone roots are usually also verbs, and derived ideophones are usually derived from verbs.

- Our theory should explain why it is easy to move between verbal meanings and ideophone meanings.

### A Theory of Ideophonic Demonstrations

We have seen that, morphologically, there is a close connection between ideophones and verbs / positionals.

- For this reason, I will be treating ideophone stems, like verbal and positional (stative predicate) stems to be neo-davidsonian predicates of events—e.g.,  $\lambda e[V(e)]$

What this means is that is the restricted distribution of ideophone roots must not be due to semantic considerations, but must be a fact about morphosyntax.

- This is not too troubling. For instance, it seems completely arbitrary which ideophone roots are polycategorial.
- In line with a morphological framework like Distributed Morphology, I propose that there are two  $v$  categories— $v_{tv}$  and  $v_{id}$ —which derive transitive verb stems and ideophone stems respectively.

- (29) a.  $\sqrt{jik'}$  *ideophone / verb root*  
 b.  $\sqrt{tsok'}$  *ideophone root*  
 c.  $\sqrt{k'oj}$  *transitive verb root*

– Polycategorial roots like  $\sqrt{jik'}$  combine equally well with both to produce stems of the appropriate category, where  $v_{tv}$  and  $v_{id}$  are associated in the morphology by the zero-allomorph via Vocabulary Insertion.

- (30) a.  $VI(\sqrt{jik'} \frown v_{tv}) = jik'$   
 b.  $VI(\sqrt{jik'} \frown v_{id}) = jik'$

– Roots like  $\sqrt{tsok'}$ , which cannot be zero-derived into transitive verbs will simply be ineffable with  $v_{tv}$ —VI yields no output.

- (31) a.  $VI(\sqrt{tsok'} \frown v_{tv}) = \emptyset$   
 b.  $VI(\sqrt{tsok'} \frown v_{id}) = tsok'$

– Finally, for transitive verb roots like  $\sqrt{k'oj}$ , which can be explicitly derived into ideophone stems, I assume the VI rule associates  $v_{id}$  with a non-zero exponent.

- (32) a.  $VI(\sqrt{k'oj} \frown v_{tv}) = k'oj$   
 b.  $VI(\sqrt{k'oj} \frown v_{id}) = k'oji$

One might wonder whether deriving a root into an ideophone stem has a semantic effect. The answer is yes, though, it might be not able to be compositionally derived.

- For instance, the positional root *chep*, when derived into a positional stative predicate, denotes events of individuals in a particular physical configuration, while the ideophone stem *chepu* denotes events of sound emission—the sound of being hit by objects in such a configuration.
- Similarly, the transitive verb stem *jik'* denotes events of an agent inhaling a theme, while the ideophone stem *jik'* denotes events of sound emission—the sound of inhaling.
- This is perfectly normal. Expressions derivationally related to the same root often have similar, though not necessarily transparently related meanings—e.g.,  $v$ : *appear*  $\sim$   $n$ : *appearance*  $\sim$   $n$ : *apparition*
- In sum, I'll take ideophone stems—i.e., expressions derived by  $v_{id}$ —to be predicates of events, and usually (though not always) events of sound emission.

The final core aspect of the analysis an operator IDEO-DEMO, which takes ideophone stems and returns an expression that can be used in the basic ideophone construction—a quotative construction.

- i.e., it takes a predicate of events and derives a predicate of demonstrations.

(33)  $IDEO-DEMO \rightsquigarrow \lambda V_{et} \lambda d \lambda e [TH_{\delta}(d) = \ulcorner V \urcorner \wedge \mathbf{struc-sim}_V(d, e)]$

- In this way, it behaves like the operator Q-DEMO in *be like*-quotation that takes a quoted string and derives a predicate demonstrations that involve that string—e.g.,

(34)  $Q-DEMO \rightsquigarrow \lambda u \lambda d \lambda e [TH_{\delta}(d) = u \wedge \mathbf{demo}(d, e)]$

- Instead of a quotational demonstrations, though, IDEO-DEMO operator derives a predicate of ideophone demonstrations—which we saw must be formally distinct due to the fact that quotation has a wider distribution.
- This difference boils down to whether the demonstration and event argument have to stand in the **demo** relation or **struc-sim<sub>V</sub>** relation.

Recall that, following Davidson to appear, the **demo** relation is meant to be radically underspecified, which is meant to mirror the fact that one can use a *be-like*-quotatives to demonstrate a wide variety of events.

- In contrast, the use of ideophones to depict an event is much more constrained.
- Not only can just a subset of verbs form ideophone stems, but the events depicted by means of the ideophone must satisfy the relevant aspects of its lexical content—e.g., using *jik'* means depicting events with an inhaling sound period.



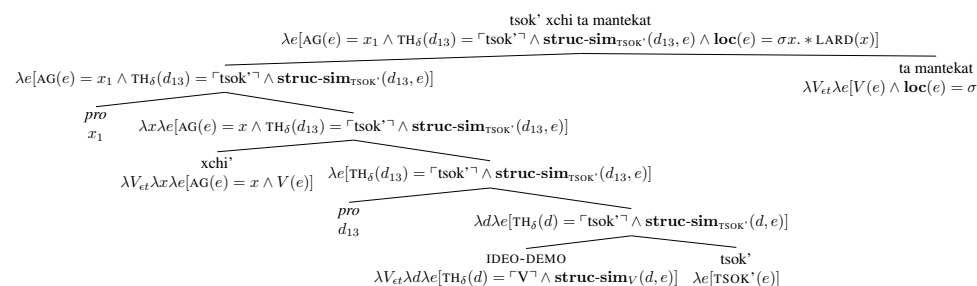
With this in mind, we can unpack  $\text{struc-sim}_V$  as in (35).

(35)  $\text{struc-sim}_V(d, e)$  [see the appendix for complete definition]

“There is a partition of  $e$  satisfying the following conditions: (i) each event in the partition satisfies  $V$ , (ii) the partition has no fewer cells than there are atoms in  $d$ , (iii) there is a one-to-one function between the atomic parts of  $d$  and the events in  $P$  that respect temporal adjacency and the downtime between temporally adjacent events.”

Let’s consider now the structure and interpretation of a sentence like (36).

(36) ... **tsok’** x-chi-Ø ta mantekat  
 IDF:sound.start.to.fry NT-say-B3 P lard  
 ...it goes *tsok’* in the lard (Pérez González 2012, p. 162)



After existential closure of the event argument, we get the following denotation.

(37)  $\exists e[\text{AG}(e) = x_1 \wedge \text{TH}_\delta(d_{13}) = \ulcorner \text{tsok}' \urcorner \wedge \text{struc-sim}_{\text{TSOK}'}(d_{13}, e) \wedge \text{loc}(e) = \sigma x. \text{LARD}(x)]$

This will be true just in case:

- There is an event  $e$  that takes place in the lard whose participant is  $x_1$  (the particular individual will be given by the context / variable assignment).
- The current demonstration event  $d_{13}$  has as its theme the string  $\ulcorner \text{tsok}' \urcorner$
- This demonstration event is structurally similar to  $e$ 
  - This means that (i) there must be a partition of  $e$  of the same cardinality of the demonstration event, here 1 since  $d_{13}$  is atomic; (ii) the elements of the partition (here just  $e$  itself) must be an event of frying sound emission; (iii) there must be a one-to-one function from demonstration events to the partition respecting temporal adjacency and downtime, which is vacuously satisfied by mapping  $d_{13}$  to  $e$  since we have an atomic demonstration.

These are precisely the truth-conditions of (36).

## 5 Demonstration-external pluractionality in Tsetla

With this demonstration-based account of ideophones in hand, we have a handle on how it is that ideophones seem to depict events instead of describing them:

- Essentially, using an ideophone means using the utterance of that ideophone (as a string) to stand for an event that would other satisfy the ideophone (as an event predicate).
- This immediately predicts that we should be able to utter such a string more than once, and in doing do, demonstrate a plurality of events.

We can now begin to examine the rich pluractional semantics of ideophones, which was completely inaccessible before providing the demonstration-based account of ideophones.

- Pérez González 2012, p. 242-243 notes that, in Tsetla, one can totally reduplicate an ideophone to demonstrate a plurality of events.
- Crucially, the manner of reduplication iconically reproduces the temporal properties of the event-plurality.
- This is demonstrated via entailment between kinds of reduplicated ideophones, and kinds of bona fide derived pluractional verbs, which must be event predicates.

(38) ja'-Ø te **kan-kon-Ø**, **kan** [pause] **kan** [pause] **kan**  
 FOC-B3 SUB IDF:sound.wood/drum-C<sub>1</sub>on-B3 IDF [pause] IDF [pause] IDF  
 x-chi-Ø=e  
 NT-say-B3=ENC  
 ‘When it knocks, it goes knock knock knock.’ Pérez González 2012, p. 242

In example (38) the speaker asserts the equivalence of the pluractional description *kan-C<sub>1</sub>on* and the ideophonic depiction *kan* [pause] *kan* [pause] *kan*

- Following the description in Pérez González 2012, I will take the pluractional morpheme *-C<sub>1</sub>on* to derive predicates of events whose minimal parts are all separated by a temporal interval of a fixed, contextually given, length  $n$ .

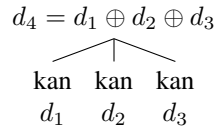
(39)  $C_{1on} \rightsquigarrow \lambda V_{et} \lambda e[\neg \text{atom}(e) \wedge V(e) \wedge \text{linear.order}_n(e)]$   
 “Takes a  $V$  and returns the characteristic function of plural  $V$ -ing events whose atomic parts are linearly ordered in time with a interval of length  $n$  between temporally adjacent atoms.” [see appedix for def of **linear.order<sub>n</sub>**]

What we now need to show is that:

$$kan-C_1on \Leftrightarrow kan [pause] kan [pause] kan$$

“*e* satisfies **kanC<sub>1</sub>on** iff **kan [pause] kan [pause] kan** faithfully demonstrates *e*”

I propose that when a speaker says “*kan [pause] kan [pause] kan xchi*” she makes a plural demonstration—e.g.,



An ideophone demonstration like this would yield the following predicate of events.

$$(40) \quad \lambda e[\text{TH}_\delta(d_4) = \ulcorner kan \urcorner \wedge \mathbf{struc-sim}_{kan}(d_4, e)]$$

An event *e* satisfies (40) just in case:

- the theme of  $d_4$  is the string  $\ulcorner kan \urcorner$ —which I assume is always distributively satisfied, that is, the atomic parts of  $d_4$  have as their theme the string  $\ulcorner kan \urcorner$
- and  $\mathbf{struc-sim}_{kan}(d_4, e)$ 
  - *e* can be partitioned into as many KAN events—i.e., knocking events—as there are atoms in  $d_4$
  - The elements of the partition and atoms in  $d_4$  are similarly structured in time—in particular:
 

“There is a one-to-one mapping from the demonstration events to the knocking events that respects temporal adjacency and downtime.”

We can now ask whether one such an event would satisfy the pluractional predicate *kanC<sub>1</sub>on*:

$$(41) \quad \mathbf{kanC_1on} \rightsquigarrow \lambda e[\neg \mathbf{atom}(e) \wedge \mathbf{KAN}(e) \wedge \mathbf{linear.order}_n(e)]$$

- The first two conditions are immediately satisfied. An event that satisfies (40) must have at least three atomic parts and be a knocking event.
- The third condition also holds, as long as we assume that the length of the pauses between  $d_1$ ,  $d_2$ , and  $d_3$  in the demonstration  $d_4$  are the same as the contextually salient length  $n$  (and it seems natural that the speaker would demonstrate using the contextually relevant interval). The reason is that:
  - events that satisfy (40) are linearly ordered in time because the demonstration event “*kan [pause] kan [pause] kan*” is linearly ordered in time.

- temporally adjacent atomic parts of an event that satisfy (40) must be separated by downtime equivalent to the length of time between demonstrations in the plural demonstration  $d_4$ . If that length of time is  $n$ , then such an event will satisfy the third condition in (41).

Reasoning the same way will allow us to conclude that an event satisfying the pluractional predicate (41) will also satisfy the predicate (40), and thus be properly demonstrated by a plural demonstration of the form “*kan [pause] kan [pause] kan*”.

- The result is that not only does our account capture the truth conditions of plural ideophone demonstrations, which demonstrate plural events with the same temporal structure as the demonstration...
- ...but we also capture a deep connection between pluractionality and ideophones. Just as one can derive a verb root into a pluractional verb stem that denotes a plurality of events, one can take that same root, derive it into an ideophone, and then use it repeatedly to demonstrate the kind of event that would fall in the extension of the pluractional—e.g., (38).

A core aspect of the account is that when using an ideophone multiple times to demonstrate a plural event, the temporal structure of that demonstration matches the temporal structure of the plural event.

- So, for instance, the time between utterances of  $\ulcorner kan \urcorner$  in “*kan [pause] kan [pause] kan*” must be like the time between events of knocking in an event that satisfies *kan-C<sub>1</sub>on*.
- This predicts that changing the downtime between demonstrations in a pluractional demonstration could allow one to demonstrate pluractional events of a different kind.
- This prediction is borne out.

In addition to the *-C<sub>1</sub>on* pluractional, Tselal has a pluractional *-lajan*, that derives predicates of plural events whose minimal parts are not separated in time—or minimally so. The relevant event-pluralities are reported as being “intense”.

$$\begin{array}{l}
 (42) \quad X-k'oj\text{-lajan-}\emptyset \quad a \quad x\text{-koy-}\emptyset \quad ta \quad s\text{-jol} \\
 \text{NT-sound.hitting-lajan-B3 icp ICP=ICP-arrive-B3 P E3-head} \\
 \text{‘It makes a hitting sound in a intense manner on his head.’ (describing a bunch} \\
 \text{balls pouring out of a shelf on someone’s head) Pérez González 2012, p. 219}
 \end{array}$$

As a first pass, I’ll translate *lajan*-marked stems as in (43).

- The idea of a set of intensely ordered events is that it is a linear order of temporally adjacent events, with the possibility of overlapping / contemporaneous events sprinkled in.

- (43)  $[[V-lajan]] = \lambda e[\neg \mathbf{atom}(e) \wedge V(e) \wedge \mathbf{intense.order}(e)]$   
 “The characteristic function of plural *V-ing* events for which a subset of the atomic events in *e*, including an initial and final event in *e*, stand in a linear order with minimal downtime between temporally adjacent events.”  
 [see the appendix for def of **intense.order**]

Returning to the domain of ideophones, we find speakers performing demonstration-external pluractional demonstrations events that must satisfy a *lajan*-marked pluractional predicate.

- Here, though, there is no downtime between each demonstration using the *chak'*.

- (44) ja'-Ø x-**chak'**-lajan-Ø te bay **chak'chak'chak**  
 FOC-B3 NT-IDF:sound.horse.hoofs-lajan-B3 DET where IDF||IDF||IDF  
 x-chi-Ø=e  
 NT-say-B3=ENC  
 ‘It’s the sound of trotting horses when it goes *chak'chak'chak*

Once again, we find speakers volunteering the equivalence of a derived pluractional verb and a particular kind of demonstration via an ideophone—e.g.,

$$chak'-lajan \Leftrightarrow chak'chak'chak'$$

“*e* satisfies **chak'lajan** iff **chak'chak'chak'** faithfully demonstrates *e*”

And once again, this equivalence follows readily from (i) the denotation of pluractional *chak'lajan*...

- (45)  $chak'lajan \rightsquigarrow \lambda e[\neg \mathbf{atom}(e) \wedge \mathbf{CHAK}'(e) \wedge \mathbf{intense.order}(e)]$

...and (ii) the fact that ideophones can be used repeatedly to make a pluractional demonstration:

- (46)  $\lambda e[\mathbf{TH}_\delta(d_8) = \lceil \mathbf{chak}' \rceil \wedge \mathbf{struc-sim}_{chak'}(d_8, e)]$ , where  $d_8 = d_5 \oplus d_6 \oplus d_7$

The predicate in (46) is satisfied by events that stand in the **struc-sim**<sub>*chak'*</sub> relation with  $d_8$ , which is a demonstration event that has three parts, namely three temporally adjacent demonstration events via the utterance of  $\lceil \mathbf{chak}' \rceil$ .

- *e* can be partitioned into at least as many **CHAK'** events—i.e., an event of horse-hoof sound emission—as there are demonstration events
- The elements of the partition and the atoms in  $d_8$  are similarly structured in time—in particular:

“There is a one-to-one function from the atomic parts of  $d_8$  to the demonstrated events that respects adjacency and temporal order.”

The crucial clause is that last one. In this case, there is actually no (or minimal) downtime between utterances of  $\lceil \mathbf{chak}' \rceil$  in the ideophone demonstration.

- This means that (46) can only be satisfied by events whose atomic subparts are linearly ordered and temporally adjacent
- These are exactly the kinds of events in the extension of a *lajan*-marked pluractional predicate like *chak'lajan*.

To summarize, there are a class of verbs roots in Tseltal, like  $\surd chak'$  and  $\surd kan$  that can be zero-derived into either verb stems or ideophone stems.

- This makes it possible for these roots to form the basis of both pluractional verb constructions and pluractional ideophone constructions.
- What we find is that one can take one of these roots and derive it into a semantically equivalent event predicate as either pluractional verb or pluractional ideophone.
- The formal account of ideophones based on demonstration events I develop here is predicts this close connection between ideophones and pluractionals, and immediately accounts for the observed entailments.
  - Demonstrations, which mediate the iconic link between the ideophone and the depicted event, are merely events themselves. As such, they have temporal structure.
  - Moreover, in this theory, a demonstration via an ideophone root is supposed to “stand for” an event satisfying the event-predicate underlying the ideophone.
  - Therefore, it makes sense that one could make a plurality of demonstrations to depict a plurality of events, and the temporal structure of the plurality of demonstrations, which it inherently has, would then have to match the temporal structure of the depicted event plurality.
- We see this pattern in the total reduplication of ideophones in Tseltal. The temporal structure of plural demonstrations mimics conventionalized pluractionality.

### Interlude on Composition

The account makes one final correct prediction concerning ideophone-mixing and pluractional demonstrations.

- Under this theory, to perform a pluractional demonstration, one first applies a verb—an expression of type  $\epsilon t$ —to the ideophonic demonstration operator, and then a plural demonstration event.

$$(47) \quad \text{IDEO-DEMO} \rightsquigarrow \lambda V_{\epsilon t} \lambda d \lambda e [\text{TH}_\delta(d) = \ulcorner V \urcorner \wedge \text{struc-sim}_V(d, e)]$$

- Such a demonstration will have to satisfy the following condition, which will hold just in case the current demonstration event involves  $n$  utterances of  $\ulcorner \text{verb} \urcorner$ , which was supplied compositionally.

$$(48) \quad \text{TH}_\delta(d_1 \oplus \dots \oplus d_n) = \ulcorner \text{verb} \urcorner$$

- This means that one should not be able to make a pluractional demonstration with a variety of ideophone stems.
- This is the case. One cannot mix stems to make a pluractional demonstration in (49).

$$(49) \quad \begin{array}{l} \mathbf{kan} \text{ [pause] } \mathbf{chak'} \text{ [pause] } \mathbf{kan} \text{ x-chi-}\emptyset=e \\ \text{IDF [pause] IDF [pause] IDF NT-say-B3} \\ \text{'It goes kan chak' kan.'} \end{array} \quad (\text{Jaime Pérez Gonzalez, p.c.})$$

- This is predicted if pluractional demonstrations are compositionally derived from an ideophone stem. Once saturated, such an expression can only characterize demonstration events in which that same stem is uttered multiple times.

Of course, this raises the question of why, in English, (50) doesn't seem so bad.

$$(50) \quad \text{It went bang boom bang.}$$

This would be possible if English allows null conjunction of (partially) saturated IDEO-DEMO functions, while Tzeltal does not. Developing tests to confirm this possibility, and understanding the source of this difference must wait for future work.

## 6 Upper Necaxa Totonac: Demonstration-internal pluractionality

In the previous section I extended the analysis of *be like*-quotation in Davidson to appear to the ideophone domain, and then illustrated how this account deftly handles that fact that one can repeatedly use an ideophone to depict a plural event, which I dubbed *demonstration-external pluractionality*.

- In this section I will show that languages with rich ideophone systems can have other types of pluractional ideophone constructions.
- In particular, I am interested in cases where there is dedicated derivational morphology to create ideophones that only depict plural events.
- That is, an atomic demonstration using one of these derived ideophone will necessarily depict a plural event.
- I will call this kind of pluractionality—where a single demonstration depicts a plural event—*demonstration-internal pluractionality*, in contrast to *demonstration-external pluractionality*—where a plural demonstration depicts a plural event.

First, note that UNT has demonstration-external pluractionality. One finds pairs of sentences where demonstrating using the ideophone more than once means demonstrating a plural event.

$$(51) \quad \begin{array}{l} \text{Upper Necaxa Totonac} \\ \text{a. } \mathbf{patf} \quad \quad \quad \text{maka-wán} \\ \text{IDF:sound.small.stone.fall hand-say} \\ \text{'The pebble falls } \mathbf{patf} \text{'} \end{array} \quad \text{Beck 2008, ex. 16a}$$

$$\begin{array}{l} \text{b. } \mathbf{patf-patf} \quad \quad \quad \text{ta-maka-wán} \\ \text{IDF:sound.small.stone.fall-RED 3PL.SUBJ-hand-say} \\ \text{'The pebbles fall } \mathbf{patfpatf} \text{'} \end{array} \quad \text{Beck 2008, ex. 16b}$$

$$(52) \quad \begin{array}{l} \text{Upper Necaxa Totonac} \\ \text{a. } \mathbf{te:t} \quad \quad \quad \text{ik-ta-wi:t} \quad \quad \quad \text{ka:s'ewi:wj} \text{ antsá} \\ \text{IDF:sound.hit.ground 1SG.SUBJ-INCH-sit PLC-cool here} \\ \text{'Te:t I plopped myself down here where it's cool.'} \end{array} \quad \text{Beck 2008, ex. 15a}$$

$$\begin{array}{l} \text{b. } \text{mat } \mathbf{te:t-te:t} \quad \quad \quad \text{li:ta:ti:tá:} \quad \quad \quad \text{tsamá: misín} \\ \text{QTV IDF:sound.hit.ground-RED bounce.on.bottom this jaguar} \\ \text{'the jaguar bounced around on its rear end'} \end{array} \quad \text{Beck 2008, ex. 15b}$$

In addition to this, though, UNT has a second way to form ideophones that depict pluractional events, namely through final -CV reduplication (usually once—with a possible copy-vowel from the root—but possibly more).

(53) **xalalala**                      maka-wan tʃiwíʃ  
 IDF:sound.hot.stone.crackle hand-say stone  
 ‘The stones went **xalalala** (crackling with heat).’                      Beck 2008, ex. 18a

(54) **tsanana**                      kin-ǵ’a-wán tafkát  
 IDF:sound.buzzing IOBJ-eat-say wild.bee  
 ‘The bee went **tsanana** in my ear.’                      Beck 2008, ex. 18b

Example (55-c) presents a few pairs of ideophone that illustrate a semantic difference between -CV reduplicated ideophones and their plain or completely reduplicated counterparts.

- In all cases we have pluractional semantics, but...
- -CV reduplicated ideophones appear to depict events whose repetitions comes more rapidly are are “minimized” relative to their non-CV-reduplicated counterparts.

(55) a. lam ‘fire flaring up’  
       lamama ‘coals glowing red’  
 b. kuʃkuʃ ‘kocking on something’  
       kuʃuʃu ‘tapping quickly on something’  
 c. tefetefe ‘(sound) water coming out in bursts’  
       tefeʃe ‘(sound) water rushing out of a pipe’                      Beck 2008, p. 14

One natural idea would be to treat -CV reduplication as essentially iconic.

- Recall that in Tseltal we accounted for the difference between ideophones that demonstrate *C<sub>1</sub>on*-type pluractional events and *lajan*-type pluractional events in a purely iconic fashion—the plurality of demonstration events were completely temporally adjacent in the latter case, but not in the former.
- Perhaps in UNT, each -CV reduplicant would correspond to its own demonstration of an event satisfying the ideophone’s event-predicate.
- The reason why CV-reduplicated ideophones in UNT would depict events with rapid repetitions and “minimized” events is that, in virtue of being affixal, these -CV reduplicants are necessarily temporally adjacent and “smaller” than the root itself.

The primary problem with such an analysis is that the semantic effect of -CV reduplication in UNT ideophones is clearly conventionalized in ways that it is not in Tseltal.

- In Tseltal, one can always predict the meaning of a reduplicated ideophone from the meaning of the ideophone root. Reduplicating the ideophone always means depicting a plurality of events of the kind a non-reduplicated ideophone would depict.
- In UNT, though, one finds a large numbers of CV-reduplicated ideophones that seem to have no transparent semantic relationship to ideophones that share the same root.

(56) a. *xalaxala* ‘a wheelbarrow jolting its load as it rolls along’  
 b. *xalala* ‘red-hot rocks crackling from heat’

(57) a. *xilixili* ‘horse galloping and rearing’  
 b. *xilili* ‘roaring (plane, rushing water, thunder)’

(58) a. *yanayana* ‘flies buzzing around’  
 b. *yanana* ‘water boiling in a pot’

These facts rule out a purely iconic account.

- That is, we don’t want to say that there is an ideophone root *xala* that can be reduplicated in two ways to iconically represent the way an event unfolds since -CV reduplication can have arbitrary, non-iconic semantic effects.
- Instead, we want to treat -CV reduplication as derivational, which has a partially uniform semantic effect (i.e., pluractionality), but is also sometimes idiosyncratic, as the semantic effect of derivation sometimes is.

That is, just like one finds an overt instantiation of a morpheme *v<sub>id</sub>* that derives ideophone stems in Tseltal (e.g., derived ideophones like in (21) and (21) above), Upper Necaxa Totonac would have an ideophone derivation whose phonological reflex is -CV reduplication.

- But, instead of returning a simple event predicate that can be used in an ideophone demonstration (as we see in Tseltal)
- The -CV derivation derives an ideophone stem that is a predicate of pluractional events.

(59)  $CV_{vid} \rightsquigarrow \lambda V_{et} \lambda e[(\mathbf{plrc}(V))(e)]$

- I’m not actually going to provide a semantics for the pluractional. I don’t have enough data to do this correctly. That said, from the examples I have, this looks like an event-internal pluractional (see Wood 2007; Henderson to appear).

- The two core points are that:
  - $V \smallfrown CV_{vid}$  is an ideophone stem that denotes a predicate that can only be satisfied by events with a plural character.
  - Though we always get an event predicate, we expect sometimes ideosyncratic semantic effects of -CV derivation because this is common to derivational morphology more generally.

Now when we use a pluractional ideophone stem like *xalala* to make an atomic ideophone demonstration  $d_{10}$ , we get the following truth conditions.

$$(60) \quad \lambda e[\text{TH}_\delta(d_{10}) = \ulcorner xalala \urcorner \wedge \mathbf{struc-sim}_{XALALA}(d_{10}, e)]$$

Which is satisfied by an event  $e$  if  $d_{10}$  is a demonstration by uttering  $\ulcorner xalala \urcorner$  and  $d_{10}$  is an ideophone demonstration of  $e$ , namely:

- $e$  can be partitioned into XALALA events—i.e., pluractional event of hot stones crackling
- There are at many events this partition there are in the demonstration, i.e., we'll have one XALALA event, which is an event with plural character (stones crackling with heat)
- The elements of partition are structure in time like demonstration event (in terms of temporal adjacency and downtime), which is vacuously satisfied here since we have an atomic demonstration.

The result is that even when the speaker makes a single demonstration by uttering  $\ulcorner xalala \urcorner$  she will be demonstrating an event of plural character. Unlike other ideophones, there is just no way to demonstrate singular events with a -CV derived ideophone stem.

- This is different from what we saw in Tseltal where the same ideophone stem was uttered multiple times to demonstrate a pluractional event and once to demonstrate an even of singular character.
- It is precisely this contrast that distinguishes demonstration-internal and demonstration-external pluractionality.

#### Mini-summary:

Upper Necaxa Totonac has a variety of pluractional ideophone constructions.

- It has, like Tseltal, demonstration-external pluractional ideophones, where one makes a plurality of demonstrations by uttering an ideophone stem repeatedly in order to demonstrate a plurality of events.

- Additionally, it has derivational morphology that creates ideophone stems that can only be used to demonstrate a plurality of events, which is what I call demonstration-internal pluractionality.

#### Interlude on Clausal Composition

This account of (pluractional) ideophones in UNT makes an additional correct empirical prediction about the distribution of ideophones.

- Like in Tseltal, UNT ideophones can occur in quotative environments—e.g., as complements to predicates like *wán* ‘say’.
- But, as Beck 2008 convincingly shows, ideophones in UNT can be used adverbially as in (61).

$$(61) \quad \text{mat } \mathbf{te:t-te:t} \quad \text{li:ta:ti:tá:} \quad \text{tsamá: misín}$$

QTV IDF:sound.hit.ground-RED bounce.on.bottom this jaguar

‘the jaguar bounced around on its rear end’ Beck 2008, ex. 15b

If we take the quotative particle *mat*, like *like* in English, to saturate the demonstration argument, the result will be a predicate of events that can compose via conjunction, just like other adverbial modifiers.

$$(62) \quad (61) \rightsquigarrow \exists e[\text{th}_\delta(d_n \oplus d_{n+1}) = \ulcorner \mathbf{te:t-te:t} \urcorner \wedge \mathbf{struc-sim}_{\text{TE:L}}(d_n \oplus d_{n+1}, e) \wedge \text{BOUNCE.BOTTOM}(e) \wedge \text{ag}(e) = \sigma x. * \text{JAGUAR}(x)]$$

- That is, (61) is true, just in case there is an event  $e$  that is an event of bouncing on one's bottom, the agent of  $e$  is the jaguar, and the pluractional demonstration  $\mathbf{te:t-te:t}$  is an ideophonic demonstration of  $e$ —here a demonstration-external pluractional derivation.

The event-based account of ideophones once again smoothly accounts for the compositional properties of ideophones as well their truth-conditional effect.

## 7 Conclusion

This project has two goals:

- To motivate a compositional semantics of ideophones that respects their iconic character while relating their meaning to more familiar, non-iconic semantic phenomena.
  - In line with the first goal, I have shown that the core properties of ideophones can be treated in a demonstration-based framework first developed to account for *be like*-quotation and iconic phenomena in sign languages (Davidson to appear).

- In line with the second goal, I have shown that this semantics allows us to diagnose two kinds of ideophonic pluractionality, and whose account closely tracks previous work on pluractionality
- That is, pluractionality involves plural event reference and ideophone pluractionality involves:
  - \* plural demonstrations (which are themselves simply plural events)
  - \* derived ideophones that are simultaneously pluractional stems, and so can only be used to demonstrate events with a plural character

Where now?

- There is a large literature on varieties of pluractionality. Do we find all the same kinds of plural event reference we see in the event domain in the demonstration domain—e.g., do we find event-external pluractional ideophone derivations to complement the seemingly event-internal pluractional ideophone derivation in Upper Necaxa Totonac?
  - My account of the two kinds of ideophone pluractionality is based on the idea that languages have a variety of ways of (compositionally) using ideophones to depict plural events.
    - Beyond plurality, what other kinds of event structure can ideophones (compositionally) target?
    - One exciting possible answer is durativity. Alto Perené (Arawak) has a ideophone-deriving affix -(V)k which derives ideophones that characterize punctual (non-durative) events (Mihas 2012).
- (63)
- a. kori ‘gulp’ / korik ‘take a gulp’
  - b. tsapo ‘pour (liquid)’ / tsapok ‘splash (liquid) once’
  - c. cheki ‘cut’ / chekik ‘make a cut’
- It seems like we want to say that -(V)k syntactically derives an ideophone stem and semantically derives a predicate of punctual events, and thus can only be used in the language’s ideophone construction(s) to depict events with that particular structure.

Finally, it would be interesting to compare the behavior of ideophones, and pluractional ideophones in particular to iconic representations of plural events in sign languages, e.g. Kuhn and Aristodemo 2015.

## References

- Akita, Kimi (2009). “A grammar of sound-symbolic words in Japanese: theoretical approaches to iconic and lexical properties of Japanese mimetics”. PhD thesis. Kobe University.
- Asher, Nicholas (2011). *Lexical meaning in context: A web of words*. Cambridge University Press.
- Beck, David (2008). “Ideophones, Adverbs, and Predicate Qualification in Upper Necaxa Totonac”. In: *International Journal of American Linguistics* 74.1, pp. 1–46.
- Clark, Herbert H and Richard J Gerrig (1990). “Quotations as demonstrations”. In: *Language*, pp. 764–805.
- Cusic, David (1981). “Verbal plurality and aspect”. PhD thesis. Stanford University.
- Davidson, Kathryn (to appear). “Quotation, Demonstration, and Iconicity”. In: *Linguistics and Philosophy* tba, tba–tba.
- Davies, Mark (2008). *COCA. Corpus of Contemporary American English*.
- Dingemanse, Mark (2011). “The meaning and use of ideophones in Siwu”. PhD thesis. Radboud University.
- (2012). “Advances in the cross-linguistic study of ideophones”. In: *Language and Linguistics Compass* 6/10, pp. 654–672.
- Eckardt, Regine (2012). “Hereby explained: an event-based account of performative utterances”. In: *Linguistics and philosophy* 35.1, pp. 21–55.
- Henderson, Robert (2012). “Ways of pluralizing events”. PhD thesis. University of California, Santa Cruz.
- (to appear). “Swarms: Spatiotemporal grouping across domains”. In: *Natural Language & Linguistic Theory*.
- Hofherr, Patricia Cabredo and Brenda Laca (2012). *Verbal plurality and distributivity*. Vol. 546. Walter de Gruyter.
- Kilian-Hatz, Christa (1999). “Ideophone: Eine typologische Untersuchung unter besonderer Berücksichtigung afrikanischer Sprachen”. Habilitation. University of Cologne.
- Kita, Sotaro (1997). “Two-dimensional semantic analysis of Japanese mimetics”. In: *Linguistics* 35, pp. 379–415.
- Kuhn, Jeremy and Valentina Aristodemo (2015). “Iconicity in the grammar: pluractionality in French Sign Language”. In: *Sinn und Bedeutung*. Vol. 20.
- Mihas, Elena I. (2012). “Ideophones in Alto Perené (Arawak) from Eastern Peru”. In: *Studies in Language* 36.2, pp. 300–344.
- Müller, A. and L. Sanchez-Mendes (2007). “The meaning of pluractionality in Kari-tiana”. In: *Proceedings of SULA* 4, pp. 1–17.
- Newman, Paul (1990). *Nominal and verbal plurality in Chadic*. Dordrecht: Foris.
- Nuckolls, Janis B (1995). “Quechua texts of perception”. In: *Semiotica* 103(1/2), pp. 145–169.

- Pérez González, Jaime (2012). “Predicados expresivos e ideófonos en tseltal”. MA thesis. El Centro de Investigaciones y Estudios Superiores en Antropología Social.
- Potts, Christopher (2007). “The dimensions of quotation”. In: *Direct compositionality*, pp. 405–431.
- Retoré, Christian (2014). “The Montagovian Generative Lexicon Lambda  $\Lambda TY_n$ : a Type Theoretical Framework for Natural Language Semantics”. In: *19th International Conference on Types for Proofs and Programs (TYPES 2013)*. Vol. 26, pp. 202–229.
- Rimer, J Thomas, Mitsuya Mori, and M Cody Poulton (2014). *The Columbia Anthology of Modern Japanese Drama*. Columbia University Press.
- Wood, Esther Jane (2007). “The semantic typology of pluractionality”. PhD thesis. University of California Berkeley.

## A Definitions / Abbreviations

For some of the definitions below it’s useful to have the following functions: (i) a measure-function **len** from times to natural numbers representing their lengths, (ii) **init** and **fin** which map an event  $e$  to the earliest and latest times in its runtime, respectively, and (iii) **first** and **last** which map a set of events  $E$  to a set with the first and last event(s) in  $E$ , respectively. (We can get non-singleton sets because events can be simultaneous.)

- (64) **atoms**( $x$ ) :=  $\{x' \mid x' \leq x \wedge \mathbf{atom}(x')\}$   
‘The set of atomic parts of  $x$ ’
- (65)  $O(x, y)$  iff  $\exists z[z \leq x \wedge x \leq y]$   
‘Two entities overlap just in case they share a part.’
- (66) **adjacent** $_X(e, e')$  iff  
a.  $\neg O(e, e')$   
b.  $\neg \exists e'' \in X[\mathbf{fin}(e) \prec e'' \prec \mathbf{init}(e') \vee \mathbf{fin}(e') \prec e'' \prec \mathbf{init}(e)]$
- (67) **linear-order**( $E$ ) iff  $\forall e', e'' \in E[e' \neq e'' \rightarrow \neg O(\tau(e'), \tau(e''))]$   
‘ $E$  is linearly ordered set of events just in case none of its (distinct) members have overlapping runtimes.’
- (68) **linear-order**( $e$ ) iff **linear-order**(**atoms**( $e$ ))  
‘ $e$  is linearly ordered just in case none of its (distinct) atomic parts have overlapping runtimes.’
- (69) **downtime**( $e, e', t$ ) iff  
a.  $\neg O(e, e')$   
b.  $t = \bigoplus \{t \in D_\tau \mid \mathbf{fin}(e) \prec e'' \prec \mathbf{init}(e') \vee \mathbf{fin}(e') \prec e'' \prec \mathbf{init}(e)\}$   
‘ $t$  is the contiguous temporal interval between  $e$  and  $e'$ .’
- (70) **linear-order** $_n(e)$  iff

- a. **linear-order**( $e$ )  
b.  $\forall e', e'' \in \mathbf{atoms}(e)[\mathbf{adjacent}(e', e'') \rightarrow \exists t[\mathbf{len}(t) = n \wedge \mathbf{downtime}(e', e'', t)]]$   
‘ $e$  is linearly ordered and adjacent elements in the order are separated by an interval of length  $n$ ’
- (71) **intense-order**( $E$ ) iff there is an  $E' \subseteq E$  such that  
a.  $\exists e[e \in \mathbf{first}(E) \wedge e \in E']$   
b.  $\exists e[e \in \mathbf{last}(E) \wedge e \in E']$   
c. **linear-order** $_n(E')$  where  $n$  is small
- (72) **intense-order**( $e$ ) iff **intense-order**(**atoms**( $e$ ))
- (73) **partition**( $P, x$ ) iff  
a.  $\bigoplus P = x$   
b.  $\forall x(x \in P \rightarrow \neg \exists y(y \in P \wedge O(x, y)))$   
‘ $P$  partitions  $x$  iff the elements of  $P$  sum to  $x$  and no elements of  $P$  overlap.’
- (74) **struc-sim** $_V(d, e)$  iff there is a partition  $P$  meeting the following conditions:  
a. **partition**( $P, e$ )  
b.  $\exists e' \leq e[\mathbf{atom}(e) \wedge V(e')] \rightarrow P = \mathbf{atoms}(e)$   
c.  $\forall e' \in P[V(e')]$   
d.  $|\mathbf{atoms}(d)| \leq |P|$   
e. There is a one-to-one function  $f$  from **atoms**( $d$ ) to  $P$  such that:  
(i) **adjacent**( $d', d''$ )  $\rightarrow$  **adjacent**( $f(d'), f(d'')$ )  
(ii) **downtime**( $d', d'', t$ )  $\rightarrow \exists t'[\mathbf{downtime}(f(d'), f(d''), t') \wedge \mathbf{len}(t) = \mathbf{len}(t')]$