

Counting pieces of stuff in Tzeltal Maya

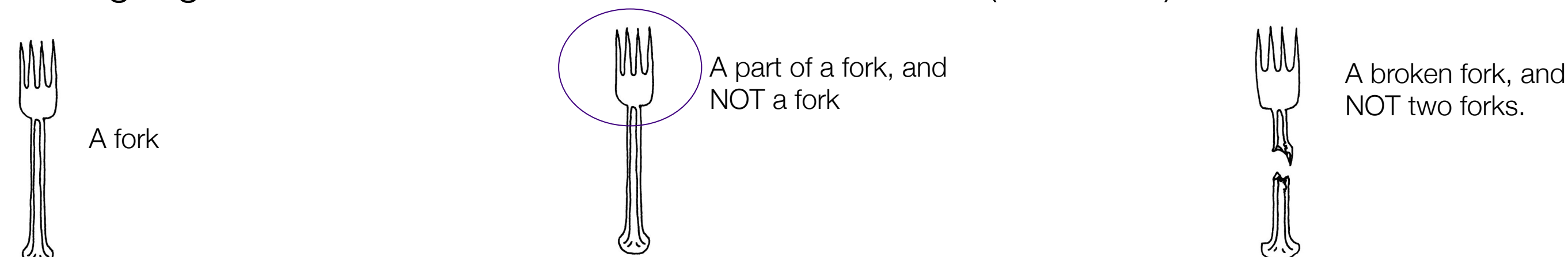
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What do nouns refer to in Tzeltal?

Background

“Sortal concepts enable us to enumerate and to track identity over time, and they are lexicalized as count nouns in languages that make the count-mass distinction.” (Xu, 1996).



Not all languages have count vs. mass nouns. Universally, nouns name kinds. Some name sortals (e.g., objects), and others non-sortals (e.g., substances).

Do object-denoting nouns provide criteria of individuation? Given cross-linguistic variations, is the answer to this question different crosslinguistically?

Hypotheses

- Object-denoting nouns provide criteria of individuation by virtue that sortal concepts provide criteria of individuation (Xu, 1996).
- In languages without count vs. mass nouns, object-denoting and substance-denoting nouns all refer to unindividuated essences: “Yucatec nouns, lacking such a specification of unit, simply refer to the substance or material composition of an object” (Lucy, 1992; p. 89).
- Although we may know what constitute an individual of that kind that is named by the noun, the noun itself does not provide criteria of individuation (Srinivasan et al., 2013).

TSELTAL MAYA

- Classifier language
- Numeral object classifiers apply to nouns on the basis of shape, material, animacy, & configuration



ox-p'ej ton
3-CL:chunk rock
'three rocks'



ox-busj ton
3-CL:pile rock
'three piles of rocks'



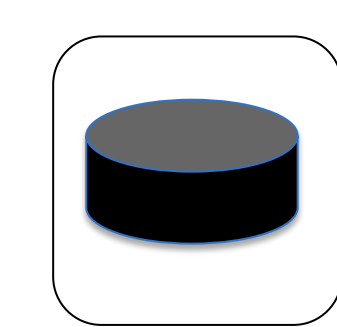
Experiment 1: Novel Entity Construal

How do Tzeltal speakers extend novel nouns? All by substance (H2), or by object for canonical objects and substance for canonical substances (H1 & H3)?

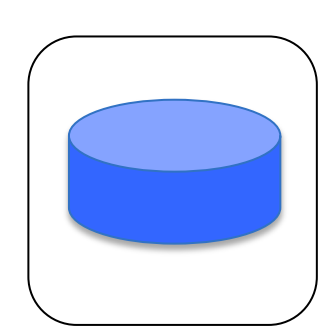
PARTICIPANTS 33 native Tzeltal-speakers (28 women, ages 18 – 59)

STIMULI Twelve novel entities, four from each of three categories:
Complex, Simple, Non-Solid Substances (Li et al., 2009)

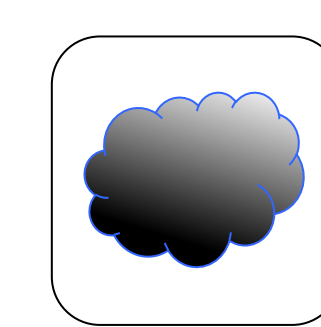
WORD EXTENSION



Standard



Shape-Match



Material-Match

k'abu bel ts'i nin
look-IMP DIR DET nin
'Look at the nin.'

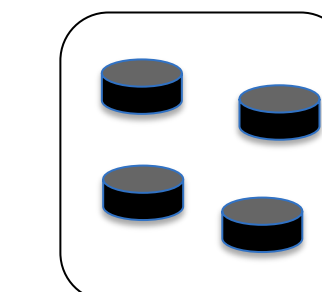
ba jun-uk ts'i nin?
which one-IRR DET nin
'Which one is the nin?'

- Subjects extended nouns referring to Complex entities on the basis of shape, and Non-Solid-Substances on the basis of material ($p < 0.001$).

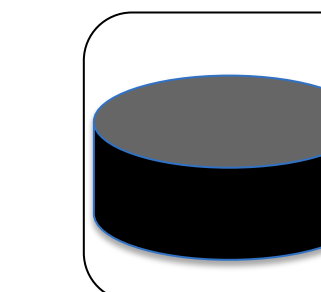
QUANTITY JUDGMENT

potential encoding of count/mass in quantifiers bayal and uts

banti bayal/uts ts'i nin?
where a-lot DET nin
'Who has more nin?'



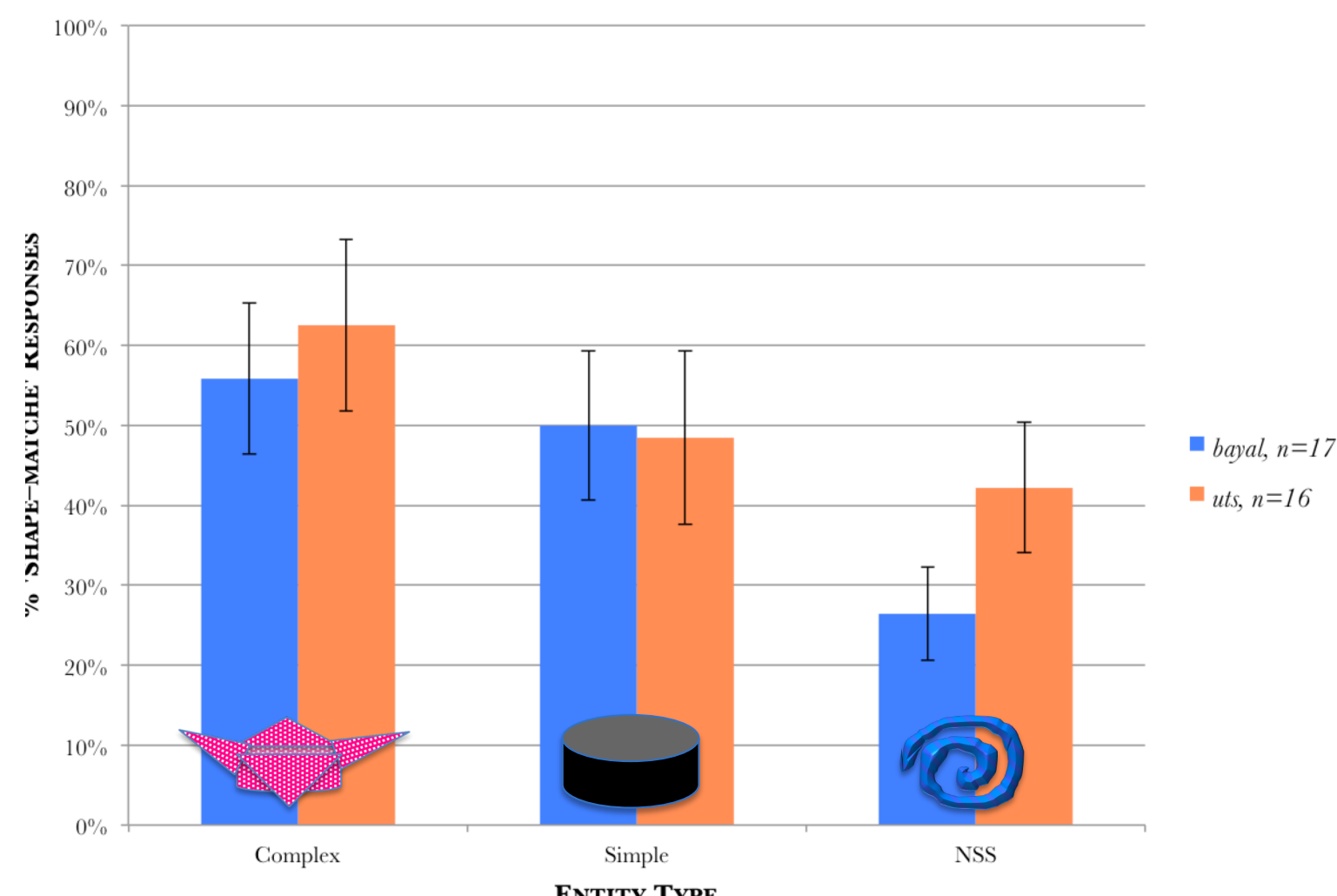
Number-More



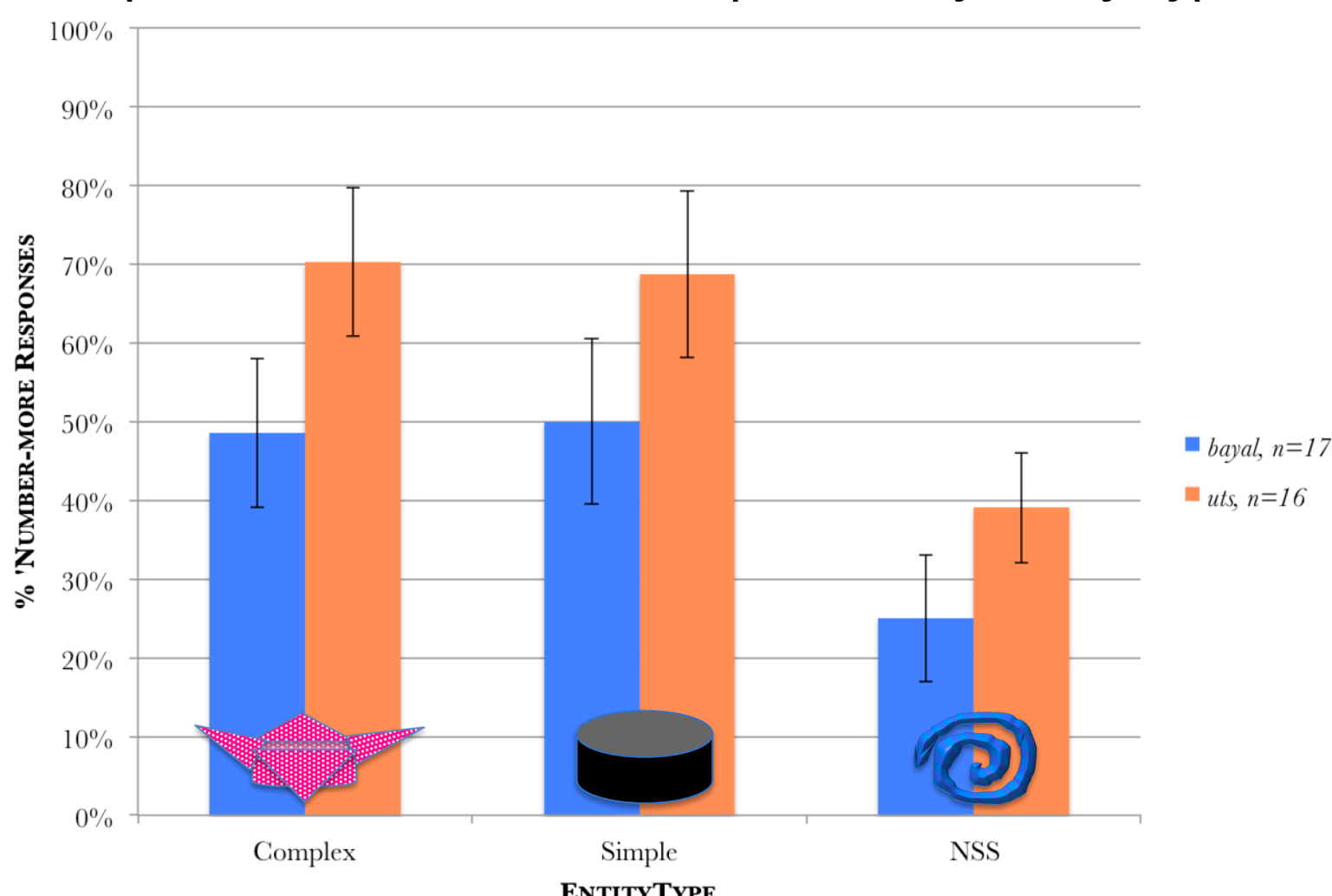
Volume-More

- Subjects systematically quantified Complex entities by number, and Non-Solid-Substances by volume ($p = 0.001$).

Proportion Shape-Match responses by Entity Type



Proportion Number-More responses by Entity Type



Exp. 2: Familiar Noun Quantity Judgment

Do Tzeltal speakers quantify by number for known object-denoting nouns and by substance for known substance-denoting nouns (H1 & H3) or do they not distinguish object- and substance-denoting nouns (H2)?

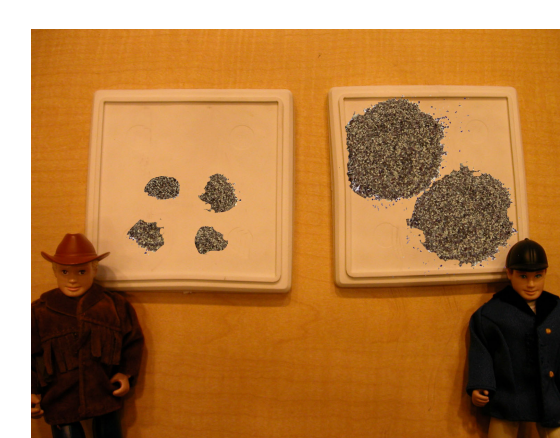
PARTICIPANTS 23 native Tzeltal-speakers
(17 women, ages 17 – 51)

STIMULI 16 entities typed as 'count-like' or 'mass-like,' presented in blocks, with order counterbalanced across participants

banti bayal ts'i tan?
where a-lot DET ash
'Who has more ash?'



Count-like Quantity Judgment: tepil (gourd)



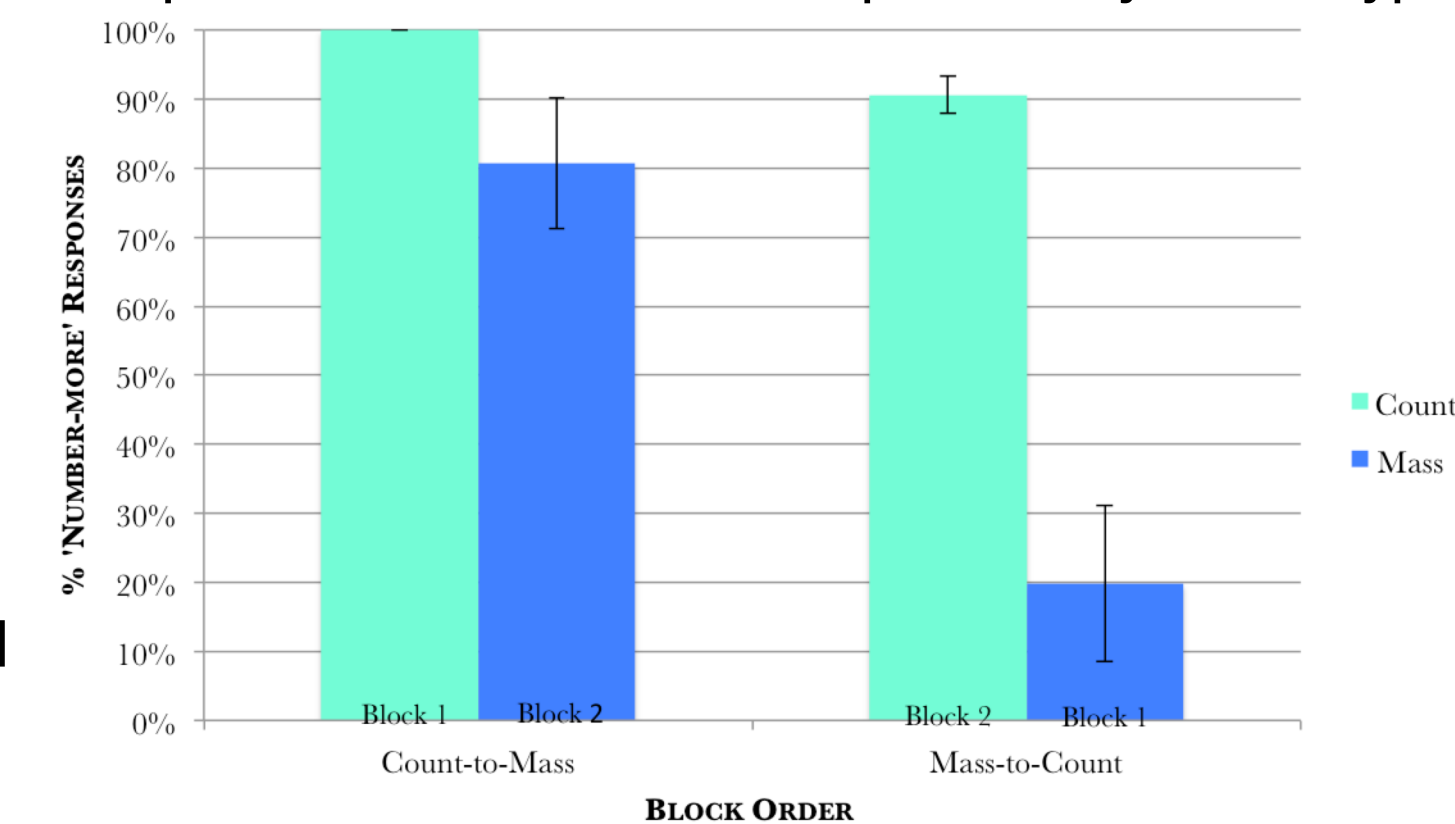
Mass-like Quantity Judgment: tan (ash)

- Participants judged quantity by number more for Count-like nouns than for Mass-like nouns (90% vs. 55%, $p < 0.001$).

- The type of noun participants judged first influenced how they judged the second type (interaction between Noun Type & Order, $p < 0.001$).

Presentation Method	Count	Mass
Physical	boch bowl	juchbil ich chile powder
	xampixol hat	ch'ab' honey
	jach'ubil comb	ach'al dirt
	tepil shoe	ch'ich blood
Photo	balti bucket	xepu fat
	akuxa needle	atsam salt
	ts'uj guord	tan ash
	echa axe	yalel broth

Proportion Number-More responses by Noun Type

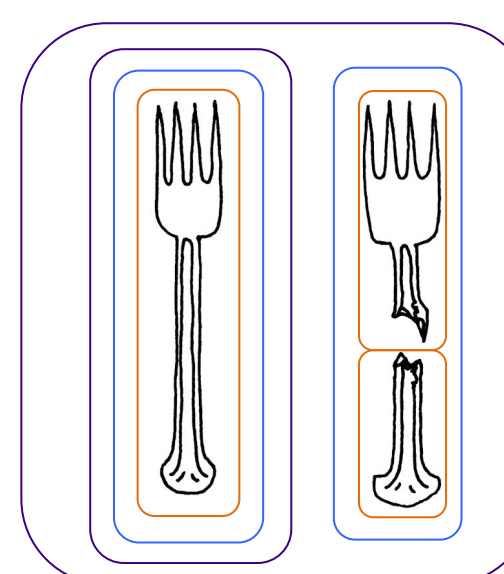


Experiment 3: Broken Objects

How do Tzeltal speakers count broken objects? Do they count pieces as individuals (H3) or do they only count whole objects as individuals (H1)? Do classifiers serve to explicitly provide criteria of individuation?

COUNTING BROKEN OBJECTS

PARTICIPANTS 34 native Tzeltal-speakers (20 women ages 19 – 60)



Jay-eb me tuts-e?
INT-CL:GEN DET fork-DET
'How many forks?'

Jay-k'ajs me tuts-e?
INT-CL:BRO DET fork-DET
'How many broken forks?'

Classifier in prompt	1 (jun)	2 (cheb)	3 (oxeb)
Generic	7%	69%	24%*
Broken	0%	100%	0%

* 0% of English-speaking adults count such an array "three"

CRITERIAL CLASSIFIERS

PARTICIPANTS 5 native Tzeltal-speakers (4 women, ages 18 – 52)

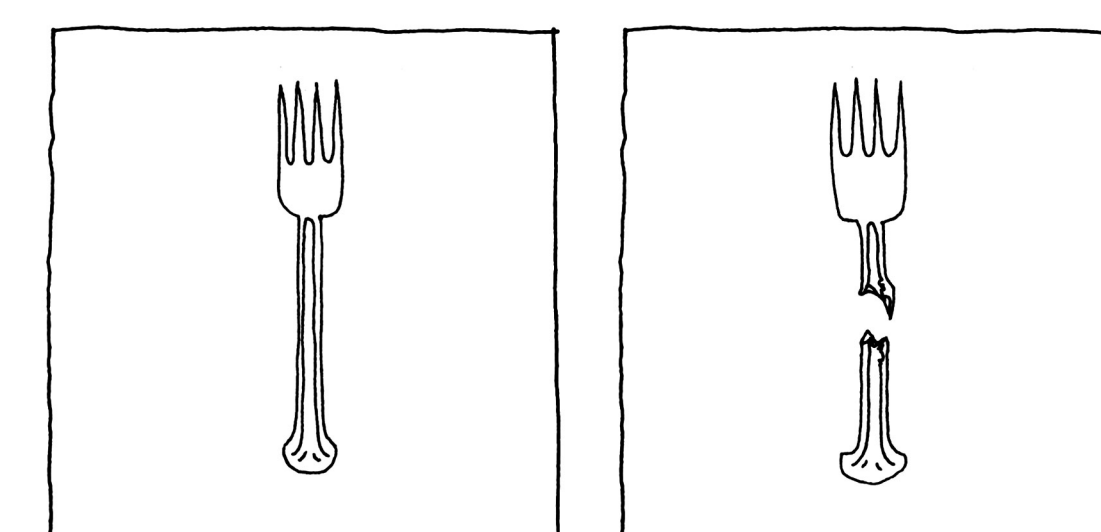
STIMULI Eight cards with quadrants depicting the same item in four states of brokenness: whole (a), halved (b), and one piece

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met the criteria imposed by a temporary classifier ((c); e.g., the pronged half of a fork) and another that did not (d).

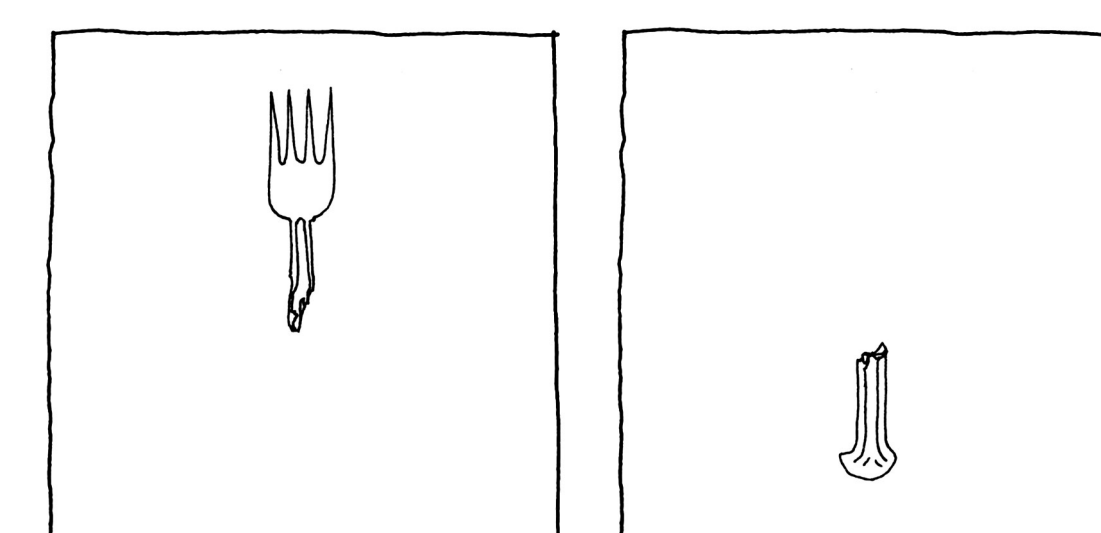
METHOD

Participants answered yes/no to the question, "Is this one-CL NOUN?" for each quadrant on each card for each classifier category, resulting in four blocks of 32 trials each. Block order was counterbalanced across participants.



(a) tuts: WHOLE

(b) tuts: BROKEN



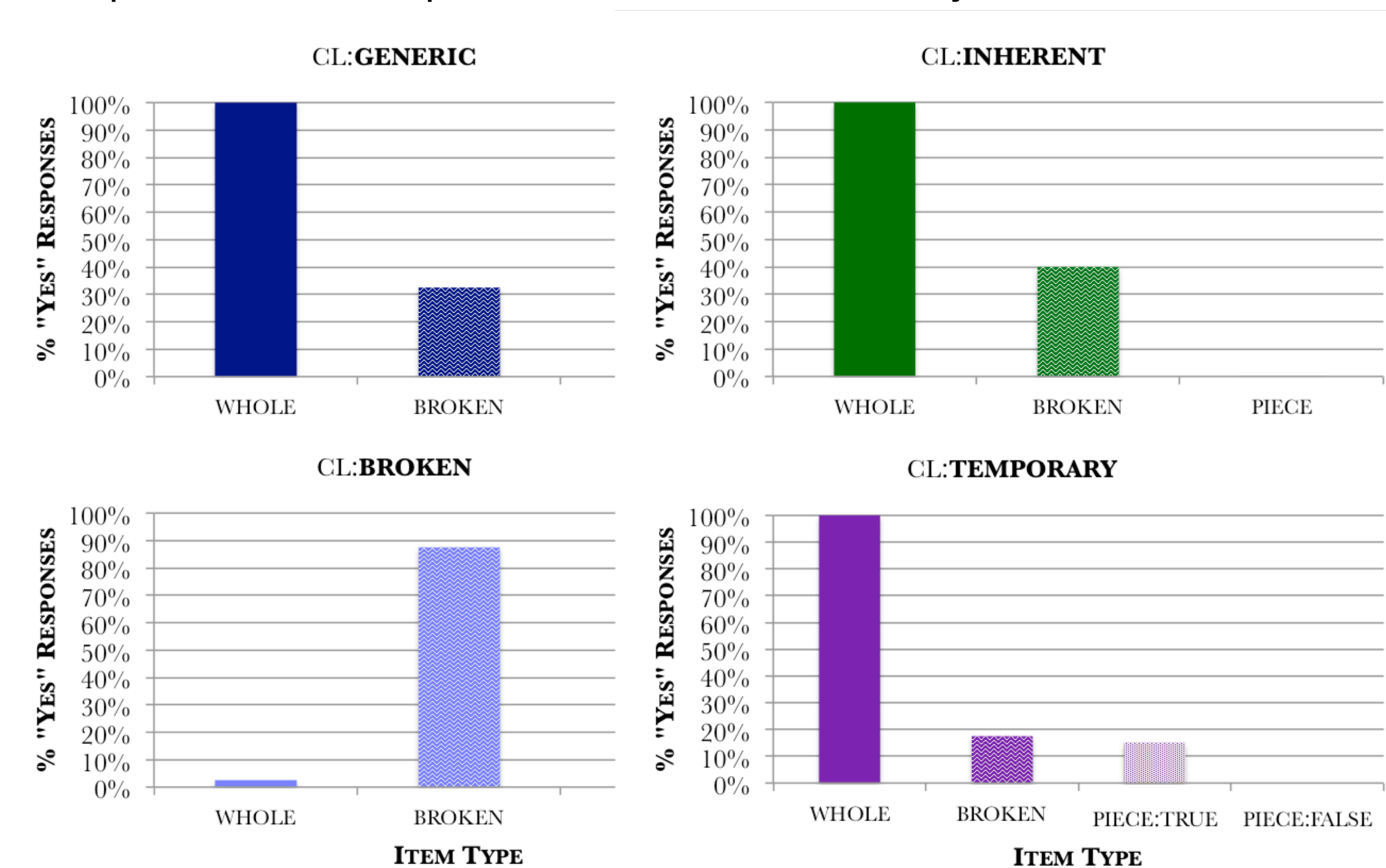
(c) tuts: PIECE:TRUE

(d) tuts: PIECE:FALSE

Jun/ch'ijx/xal/k'ajs wa'an me tuts-e?
1-CL DET fork-DET
'Is this one fork?'

Object	Noun	Classifiers			Meaning (CL:TEMP)
		INHERENT	BROKEN	TEMP.	
fork	tuts	ch'ijx	kajs	xal	single pronged
jar	p'in	chojt	xojt	pajch	full of food
rope	laso	lijj	xojt	poj	knotted
bag	chajak	lijj	xojt	jijp	hanging
shirt	k'ui'il	lijj	xojt	lim	laying flat
tortilla	waj	p'ejch	xejt'	sejp	circular, flexible
wire	chajan tak'in	ch'ijx	k'ajs	pujch	bent upward
rock	ton	p'ej	jejp	wol	spherical

Proportion "Yes" Responses to Critical Question by Classifier and Referent



- Speakers restricted application of noun to whole units of the referent

- No difference in reference of noun with generic and inherent classifiers

- Specific classifiers (BROKEN & TEMPORARY) contributed some criteria for reference

Conclusions

EXPERIMENT 1

- Speakers typed and quantified entities based on universally accessible visual features, in the absence of syntax.
- Lexical quantifiers, while anecdotally used with different distributions (e.g., uts more when describing great numbers of individuals), did not significantly impact the strategies speakers used to judge quantities (i.e., by number or by volume).

EXPERIMENT 2

- Speakers quantify familiar object-denoting and substance-denoting nouns systematically differently, even in the absence of syntactic cues.
- Order effect indicates quantification strategy corresponding to noun is flexible.

EXPERIMENT 3

- Only specific classifiers, not generic or inherent ones, seem to provide criteria for individuation. If English-speakers get the whole-object reference of unmarked nouns through pragmatic inference based on the contrast with alternative units like "a piece of—" (Srinivasan et. al, 2013), Tzeltal-speakers' greater acceptance of individual pieces of objects as referents for unmarked nouns may come from the fact that all nouns are enumerated using the same syntax, decreasing the contrast of alternative units.
- When alternative units for a noun's referent are made more accessible, either visually or linguistically, speakers restrict their application of a noun to whole objects.

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