HOW MANY LANGUAGES HAVE EVER BEEN SPOKEN IN THE WORLD UNTIL TODAY?

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OVERVIEW

- 1. Definitions
- 2. What We Know & Mere Conjecture
- 3. Human Population Through Time
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""Language use is more **like a litmus test** for **what is happening** in the wider societies. Where language use changes, there is an underlying social upheaval that may have environmental, economic, or political causes.""

-Daniel Nettle, Vanishing Voices

DEFINITIONS

- 1. Language
 - Political, societal, or mutual intelligibility?
- 2. Language Evolution
- 3. Rate of Language Change
- 4. Linguistic Equilibrium
- 5. Language Death/Extinction

"There is no way of knowing in advance how many or what kind of answers will be given to the question, 'What is the name of your language,' or whether a list of names... represents 1, 2, 6, or 12 languages. And the scale of this problem must be appreciated: the 6,703 language headings in the Ethnologue (Edition 13) index generate as many as 39, 304 different names"

·David Crystal, Language Death

WHAT WE KNOW & MERE CONJECTURE

KNOWN:

- At least 5,000 years!
 - · Earliest known written representations
- Known Extinct Languages:
 - 423 listed in Wikipedia
- Living Languages:
 - 7,099 listed in Ethnologue

"For the origin of language, **facts are scarce**, but the **amount of literature enormous.**"

·Tore Janson, Speak (2002).



SUMERIAN CUNEIFORM, Mesopotamia c. 3500-3000 BCE

WHAT WE KNOW & MERE CONJECTURE

<u>SPECULATIONS &</u> IMPORTANT QUESTIONS:

- Emergence of humans
- Emergence of language
 - When & how
 - Language evolution vs. sudden appearance
- Human population & speaker populations

Estimates of the population of the world at the time agriculture emerged in around 10,000 BCE have **ranged between 1 million and 15 million.** *-Wikipedia, World Populations.*



Drawing by Kathryn Cruz-Uribe (Klein, 2016; Fig. 7). The figurine is thought to be at least 35 ka old and is among the oldest known examples of representational art.

HUMAN POPULATION THROUGH TIME

YouTube. "Human Population Through Time." Online Video Clip. American Museum of Natural History, November 4, 2016.

"LANGUAGES BEFORE HISTORY" (TORE JANSON)

40,000 BC-10,000 BC

Hunter-gatherers
Population size stays small *Linguistic Equilibrium* (David Nettle)

10,000 BC-AD 1

Advent of agriculture
Around 6 centers of agricultural origin
Dramatic spike in population



YouTube. "Human Population Through Time." Online Video Clip. American Museum of Natural History, November 4, 2016.

POPULATION HISTORY

AD 1-1800

•Population grows from between ~170-300 million at the dawn of the 1st century to 1 billion in 1,800 years

1800-2017

•Population reaches 1 billion at ~1800

•Exponentially grows in the last 200 years

•Today's population: 7.5 Billion

"7099 languages are spoken today, but just
23 languages account for more than half the world's population."

-Ethnologue, 20th Edition



YouTube. "Human Population Through Time." Online Video Clip. American Museum of Natural History, November 4, 2016.

LANGUAGE LIFE & DEATH

"Birth" of new languages:

- Original speech community \rightarrow separation \rightarrow divergent dialects \rightarrow separate languages
- Created out of necessity, ex: pidgin languages during slave trade

Factors effecting language communities:

- Physical geography
- Natural resources
- Speakers' knowledge
- Speaker opportunities
- Behavior of those around them

Language "death":

- Shift from a local language with few speakers to a language with more speakers, which is generally used over a larger area
- Economical, social, political reasons
- Forced and/or voluntarily
- Sudden vs. gradual





AVERAGE SPEAKER POPULATIONS

Hunter-Gatherer Societies:

Assumption:

Population size = Language Speaker Size

839 speakers/language

"The San people, who live (or have lived) on what they can get from hunting and gathering fruits and edible roots, **need large areas to provide themselves with food**...This means that each group needs a large area, and has to move over it systematically. **They cannot live close to other people**...Thus, each group is **comparatively isolated**."

> -Janson Tore. Speak: A Short History of Languages. pg. 26

organizational level	Horton order	sample size	ln mean	s.d.	geometric mean	95% CLs ¹	95% CLs	
	—	—	—	-		—	—	
group size (g)	ω	п	$\langle ln g \rangle$	s_{g}	ģ	lower	upper	
individual	1	_	0	-	1	-	-	مىر . مەربىيە يېرىيە يېرىيە يېرى
family	2	114	1.50	0.23	4.48	4.31	4.67	
dispersed group	3	227	2.75	0.46	15.60	14.68	16.58	
aggregated group	4	297	3.98	0.71	53.66	49.86	58.29	
periodic aggregation	5	213	5.11	0.66	165.32	152.25	181.00	
population size	б	339	6.73		839.19	736.36	954.03	

Table 1. M.J. Hamilton et al. (2007) *Hunter-gatherer social networks.* http://dx.doi.org/10. 1098/rspb. 2007.0564



Database of Places, Language, Culture and Environment

•339 (strictly) hunter- gatherer societies listed

Kirby, K.R., Gray, R. D., Greenhill, S. J., Jordan, F. M., Gomes-Ng, S., Bibiko, H-J, et al. (2016). D-PLACE: A Global Database of Cultural, Linguistic and Environmental Diversity. PLoS ONE, 11(7): e0158391. doi: <u>10.1371/journal.pone.</u> 0158391.



- Majority of a group's nutritional intake comes from aquatic resources
- Missing data

BASIC FORMULAS

POPULATION:	<u># of SPOKEN</u> LANGUAGES at TIME <u>(t):</u>	<u># OF LANGUAGE</u> <u>CHANGES during</u> <u>TIME (t):</u>	<u>TOTAL # of SPOKEN</u> <u>LANGUAGES up until</u> <u>TIME (t)</u>
p= h + a	$I_{t} = (h/s_{h}) + (a/s_{a})$	$c_t = t/t_s$	$(C_{t} \times I_{0}) + I_{0}$
 p is the total human population at a specific point time h is the number of hunter-gatherers a is the number of agriculturalists 	 <i>I_t</i> is the total # of L spoken at time <i>t</i> <i>s_h</i> is the avg # of speakers per language in a hunter-gather society <i>s_a</i> is the avg # of speakers per language in an agriculturalist society 	$-c_t$ is the number of times a language will change over the course of t - t is a number of years - t_s is the time it takes for a language to change into another	 -I₀ is the number of languages at time (o) where population size remains constant -where # of speakers per language remains constant

LANGUAGES AMONG HUNTER-GATHERERS

•Linguistic equilibrium $c_t = t/t_s$ $l_t = (h/s_h) + (a/s_a)$ $(C_t \times l_0) + l_0$ "Most parts of the world have, for most of human history, been at or near linguistic equilibrium. This does not mean, however, that languages have not always been dying out. The equilibrium concept merely implies that the number dying out in a region roughly balances the number being created. Extinction has always been happening."t is 30,000 years t is 30,000 years t is 30,000 years c_{30,000} = 30,000/1,000a is zero h is ~839,000 S_h=839 l_t = (839,000/839)+ (0) l_t=1,0001,000 languages that change 30 times in 30,000 years = 30,000 languages = 31,000 languages	40,000 BC – 10,000 BC •Stable population •possibly under 1 million	<u># OF LANGUAGE</u> <u>CHANGES in 30,000</u> <u>years:</u>	<u># of SPOKEN</u> LANGUAGES at 40,000 <u>BC:</u>	<u># OF LANGUAGES</u> <u>SPOKEN between</u> <u>40,000 BC – 10,000 BC</u>
$\begin{bmatrix} "Most parts of the world have, for most of human history, been at or near linguistic equilibrium. This does not mean, however, that languages have not always been dying out. The equilibrium concept merely implies that the number dying out in a region roughly balances the number being created. Extinction has always been happening." t is 30,000 years t is 30,000 years t is 30,000 years C_{30,000} = 30,000/1,000 and C_{30,000} = 30,000/1,000 and C_{30,000} = 30,000/1,000 and C_{30,000} = 30,000/1,000 and C_{30,000} = 30 are substituted by the substitution of the substitution of the substitution has always been happening." t is 30,000 years to substitute the substitution of the substitution has always been happening." t is 30,000 years to substitute the substitution has always been happening. The substitution happening is the substitution happening is the substitution happening. The substitution happening is thappening is the substitution happening is thap$	•Linguistic equilibrium	$c_t = t/t_s$	$I_{t} = (h/s_{h}) + (a/s_{a})$	$(C_{t} \times I_{0}) + I_{0}$
Daniel Nettle, Vanishing Voices, Pg 109	"Most parts of the world have, for most of human history, been at or near linguistic equilibrium. This does not mean, however, that languages have not always been dying out. The equilibrium concept merely implies that the number dying out in a region roughly balances the number being created. Extinction has always been happening."	t is 30,000 years t _s is 1,000 years $c_{30,000}$ = 30,000/1,000 $c_{30,000}$ =30	a is zero h is ~839,000 S_h =839 I_t = (839,000/839)+ (0) I_t =1,000	1,000 languages that change 30 times in 30,000 years= 30,000 languages + 1,000 original languages= 31,000 languages

LANGUAGES AMONG HUNTER-GATHERERS

10,000 BC- AD 2000	Loss of Languages:	Rate of Decrease:	# OF LANGUAGUES
•Shift from hunting and gathering to farming			<u>BC – AD 2000:</u>
•Forced or voluntary	10,000 BC = 1,000	$L_0 = (10,000 \text{ BC} = 1,000)$	1. (c _t x I_0) - $\sum_{i=1}^{12} 50i =$
I ass of HG societies	Societies	9,000 BC = 950	
	AD 2000 = 400 Societies	8,000 BC = 900	2. ((t/t_s) x 1,000) - \sum_{50i}^{12} =
		7,000 BC = 850	
"As farming spread out from its	1,000 - 400 = 600 lost	6,000 BC = 800	3. (12 x 1000) – $\sum_{i=1}^{n} 50i$ =
pushed out with it. It is not entirely	600/12 000 -	5,000 BC = 750	12
clear whether the hunters and	$1 \log t every 20 vers$	4,000 BC = 700	4. 12,000 $-\sum_{i=1}^{50i}$ =
gatherers on the periphery were	I lost every 20 years	2,000 BC = 600	
incorporated or ousted, but in	20x=1.000	1.000 BC = 550	
people carried with it the	x=50	1 AD = 500	
language that they happened		1000 AD = 450	8,100 languages spoken
to speak."	Every thousand years, we	2000 AD = 400	
Daniel Nettle, Vanishing Voices, Pg 100	lose 50 societies and/or 50		
-Damei Nettle, Vallishing Voices. Fg 109	languages.		



LANGUAGES AMONG AGRICULTURALISTS

ASSUMPTIONS:	10,000 BC- AD 1	AD 1 - 1000	1000-1750	1750 - 2017
•Starting population of	$\mathbf{L}_{\mathbf{a}_{10}^{-}} \mathbf{a/s}_{\mathbf{a}}$ $= \sum_{i=0}^{\infty} (P_0 * r^i) / s_a$	L _a =a/s _a	$L_a = a/s_a - (L_0 x .25)$	L _a =a/s _a - (L ₀ x .75)
•At the dawn of the Industrial Revolution (~1800), average speakers per language increase	P_0 = 500,000 r=1.79 S_a =83,333 - P_0 is population at start - r is population increase percentage	a= 254 million S _a = 83,333 254,000,000÷ 83,333=	a= 750 million S_a = 83,333 750,000,000 ÷ 83,333 – (3048 x .25 = 762) =	a=7.5 billion S_a = 425,914 7099-23 (languages w/ 4,322,800,000 sp)=7076 7076-400 HGL=6676 3,177,200,000/6676 = 475, 914 speakers/ language 6676 languages - (8,238 x .75= 6178)=
	4,606	3,048	8,238	498

RESULTS:

Language change every 1,000 years
Small population of ~1 million at the dawn of agriculture (10,000BC)

SOCIETIES:	40,000BC - 10,000 BC	10,000BC - AD 1	AD 1 - 1000	1000 - 1750	1750 - 2017	TOTALS:
Hunter- gatherers	31,000		8,	,100	-	39,100
Agriculturalists	0	4606	3,048	8,238	498	16,390
	$I_{t} = (h/s_{h}) + (a/s_{a})$				55,490	

RESULTS:

Language change every 500 years
Small population of ~1 million at the dawn of agriculture (10,000BC)

SOCIETIES:	40,000BC - 10,000 BC	10,000BC - AD 1	AD 1 - 1000	1000 - 1750	1750 - 2017	TOTALS:
Hunter- gatherers	61,000		16	5,500		77,500
Agriculturalists	0	8,011	5,172	6,432	3,460	23,075
		$I_{t} = (h/s_{h}) + (a/s_{a})$			100,575	

With population of less than 1,000,000 before the dawn of agriculture and a rate of language change of between 500 and 1,000 years, there have been

55,490 — 100,575 LANGUAGES

ever spoken on the earth from 40,000 BC until today.

ALTERNATE VIEWS:

"Language groups in aboriginal Australia consisted of no more than **two or three thousand people at most**, and this may not be an unreasonable model of most of the world **before the origin of farming.** "

-Daniel Nettle, Vanishing Voices

Year	Population
50,000BC	2
8000 BC	5,000,000
AD 1	300 million
1200	450 million
1750	795 million

-Population Reference Bureau

"...the rate of linguistic change is likely to vary across time and place for many different reasons[...] change is generally faster in small groups."

-David Crystal, Is the Rate of Linguistic Change Constant?

"The median number of speakers for the languages of the world is only 5,000 to 6,000 , and nearly 85 percent of languages have fewer than	"If those who make tools have to be able to speak, languages must have existed for must longer, conceivably as long as a couple of million years. "	"Agriculture developed independently in at least nine areas. "
100,000."	-Tore Janson, Speak: A Short History of	-Edward Hill, Hunting and Gathering vs.
-Daniel Nettle, Vanishing Voices	Languages	Agriculture

OTHER ESTIMATIONS

Mark Pagel: ~30,000—500,000 The History, Rate and Pattern of World Linguistic Evolution



Number of Years Humans Have Spoken

Figure 22.1b. The total number of languages ever spoken as a function of time since the origin of language, and three different assumptions about the rate of language evolution. The top curve of each set of three corresponds to a rate of 0.002 per annum (one new language per 500 years), the middle curve to 0.001, and the lower curve to 0.0005. Choice of this rate determines the death rate.

David Crystal: ~64,000—140,000? Language Death

Daniel Ross: ~200,000 https://www.quora.com/How-many-dead-languagesare-there

The Lousy Linguist: ~100,000 http://thelousylinguist.blogspot.de/2010/11/94000language-deaths.html

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Thank you for your attention!

ANY QUESTIONS?