USCOTS 2025 workshop Thurs. 1-4:15pm
Poems and Lyrics for Teaching Statistics!

- 2:30-2:45 is break with refreshments – help me remember!
- CAUSEweb.org/fun now has 78 poem and 201 song entries
- Since poems and lyrics have overlap, content is **organized by topics** with poems, lyrics and pedagogy threaded throughout
- Our group's **big** enough to have great discussion informed by varied backgrounds, experiences, and interests
- Our group's **small** enough to tailor topics and fine-tune balance of interactive activities, presentation, and discussion – ask your questions!
- I'll submit materials by July 25 to be posted on our workshop webpage.

ABSTRACT from CAUSEweb.org/cause/uscots/uscots25/program/workshops/w14

Want a novel and efficient way to engage intro statistics students, especially non-majors? This highly-interactive, fun session offers basic workshop/class-tested experiences and guidance on how/when you and your students can use/create statistical poems or (parody) lyrics to help humanize a course and enhance student learning, motivation, and classroom community in a way that's integrated with learning objectives, not an "add-on". You'll become "well-versed" in how using poetry/lyrics can support recall, confront misconceptions, introduce concepts, explore processes, and make real-world connections.

No special talent, experience, or music knowledge needed – just curiosity and openness – to readily find connections within the palette of possibilities, from short mnemonic verse/jingle to more open-ended intriguing art! With lyrics and poems, we'll overview (and note tradeoffs of) various forms (starting with the simplest) and explore examples of how statistics concepts can be the work's subject or inform imagery or form. We'll share parallels in encountering poems/lyrics or datasets, and share how to integrate examples into lecture or implement poetry/lyric projects. We'll discuss a "useful model" to choose/use existing examples (e.g., from CAUSEweb.org/fun), as well as enjoy no-pressure exercises throughout. You'll experience open-access web-based resources (e.g., rhymezone.com) to support creating lyrics/poems so bring a device to access the Internet from your Iowa State guest account.

The facilitator has given related workshops (eCOTS; MoMath), published 100+ STEM lyrics and 100+ STEM poems, and had related scholarship (e.g., Summer 2025 paper in *Teaching Statistics*) and NSF grants.

mnemonics (with poetic devices) (e.g., Lesser, 2025)

of RHYME…

- The null is dull.
- Reject means “no!”; “not reject” means “maybe so”
- Variance has a square routine:
  mean of the squares minus square of the mean.
- Multicollinearity is alive
  with VIF over 5.
- Did you draw their name from a hat

or were you drawn to them and that was that?

….and/or ALLITERATION

- Tail tells the tale.
- Permutations presume positions; combinations concern collections.
- Kurtosis: Plat is flat and lepto leaps!

10-second jingle recalls a definition

“What p-value means”
(Lesser 2005)

It is key to know
What p-value means:

It’s the chance
With the null
You obtain
Data that’s

At least that extreme!

“Row Row Row Your Boat”
(public domain)

Row, row, row your boat,
Gently down the stream,

Merrily, merrily,
merrily, merrily

Life is but a dream.

possible benefits

- make content memorable (e.g., via rhyme or emotion)

but also…..

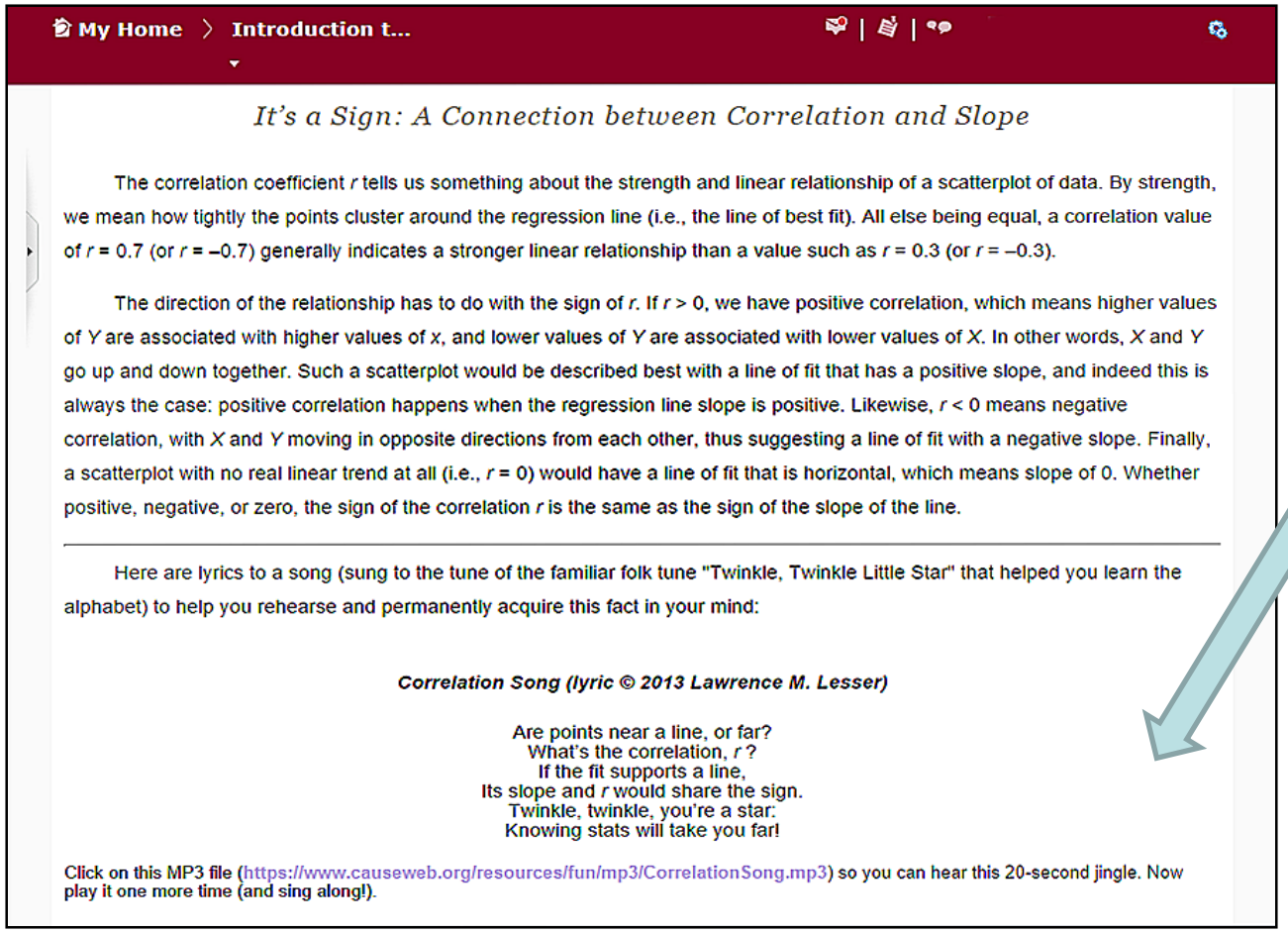
- prioritize/consolidate concepts (to fit a concise form)
- contrast everyday and statistical language
- lower anxiety and build classroom community
- humanize course/instructor to the students

IRB-approved study

(Lesser et al., July 2016 *JSE*)

- All *n* = 247 students were told their exams would have (12-14) embedded (MC) items related to online (LMS) content readings
- Half the students randomized to always have a “fun insert” (song, poem, cartoon, etc.) in otherwise self-contained readings

mini-reading with insert



My Home > Introduction t...

It's a Sign: A Connection between Correlation and Slope

The correlation coefficient *r* tells us something about the strength and linear relationship of a scatterplot of data. By strength, we mean how tightly the points cluster around the regression line (i.e., the line of best fit). All else being equal, a correlation value of $r = 0.7$ (or $r = -0.7$) generally indicates a stronger linear relationship than a value such as $r = 0.3$ (or $r = -0.3$).

The direction of the relationship has to do with the sign of *r*. If $r > 0$, we have positive correlation, which means higher values of *Y* are associated with higher values of *x*, and lower values of *Y* are associated with lower values of *X*. In other words, *X* and *Y* go up and down together. Such a scatterplot would be described best with a line of fit that has a positive slope, and indeed this is always the case: positive correlation happens when the regression line slope is positive. Likewise, $r < 0$ means negative correlation, with *X* and *Y* moving in opposite directions from each other, thus suggesting a line of fit with a negative slope. Finally, a scatterplot with no real linear trend at all (i.e., $r = 0$) would have a line of fit that is horizontal, which means slope of 0. Whether positive, negative, or zero, the sign of the correlation *r* is the same as the sign of the slope of the line.

Here are lyrics to a song (sung to the tune of the familiar folk tune "Twinkle, Twinkle Little Star" that helped you learn the alphabet) to help you rehearse and permanently acquire this fact in your mind:

Correlation Song (lyric © 2013 Lawrence M. Lesser)

Are points near a line, or far?
What's the correlation, *r* ?
If the fit supports a line,
Its slope and *r* would share the sign.
Twinkle, twinkle, you're a star:
Knowing stats will take you far!

Click on this MP3 file (https://www.causeweb.org/resources/fun/mp3/CorrelationSong.mp3) so you can hear this 20-second jingle. Now play it one more time (and sing along!).

% Correct without/with 6 Song Inserts

Topic	Without song *n* = 88	With Song *n* = 80	Difference
Margin of error: down with n down by √n	 57.3% 9.1%	 61.3% 10.0%	 4.0% 0.9%
Standard score	62.5%	75.0%	12.5%
Correlation & slope	60.2%	73.8%	13.6%
Equiprobability bias	40.9%	50.0%	9.1%
Multiplicity	36.1%	37.0%	0.9% (medium university)
p-value	44.4%	50.0%	5.6% (2-yr. college)
OVERALL	**42.3%**	**50.0%**	**7.7%**
2-tailed *p*-value ≈ 0.04			

Did the poem insert make a difference?

Table 3b. Percent correct on statistical concept assessment, by with/without (nonsong) inserts.

Topic of reading/insert (CAUSEweb id#)	Modality of insert	Without insert $n = 88$	With insert $n = 80$	Difference
Interval versus point estimate (419, 216)	Cartoon	73.9%	63.8%	−10.1%
Simple random sampling (3)	Cartoon	61.4%	48.8%	−12.6%
Random versus haphazard (468)	Cartoon	59.1%	52.5%	−6.6%
Mean versus median (258)	Cartoon	61.4%	55.0%	−6.4%
Correlation versus causation (5)	Cartoon	42.0%	52.5%	10.5%
Overall cartoon		**59.5%**	**54.5%**	**−5.0%**
Categorical versus quantitative variables (486)	Poem	17.0%	20.0%	3.0%
Inadequacy of mean without variation (181)	Quote	22.7%	27.5%	4.8%
Sample size versus margin of error (350)	Joke	40.9%	50.0%	9.1%[a]
Overall other		**22.6%**	**27.4%**	**4.8%**

NOTE: [a]Results only from two-year college with $n = 27$ without insert and $n = 26$ with insert.

What do you wonder, notice, etc.?

- See Activity #2 from my article in the Summer 2025 issue of *Teaching Statistics*

Assignment I debuted in my fall 2017 stat literacy class

- Poem, song, or video (6; 2; 0)
- Extra-credit, as trio/duo/solo
- About content, not class/instructor
- Opportunity to perform/display or even submit to a national curated collection
- Compact product forces synthesis of concepts
- Assessed on reflection, content accuracy, creativity (of idea, not physical execution)
- More detail in my 2018 eCOTS poster and 2025 *Teaching Statistics* paper

CAUSEweb.org/fun

CAUSEweb Fun Collection

Statistics fun items include an art gallery, cartoons, food, games, jokes, kinesthetic, magic, poems, puzzles, quotes, songs, short stories, and videos. Some items in the collection may have associated materials intended for instructors only, please **login** to view these materials. Click **here** to overview the literature and usage guidance. Consider contributing to this collection by contacting **Dennis Pearl** or by entering the A-μ-Sing contest (see **recent winners** and **contest rules**) or by contributing a **SPARKS** video clip. If an item is not found when searching below by keyword, type or topic, try the keyword in the Resource Library search window above.

Displaying 1 - 10 of 1042

Keyword(s)	**Type**	**Topic**	**Sort by**
	- Any -	- Any -	Title

POEMS

- Lesser, L. (2025). Poetry projects and activities help make students well-versed in statistics. Teaching Statistics, 47(2), 139-149. **https://onlinelibrary.wiley.com/doi/epdf/10.1111/test.12400**
- Patterson, C. C. & Patterson, J. W., (2009). Poetry writing in quantitative courses, Decision Sciences Journal of Innovative Education, 7(1), 233-238. **https://onlinelibrary.wiley.com/doi/10.1111/j.1540-4609.2008.00215.x**
- Smith, C., & McMurray, D. (2025). Similarities and differences between inferential statistics and global haiku. CHANCE, 38(1), 20–24. **https://doi.org/10.1080/09332480.2025.2473290**

QUOTES

- Gaither, C. C., & Cavazos-Gaither, A. E. (1996), *Statistically speaking: A dictionary of quotations*. Boca Raton, FL: CRC Press.

SHORT STORIES

- Young,T.A., McDuffie,A.R., & Ward, B.A. (2018). Selecting a good book for mathematics instruction, in Monroe, E.E. et al. (Eds.), *Deepening Students' Mathematical Understanding with Children's Literature* (pp. 39-60), Reston, VA: NCTM.

SONGS

- Lesser, L.M., Pearl, D.K., Weber, J.J., Dousa, D.M., Carey, R.P., & Haddad, S.A. (2019). Developing Interactive Educational Songs for Introductory Statistics. *Journal of Statistics Education*, 27(3), 238-252. **https://www.tandfonline.com/doi/pdf/10.1080/10691898.2019.1677533**
- Lesser, L. (2018). Modulating Misconceptions with Musical Means. *Teaching Statistics, 40*(3), 79-82. **https://onlinelibrary.wiley.com/doi/pdf/10.1111/test.12157**
- Lesser, L. (2018). Student-Created Songs in Statistics Class, videoposter, 4th Electronic Conference on Teaching Statistics, **https://www.causeweb.org/cause/ecots/ecots18/posters/4-04**

a few more references….

POEMS

- Bottom of https://www.ams.org/learning-careers/students/math-poetry
- https://www.readpoetry.com/6-online-tools-for-poets/

SONGS

- L.M. Lesser, S. Patterson, J.H. Solis, & R. Moral. (2024). A sing-ular aid: Using song to help teach solution set cases for systems of linear equations. *PRIMUS*, *34*(6), 653-667.
- L. Lesser (2014). Mathematical lyrics: Noteworthy endeavours in education. *Journal of Mathematics and the Arts, 8*(1-2), 46-53.
- L. Lesser (2001). Musical means: Using songs in teaching statistics. *Teaching Statistics, 23*(3), 81-85.

also on CAUSEweb.org/cause/resources/fun/references

Lesson Guidance

While every modality and teaching context will have its own nuances, there are some general principles that may apply to the large majority of planned usages. To this end, we have compiled a list (adapted from the guiding questions in the 2008 Lesser & Pearl *JSE* paper) that can serve as a template for teachers:

- Pick a specific learning objective -- either from your academic unit's learning outcomes, or perhaps from a vetted document such as the GAISE (**http://www.amstat.org/asa/education/Guidelines-for-Assessment-and-Instruction-in-Statistics-Education-Reports.aspx**) or the GOALS-4 Blueprint (**http://iase-web.org/documents/papers/sat2015/IASE2015%20Satellite%2041_SABBAG.pdf**).
- Find an appropriate item in the CAUSEweb fun collection that is aligned with the objective.
- Decide if the item is best used in class or out of class (e.g., on a website or in a learning management system).
- Determine if the fun item is best used to introduce the concept, to apply the concept, or to summarize the concept; in other words, consider what instruction will happen before or after the fun item and what specific things might need to happen or be said to "set up" the item and what specific things might be effective to do, say or ask afterwards.

EXAMPLE 1:

Description (From the full CAUSEweb record description at: **https://www.causeweb.org/cwis/r1248/song_what_p-value_means**): Song is simply a quick jingle to help students recall the conceptual interpretation of a p-value. May be sung to tune of "Row, Row, Row Your Boat". Recorded June 26, 2009 at the OSU Whisper Room: Larry Lesser, vocals/guitar; Justin Slauson, engineer.

URL for lyric and soundfile: **http://www.causeweb.org/resources/fun/db.php?id=86**

Length of song: 10 seconds

Goal: helping students learn (and practice saying) the interpretation of a p-value

Target audience: students in any class that introduces p-values

Set-up: discuss a real-life vignette's probability such as "in a 10-child family, 9 babies were girls". Discuss what would be even more "extreme" (10 of 10 girls; if two-tailed, 9 or 10 boys as well) and unpack that there is an implicit null hypothesis that the probability of a birth being a girl is about 0.50, and that the 7 of 7 feels unusual because under the null hypothesis of independent births with P(girl) = 0.5 each time, it seems very unlikely to get 9 or more of the babies to be girls. Play the song.

In-class Use: Play the soundfile (**http://www.causeweb.org/resources/fun/db.php?id=86**) so students can hear the song (and read the lyric at the same time, making sure you select an updated browser that allows this). Then play it again and have the class sing along. For more adventurous classes, try singing it in a two-part round as "Row, Row, Row Your Boat" would be (i.e. after one half of the room finishes "It is key to know," the other half begins the song as done in the video at **www.youtube.com/watch?v=CJrXuooX7hI**.

Online self-paced use: instruct students to do a "set-up" reading, then click on the soundfile to play the song several times, then click on the "follow-up" reading. Alternatively, instructors can have students go to **https://www.causeweb.org/smiles/songs/what_p-value_means** and answer the three questions before having the song revealed.

Follow-up: recap the pieces of the song to make sure students understand what is meant by "extreme" (try a different scenario to assess this and move away from the p=0.5 null hypothesis: a basketball player makes 7 of 10 free throws) and give examples that are one-tailed and examples that are two-tailed. Emphasize the conditional (i.e., "if the null hypothesis is true, then the probability of...") structure of the interpretation of a p-value.

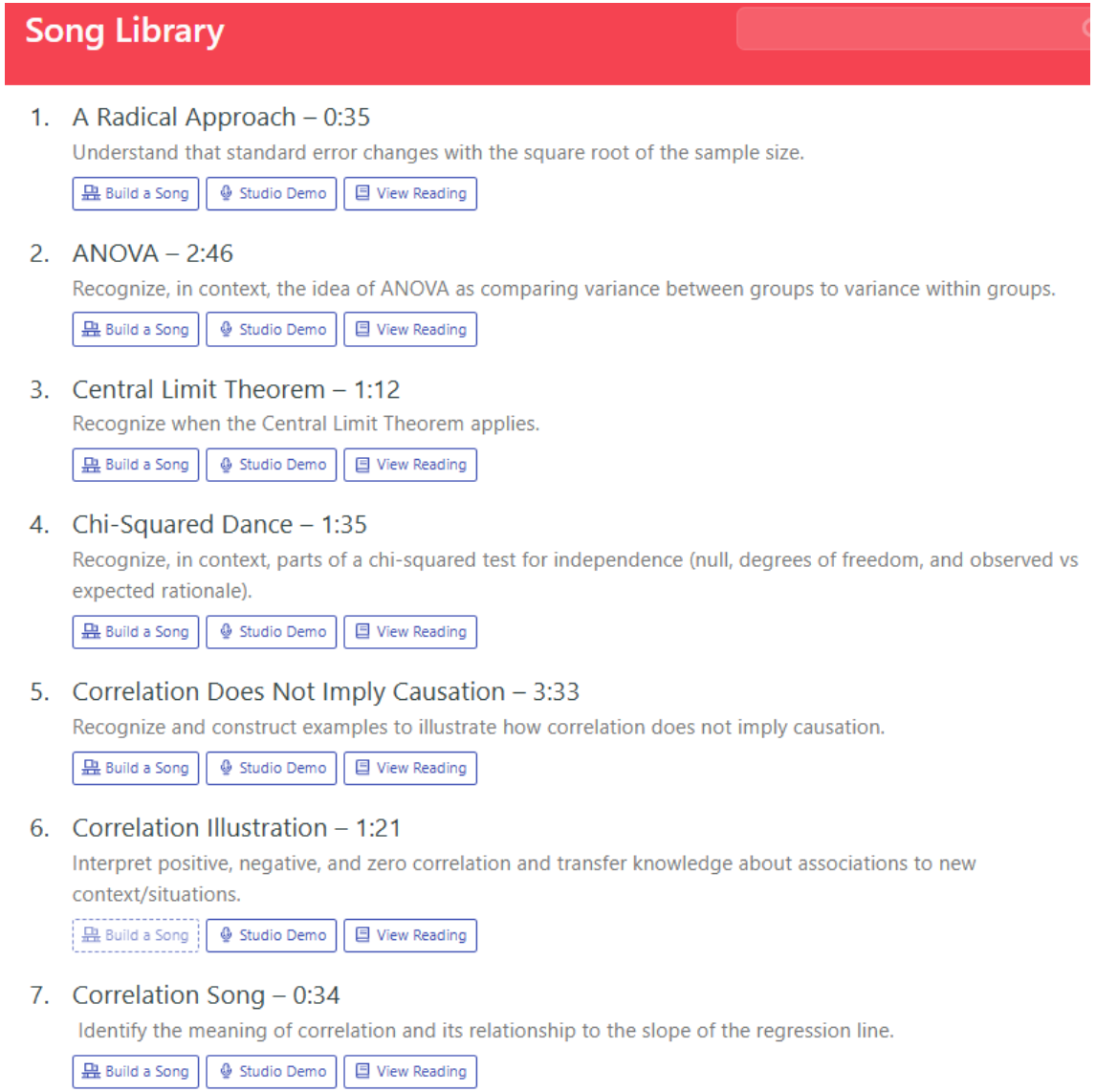
Assessment: on the next midterm or quiz, try a relevant CAOS-pool item from the ARTIST database (**https://apps3.cehd.umn.edu/artist/** or **https://apps3.cehd.umn.edu/artist/tests/index.html**); or here's a multiple-choice item adapted from Vogt, 2007 p. 13:

A p-value of .03 means:

1. There's a 3% chance the null hypothesis is wrong.
2. The probability that the result is due to chance (is a coincidence) is 3%.
3. A result of this size would occur by chance alone 3% of the time.
4. If the null hypothesis were true, the probability of getting a result at least this far away from the null hypothesis would be 3%.

CAUSEweb.org/smiles

28+ “interactive” intro statistics songs with stated learning objectives



song topics span intro course

- Levels of measurement
- Mean vs. median
- Convenience vs. random sampling
- Correlation vs. causation
- Patterns of correlation
- Correlation and slope
- Statistic vs. parameter
- Descriptive vs. inferential
- Estimator bias
- Margin of error in poll
- Probability rules
- Effects on width of CI
- Framework of testing H_o
- *p*-values
- Reporting test conclusion
- Concepts of X^2 test
- Effect of *n* on significance
- Concepts of regression model
- Observed/fitted/residuals
- Standard error (sqrt law)
- Concepts of ANOVA test
- Bayesian reasoning (most tests for rare traits yield false positives)
- Central Limit Theorem
- Simpson's Paradox
- Ethics in statistics

POEMS & LYRICS:

similarities and differences

- Use context (like stats, not math)?
- Use repetition?
- Use rhyme?
- Use meter?
- Use imagery?
- Most salient mode of reception?
- Additional meaning via….?

Types of rhyme (see https://en.wikipedia.org/wiki/Rhyme)

- **Perfect rhyme** (different preceding consonant, but same final stressed vowel and all following sounds)
- **Alternatives**: Syllabic, near/imperfect, weak(unaccented), semirhyme, forced(oblique), assonance, consonance, half(slant), pararhyme, alliteration, homophones, eye
- **Types by position**: tail/end, internal, off-centered, holorime, echo, broken, cross

(End-)rhyme schemes

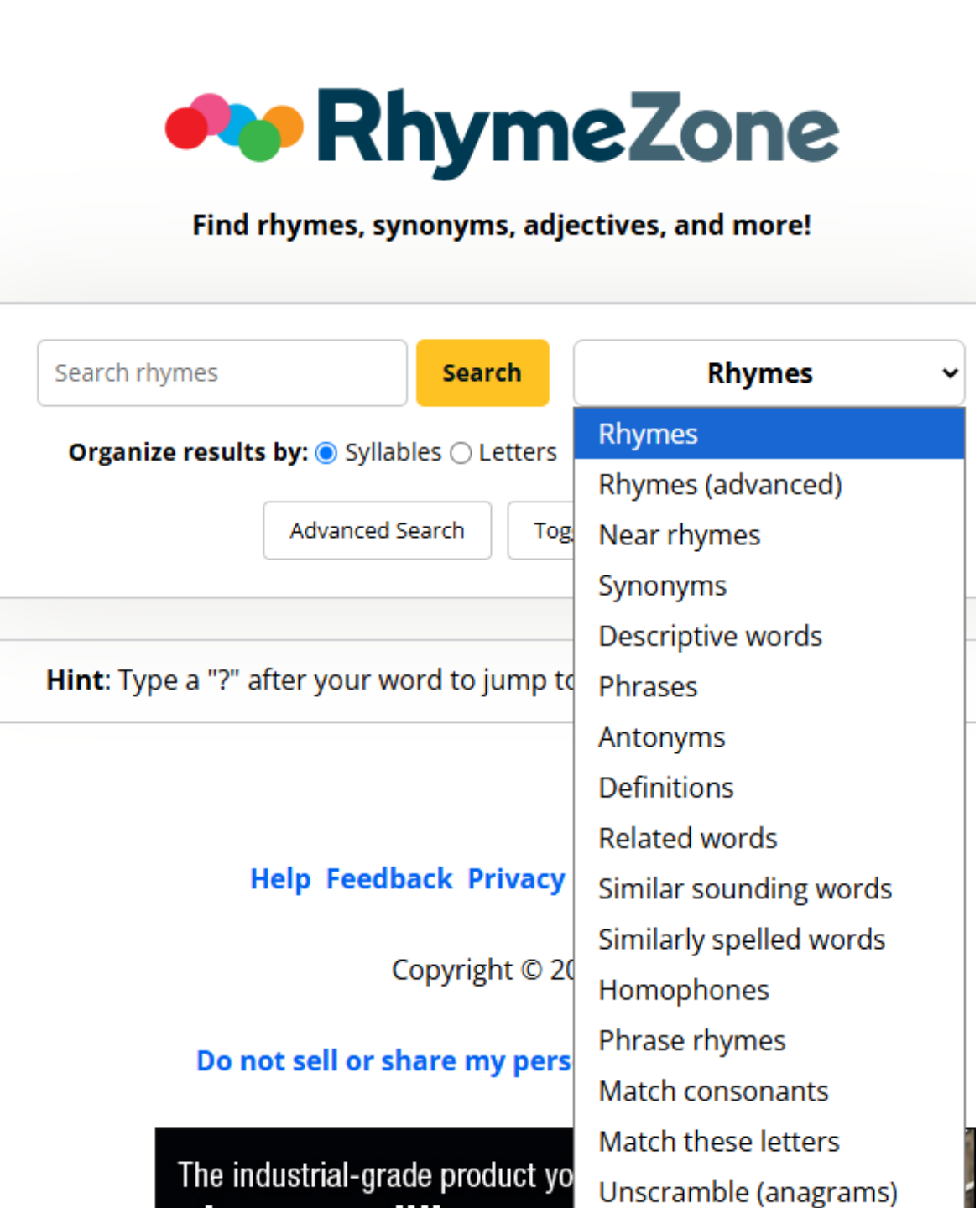
(i.e., patterns of rhyming lines in a stanza)

- Couplet: aa
- Triplet: aaa
- Enclosed rhyme: abba
- Ballad: abab (alternate rhyme) or abcb
- Limerick: aabba

for STEM educational purposes, fancier forms are less common:

- Terza Rima, Sonnet, Villanelle, Pantoum, Sestina, etc.

rhymezone.com



rhymezone.com

RhymeZone

Find rhymes, synonyms, adjectives, and more!

Search rhymes | Search | Rhymes

Organize results by: Syllables Letters

Advanced Search | Tog

Hint: Type a "?" after your word to jump to

Help Feedback Privacy

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Do not sell or share my pers

The industrial-grade product yo

- Rhymes
- Rhymes (advanced)
- Near rhymes
- Synonyms
- Descriptive words
- Phrases
- Antonyms
- Definitions
- Related words
- Similar sounding words
- Similarly spelled words
- Homophones
- Phrase rhymes
- Match consonants
- Match these letters
- Unscramble (anagrams)

RhymeZone

Word: statistics | Search | Find rhymes

[Rhymes] Near rhymes Related words Phrases Phrase rhymes
Descriptive words Definitions Homophones Similar sound Same consonants

Advanced >>

Words and phrases that rhyme with *statistics*: (38 results)

2 syllables:
mystics

3 syllables:
anglistics, autistics, **ballistics**, casuistics, eristics, f-statistics, heuristics, **linguistics**, **logistics**, **patristics**, **sphragistics**, statistics', **stylistics**

4 syllables:
agonistics, biolistics, cameralistics, chrematistics, folkloristics, matheuristics

METER

Rhythmic structure of a line – specify number of "feet", where each foot generally has 2-3 syllables with a particular pattern of **stressed ("/") and unstressed ("x")** syllables (e.g., iambic pentameter has 5 iambic feet);
don't worry about the names, just be mindful about pattern consistency

TIP: Whether sung or spoken, a word's stressed syllables should be the same

metrical foot	stress pattern	
iamb	x/	E,Q
trochee	/x	Q,E
spondee	//	DQ,DQ
dactyl	/xx	DQ,E,Q
anapest	xx/	E,Q,DQ
amphibrach	x/x	
cretic	/x/	
bacchius	x//	
antibacchius	//x	

Meters have different emotional colors (deliberate, light, conversational, etc.)

try some out with this 6-syllable phrase and see how feeling or meaning shifts:
I need you in my life

Note: rhyme not always needed!

- Especially if it interferes with saying what you really want to say
- Free verse **poems** have no rhyme
- Some well-known **lyrics** have little or no rhyme, such as:
  “Moonlight in Vermont” (John Blackburn), “America” (Paul Simon),
  “Annie’s Song” (John Denver), “Fields of Gold” (Sting),
  “Hand in My Pocket” (Alanis Morissette)

TYPES OF POEMS

		With rhyme scheme?	
		YES	NO
With strict meter?	YES	**Formal verse**	Blank verse
	NO	Rhymed verse (rare)	**Free verse**

TYPES OF STATISTICS POEMS:
subject, structure, metaphor (Lesser, 2025)

- **Subject** of the poem is statistics itself (or a statistics concept…)
- **Structure**/form is informed/generated by statistics
- **Metaphor/imagery** for something non-statistical (“show, don’t tell”)

Which type is this?

- **Subject** of the poem is statistics itself (or a statistics concept…)
- **Structure**/form is informed/generated by statistics
- **Metaphor** for something non-statistical

"**Systematic Sample from a Children's Song**" (Lesser, 2020)

Twinkle star
wonder are
the high diamond sky
little I
you

inspiration for that “sampling” poem:

“erasure” – a type of “found poetry”
made by deleting words
from a larger piece of text,

(e.g., 2017-2019 US Poet Laureate
Tracy Smith created “Declaration” by
selecting from US Declaration of Independence)

alternatives….

- Those were systematic samples,

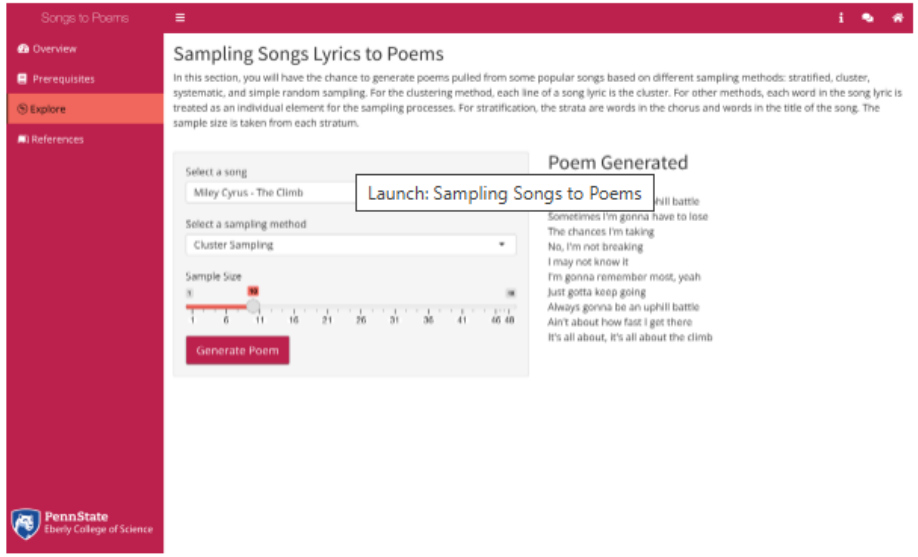
but what if we used

a different sampling scheme

(e.g., stratified, cluster, simple random sample)?

- This inspired an AMS column by Sara Stoudt
  and a Penn State BOAST app →

https://sites.psu.edu/shinyapps/2023/05/04/sampling-songs-to-poems/



Sampling Songs to Poems

DATA GATHERING, INTRODUCTORY APPS

NEW!, SIMULATION

This app is used to let the student learn about the concept of all four sampling methods: cluster, stratified, systematic, and simple random sampling.

Want to contribute a song to the app? You can do so via our Google Form: Add Songs to the Song Poems App. (Note: you will need to (re-)launch the app *after* successfully adding new songs to see them.)

Launch App

https://psu-eberly.shinyapps.io/Song_Poems_Beta/

Sampling Song Lyrics to Poems

This app demonstrates using four common sampling methods to generate poems out of the lyrics from different songs. The different sampling methods include: simple random sampling, systematic sampling, cluster sampling, and stratified sampling.

Instructions

To get the most out this app, we recommend:

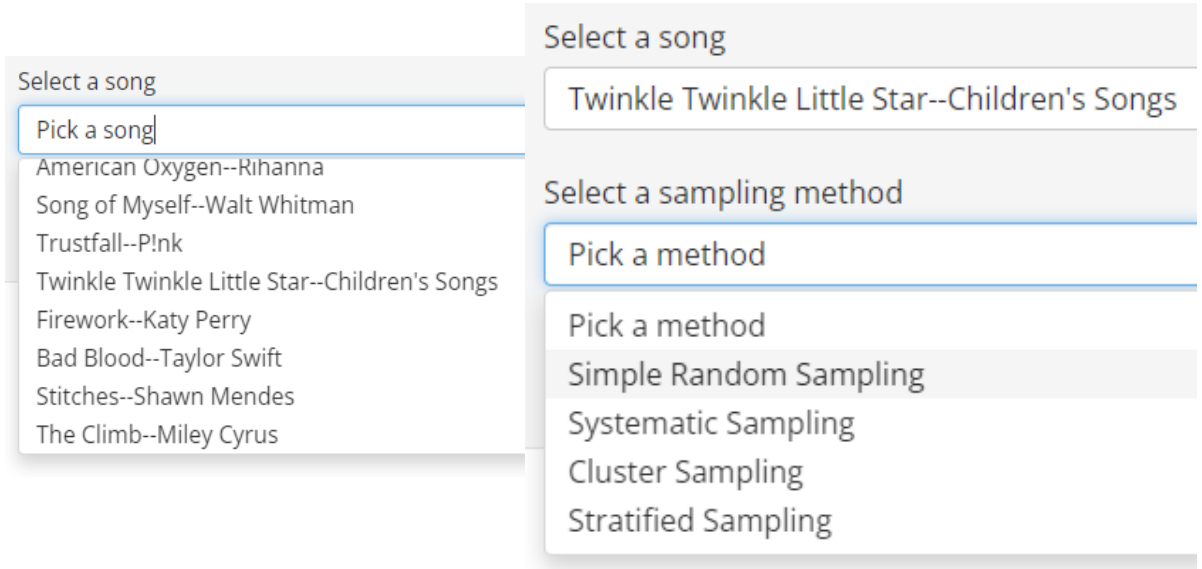
1. Reviewing the prerequistes to understand how each sampling method works.
2. Using these sampling methods to create your own poems on the Explore page.

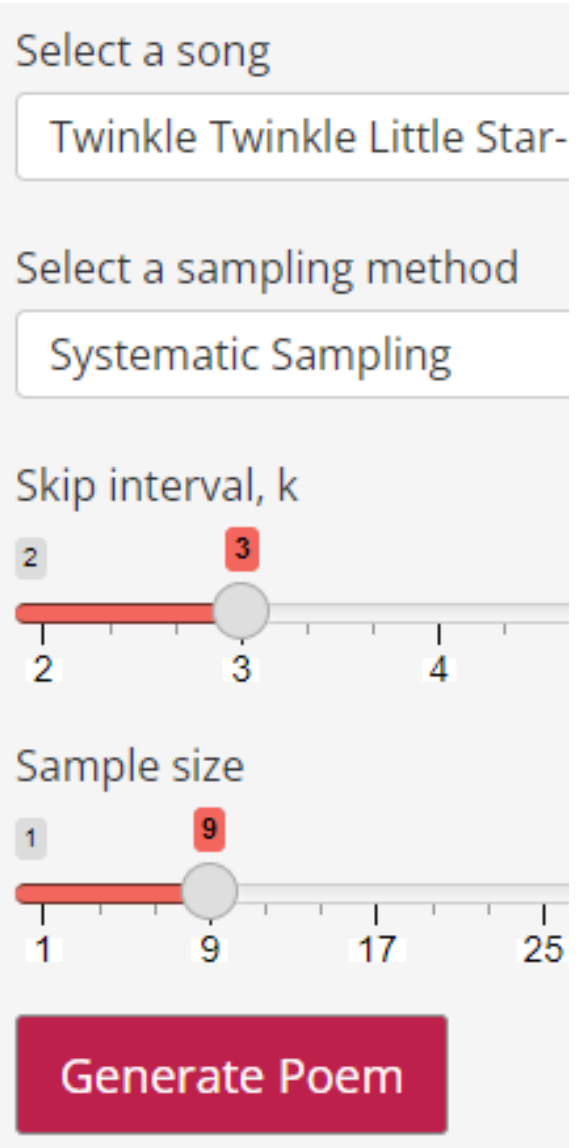
GO!

Acknowledgements

This app was developed and coded by Nurul Syafiqah Hamdi. Special thanks to Larry Lesser, The University of Texas at El Paso, for his support in developing the app, which implements the idea of using the poetry writing technique of erasure to illustrate statistical ideas as suggested in his **2020 Journal of Humanistic Mathematics Paper** .

Cite this app as:
M. Hamdi, N., Pearl, D. K., and Hatfield, N. J. (2022). Sampling Song Lyrics to Poems. [R Shiny app]. Available https://psu-eberly.shinyapps.io/Song_Poems





key song structure terms

- **Verse**: melody stays same but words change across verses
- **Refrain**: repeated line or phrase often found at the end of each verse
- **Chorus**: melody and words same across choruses, but differ from verses
- **Bridge**: offers new angle or turning point in second half of the song and is lyrically and musically different from verses (and any chorus)

TYPES OF SONGS

- **12-bar blues** (3-line rhymed verses where first 2 lines are identical)
- **AAA** (e.g., verse, verse, verse like Bob Dylan's "Blowing in the Wind")
- **AABA** (verse, verse, bridge, verse, like The Beatles' "Yesterday")
- **Verse-Chorus** (like James Taylor's "Fire and Rain"; or including a bridge like Julie Gold's "From a Distance")

why might Verse-Chorus be best for educational songs?

Continuum of lyrics (in ascending difficulty/complexity; Lesser, 2014):

- **rap/chant** (uses mainly rhythm and rhyme, not melody or harmony),

[examples: “What to Ask About a Study”; “The Null Hypothesis”]

- **12-bar blues** (“Statistician’s BLUEs” or “X-bar 12-bar Blues”; the 12 bars of music keep repeating and use only 3 chords; the first 2 lines of each 3-line verse are the same)
- **parody** lyric of an existing song, utilizing its rhythmic or rhyming structures and its familiar melody and style.
- **original lyrics AND music** (not covered here for time reasons): verse-chorus, AABA, AAA

avoid CAOS: don't rewrite songs that are….

- **C**OARSE (lest it make students think about the original song's vulgarity, racism, etc.)
- **A**PPROPRIATING (e.g., not everyone can pull off a rap (persona))
- **O**BSCURE (seek songs that are "classic" or charted high on Billboard; poll students in the first week of class on their favorite artists)
- **S**ACRED (e.g., a hymn or Christmas song)

SOME LYRIC-WRITING TIPS

Method: placeholder lyrics (with number and stress pattern of syllables needed for the melody)

“Scrambled eggs

oh my baby how I love your legs

but not as much as I love scrambled eggs”

became…..

“side-by-side method” when writing parody (example: “The Gambler” through 1st chorus)

On a warm summer's evenin' on a train bound for nowhere
I met up with a gambler, we were both too tired to sleep
So we took turns a-starin' out the window at the darkness
'Til boredom overtook us and he began to speak

He said, "Son, I've made a life out of readin' people's faces
And knowin' what their cards were by the way they held their eyes
So if you don't mind my sayin', I can see you're out of aces
For a taste of your whiskey I'll give you some advice"

So I handed him my bottle and he drank down my last swallow
Then he bummed a cigarette and asked me for a light
And the night got deathly quiet and his face lost all expression
Said, "If you're gonna play the game, boy, you gotta learn to play it right"

CHORUS: You got to know when to hold 'em, know when to fold 'em
Know when to walk away and know when to run
You never count your money when you're sittin' at the table
There'll be time enough for countin' when the dealing's done

On a warm summer's evenin', on a train bound for nowhere,
I met up with a gambler -- we were both too tired to sleep.
So he told me how he planned winnin' lottery prizes
'Til, as a stats teacher, I just had to speak:

"Son, I've made a life out of readin' students' faces,
Checkin' comprehension by the way they held their eyes.
And I can see your blackboard is erased in some places--
Give me some peanuts and I'll give ya some advice.

You track those weekly draws, you say ya got a system--
You call some numbers "hot", you deem others "due";
But I insist, they each have the same chance--
If you're gonna play the game, boy, ya gotta know what's true!

CHORUS: You gotta know when you pick 'em, what's superstition,
Know what is strategy and know when there's none!
You never try to learn this at the Seven-Eleven-
Take the time right now for learnin' when the singin's done!

Ideas for songs

look for existing titles that contain a word that is a statistical term (or homonym or rhyme of one)

- “Mean”
- “The Gambler”,
- “~~Happy~~ Birthday *Song* ~~to You~~”,
- “Hit Me with your best ~~shot~~ *plot*”,
- “one is the ~~loneliest~~ *likeliest* number”,
- “She ~~blinded~~ *taught* me ~~with~~ *data* science”,
- “slip slidin’ ~~away~~ *to the mean*”,
- “You’ve got a ~~friend~~ *trend*”

Concept map brainstorm technique

- Start with one idea/word in the center of the page
- set a timer for 10 minutes, and don't stop writing
- just write down anything it reminds you of or that you might want to work into the song – don't worry yet about meter or rhymes (you'll find those a second pass later)

- If you're usually left-brained, activate the rest of your brain by doing something physical first
- If you're usually right-brained, activate the rest of your brain by doing something involving logic or organizing

Example excerpt of “regular lyric” with stats terms or concepts (others are in my 2001 *Teaching Statistics* paper)

What statistics concept is implicitly in this excerpt from

Christine Lavin’s “Attractive Stupid People”?

“but the problem is

the kids won't look as good as mom or dad
and they're always slightly smarter
which drives their pretty parents mad”

Using lyrics of "regular songs"

Continuum of Interactivity with Educational (Ma...

flowchart usage model: Figure 2 of Michael Jurmu (2005) in *J. of Geography*

- Identify lyrics with content concept
- Ascertain appropriateness
- Are lyrics the focus or a facet?
- Do lyrics describe or just mention…?
- How accurate are the lyrics? Explain.
- Are lyrics an (intended?) analogy?
- etc.

Continuum of interactivity (Lesser, 2017)

1.) discuss content in existing commercially-released songs
2.) listen to recording of a song
3.) listen to performer play song live
4.) provide accompanying rhythm as performer plays song live
5.) sing along (with lyric displayed) with recording
6.) sing along (with lyric displayed) with live performance
7.) sing along, including filling in blanks in real time
8.) fill in words in advance in response to content-based prompts
9.) write entire songs as a project

Lesser *2-D* model of activeness

Student role in lyric-writing

- just explore meaning of given words
- Input words
- Write a rap
- Write parody or section of a song
- Write a full song

Student role in performing

- Just listen
- Provide accompaniment (e.g., rhythm)
- Sing (in group or to oneself); complete rhymes during real-time singing
- Solo performance of rap
- Solo performance of song

Sample process

(also, see flowchart in Crowther et al., 2017)

- Pick a STEM word, topic, or concept
- Brainstorm a concept map or word web with key terms and facts to incorporate
- Identify title (and song to parody?)
- Write lyric of chorus (if song has one)
- Identify what each verse should "cover"
- Write verses
- Write melody and harmony (if non-parody)

Haiku structure (as a haiku – *so meta !*)

author unknown

Haiku instructions:
5 syllables, then 7,
Then another 5.

What’s the CHANCE of a 2025 haiku paper?

- Smith, C., & McMurray, D. (2025). Similarities and differences between inferential statistics and global haiku. *CHANCE*, *38*(1), 20–24. **https://doi.org/10.1080/09332480.2025.2473290**

statistics haiku examples

(*J. of Humanistic Mathematics; Amstat News, CAUSEweb*)

“Multivariate”

So many factors

In my life changing at once:
I am confounded.

“Transformed”

Rocked by earthquake strength,

musical notes and loudness,

and brightness of stars.

“Adjusted R Square”
At some point, adding lines to a poem only dilutes its impact.

“99.73%”
It’s why your birthday is viewed as an outlier, normally speaking.

or have entire class use the same topic!

Expected Value Haikus

by Lawrence Mark Lesser

Deal or No Deal

The banker offers
less than expected value,
as was expected.

62% Shooter's 1-and-1

Expected number
of points is 1, the outcome
that is least likely!

Exchange Paradox

Dogs swap bowls and beds,
sure the other's better like
Monty's other door.

Negative Expected Value

Lottery tickets,
extended car warranty,
or health insurance.

Expectation in the Balance

Where distributions
balance like a see-saw with
one's child more distant.

Unbiased

It is hard to speak
about expected value
and avoid bias.

The Point

I could reduce a
distribution to EV,
but that would be mean.

ACTIVITY (solo or with partners): haiku

Pick a statistics topic that is part of your
course and write a haiku about it.

To help find rhymes for poems (including limericks) with rhyming lines, try free resources such as **rhymezone.com**

lesser limerick example

Lottery Strategy

The lottery numbers you choose
Won't change your chance to lose
But if all 6 match
You'll get way more cash
If you picked what's picked by few!

Stressed &
unstressed syllables

- uSuuSuuS
- uSuuSuuS
- uSuuS
- uSuuS
- uSuuSuuS

ACTIVITY: limerick

Pick a statistics topic in your course, write a limerick about it, and share

To explore rhymes for the same-color rhyming lines, try free resources such as **rhymezone.com**

Stressed & unstressed syllables

- uSuuSuuS
- uSuuSuuS
- uSuuS
- uSuuS
- uSuuSuuS

An explanatory variable has a response and
The space
Before response is deemed
Freedom,
Sought by degrees:
More time to reflect
If randomness is
Uniform, if correlation is
Causal, chance, or complexity yet
Unnamed.

In the space
To scan
What's there, what else
Could be: mediator or moderator
Variable.
Not bearing burden of being
Certain, we seek habit
To inhabit uncertainty –
To describe, not deny –
And fail to reject.

Conducting a study of one
Being present in the moment,
Not lost in time series,
Letting noise and outliers pass,
Centered in breath,
Eyes shut to better see our mode
Beyond expectation,
Sitting in the lotus,
No longer standing for
Law Of The Unconscious Statistician.

"Mindful Means" ACTIVITY

(Lesser, April 2018 *Amstat News*)

For each underlined word,

are statistical and mindfulness meanings

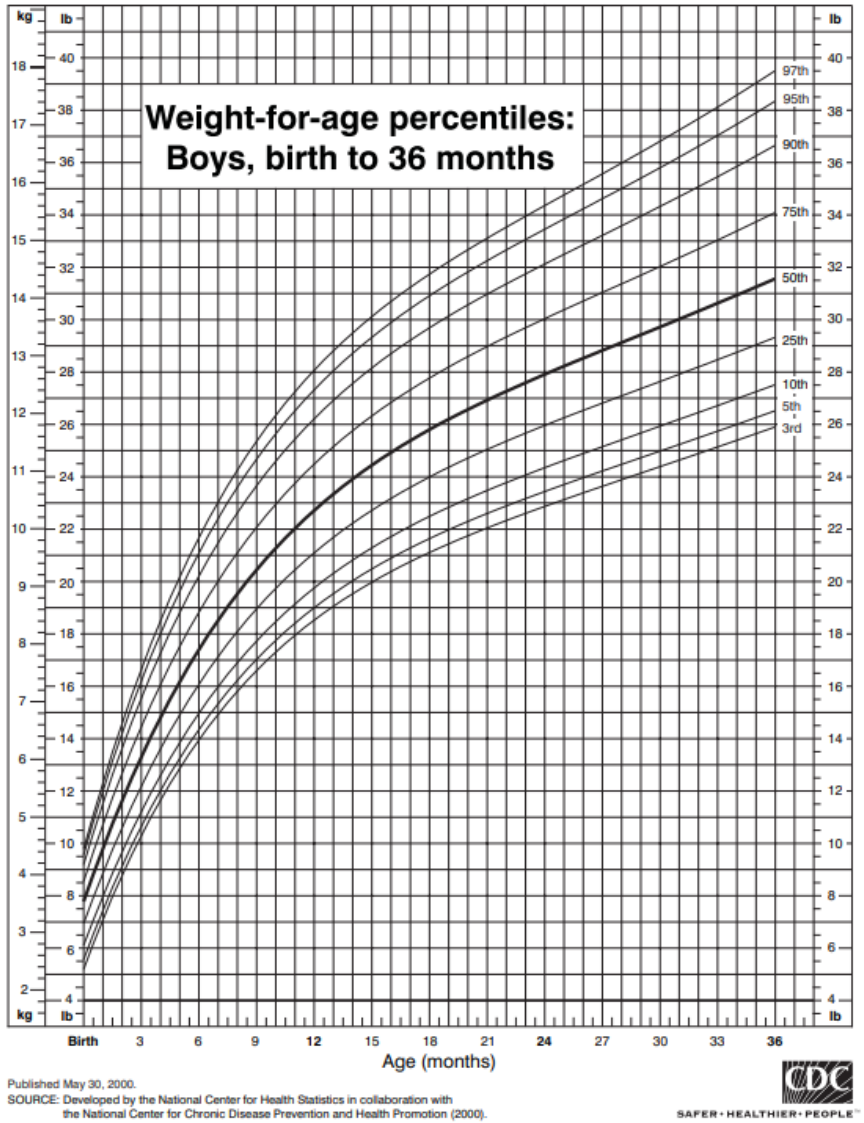
aligned, opposite, or unrelated?

Other teaching ideas

- Rhymes/jingles to help students recall key ideas/definitions
- (extra-credit) opportunities to create their own art (poem, song, video), and most choose poem! See Lesser 2018 eCOTS poster for detail on assignment and its assessment
- Encourage students to submit best poetry to CAUSEweb (e.g., for the 2025 A-mu-sing contest or anytime!) or to occasional other contests (e.g., by ASA)
- Write poem (e.g., on Google Doc) as a class by crowdsourcing ideas
- Spring statistical poetry event (e.g., March is National Music Month; April is National Poetry Month AND Mathematics and Statistics Awareness Month; May is National Songwriting Month)

What do you notice?

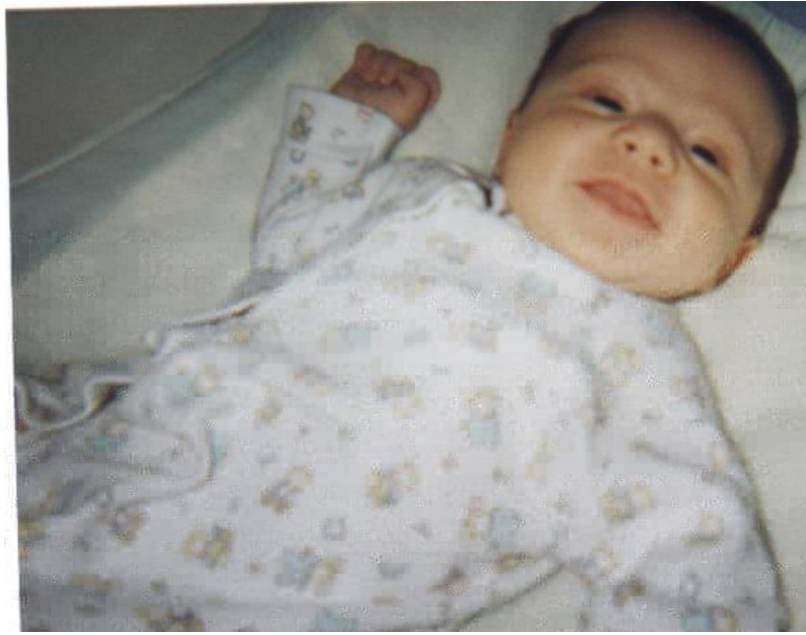
"Worry Lines" (Lesser, 2020)

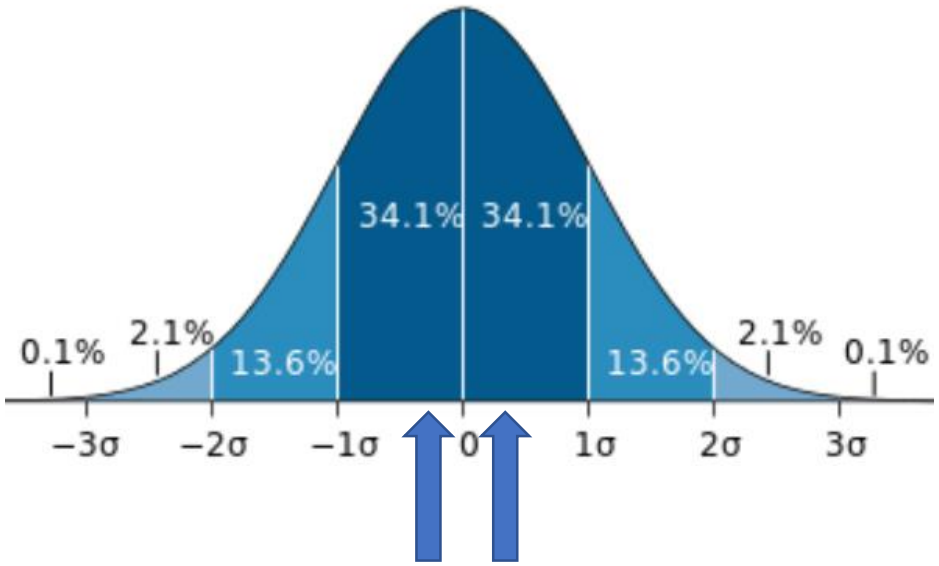


At our next infant wellness visit,
the pediatrician plots
our only child's weight on
paper ruled
by increasing bands
with concavity ill-suited
for extrapolation.

Kilograms or pounds,
it's 40th percentile, down
from the 60th percentile.
Having delivered well
into "advanced maternal age," my wife
frowns ("*we aren't feeding him enough!*").
I say it just fell

half a sigma and
we're still well
within the fat
part of the bell curve –
it's normal –
this won't be one
of our worries.





TEACHING TIP

- Let students read AND hear the poem
- Have accompanying visuals
- Have accompanying questions ready (how is 60^{th} to 40^{th} percentile “half a sigma”? what do the bands mean and why are they curved?)

ACTIVITY: write a clerihew about a statistician

- features a famous person in a quirky/humorous light
- a 4-line poem with aabb rhyme scheme
- first line is the person's name, then a rhyming line follows
- the second couplet typically has a different meter and rhyme

Statistical Clerihews

by Lawrence Mark Lesser

Reverend Thomas Bayes
learned probability's ways:
a minister, not friar,
he used what came prior.

William Playfair
made charts you display there:
a British spy with zeal
who stormed the Bastille.

Florence Nightingale
(where gents tried 'n' failed)
gave hospital staffs
illuminating graphs!

Sir Francis Galton
gives us a caution:
correlation caught,
but eugenics was fraught.

William Sealy Gosset
turned on the faucet,
sampled the beer:
law of error got clear.

Sir Ronald Fisher
tested a mixture
of milk and tea:
did milk precede?

Jerome Cornfield
his fame was more sealed
by proving the answer
that smoking brings cancer.

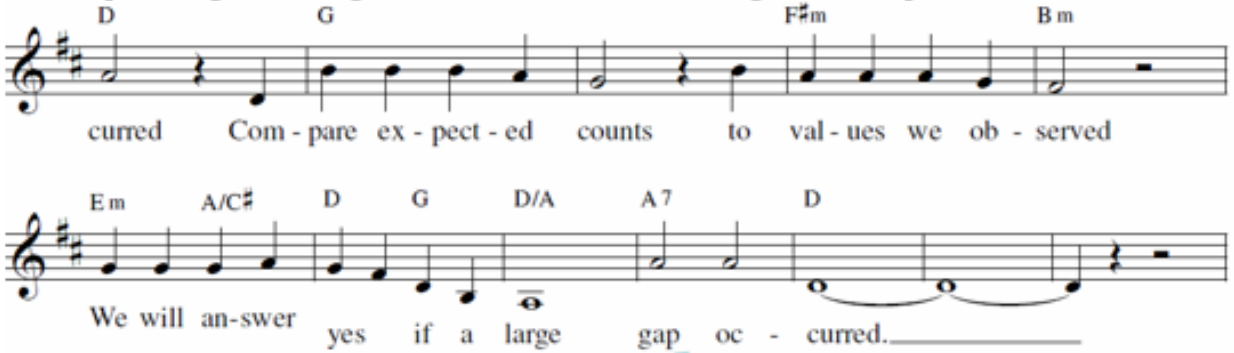
Could also try a full-length piece about a statistician (e.g., Florence Nightingale)

- See the poem “After Math” from Mary Alexandra Agner’s collection *The Scientific Method*
- See Lesser’s song “Florence” in the CAUSEweb.org/fun collection

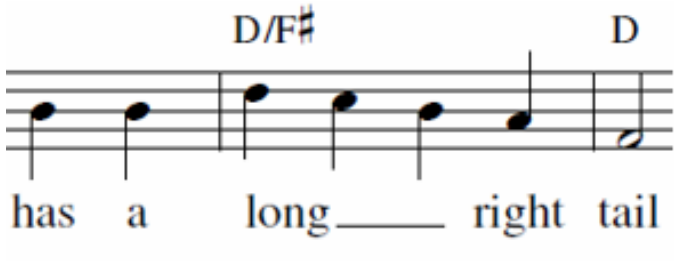
examples with statistics-informed structure

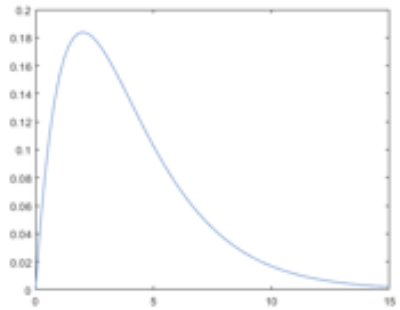
prosody in Lesser/Dousa “Chi-squared Dance”

- title playfully invoked by “square dance” music



- large melodic leap for “large gap”
- “long right tail” set to a long descending phrase





my 2020 *JHM* poem “By Design”

(four 4-word lines in Latin square layout)

An	experimental	poem	designed
with	two	blocking	factors,
neither	of	them	gender:
it’s	a	Latinx	square.

Pedestrian Injury Rates by Age

by Lawrence Mark Lesser

Data hint

that youth and elders

lack the sense or sharp senses

to get out of the street fast enough.

Also, see

- Lesser’s “New Normal”
- Lesser’s “Factor!al Countdown”

brainstorm!

How else might statistics
inform the **visual shape** of a poem?

ACTIVITY (solo or with partners): parody-writing

- Avoiding CAOS, pick a song you know well enough to write (on the left side of a page) one verse or chorus from it
- Pick a statistics learning objective
- On the right side of the page, rewrite the left side (trying to maintain its meter, rhyme scheme, and style) to support the learning objective

ACTIVITY (solo or with partner(s)) – 10 minutes

- Pick one word that has statistical and everyday meanings (e.g., pick one from Kaplan et al. 2009):

Table 1: List of words suspected to have lexical ambiguity in statistics (words examined in this study *italicized*)

Association	Control	Independence	Nominal	Range	Skew
Average	Correlation	Margin	Normal	Response	*Spread*
Bias	Distribution	Mean	Null	Sample	Standard
Blocking	Error	Median	Parameter	Scatter	Statistic
Center	Event	Minimum	Population	Significance	Statistics
Confidence	Experiment	Mode	*Random*	Simple	Variance

- Write a **free verse** poem (no regular meter or rhyme) where statistics (or a statistics concept) is a metaphor (OR a lyric, if you prefer)

ACTIVITY: write a poem about a misconception

- Equiprobability bias: my poem “50-50” and my song “1 in 2”

lessons learned…

- Be open to beauty in other disciplines
- Never too late to (re)start creative path
- Poetry/song is more than a memory aid
- Poetry, song, and statistics are too important to leave only to the full-timers!
- Poetry and song humanize us (…to our students)

ADDRESSING HESITATIONS

Hesitations	Solutions
Can't quickly find good examples	CAUSEweb.org, etc.
No skills/talent	Press "PLAY"; tap student talent
Uses too much time	Streamline length; share as students enter room or get papers; have students access online outside class.
Clash with students' cultures	Know your audience (week 1 survey, etc.)
Need to be seen as serious by students	Make connections to content (or assessment); make a mini-lesson plan
Need to be seen as serious by colleagues/supervisor; Unaware of evidence of helping learning	See studies and statements supporting engaging/active learning
Copyright permission	Apply "fair use test" as with other materials

Lesser et al. (2013)

they can be quite short!

Songs: short jingle [notice use of public domain songs!]

- 30 sec: “Take Me Out to the Brew’ry” or ”Help Me Make a Good Bar Graph”
- 20 sec: “Correlation Song”, “Birthday Song”, or

“An Ordered Arrangement with no Lyric Repeats”

- 10 sec: “What p-value means”

Poems:

- 10 sec: read a limerick (5 lines) or clerihew (4 lines)
- 5 sec: read a haiku (5+7+5 = 17 syllables)

But I can’t create music….

- Collaborate with peers or students!
- Do rap/hip-hop lyrics over backing tracks (royalty free) in different genres: https://pixabay.com/music/
- Generate music with AI – DEMO by Dennis Pearl…..

Poems to Lyrics to Music

Demo of AI generated music for Larry's Poetry & Lyrics Workshop

Dennis Pearl July 17, 2025

Poems to Lyrics to Music

- AI tools are now available to convert lyrics to the type of music you enjoy
- Examples include udio.com and suno.com which offer limited free versions
- Both are easy to get started with and generate good quality songs. Udio has more options for advanced users but more difficulty in creating longer songs with free version. Suno has more restrictions on free use (and way more ads) but has a cleaner interface.
- About 5 to 7 lines of poetry (≈ 50 to 70 words) (≈ 1 verse and a short chorus) translate to 30 seconds of music
- My simple process in moving poems to lyrics for input into either of these AI tools:
  - decide on a couple lines that give the theme that goes with the learning objective;
  - make that a chorus and repeat it.