

# The Language of Music

Kimi Spencer

# Music Lyrics & Culture

“One cultural product—word use in popular song lyrics—changes over time in harmony with cultural changes.”

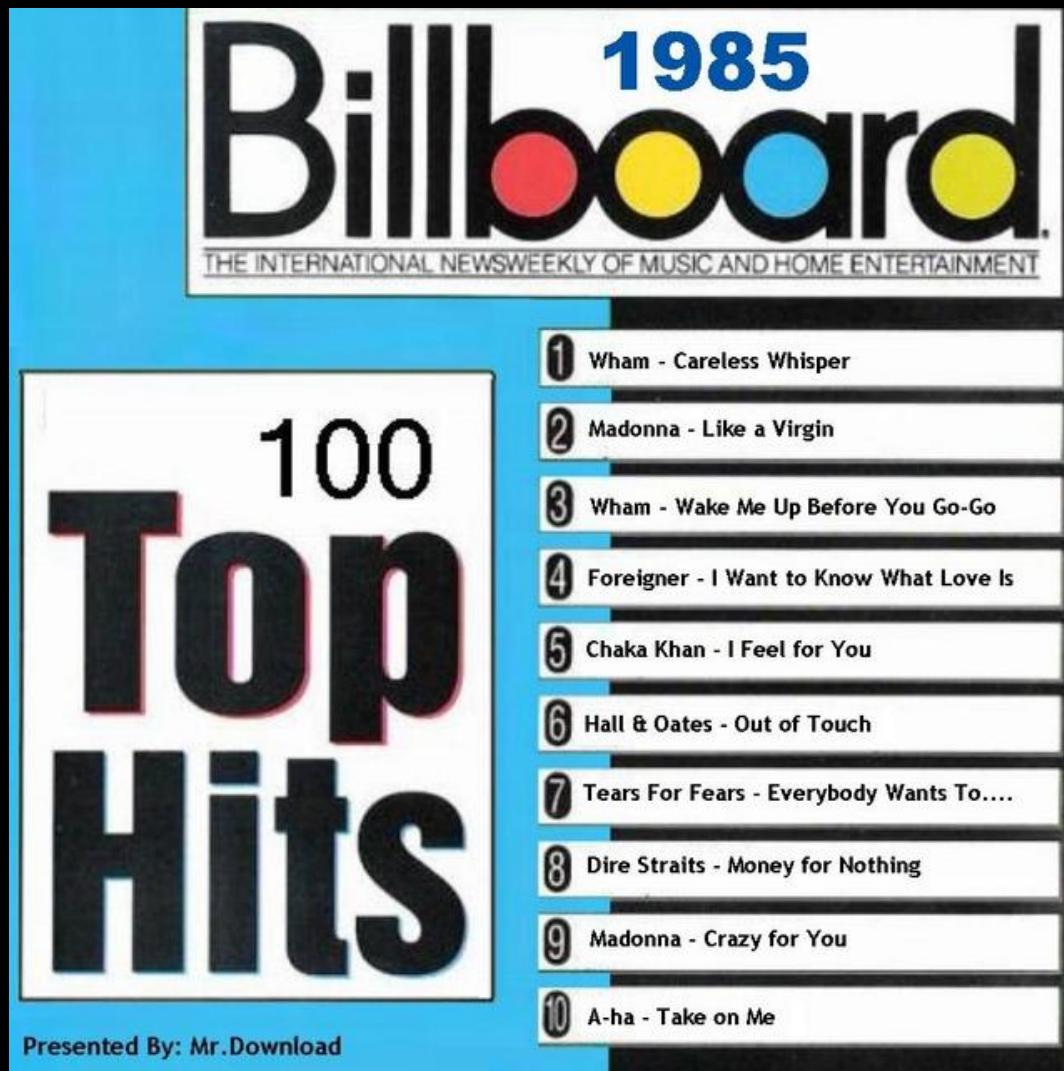
Source – “Tuning in to psychological change: Linguistic markers of psychological traits and emotions over time in popular U.S. song lyrics.” by Dr. DeWall

# The Questions

Are our notions of historic cultural values reflective in popular music lyrics?

How can we visualize thematic trends in music lyrics?

# Billboard Top 100



## The Billboard Charts

Since 1936 Billboard magazine has tracked the weekly popularity of songs in the US based on single sales, radio airplay and digital downloads.

Source - <http://www.billboard.com/charts/>

# The Whitburn Project

Year	Yearly	Source	Prefix	CH	40	10	PK	High	Ver	Artist	Invert ed	Featured	U	Album	B-Side	Track
2011	407	h	2011-407	1	0	0	1	94		Lil Wayne		Lil Wayne		<i>Tha Carter IV (Dt President Carter</i>		
2011	408	h	2011-408	1	0	0	1	95		Lil Wayne		Lil Wayne	Featuring	<i>, Tha Carter IV (Dt So Special</i>		
2011	409	h	2011-409	7	7	0	1	18		Kelly Clarkson		Clarkson, Kelly	s	<i>Mr. Know It All</i>		
2011	410	h	2011-410	1	1	0	1	34		Lady Antebellum		Lady Antebellum	Own The Night	<i>Wanted You More</i>		
2011	411	h	2011-411	2	0	0	1	58		Hugh Laurie		H Laurie, Hugh	Let Them Talk (E Police Dog Blues			
2011	412	h	2011-412	1	0	0	1	84		Scotty McCreery		McCreery, Scotty	Clear As Day	<i>The Trouble With Girls</i>		
2011	413	h	2011-413	1	0	0	1	87		JoJo		JoJo	s	<i>Disaster</i>		
2011	414	h	2011-414	7	0	0	1	72		Band Perry, The		Band Perry, The	<i>The Band Perry</i>	<i>All Your Life</i>		
2011	415	h	2011-415	7	0	0	1	77		Chris Brown		Brown, Featuring	I.F.A.M.E.	<i>Wet The Bed</i>		
2011	416	h	2011-416	6	4	0	1	15		Coldplay		Coldplay	<i>Mylo Xyloto</i>	<i>Paradise</i>		
2011	417	h	2011-417	5	0	0	2	84		Darius Rucker		Rucker, Darius	<i>Charleston, SC 1. I Got Nothin'</i>			
2011	418	h	2011-418	1	0	0	1	87		Tony Bennett		Bennett & Amy Wirs	<i>Duets II</i>	<i>Body And Soul</i>		
2011	419	h	2011-419	6	0	0	1	78		David Nail		Nail, David	<i>The Sound of a M</i>	<i>Let It Rain</i>		
2011	420	h	2011-420	6	0	0	2	76		Ace Hood		Ace Ho	Featuring (Blood, Sweat & T	<i>Body 2 Body</i>		
2011	421	h	2011-421	5	0	0	1	84		Sean Paul		Paul, Se	Featuring (s	<i>Got 2 Luv U</i>		
2011	422	h	2011-422	1	0	0	1	100		Brantley Gilbert		Gilbert, Brantley	<i>Halfway To Heav</i>	<i>You Don't Know Her Like I Do</i>		
2011	423	h	2011-423	5	5	4	1	2		Rihanna		Rihanna	Featuring (Talk That Talk	<i>We Found Love</i>		
2011	424	h	2011-424	1	0	0	1	65		Glee Cast		Glee Cast	s	<i>It's Not Unusual</i>		
2011	425	h	2011-425	1	0	0	1	67		Glee Cast		Glee Cast	s	<i>You Can't Stop The Beat</i>		
2011	426	h	2011-426	1	0	0	1	68		Birdman		Birdmar	Featuring (s	<i>Y.U. Mad</i>		
2011	427	h	2011-427	1	0	0	1	69		Demi Lovato		Lovato, Demi	<i>Unbroken</i>	<i>Fix A Heart</i>		
2011	428	h	2011-428	5	0	0	1	51		Jason Aldean		Aldean, Jason	<i>My Kinda Party</i>	<i>Tattoos On This Town</i>		
2011	429	h	2011-429	1	0	0	1	83		Glee Cast		Glee Cast	s	<i>We Got The Beat</i>		
2011	430	h	2011-430	5	0	0	1	68		Eric Church		Church, Eric	<i>Chief</i>	<i>Drink In My Hand</i>		
2011	431	h	2011-431	1	0	0	1	98		Demi Lovato		Lovato, Demi	<i>Unbroken</i>	<i>Unbroken</i>		
2011	432	h	2011-432	4	3	1	1	7		B.o.B.		B.o.B.	Featuring (Strange Clouds	<i>Strange Clouds</i>		
2011	433	h	2011-433	4	2	0	1	28		Bruno Mars		Mars, Bruno	<i>Twilight Saga: Br</i>	<i>It Will Rain</i>		
2011	434	h	2011-434	4	0	0	1	48		Nickelback		Nickelback	<i>Here And Now</i>	<i>When We Stand Together</i>		
2011	435	h	2011-435	4	3	0	1	20		T-Pain		T-Pain	Featuring (Revolver	<i>5 O'Clock</i>		
2011	436	h	2011-436	1	0	0	1	75		Glee Cast		Glee Cast	s	<i>Somewhere</i>		
2011	437	h	2011-437	4	0	0	1	79		Lloyd		Lloyd	Featuring (King Of Hearts	<i>Dedication To My Ex (Miss That)</i>		
2011	438	h	2011-438	1	0	0	1	83		Jason DeRulo		DeRulo, Jason	<i>Future History</i>	<i>Fight For You</i>		
2011	439	h	2011-439	1	0	0	1	88		Blink-182		Blink-182	<i>Neighborhoods (i</i>	<i>After Midnight</i>		
2011	440	h	2011-440	4	0	0	1	44		Luke Bryan		Bryan, Luke	<i>Tailgates &amp; Tanli</i>	<i>I Don't Want This Night To End</i>		
2011	441	h	2011-441	4	0	0	1	57		Zac Brown Band		Brown, Zac, Band	<i>You Get What Yo Keep Me In Mind</i>			

## The Data

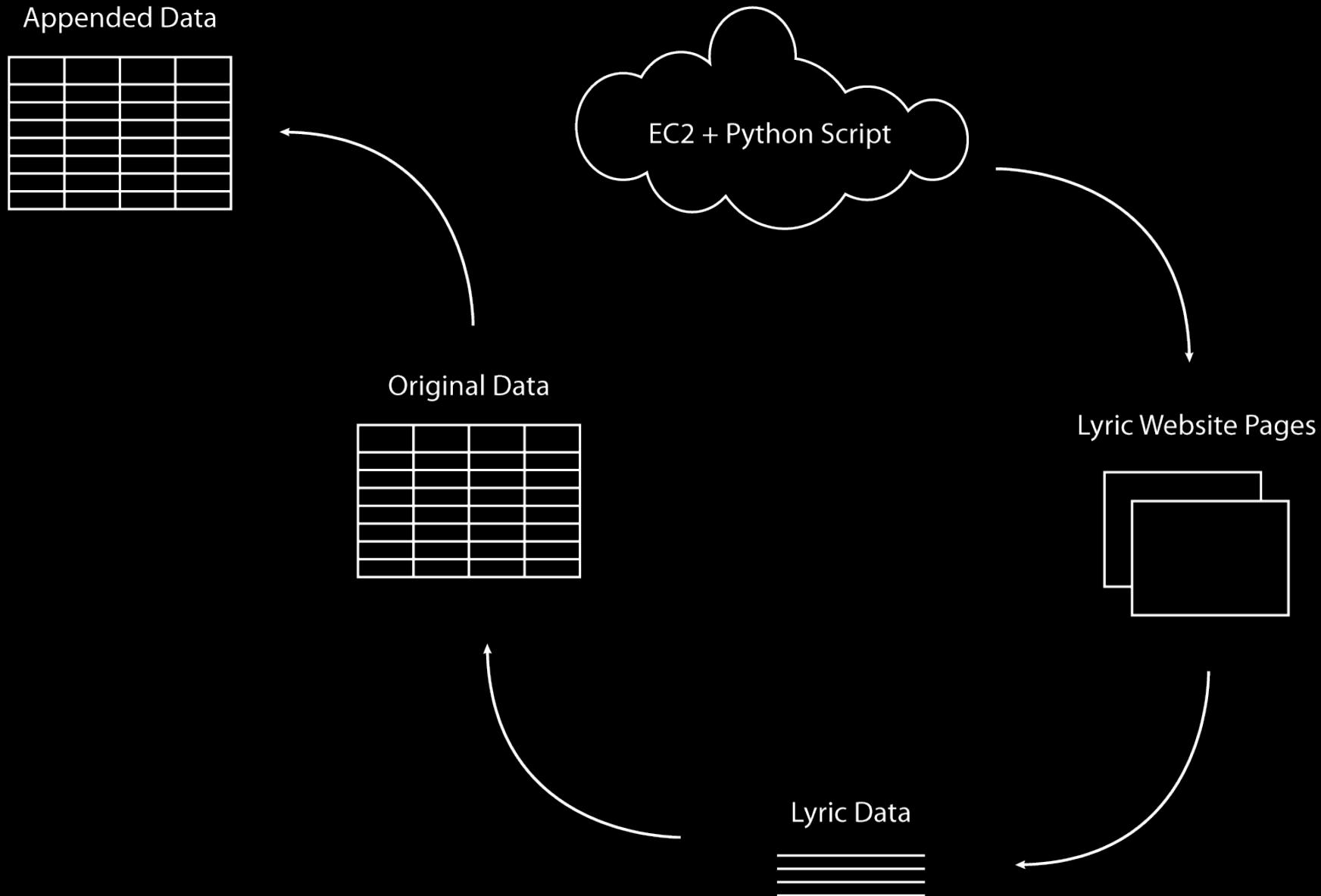
User curated Excel spreadsheet of 37,000 songs and 112 columns of raw data logging every Top 100 hit song from 1936 to today.

Source – Record Research and Billboard Magazine

# Copyright

Redistribution of the data is in violation of Billboard and Record Research's copyright. However, the analysis of data falls under fair use.

# Web Scraping for Lyrics



# Turning Text into Numbers

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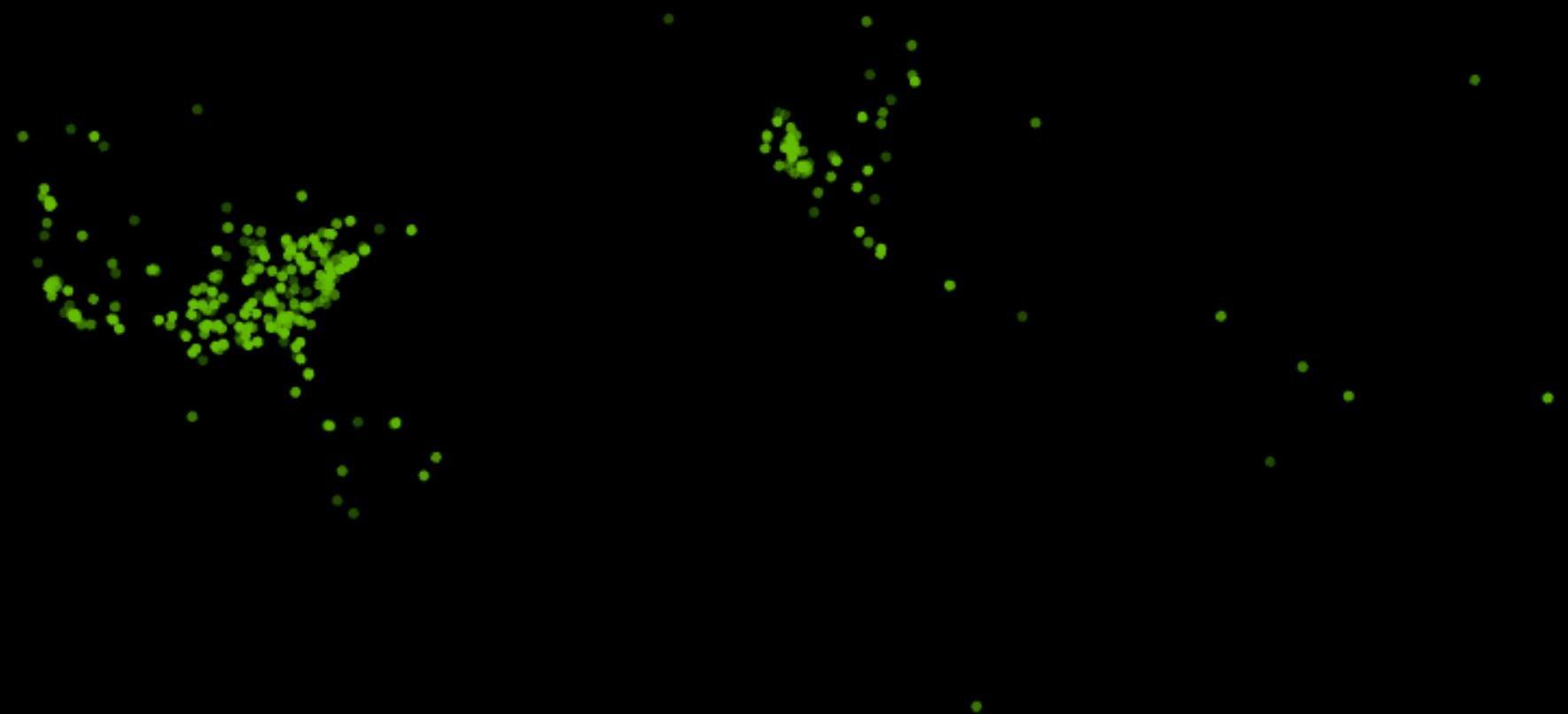
## Qualitative vs. Quantitative Data

Transforming textual data into numeric points we can plot onto a visual representation. Such as, counting words or putting dots onto a map.

# Visualizing the Data, Part I

Location of artist and word frequency in lyrics.

# Location of Artists, 1936 - 2010



# Word Frequency, 1936 - 2010

YOU I THE TO AND A ME IT MY IN  
THAT ON I'M YOUR OF LOVE BE ALL KNOW FOR  
DON'T SO LIKE IS WE JUST DO BUT WITH IT'S OH  
WHEN WHAT NO CAN UP BABY GOT THIS GET IF NOW YEAH GO  
YOU'RE ONE OUT SEE SHE TIME WAS COME DOWN SAY CAN'T THEY  
WANT CHORUS WAY MAKE LET NEVER HER HAVE GIRL WANNA BACK I'LL  
HOW ARE AT RIGHT FROM GONNA TAKE TELL NEED AIN'T HE NOT WILL HERE  
THERE FEEL NIGHT AS BEEN MORE ABOUT MAN HEART COULD AWAY I'VE THINK  
LIFE DAY TOO WHERE GIVE GOOD THAT'S LITTLE KEEP WHY THEN WORLD SOME AGAIN  
ONLY SAID AROUND THERE'S OR HEY BY THROUGH WELL STILL EVERY OVER ALWAYS HAD  
CAUSE WHO REALLY GOTTA WON'T LOOK WOULD EVER OUR FIND YA MIND LONG US THINGS WERE BOY  
'CAUSE SHE'S THEM MUCH PUT EYES HOLD STAY HIS CALL GONE BELIEVE BETTER HOME THING STOP TRY  
OFF WE'RE OOH AN HEAR O THAN LEAVE NEW NOTHING VERSE EVEN EVERYTHING SHOW RUN AM TONIGHT  
YOU'LL I'D HIM TURN AH ANOTHER LA LET'S INTO BEFORE SOMETHING UH SHOULD ALONE YOU'VE OLD PLEASE NA  
NIGGA LEFT HARD REAL WITHOUT YO TWO MADE LAST WRONG MONEY NAME LIVE DANCE TRUE FACE GOING DID FOREVER  
CRY THESE BIG CRAZY T OTHER PEOPLE WOMAN WALK MINE BAD INSIDE TALK SAME PLAY SHIT HEAD SWEET LIGHT BODY  
WE'LL 2 SONG 'EM FEELING HE'S THOUGHT HAND END CHANGE ROCK USED TOGETHER HAS WHAT'S WHILE YES BREAK BEST  
MAYBE ENOUGH DONE FIRST PLACE LOOKING MIGHT TOUCH ALRIGHT FALL SOMEONE ANYTHING WORK SOMEBODY LOST 1 SIDE REPEAT  
I KNEW HIT STAND DREAMS SUN TOLD BRING TOWN HIGH FREE RIDE OWN DIDN'T THOSE FLY KISS C DREAM YOUNG HOT TILL PAIN  
REMEMBER SMILE RUNNING MUST MYSELF GIRLS START EVERYBODY ROLL MISS LATE LONELY SHAKE FRIEND BECAUSE CARE CAME DAYS  
FAR MOVE FOOL HELP HA WISH WAIT MANY FOUND DOOR GAME GUESS SURE SING FINE SOUL GOES SOMETIMES BLUE HANDS FRIENDS WAITING  
TIMES THOUGH TRYING COMES D B READY WHOLE U WORDS HEARD YOURSELF UNTIL LOSE BLACK WATCH DA STRONG GOODBYE ANY MATTER COMING  
ELSE M FIRE ITS WHOA GETTING NIGGAS NOBODY GOD YEA Y MEAN SKY ASS LINE LOVING MAY S MAKES PRETTY HOPE HAPPY CLOSE DAMN WENT  
AFTER LIVING CHANCE FORGET FIGHT FLOOR MAMA THEIR RAIN BEHIND UNDERSTAND H LIE BITCH P TOOK EASY LISTEN COULDN'T SEEN ONCE LADY  
MORNING TEARS FUCK OPEN KIND YEARS ARMS ROUND MUSIC IA<sup>TMM</sup> LOT TODAY DEEP SEEMS SINCE PARTY NEXT HOUSE THEY'RE COOL ROAD WIT DIE WHO'S  
BEAT THREE TOP FEELS E SLEEP HURT ASK HUH DOES BOTH CUZ BABE COLD 'BOUT STEP LAY WONDER CLUB G DARK BEAUTIFUL TIGHT HAIR EACH GAVE SUCH  
SET K CAR BRIDGE Y'ALL FEET LOW HONEY HEAVEN TRIED N SHINE STREET KNOWS WANTED PART CITY WOULDN'T YOU'D DOING HELL WORD SLOW WIND CHECK BED HOOK  
THROW UNDER RED WAKE LOVIN' STANDING HATE GETS FALLING WE'VE REASON WHITE BA SAW BOYS SOUND SOON VERY TOMORROW PHONE DADDY LIGHTS

# Natural Language Processing

“The process of a computer extracting meaningful information from natural language input.”

Source – [http://en.wikipedia.org/wiki/  
Natural\\_language\\_processing](http://en.wikipedia.org/wiki/Natural_language_processing)

# Word Frequency, 1936 - 2010

LOVE KNOW LIKE JUST OH CAN  
BABY GOT GET NOW YEAH GO ONE  
SEE TIME YOU COME SAY WANT CHORUS  
WAY MAKE LET NEVER ME WANNA GIRL  
BACK RIGHT GONNA TAKE TELL NEED AIN' T  
WILL I FEEL NIGHT MAN HEART AWAY THINK  
LIFE DAY GIVE GOOD IT LITTLE KEEP WORLD  
SAID AROUND HEY WELL STILL EVERY ALWAYS  
CAUSE REALLY GOTTA LOOK EVER FIND YA MIND LONG  
US THINGS BOY 'CAUSE MUCH PUT EYES HOLD STAY CALL  
GONE BELIEVE BETTER HOME DO THING STOP TRY OOH HEAR  
O ON LEAVE NEW EVEN NOTHING VERSE EVERYTHING  
SHOW RUN TONIGHT NO TURN AH ANOTHER LA SOMETHING  
UH ALONE OLD PLEASE NA UP NIGGA LEFT HARD REAL WITHOUT  
YO MADE TWO LAST WRONG MONEY NAME LIVE DANCE TRUE FACE  
A GOING FOREVER T CRY BIG CRAZY DOWN PEOPLE WOMAN WALK MINE

# Word Frequency, 1950s

LOVE KNOW OH BABY YOU GO LIKE  
WELL DOOBY HEART KISS ME WILL NOW  
JUST OOBY TIME LITTLE ONE COME NEVER  
ON BIMBO CAN SAY GOT CRAZY HONEY DREAM  
DO SEE WAY TRUE DAY GONNA WANT HOLD TELL CHICAG  
QUEEN MUCH OLD BLUE EVERY A BACK MAYBE EVER GOOD  
BABE RIGHT LIFE KIND NIGHT TAKE GET SEND STILL  
THINGS E THRILL LOVING WAH PLEASE RAVE ALONE WRONG  
PART NEW ALWAYS O GIRL TOWN PARADISE THINK BOY LOVED  
MAKE MAN HILL DON'T YEAH WOMAN LEAVE HOME HEAR 'CAUSE  
DARLING DREAMS BIG CRY AIN'T FELL LIPS CARE AROUND HEAVEN  
WORLD AND SWEET HONEST SINCERE FOOL MINE SAID NEED WIN START  
TOLD TEARS TWO EYES CANDY ARMS DOLL TAUGHT HAPPY BLUEBERRY  
BUTTERFLY ANNA MARIE TEENAGE SUN REMEMBER MIND AGAIN DONE  
YOUNG HARD HEAD FORGIVE NAME MAKES CRIED CAME SIDE CALL DOOR  
FEEL LONELY DIANA CHORUS SHARE WITHOUT LIVE MOON NEAR DARLIN'  
WALKING THOUGH LOOK SOMEONE FACE SAW BLOSSOM BE STAY MORE SHEP GONE  
LONG FOUND I CAUSE HEADED SINCE BEGAN STUNG UH BILLY PRETTY NEXT  
STORE RIVER BLUES LEFT GIVE SONG SHINE FOREVER RAIN YES SOON FIND FUN  
MADE MEAN APART SING CROW STREET GAMES SHAME THOUGHT EVERYTHING

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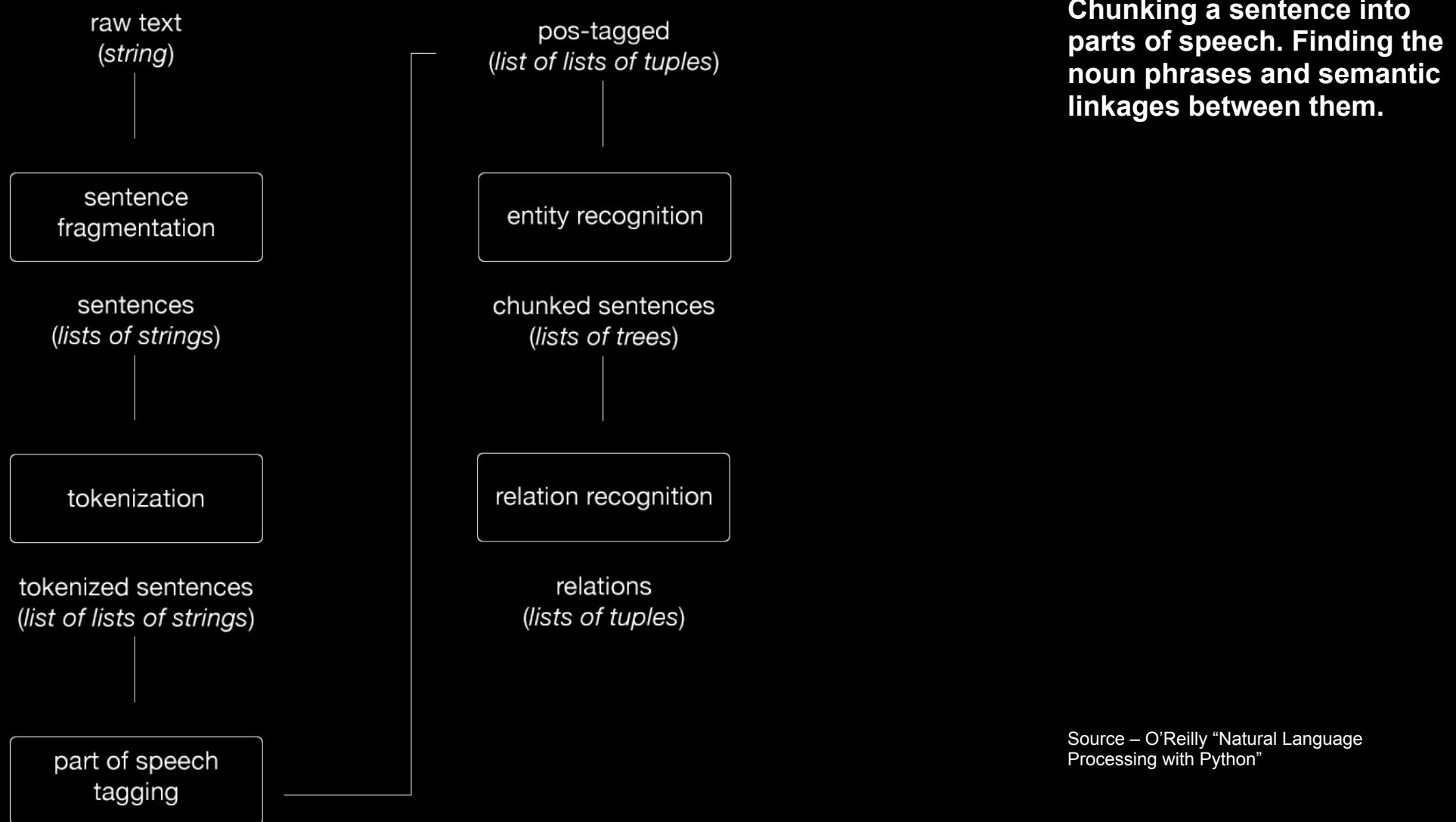
# Word Frequency, 1970s

LOVE KNOW OH JUST CAN GOT  
BABY LIKE TIME YEAH NOW COME YOU  
GO GET WAY SEE SAY FEEL LET GOOD MAN  
MAKE ME RIGHT ONE LIFE AWAY WELL WANT  
NEVER DO GONNA DAY AIN'T TELL NIGHT NEED  
WILL LITTLE KEEP RUNNING ALWAYS BACK LONG  
MIND HEY SONG AH TAKE THINK REALLY OLD HEART  
EVER WORLD HOME CALL PEOPLE US GIVE STAY SWEET  
SAID 'CAUSE EVERY ON OOH THING BELIEVE AROUND  
PLAY WANNA EYES PLEASE NO PUT WITHOUT NAME LIGHT STILL  
BOOGIE BOY HEAR WOMAN GONE NA FIND THINGS BETTER RUN IT  
HONEY HIGH MUCH CRY SOMETHING WHOA LA MUSIC FACE FRIEND  
BODY TRY TURN LEAVE DAYS LOOK FREE NOTHING GIRL FEELING  
MONEY INSIDE SING HARD LAST CHORUS MINE SUN SHOW LIVE FIRST  
MY USED GOING ANOTHER FA HAND MACHO SAD YES MADE SMILE SURE  
DANCE TOGETHER GOODBYE CAME BLAME NEW LONELY KNEW BEST POWER  
DREAMS GOTTA FEELS MAMA STOP REAL RIDE MAKES MAY EVEN TWO PUNK  
MORNING AGAIN BLUE CRAZY MR FAME UNDERSTAND HAPPY I LOOKING GOIN'

# Word Frequency, 1970s

LOVE KNOW OH JUST CAN GOT  
BABY LIKE TIME YEAH NOW COME YOU  
GO GET WAY SEE SAY FEEL LET GOOD MAN  
MAKE ME RIGHT ONE LIFE AWAY WELL WANT  
NEVER DO GONNA DAY **AIN'T** TELL NIGHT NEED  
WILL LITTLE KEEP RUNNING ALWAYS BACK LONG  
MIND HEY SONG AH TAKE THINK REALLY OLD HEART  
EVER WORLD HOME CALL PEOPLE US GIVE STAY SWEET  
SAID 'CAUSE EVERY ON OOH THING BELIEVE AROUND  
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BODY TRY TURN LEAVE DAYS LOOK FREE NOTHING GIRL FEELING  
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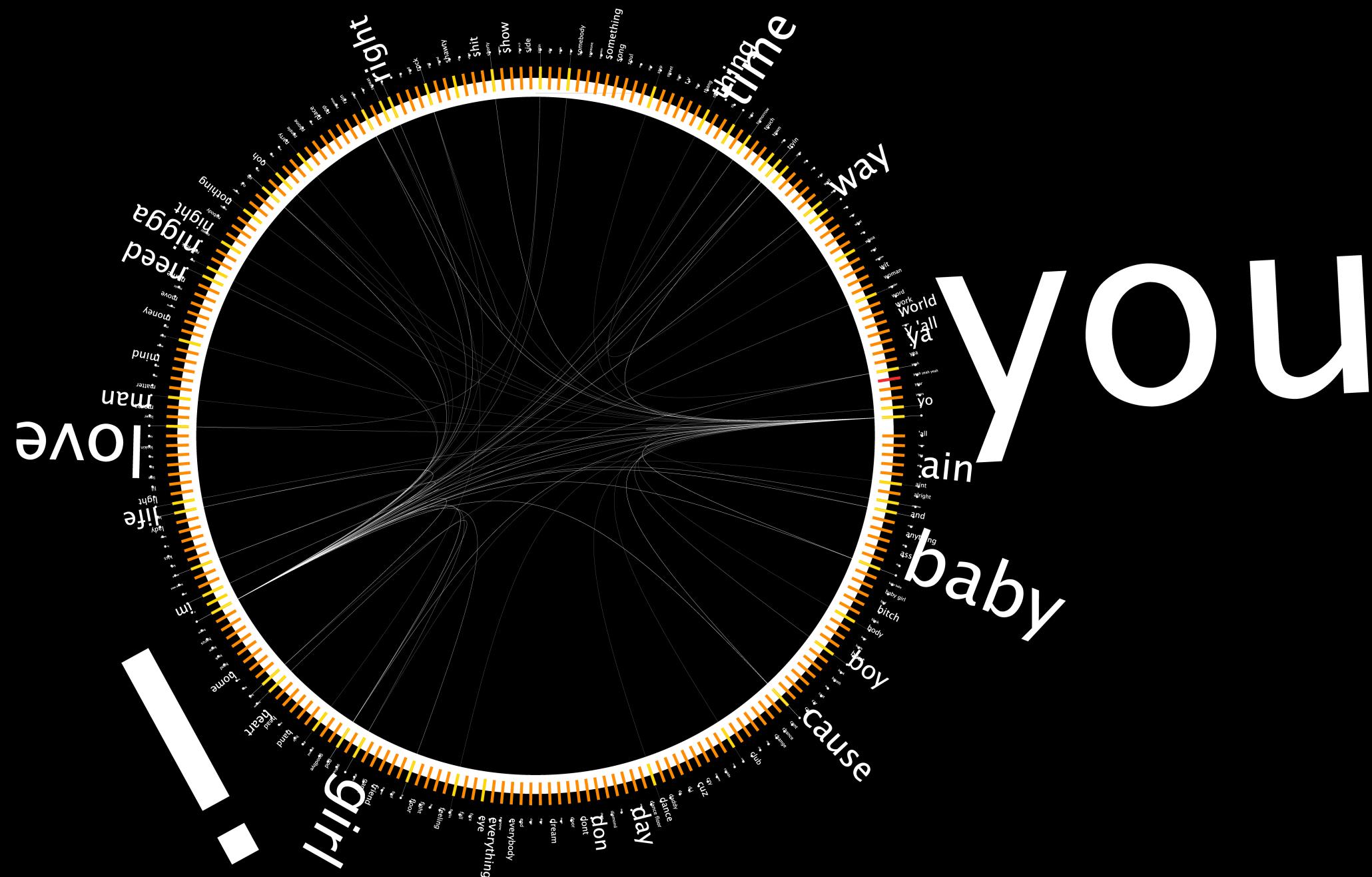
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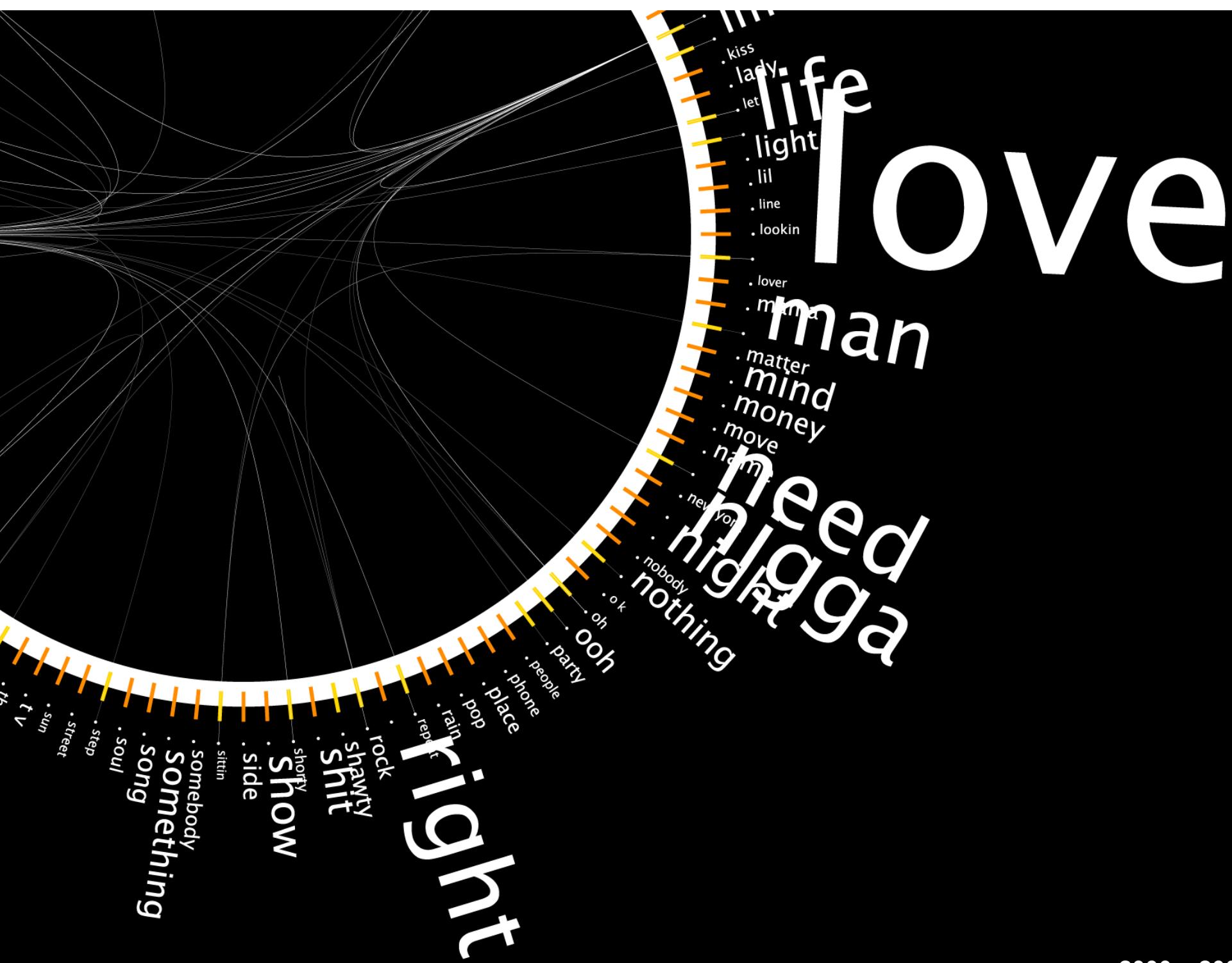


# Visualizing the Data, Part II

N-grams, named entities, and relationships.

2000 – 2009



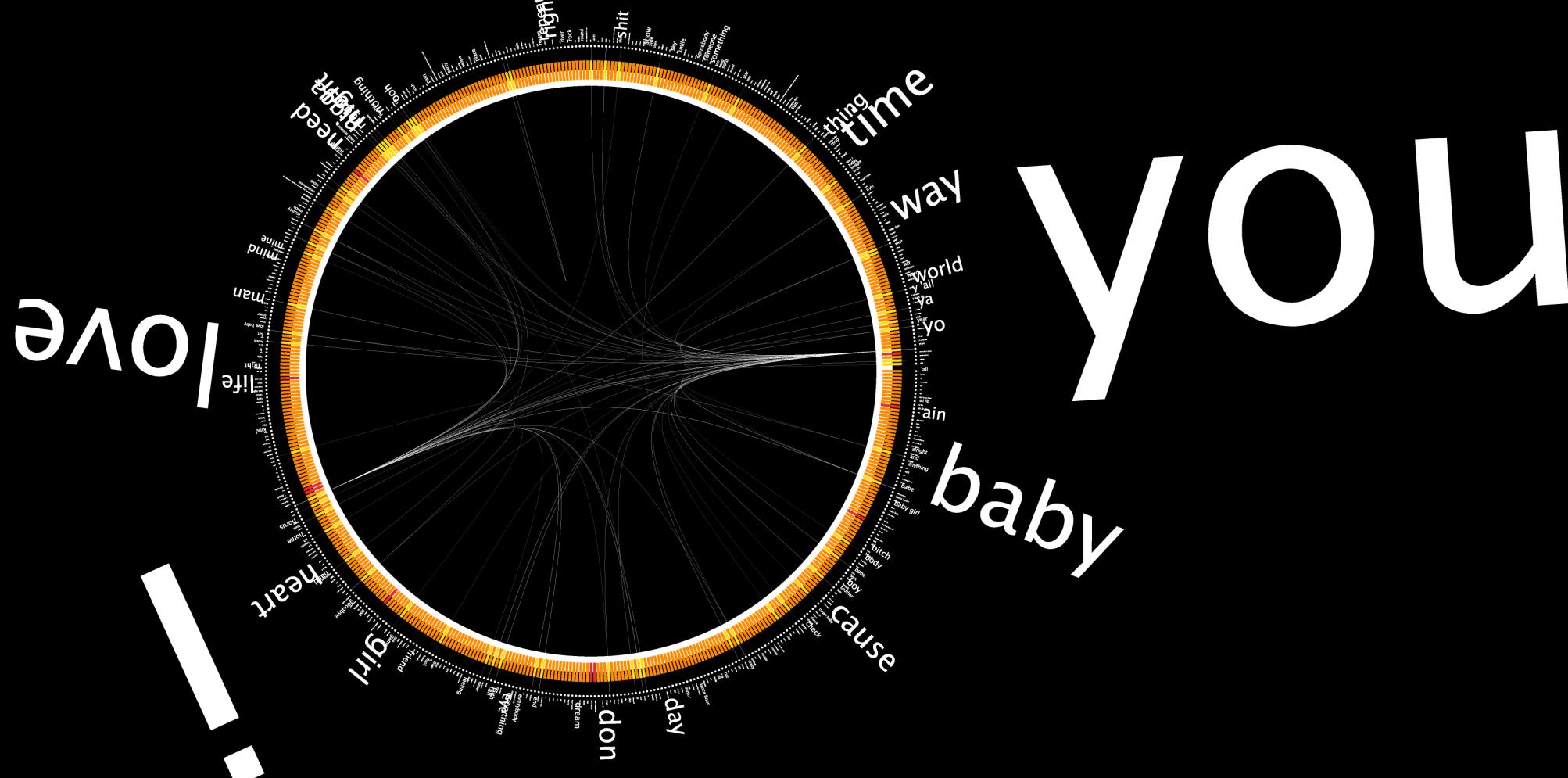


2000 – 2009

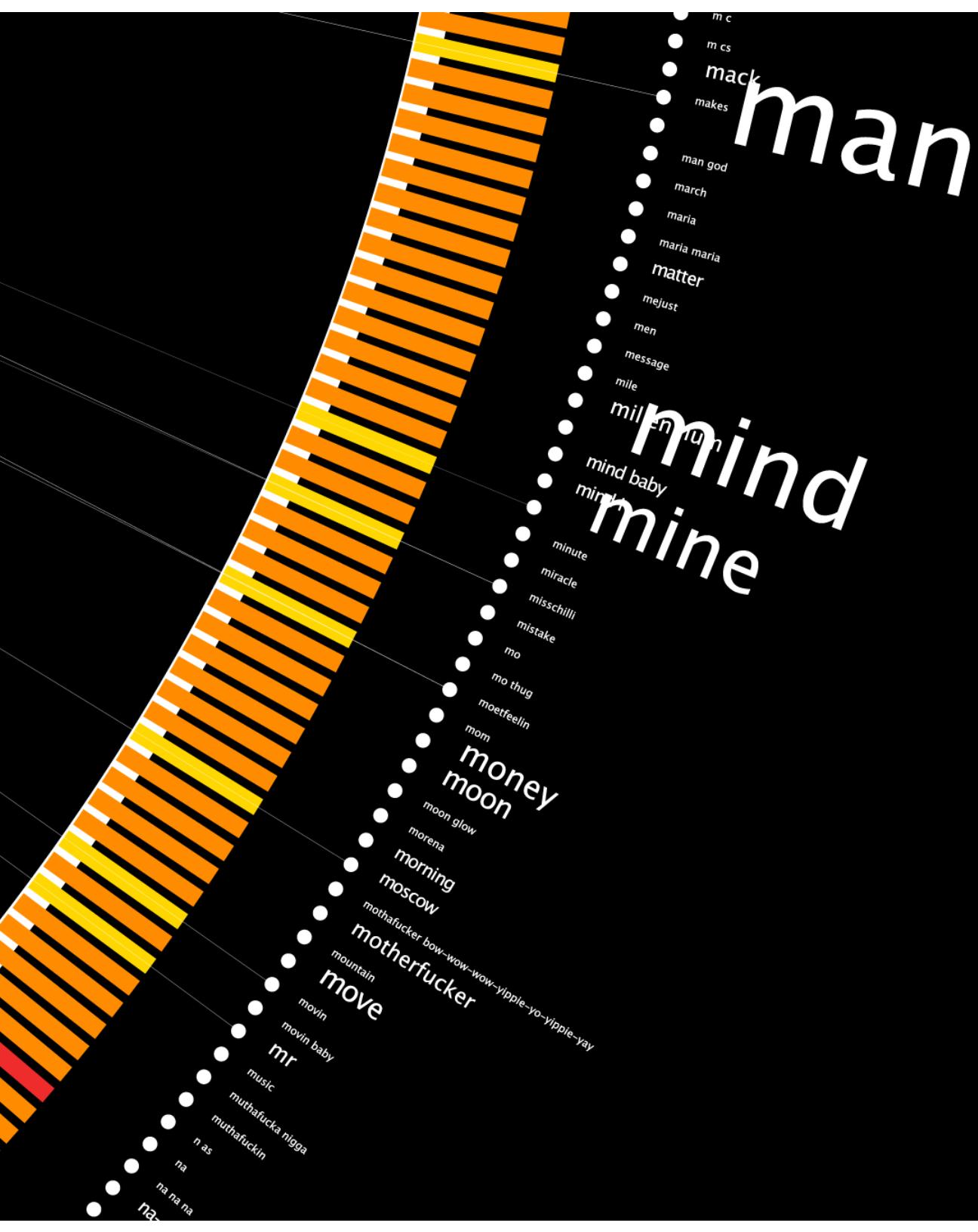
The image features a large, bold, white, handwritten-style text "ain baby boy cause" on a black background. To the left of this main text, there is a vertical column of words and abbreviations, each preceded by a small orange line segment. The words listed are: yo, 'all, aint, alright, and, anything, ass, baby girl, bitch, body, boi, car, car, cent, chance, change, club, cry, cuz, da, dj, daddy, dance, day, don, dont, door, room, diamond, floor, and dia.

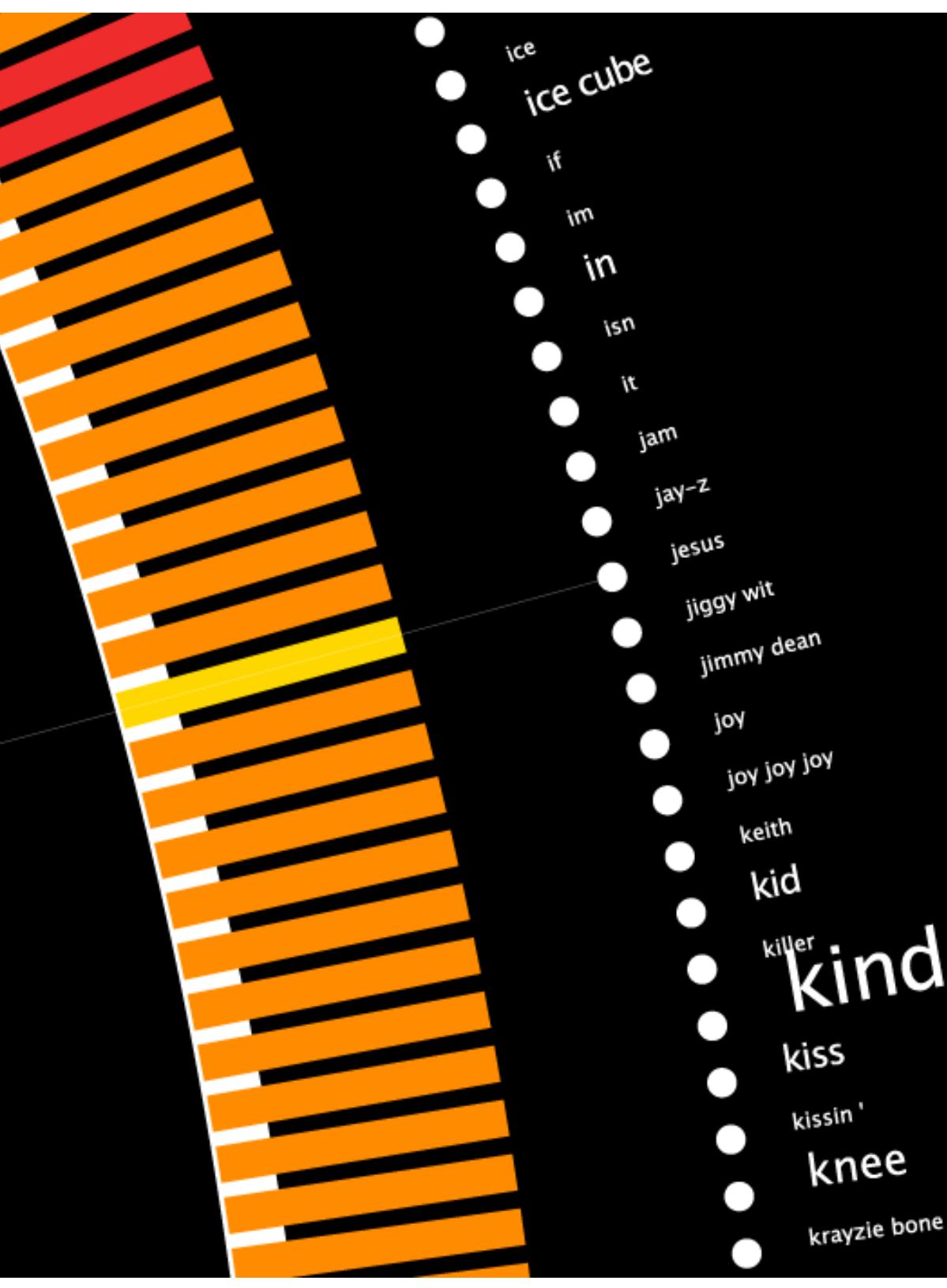
2000 – 2009

1990 - 1999



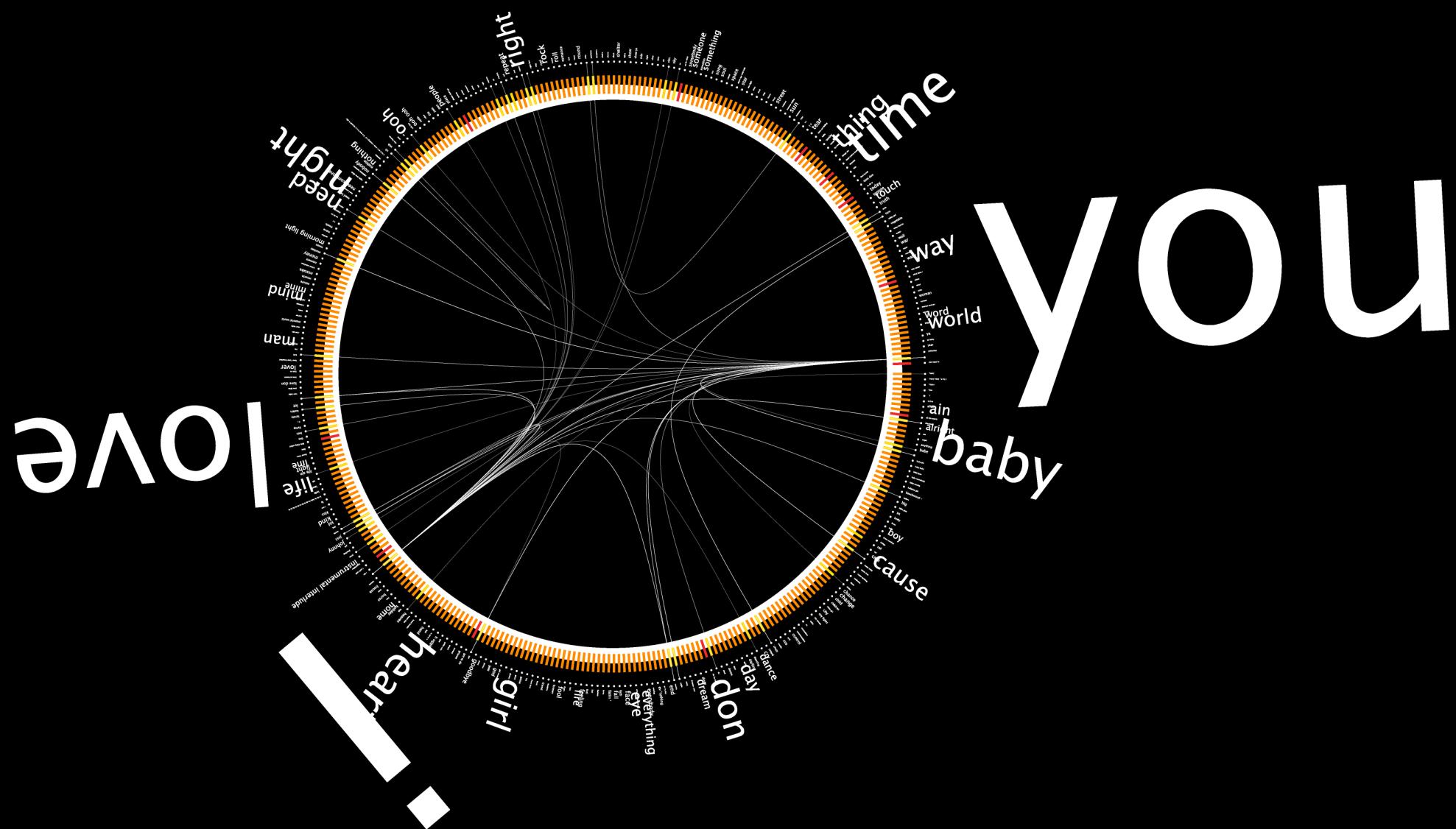
1990 - 1999





1990 - 1999

1980 -1989



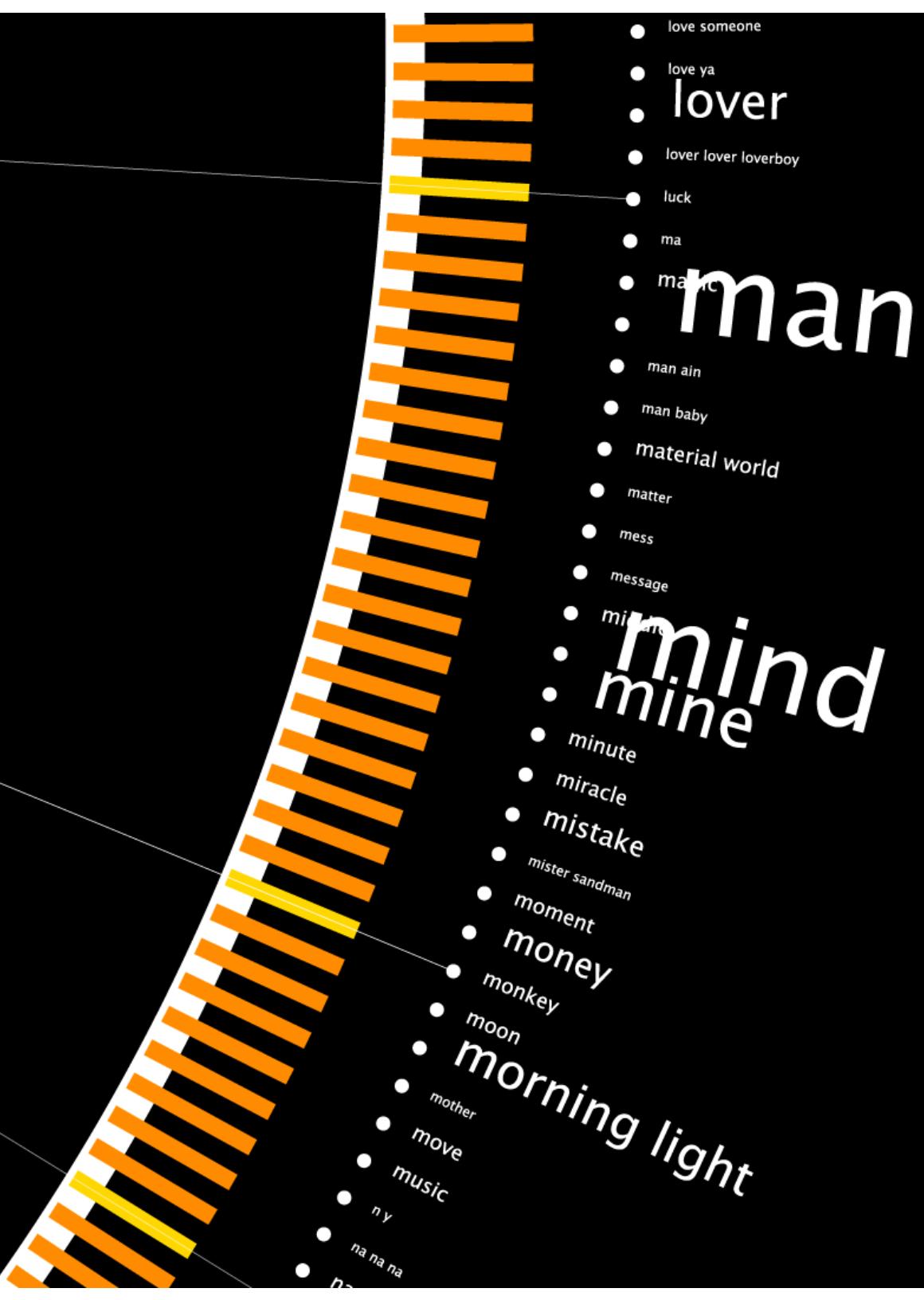
cause

boy

cause

- baby baby
- baby Jane
- baby somebody
- baby touche
- ballerina girl
- beechwood ~
- before
- big
- billie Jean
- bit
- body
- bone
- bolt
- brass monkey
- bridge
- cali
- car
- care
- cause baby
- cause love
- cause nothing
- celebrate
- chain
- chaka
- chance
- change
- child
- children
- china girl
- City
- city lights
- y streets

1980 - 1989



1980 - 1989

# Lyrical Themes in History

What do the visualizations tell us?

# Next Steps

Lyrical themes by genre and location.

Sentiment analysis.

Interactive applications.

Sociolinguistics and academic analysis of cultural trends.

Thank you.