The Meaning of Meaning

Last updated: 2022/11/01, 09:16:55 EDT

Principles of Complex Systems, Vols. 1, 2, & 3D
CSYS/MATH 300, 303, & 394, 2022–2023| @pocsvox

Prof. Peter Sheridan Dodds | @peterdodds

Computational Story Lab | Vermont Complex Systems Center
Santa Fe Institute | University of Vermont

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On Instagram at pratchett_the_cat

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"Ousiometrics and Telegnomics: The essence of meaning conforms to a two-dimensional powerful-weak and dangerous-safe framework with diverse corpora presenting a safety bias"

Dodds et al.,
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What does meaning even mean?

From the smack-tweeting Merriam-Webster:[1]
"The thing that is conveyed especially by language"

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What does meaning even mean?

- From the smack-tweeting Merriam-Webster:[1]
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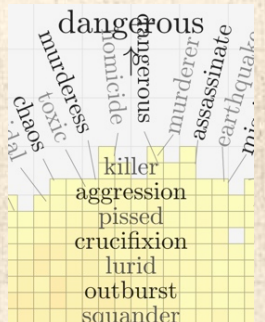

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[1] Life goal: Never get owned by a dictionary on social media

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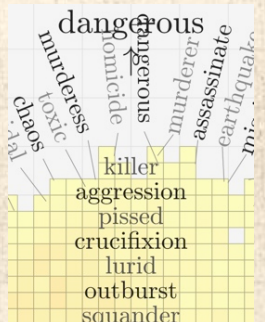

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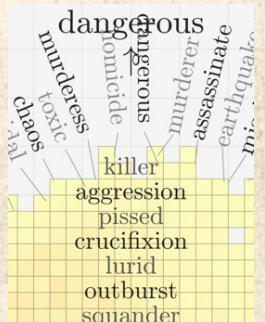

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- Abed searches for the meaning of Christmas (in stop animation)
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“Introduction to Teaching”

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Abed Nadir: “I thought the meaning of people was somewhere in here.

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- Abed Nadir: “It’s a metaphor. It represents lack of payoff.”

“Introduction to Teaching”

Abed Nadir: “I thought the meaning of people was somewhere in here. Then I looked inside Nicolas Cage and I found a secret—people are random and pointless.”

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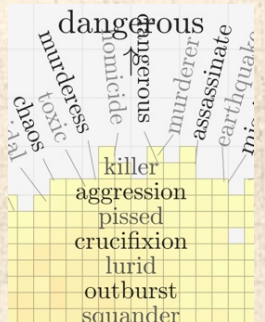

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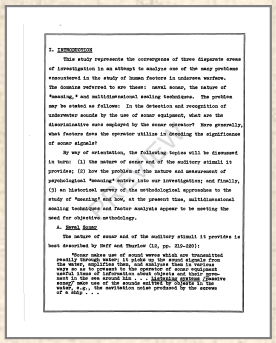

"A factorial study of complex auditory stimuli (passive sonar sounds)"

L. M. Solomon,
Unpublished doctoral dissertation, University of Illinois, , , 1954. [22]

From the introduction:

'This study represents the convergence of three disparate areas of investigation in an attempt to analyze one of the many problems encountered in the study of human factors in undersea warfare.
The domains referred to are these:

- naval sonar,
- the nature of "meaning,"
- and multidimensional scaling techniques.

The problem may be stated as follows: In the detection and recognition of underwater sounds by the use of sonar equipment, what are the discriminative cues employed by the sonar operator?
More generally, what factors does the operator utilize in decoding the significance of sonar signals?'

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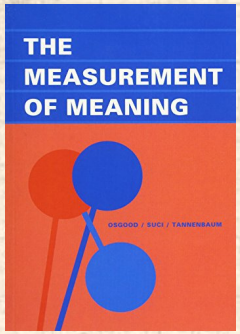

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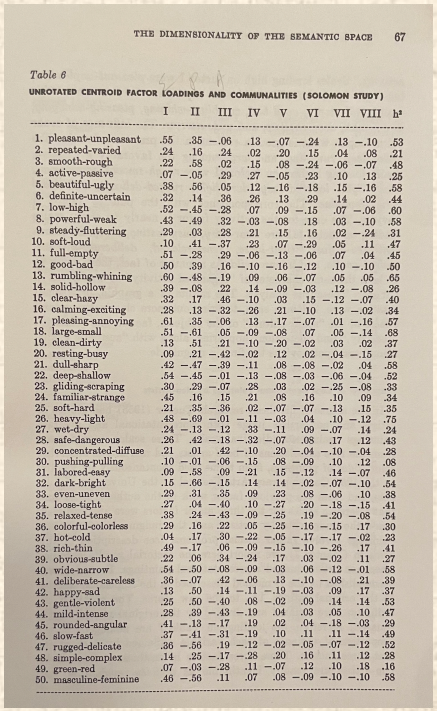

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Table 6

UNROTATED CENTROID FACTOR LOADINGS AND COMMUNALITIES (SOLOMON STUDY)

	I	II	III	IV	V	VI	VII	VIII	h^2
1. pleasant-unpleasant	.55	.35	−.06	.13	−.07	−.24	.13	−.10	.53
2. repeated-varied	.24	.16	.24	.02	.20	.15	.04	.08	.21
3. smooth-rough	.22	.58	.02	.15	.08	−.24	−.06	−.07	.48
4. active-passive	.07	−.05	.29	.27	−.05	.23	.10	.13	.25
5. beautiful-ugly	.38	.56	.05	.12	−.16	−.18	.15	−.16	.58
6. definite-uncertain	.32	.14	.36	.26	.13	.29	.14	.02	.44
7. low-high	.52	−.45	−.28	.07	.09	−.15	.07	−.06	.60
8. powerful-weak	.43	−.49	.32	−.03	−.08	.18	.03	−.10	.58
9. steady-fluttering	.29	.03	.28	.21	.15	.16	.02	−.24	.31
10. soft-loud	.10	.41	−.37	.23	.07	−.29	.05	.11	.47
11. full-empty	.51	−.28	.29	−.06	−.13	−.06	.07	.04	.45
12. good-bad	.50	.39	.16	−.10	−.16	−.12	.10	−.10	.50
13. rumbling-whining	.60	−.48	−.19	.09	.06	−.07	.05	.05	.55
14. solid-hollow	.39	−.08	.22	.14	−.09	−.03	.12	−.08	.26
15. clear-hazy	.32	.17	.46	−.10	.03	.15	−.12	−.07	.40
16. calming-exciting	.28	.13	−.32	−.26	.21	−.10	.13	−.02	.34
17. pleasing-annoying	.61	.35	−.06	.13	−.17	−.07	.01	−.16	.57
18. large-small	.51	−.61	.05	−.09	−.08	.07	.05	−.14	.68
19. clean-dirty	.13	.51	.21	−.10	−.20	−.02	.03	.02	.37
20. resting-busy	.09	.21	−.42	−.02	.12	.02	−.04	−.15	.27
21. dull-sharp	.42	−.47	−.39	−.11	.08	−.08	−.02	.04	.58
22. deep-shallow	.54	−.45	−.01	−.13	−.08	−.03	−.06	−.04	.52
23. gliding-scraping	.30	.29	−.07	.28	.03	.02	−.25	−.08	.33
24. familiar-strange	.45	.16	.15	.21	.08	.16	.10	.09	.34
25. soft-hard	.21	.35	−.36	.02	−.07	−.07	−.13	.15	.35
26. heavy-light	.48	−.69	−.01	−.11	−.03	.04	.10	−.12	.75
27. wet-dry	.24	−.13	−.12	.33	−.11	.09	−.07	.14	.24
28. safe-dangerous	.26	.42	−.18	−.32	−.07	.08	.17	.12	.43
29. concentrated-diffuse	.21	.01	.42	−.10	.20	−.04	−.10	−.04	.28
30. pushing-pulling	.10	−.01	−.06	−.15	.08	−.09	.10	.12	.08
31. labored-easy	.09	−.58	.09	−.21	.15	−.12	.14	−.07	.46
32. dark-bright	.15	−.66	−.15	.14	.14	−.02	−.07	−.10	.54
33. even-uneven	.29	.31	.35	.09	.23	.08	−.06	.10	.38
34. loose-tight	.27	.04	−.40	.10	−.27	.20	−.18	−.15	.41
35. relaxed-tense	.38	.24	−.43	−.09	−.25	.19	−.20	−.08	.54
36. colorful-colorless	.29	.16	.22	.05	−.25	−.16	−.15	.17	.30
37. hot-cold	.04	.17	.30	−.22	−.05	−.17	−.17	−.02	.23
38. rich-thin	.49	−.17	.06	−.09	−.15	−.10	−.26	.17	.41
39. obvious-subtle	.22	.06	.34	−.24	.17	.03	−.02	.11	.27
40. wide-narrow	.54	−.50	−.08	−.09	−.03	.06	−.12	−.01	.58
41. deliberate-careless	.36	−.07	.42	−.06	.13	−.10	−.08	.21	.39
42. happy-sad	.13	.50	.14	−.11	−.19	−.03	.09	.17	.37
43. gentle-violent	.25	.50	−.40	.08	−.02	.09	.14	.14	.53
44. mild-intense	.28	.39	−.43	−.19	.04	.03	.05	.10	.47
45. rounded-angular	.41	−.13	−.17	.19	.02	.04	−.18	−.03	.29
46. slow-fast	.37	−.41	−.31	−.19	.10	.11	.11	−.14	.49
47. rugged-delicate	.36	−.56	.19	−.12	−.02	−.05	−.07	−.12	.52
48. simple-complex	.14	.25	−.17	−.28	.20	.16	.11	.12	.28
49. green-red	.07	−.03	−.28	.11	−.07	.12	.10	.18	.16
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Osgood et al. used semantic differentials and factor analysis to identify a basis of three variables for meaning-space:

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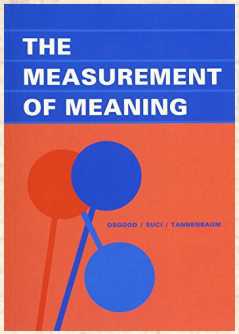

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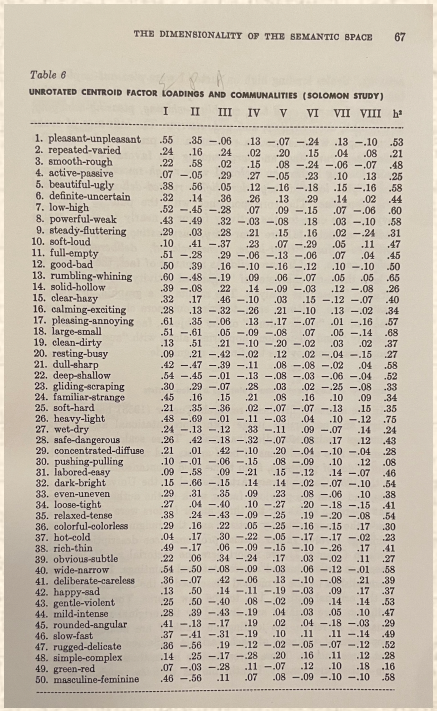

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19. clean-dirty	.13	.51	.21	−.10	−.20	−.02	.03	.02	.37
20. resting-busy	.09	.21	−.42	−.02	.12	.02	−.04	−.15	.27
21. dull-sharp	.42	−.47	−.39	−.11	.08	−.08	−.02	.04	.58
22. deep-shallow	.54	−.45	−.01	−.13	−.08	−.03	−.06	−.04	.52
23. gliding-scraping	.30	.29	−.07	.28	.03	.02	−.25	−.08	.33
24. familiar-strange	.45	.16	.15	.21	.08	.16	.10	.09	.34
25. soft-hard	.21	.35	−.36	.02	−.07	−.07	−.13	.15	.35
26. heavy-light	.48	−.69	−.01	−.11	−.03	.04	.10	−.12	.75
27. wet-dry	.24	−.13	−.12	.33	−.11	.09	−.07	.14	.24
28. safe-dangerous	.26	.42	−.18	−.32	−.07	.08	.17	.12	.43
29. concentrated-diffuse	.21	.01	.42	−.10	.20	−.04	−.10	−.04	.28
30. pushing-pulling	.10	−.01	−.06	−.15	.08	−.09	.10	.12	.08
31. labored-easy	.09	−.58	.09	−.21	.15	−.12	.14	−.07	.46
32. dark-bright	.15	−.66	−.15	.14	.14	−.02	−.07	−.10	.54
33. even-uneven	.29	.31	.35	.09	.23	.08	−.06	.10	.38
34. loose-tight	.27	.04	−.40	.10	−.27	.20	−.18	−.15	.41
35. relaxed-tense	.38	.24	−.43	−.09	−.25	.19	−.20	−.08	.54
36. colorful-colorless	.29	.16	.22	.05	−.25	−.16	−.15	.17	.30
37. hot-cold	.04	.17	.30	−.22	−.05	−.17	−.17	−.02	.23
38. rich-thin	.49	−.17	.06	−.09	−.15	−.10	−.26	.17	.41
39. obvious-subtle	.22	.06	.34	−.24	.17	.03	−.02	.11	.27
40. wide-narrow	.54	−.50	−.08	−.09	−.03	.06	−.12	−.01	.58
41. deliberate-careless	.36	−.07	.42	−.06	.13	−.10	−.08	.21	.39
42. happy-sad	.13	.50	.14	−.11	−.19	−.03	.09	.17	.37
43. gentle-violent	.25	.50	−.40	.08	−.02	.09	.14	.14	.53
44. mild-intense	.28	.39	−.43	−.19	.04	.03	.05	.10	.47
45. rounded-angular	.41	−.13	−.17	.19	.02	.04	−.18	−.03	.29
46. slow-fast	.37	−.41	−.31	−.19	.10	.11	.11	−.14	.49
47. rugged-delicate	.36	−.56	.19	−.12	−.02	−.05	−.07	−.12	.52
48. simple-complex	.14	.25	−.17	−.28	.20	.16	.11	.12	.28
49. green-red	.07	−.03	−.28	.11	−.07	.12	.10	.18	.16
50. masculine-feminine	.46	−.56	.11	.07	.08	−.09	−.10	−.10	.58

- Osgood et al. used semantic differentials and factor analysis to identify a basis of three variables for meaning-space:
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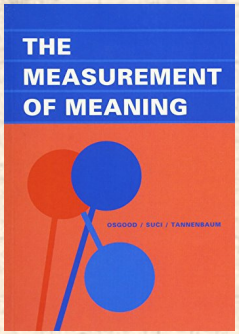

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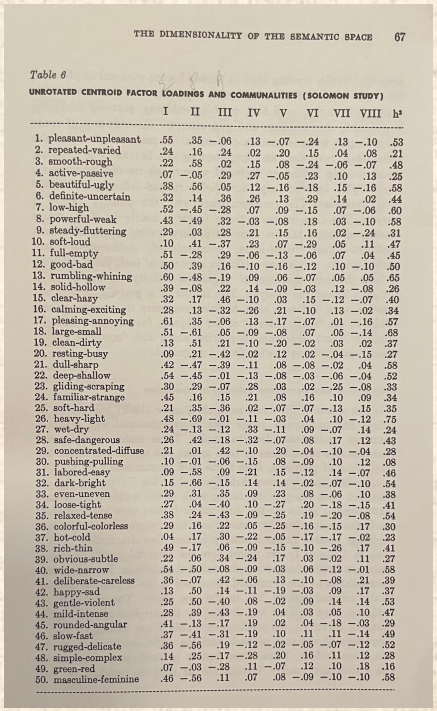

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Table 6

UNROTATED CENTROID FACTOR LOADINGS AND COMMUNALITIES (SOLOMON STUDY)

	I	II	III	IV	V	VI	VII	VIII	h^2
1. pleasant-unpleasant	.55	.35	−.06	.13	−.07	−.24	.13	−.10	.53
2. repeated-varied	.24	.16	.24	.02	.20	.15	.04	.08	.21
3. smooth-rough	.22	.58	.02	.15	.08	−.24	−.06	−.07	.48
4. active-passive	.07	−.05	.29	.27	−.05	.23	.10	.13	.25
5. beautiful-ugly	.38	.56	.05	.12	−.16	−.18	.15	−.16	.58
6. definite-uncertain	.32	.14	.36	.26	.13	.29	.14	.02	.44
7. low-high	.52	−.45	−.28	.07	.09	−.15	.07	−.06	.60
8. powerful-weak	.43	−.49	.32	−.03	−.08	.18	.03	−.10	.58
9. steady-fluttering	.29	.03	.28	.21	.15	.16	.02	−.24	.31
10. soft-loud	.10	.41	−.37	.23	.07	−.29	.05	.11	.47
11. full-empty	.51	−.28	.29	−.06	−.13	−.06	.07	.04	.45
12. good-bad	.50	.39	.16	−.10	−.16	−.12	.10	−.10	.50
13. rumbling-whining	.60	−.48	−.19	.09	.06	−.07	.05	.05	.55
14. solid-hollow	.39	−.08	.22	.14	−.09	−.03	.12	−.08	.26
15. clear-hazy	.32	.17	.46	−.10	.03	.15	−.12	−.07	.40
16. calming-exciting	.28	.13	−.32	−.26	.21	−.10	.13	−.02	.34
17. pleasing-annoying	.61	.35	−.06	.13	−.17	−.07	.01	−.16	.57
18. large-small	.51	−.61	.05	−.09	−.08	.07	.05	−.14	.68
19. clean-dirty	.13	.51	.21	−.10	−.20	−.02	.03	.02	.37
20. resting-busy	.09	.21	−.42	−.02	.12	.02	−.04	−.15	.27
21. dull-sharp	.42	−.47	−.39	−.11	.08	−.08	−.02	.04	.58
22. deep-shallow	.54	−.45	−.01	.13	−.08	−.03	−.06	−.04	.52
23. gliding-scraping	.30	.29	−.07	.28	.03	.02	−.25	−.08	.33
24. familiar-strange	.45	.16	.15	.21	.08	.16	.10	.09	.34
25. soft-hard	.21	.35	−.36	.02	−.07	−.07	−.13	.15	.35
26. heavy-light	.48	−.69	−.01	−.11	−.03	.04	.10	−.12	.75
27. wet-dry	.24	−.13	−.12	.33	−.11	.09	−.07	.14	.24
28. safe-dangerous	.26	.42	−.18	−.32	−.07	.08	.17	.12	.43
29. concentrated-diffuse	.21	.01	.42	−.10	.20	−.04	−.10	−.04	.28
30. pushing-pulling	.10	−.01	−.06	−.15	.08	−.09	.10	.12	.08
31. labored-easy	.09	−.58	.09	−.21	.15	−.12	.14	−.07	.46
32. dark-bright	.15	−.66	−.15	.14	.14	−.02	−.07	−.10	.54
33. even-uneven	.29	.31	.35	.09	.23	.08	−.06	.10	.38
34. loose-tight	.27	.04	−.40	.10	−.27	.20	−.18	−.15	.41
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36. colorful-colorless	.29	.16	.22	.05	−.25	−.16	−.15	.17	.30
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38. rich-thin	.49	−.17	.06	−.09	−.15	−.10	−.26	.17	.41
39. obvious-subtle	.22	.06	.34	−.24	.17	.03	−.02	.11	.27
40. wide-narrow	.54	−.50	−.08	−.09	−.03	.06	−.12	−.01	.58
41. deliberate-careless	.36	−.07	.42	−.06	.13	−.10	−.08	.21	.39
42. happy-sad	.13	.50	.14	−.11	−.19	−.03	.09	.17	.37
43. gentle-violent	.25	.50	−.40	.08	−.02	.09	.14	.14	.53
44. mild-intense	.28	.39	−.43	−.19	.04	.03	.05	.10	.47
45. rounded-angular	.41	−.13	−.17	.19	.02	.04	−.18	−.03	.29
46. slow-fast	.37	−.41	−.31	−.19	.10	.11	.11	−.14	.49
47. rugged-delicate	.36	−.56	.19	−.12	−.02	−.05	−.07	−.12	.52
48. simple-complex	.14	.25	−.17	−.28	.20	.16	.11	.12	.28
49. green-red	.07	−.03	−.28	.11	−.07	.12	.10	.18	.16
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- Osgood et al. used semantic differentials and factor analysis to identify a basis of three variables for meaning-space:
  - Evaluation: {bad ⇔ good}
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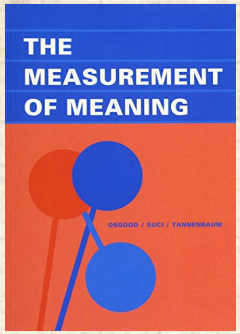

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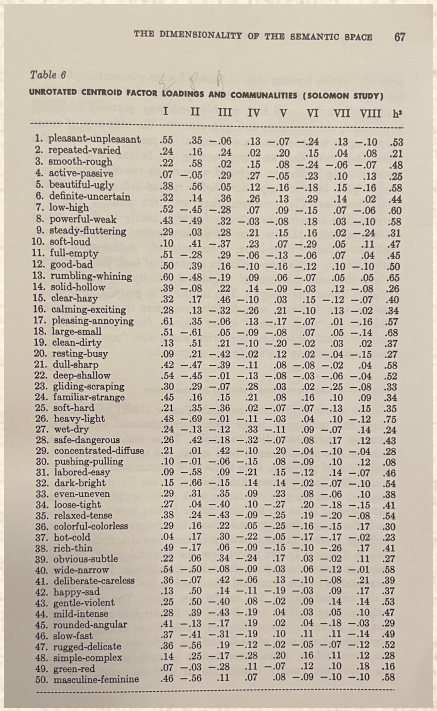

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1. pleasant-unpleasant	.55	.35	−.06	.13	−.07	−.24	.13	−.10	.53
2. repeated-varied	.24	.16	.24	.02	.20	.15	.04	.08	.21
3. smooth-rough	.22	.58	.02	.15	.08	−.24	−.06	−.07	.48
4. active-passive	.07	−.05	.29	.27	−.05	.23	.10	.13	.25
5. beautiful-ugly	.38	.56	.05	.12	−.16	−.18	.15	−.16	.58
6. definite-uncertain	.32	.14	.36	.26	.13	.29	.14	.02	.44
7. low-high	.52	−.45	−.28	.07	.09	−.15	.07	−.06	.60
8. powerful-weak	.43	−.49	.32	−.03	−.08	.18	.03	−.10	.58
9. steady-fluttering	.29	.03	.28	.21	.15	.16	.02	−.24	.31
10. soft-loud	.10	.41	−.37	.23	.07	−.29	.05	.11	.47
11. full-empty	.51	−.28	.29	−.06	−.13	−.06	.07	.04	.45
12. good-bad	.50	.39	.16	−.10	−.16	−.12	.10	−.10	.50
13. rumbling-whining	.60	−.48	−.19	.09	.06	−.07	.05	.05	.55
14. solid-hollow	.39	−.08	.22	.14	−.09	−.03	.12	−.08	.26
15. clear-hazy	.32	.17	.46	−.10	.03	.15	−.12	−.07	.40
16. calming-exciting	.28	.13	−.32	−.26	.21	−.10	.13	−.02	.34
17. pleasing-annoying	.61	.35	−.06	.13	−.17	−.07	.01	−.16	.57
18. large-small	.51	−.61	.05	−.09	−.08	.07	.05	−.14	.68
19. clean-dirty	.13	.51	.21	−.10	−.20	−.02	.03	.02	.37
20. resting-busy	.09	.21	−.42	−.02	.12	.02	−.04	−.15	.27
21. dull-sharp	.42	−.47	−.39	−.11	.08	−.08	−.02	.04	.58
22. deep-shallow	.54	−.45	−.01	.13	−.08	−.03	−.06	−.04	.52
23. gliding-scraping	.30	.29	−.07	.28	.03	.02	−.25	−.08	.33
24. familiar-strange	.45	.16	.15	.21	.08	.16	.10	.09	.34
25. soft-hard	.21	.35	−.36	.02	−.07	−.07	−.13	.15	.35
26. heavy-light	.48	−.69	−.01	−.11	−.03	.04	.10	−.12	.75
27. wet-dry	.24	−.13	−.12	.33	−.11	.09	−.07	.14	.24
28. safe-dangerous	.26	.42	−.18	−.32	−.07	.08	.17	.12	.43
29. concentrated-diffuse	.21	.01	.42	−.10	.20	−.04	−.10	−.04	.28
30. pushing-pulling	.10	−.01	−.06	−.15	.08	−.09	.10	.12	.08
31. labored-easy	.09	−.58	.09	−.21	.15	−.12	.14	−.07	.46
32. dark-bright	.15	−.66	−.15	.14	.14	−.02	−.07	−.10	.54
33. even-uneven	.29	.31	.35	.09	.23	.08	−.06	.10	.38
34. loose-tight	.27	.04	−.40	.10	−.27	.20	−.18	−.15	.41
35. relaxed-tense	.38	.24	−.43	−.09	−.25	.19	−.20	−.08	.54
36. colorful-colorless	.29	.16	.22	.05	−.25	−.16	−.15	.17	.30
37. hot-cold	.04	.17	.30	−.22	−.05	−.17	−.17	−.02	.23
38. rich-thin	.49	−.17	.06	−.09	−.15	−.10	−.26	.17	.41
39. obvious-subtle	.22	.06	.34	−.24	.17	.03	−.02	.11	.27
40. wide-narrow	.54	−.50	−.08	−.09	−.03	.06	−.12	−.01	.58
41. deliberate-careless	.36	−.07	.42	−.06	.13	−.10	−.08	.21	.39
42. happy-sad	.13	.50	.14	−.11	−.19	−.03	.09	.17	.37
43. gentle-violent	.25	.50	−.40	.08	−.02	.09	.14	.14	.53
44. mild-intense	.28	.39	−.43	−.19	.04	.03	.05	.10	.47
45. rounded-angular	.41	−.13	−.17	.19	.02	.04	−.18	−.03	.29
46. slow-fast	.37	−.41	−.31	−.19	.10	.11	.11	−.14	.49
47. rugged-delicate	.36	−.56	.19	−.12	−.02	−.05	−.07	−.12	.52
48. simple-complex	.14	.25	−.17	−.28	.20	.16	.11	.12	.28
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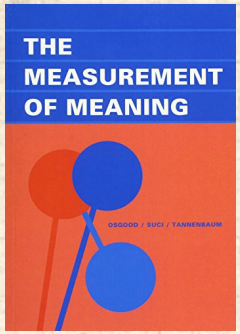

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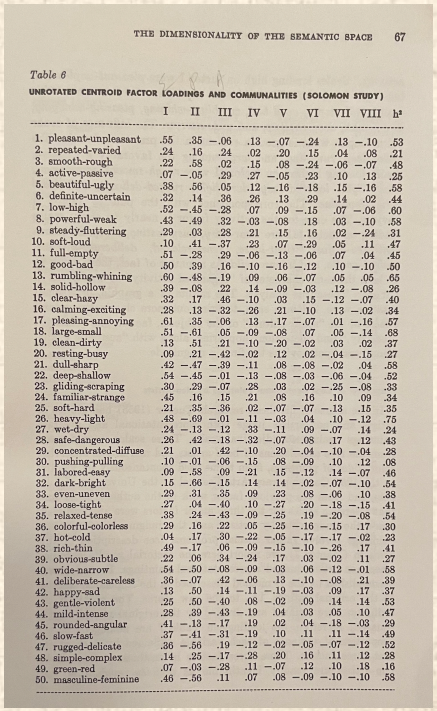

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3. smooth-rough	.22	.58	.02	.15	.08	−.24	−.06	−.07	.48
4. active-passive	.07	−.05	.29	.27	−.05	.23	.10	.13	.25
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8. powerful-weak	.43	−.49	.32	−.03	−.08	.18	.03	−.10	.58
9. steady-fluttering	.29	.03	.28	.21	.15	.16	.02	−.24	.31
10. soft-loud	.10	.41	−.37	.23	.07	−.29	.05	.11	.47
11. full-empty	.51	−.28	.29	−.06	−.13	−.06	.07	.04	.45
12. good-bad	.50	.39	.16	−.10	−.16	−.12	.10	−.10	.50
13. rumbling-whining	.60	−.48	−.19	.09	.06	−.07	.05	.05	.55
14. solid-hollow	.39	−.08	.22	.14	−.09	−.03	.12	−.08	.26
15. clear-hazy	.32	.17	.46	−.10	.03	.15	−.12	−.07	.40
16. calming-exciting	.28	.13	−.32	−.26	.21	−.10	.13	−.02	.34
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19. clean-dirty	.13	.51	.21	−.10	−.20	−.02	.03	.02	.37
20. resting-busy	.09	.21	−.42	−.02	.12	.02	−.04	−.15	.27
21. dull-sharp	.42	−.47	−.39	−.11	.08	−.08	−.02	.04	.58
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27. wet-dry	.24	−.13	−.12	.33	−.11	.09	−.07	.14	.24
28. safe-dangerous	.26	.42	−.18	−.32	−.07	.08	.17	.12	.43
29. concentrated-diffuse	.21	.01	.42	−.10	.20	−.04	−.10	−.04	.28
30. pushing-pulling	.10	−.01	−.06	−.15	.08	−.09	.10	.12	.08
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34. loose-tight	.27	.04	−.40	.10	−.27	.20	−.18	−.15	.41
35. relaxed-tense	.38	.24	−.43	−.09	−.25	.19	−.20	−.08	.54
36. colorful-colorless	.29	.16	.22	.05	−.25	−.16	−.15	.17	.30
37. hot-cold	.04	.17	.30	−.22	−.05	−.17	−.17	−.02	.23
38. rich-thin	.49	−.17	.06	−.09	−.15	−.10	−.26	.17	.41
39. obvious-subtle	.22	.06	.34	−.24	.17	.03	−.02	.11	.27
40. wide-narrow	.54	−.50	−.08	−.09	−.03	.06	−.12	−.01	.58
41. deliberate-careless	.36	−.07	.42	−.06	.13	−.10	−.08	.21	.39
42. happy-sad	.13	.50	.14	−.11	−.19	−.03	.09	.17	.37
43. gentle-violent	.25	.50	−.40	.08	−.02	.09	.14	.14	.53
44. mild-intense	.28	.39	−.43	−.19	.04	.03	.05	.10	.47
45. rounded-angular	.41	−.13	−.17	.19	.02	.04	−.18	−.03	.29
46. slow-fast	.37	−.41	−.31	−.19	.10	.11	.11	−.14	.49
47. rugged-delicate	.36	−.56	.19	−.12	−.02	−.05	−.07	−.12	.52
48. simple-complex	.14	.25	−.17	−.28	.20	.16	.11	.12	.28
49. green-red	.07	−.03	−.28	.11	−.07	.12	.10	.18	.16
50. masculine-feminine	.46	−.56	.11	.07	.08	−.09	−.10	−.10	.58

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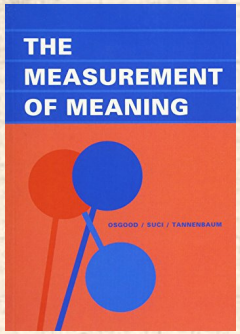
From pings to things:



"The Measurement of Meaning" by Osgood, Suci, and Tannenbaum (1957). [14]

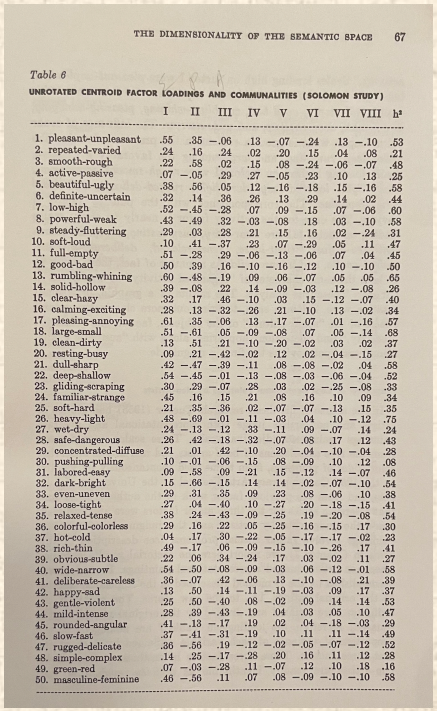


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Table 6

UNROTATED CENTROID FACTOR LOADINGS AND COMMUNALITIES (SOLOMON STUDY)

	I	II	III	IV	V	VI	VII	VIII	h^2
1. pleasant-unpleasant	.55	.35	−.06	.13	−.07	−.24	.13	−.10	.53
2. repeated-varied	.24	.16	.24	.02	.20	.15	.04	.08	.21
3. smooth-rough	.22	.58	.02	.15	.08	−.24	−.06	−.07	.48
4. active-passive	.07	−.05	.29	.27	−.05	.23	.10	.13	.25
5. beautiful-ugly	.38	.56	.05	.12	−.16	−.18	.15	−.16	.58
6. definite-uncertain	.32	.14	.36	.26	.13	.29	.14	.02	.44
7. low-high	.52	−.45	−.28	.07	.09	−.15	.07	−.06	.60
8. powerful-weak	.43	−.49	.32	−.03	−.08	.18	.03	−.10	.58
9. steady-fluttering	.29	.03	.28	.21	.15	.16	.02	−.24	.31
10. soft-loud	.10	.41	−.37	.23	.07	−.29	.05	.11	.47
11. full-empty	.51	−.28	.29	−.06	−.13	−.06	.07	.04	.45
12. good-bad	.50	.39	.16	−.10	−.16	−.12	.10	−.10	.50
13. rumbling-whining	.60	−.48	−.19	.09	.06	−.07	.05	.05	.55
14. solid-hollow	.39	−.08	.22	.14	−.09	−.03	.12	−.08	.26
15. clear-hazy	.32	.17	.46	−.10	.03	.15	−.12	−.07	.40
16. calming-exciting	.28	.13	−.32	−.26	.21	−.10	.13	−.02	.34
17. pleasing-annoying	.61	.35	−.06	.13	−.17	−.07	.01	−.16	.57
18. large-small	.51	−.61	.05	−.09	−.08	.07	.05	−.14	.68
19. clean-dirty	.13	.51	.21	−.10	−.20	−.02	.03	.02	.37
20. resting-busy	.09	.21	−.42	−.02	.12	.02	−.04	−.15	.27
21. dull-sharp	.42	−.47	−.39	−.11	.08	−.08	−.02	.04	.58
22. deep-shallow	.54	−.45	−.01	.13	−.08	−.03	−.06	−.04	.52
23. gliding-scraping	.30	.29	−.07	.28	.03	.02	−.25	−.08	.33
24. familiar-strange	.45	.16	.15	.21	.08	.16	.10	.09	.34
25. soft-hard	.21	.35	−.36	.02	−.07	−.07	−.13	.15	.35
26. heavy-light	.48	−.69	−.01	−.11	−.03	.04	.10	−.12	.75
27. wet-dry	.24	−.13	−.12	.33	−.11	.09	−.07	.14	.24
28. safe-dangerous	.26	.42	−.18	−.32	−.07	.08	.17	.12	.43
29. concentrated-diffuse	.21	.01	.42	−.10	.20	−.04	−.10	−.04	.28
30. pushing-pulling	.10	−.01	−.06	−.15	.08	−.09	.10	.12	.08
31. labored-easy	.09	−.58	.09	−.21	.15	−.12	.14	−.07	.46
32. dark-bright	.15	−.66	−.15	.14	.14	−.02	−.07	−.10	.54
33. even-uneven	.29	.31	.35	.09	.23	.08	−.06	.10	.38
34. loose-tight	.27	.04	−.40	.10	−.27	.20	−.18	−.15	.41
35. relaxed-tense	.38	.24	−.43	−.09	−.25	.19	−.20	−.08	.54
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- "EPA framework"

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Semantic differentials from Osgood et al.:[14]

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3. smooth-rough
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5. beautiful-ugly
6. definite-uncertain
7. low-high
8. powerful-weak
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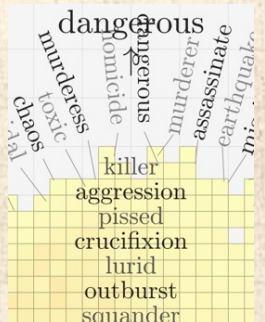

Definitions:

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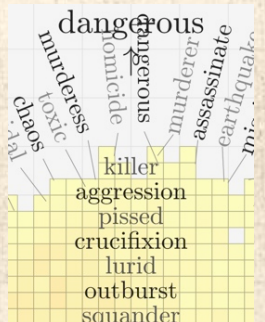

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- Intention that VAD $\equiv$ EPA has become lost in literature. [2]

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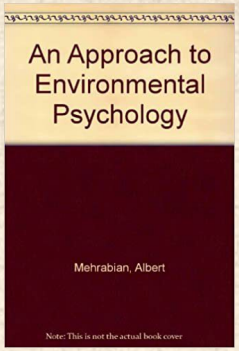

"An Approach to Environmental Psychology."
by Mehrabian and Russell (1974). [8]

"The basic emotional impact of environments"
Mehrabian and Russell,
Perceptual and motor skills, **38**, 283–301, 1974. [9]

"Semantic differential studies, in particular, have shown that human judgments of diverse samples of stimuli can be characterized in terms of three dimensions: evaluation, activity, and potency. We have termed the corresponding emotional responses pleasure, arousal, and dominance."

"Thus, each dimension is, in principle, functionally independent of the other two; none of the three dimensions could be subsumed by the others."

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Major problems with measuring essential meaning:

1. **Scale**: Originally 10s and 100s of words $\rightarrow$ now 10,000s + online rating.

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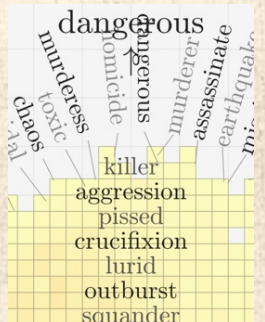

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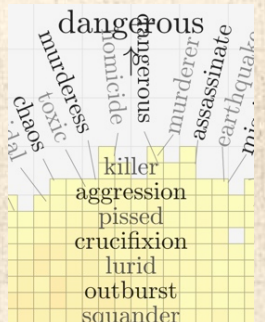

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5. **The misalignment between expert-chosen, end-point descriptors and dimensions of essential meaning:** How to guide raters to score VAD dimensions?

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Major problems with measuring essential meaning:

1. **Scale**: Originally 10s and 100s of words $\rightarrow$ now 10,000s + online rating.
2. **The focus on types alone and not tokens:** Missing the forest for the book of tree species.
3. **The use of Likert scales for semantic differentials:** Solid but can be improved upon.
4. **Limitations of factor analysis for a large number of categorical dimensions:** Ousiograms will help sort things out.
5. **The misalignment between expert-chosen, end-point descriptors and dimensions of essential meaning:** How to guide raters to score VAD dimensions?

   Solution is to always perform factor analysis (SVD).

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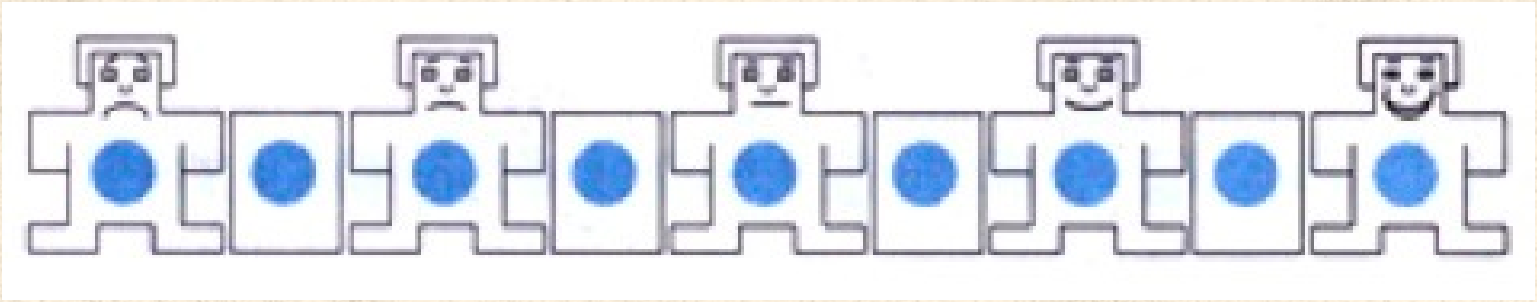
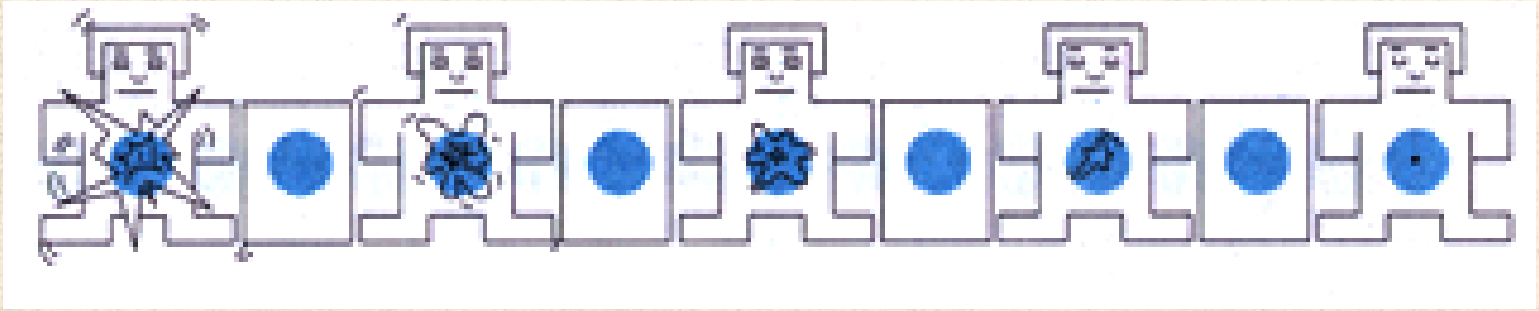
1999 ANEW study—three 1–9 scales: [4]

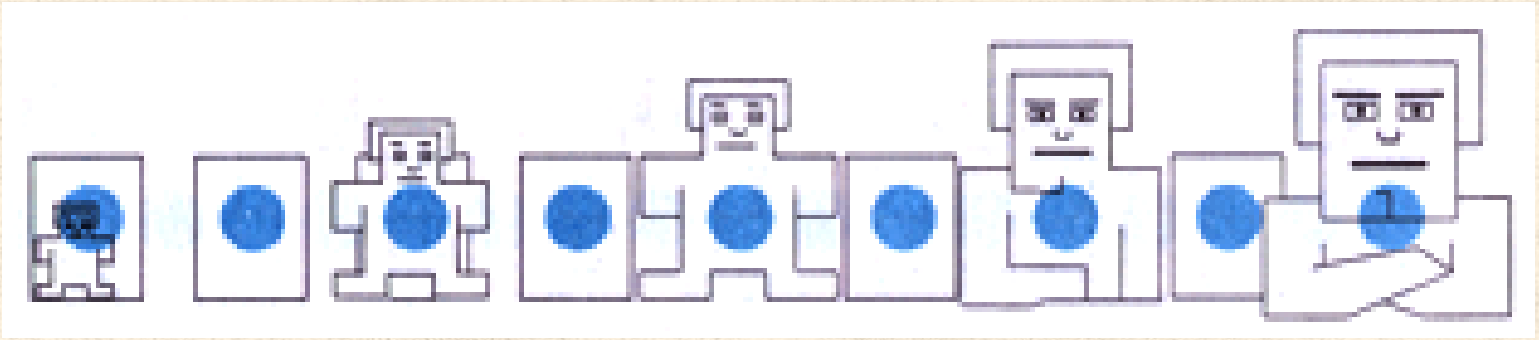
valence:



arousal:



dominance:



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ANEW study: Valence ~ Happiness:

- Valence scale presented to participants as a ‘happy-unhappy scale.’

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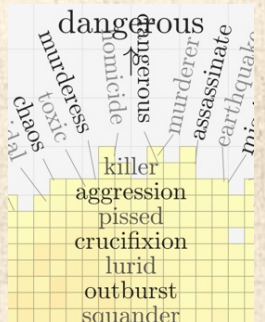

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- Valence scale presented to participants as a ‘happy-unhappy scale.’
- Participants were further told:

  “At one extreme of this scale, you are happy, pleased, satisfied, contented, hopeful. …

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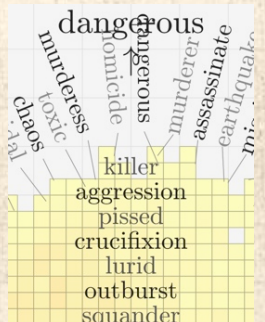

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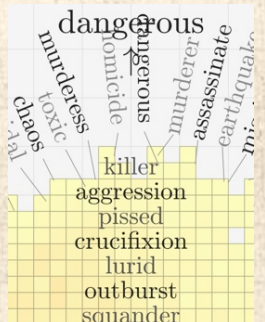

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We now know that ANEW is a no-no:

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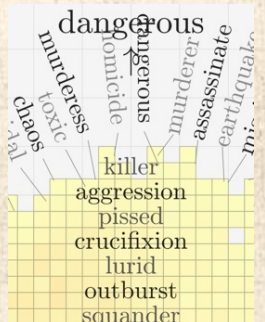

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- Problem: Expert-chosen list of ∼ 1,000 words.

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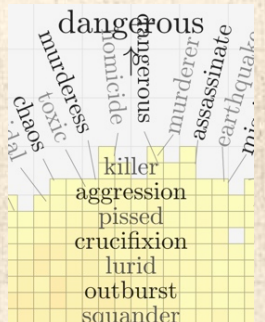

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- Fine words but poorly cover real texts [16].

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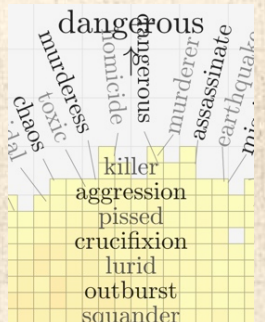

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- The Hedonometer was always about essential meaning.

We now know that ANEW is a no-no:

- Problem: Expert-chosen list of ∼ 1,000 words.
- Fine words but poorly cover real texts [16].
- Wrongly suggests Arousal and Dominance are minimal relative to Valence.

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Remeasuring meaning:

Obtaining Reliable Human Ratings of Valence, Arousal, and Dominance for 20,000 English Words

Saif M. Mohammad
National Research Council Canada

Abstract

Words play a central role in language and thought. Research in psychology has shown that the primary dimensions of meaning are valence, arousal, and dominance (VAD). We present the NRC VAD Lexicon, which has human ratings of valence, arousal, and dominance for more than 20,000 English words. We use Best–Worst Scaling to obtain fine-grained scores, and we show that they are highly reliable. Perhaps surprisingly, this is the first study to show that rating words on valence, arousal, and dominance is similarly reliable. We also show that the ratings are consistent with existing lexicons of valence and arousal. We use the lexicon to explore how dominance relates to valence in words (stronger words tend to be more positive), and to study how concepts are divided into categories of valence, arousal, and dominance. For example, the word banquet indicates more positiveness than the word funeral, but they both indicate similar levels of arousal and dominance. We also show that valence is the primary factor associated with words denoting personal traits, interpersonal relations, and events.

1 Introduction

Words are the smallest meaningful utterances in language. They play a central role in our understanding and descriptions of the world around us. Some believe that the structure of a language has a profound effect on the thoughts and linguistic relativity aka the Sapir/Whorf hypothesis). Several influential frame analysis studies in psychology have argued that humans rely largely on conceptual dimensions of core domains; are valence (positiveness–negativeness), arousal (excitedness–calmness), arousal (active–passive), and dominance (dominant–submissive) (Osgood et al., 1957; Russell, 1980; Fontaine et al., 2007). Thus, comparing the meanings of two words, we can compare their degrees of valence, arousal, or dominance. For example, the word banquet indicates more positiveness than the word funeral, but they both indicate similar levels of arousal and dominance. Words such as and, of, and together as [illegible]

Access to these degrees of valence, arousal, and dominance of words is beneficial for a number of applications, including those in natural language processing (e.g., automatic sentiment and emotion analysis), in the social sciences (e.g., for understanding how humans represent and use language), in psychology (e.g., for understanding connotative meanings of words), and in the digital humanities (e.g., for understanding relationships between people), and even in evolutionary linguistics (e.g., for understanding how language and human values relate to give rise to an advantage).

Over the last few decades, Osgood (1964), Bradley and Lang (1999), Warriner et al., (2013), have created rating scales and then recruited annotators from Amazon Mechanical Turk (crowdsourcing) to provide ratings (Snow et al., 2008; Callison-Burch and Dredze, 2010). These include inconsistencies in annotations by different annotators, inconsistencies in annotations by the same annotator, scale regions bias (annotators tend to prefer certain regions of the scale over others), and problems associated with a fixed granularity.

In this paper, we describe how we obtained human ratings of valence, arousal, and dominance for more than 20,000 commonly used English words by crowdsourcing. Notably, we use a comparative annotation technique called Best-Worst Scaling (BWS) that addresses the limitations of traditional rating scales (Louviere et al., 2015; Kiritchenko and Mohammad, 2017). The scores are then adjusted to obtain real-valued numbers in the interval from 0 (lowest V, A, or D) to 1 (highest V, A, or D). We refer to the lexicon created here as the NRC Valence, Arousal, and Dominance (VAD) Lexicon.[1]

[1] NRC refers to National Research Council Canada.

"Obtaining Reliable human ratings of valence, arousal, and dominance for 20,000 English words"

Saif M. Mohammad, Proceedings of The Annual Conference of the Association for Computational Linguistics (ACL), **38**, , 2018. [11]

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1 Introduction

Words are the smallest meaningful utterances in a language. They play a central role in our understanding and descriptions of the world around us. Some believe that the structure of a language system dictates the way its speakers view the world (linguistic relativity aka the Sapir/Whorf hypothesis). Several influential frame analysis studies in sociology (e.g., Goffman, 1974) have argued that largely independent dimensions of word meaning are valence (positiveness–negativeness; pleasantness–unpleasantness), arousal (active–passive), and dominance (dominant–submissive) (Osgood et al., 1957; Russell, 1980). In order to study how people perceive the meanings of text words, we can compare their degrees of valence, arousal, or dominance. For example, the word *banquet* indicates more positiveness than the word *funeral*; *carnage* indicates more arousal than *hay*; and *defeat* indicates more dominance than *dependent*.

Access to these degrees of valence, arousal, and dominance of words is beneficial for a number of applications, including those in natural language processing (e.g., automatic sentiment and emotion analysis), and in the social sciences (e.g., for understanding how humans represent and use language); in psychology (e.g., for understanding connotative meaning); and in literature (e.g., for digital humanities, computational stylistics, and computational analysis of poetry). For understanding relationships between people, and even in evolutionary linguistics (e.g., for understanding how language and brains have co-evolved to give us an advantage).

Over the last 50 years, psychologists (e.g., Osgood (1957), Warriner et al., 2013) have created rating scales and then recruited human participants to rate words. For example, Warriner et al. (2013) asked participants to rate valence on a 9-point scale from happy to unhappy, arousal on a scale from excited to calm, and dominance on a scale from controlled to in control. Such word–level ratings are then used in various ways to study the connotative meanings of words. However, there are several problems associated with a fixed-point scale. For example, different annotators may perceive different degrees of valence for the word *birthday*. Also, annotators may not know many words, especially words that are not commonly used in everyday language. Finally, annotators may not be sufficiently motivated to provide careful ratings for words that they do not know well or for words that they perceive to be neutral in valence, arousal, or dominance.

In this paper, we describe how we obtained human ratings of valence, arousal, and dominance for over 20,000 commonly used English words by crowdsourcing. Notably, we use a comparative annotation technique called Best–Worst Scaling (BWS) that addresses the limitations of traditional rating scales (Louviere et al., 2015; Kiritchenko and Mohammad, 2016). The scores are then adjusted for bias and converted to the interval from 0 (lowest) to 1 (highest). We refer to the lexicon with these scores as the NRC Valence, Arousal, and Dominance (VAD) Lexicon.

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Moving beyond Likert scales:

- Best-worst scaling

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Words play a central role in language and thought. Research in psychology has shown that the primary dimensions of meaning are valence, arousal, and dominance (VAD). We present the NRC VAD Lexicon, which has human ratings of valence, arousal, and dominance for more than 20,000 English words. We use Best–Worst Scaling to obtain fine-grained scores and show that the ratings are reliable and consistent. We also present emotion word analysis and multi-way correlations between VAD and basic, social, and psychological categories of emotion. We find that valence is distinct from arousal and dominance, but that arousal and dominance are correlated. Finally, we show that the lexicon is able to capture human biases as expressed in English texts and propose a method to quantify gender and racial biases in the lexicon.

1 Introduction

Words are the smallest meaningful utterances in a language. They play a central role in our understanding and descriptions of the world around us. Some believe that the structure of a language's lexicon and how it changes reveals the linguistic relativity aka the Sapir/Whorf hypothesis). Several influential theory analysis studies have argued that the three most prominent and largely independent dimensions of word meaning are valence (pleasantness–unpleasantness or happiness), arousal (active–passive), and dominance (dominant–submissive) (Osgood et al., 1957; Russell, 1980; Mehrabian, 1996). Thus, a comparing the meanings of two words, we can compare their degrees of valence, arousal, or dominance. For example, the word banquet indicates more positiveness than the word funeral, sorrow indicates more arousal than lazy, and fight indicates more dominance than weak.

Access to these degrees of valence, arousal, and dominance of words is beneficial for a number of applications, including those in natural language processing (e.g., automatic sentiment and emotion analysis), in the social sciences (e.g., for understanding how humans represent and use language), in psychology (e.g., for understanding connotative meanings), and in public health (e.g., for understanding relationships between people), and even in evolutionary linguistics (e.g., for understanding how language and human values relate to give rise to evolutionary).

Warriner et al., 2013) were created using rating scales and thus suffer from limitations associated with rating scales (discussed in detail in Section 2). Existing lexicons also do not include co-occurrences in annotations by different annotators, inconsistencies in annotations by the same annotator, scale region bias (annotators choosing only a part of the scale), and scale offset (annotators consistently choosing values higher or lower than what others would choose). Further, existing lexicons include only unigrams (single words). Finally, they do not include valence, arousal, and dominance scores for commonly used multiword terms.

In this paper, we describe how we obtained the valence, arousal, and dominance scores for words. We start with the 20,000 most frequent English words in our crowdsourcing. Notably, we use a comparative annotation technique called Best-Worst Scaling (BWS) that addresses the limitations of rating scales (Louviere et al., 2015; Kiritchenko and Mohammad, 2016, 2017). The scores are then adjusted to be in the range from 0 (lowest V, A, or D) to 1 (highest V, A, or D). We refer to this lexicon as the NRC Valence, Arousal, and Dominance (NRC VAD) Lexicon.[1]

[1] NRC VAD Lexicon, National Research Council Canada.

"Obtaining Reliable human ratings of valence, arousal, and dominance for 20,000 English words"

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Moving beyond Likert scales:

- Best-worst scaling
- Ask raters to examine n things once, and choose the best and worst according to some criterion.

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National Research Council Canada

Abstract

Words play a central role in language and thought. Research in psychology has shown that the primary dimensions of meaning are valence, arousal, and dominance (VAD). We present the NRC VAD Lexicon, which has human ratings of valence, arousal, and dominance for more than 20,000 English words. We use Best–Worst Scaling to obtain fine-grained scores and show that the ratings are reliable and consistent. We also present emotion word analogy and antonym questions as examples of how lexicons of VAD and basic emotions can be used to explore word connotations and solve challenging problems.

1 Introduction

Words are the smallest meaningful utterances in a language. They play a central role in our understanding and descriptions of the world around us. Some believe that the structure of a language system is closely tied to the experience and linguistic relativity aka the Sapir/Whorf hypothesis). Several influential frame analysis studies in psychology have argued that all words can be largely characterized by a few basic dimensions of meaning (positiveness, negativeness, activeness, dominance, arousal, control, passivity, and more). Osgood et al. (1957) is a classic work in this area. Russell (1980) argues for the importance of core affect, or more specifically, the dimensions of valence, arousal, and dominance, in describing emotions. For example, the word *banquet* indicates more positiveness than the word *funeral*, *carnivore* indicates more arousal than *hay*, and *defeat* indicates more dominance than *victory*.

Access to these dimensions of valence, arousal, and dominance of words is beneficial for a number of applications, including those in natural language processing (e.g., automatic sentiment and emotion analysis), in cognitive psychology (e.g., for understanding how humans represent and use language), in psychology (e.g., for understanding connotative meanings of words), and in the social sciences (e.g., for understanding relationships between people), and even in evolutionary linguistics (e.g., for understanding how language and human values relate to give rise to our planet).

Warriner et al. (2013) and Bradley and Lang (1999) have respectively created valuable lexicons of valence, arousal, and dominance ratings for words. However, the lexicons have relatively low coverage of the English vocabulary, and they include inconsistencies in annotations by different annotators. Inconsistencies in annotations by the same annotator, scale region bias (annotators choosing only a certain portion of the scale), and problems associated with a fixed granularity.

In this paper, we describe how we obtained the valence, arousal, and dominance (VAD) ratings for over 20,000 commonly used English words by crowdsourcing. Notably, we use a comparative annotation technique called Best-Worst Scaling (BWS) that addresses the limitations of traditional rating scales (Louviere, 1991; Louviere et al., 2015). The scores are then adjusted to be in the universal scale of real-valued numbers in the interval from 0 (lowest) to 1 (highest). We, the NRC Valence, Arousal, and Dominance (NRC VAD) Lexicon, is the largest such lexicon in any language.

* NRC refers to National Research Council Canada.

"Obtaining Reliable human ratings of valence, arousal, and dominance for 20,000 English words"

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Moving beyond Likert scales:

- Best-worst scaling
- Ask raters to examine n things once, and choose the best and worst according to some criterion.
- For $n = 4$, the are 6 pair comparisons of Things.

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Moving beyond Likert scales:

- Best-worst scaling
- Ask raters to examine n things once, and choose the best and worst according to some criterion.
- For $n = 4$, the are 6 pair comparisons of Things.
- Choosing best and worst gives 5 orderings:
  $\tau_1 > \tau_2, \tau_3 > \tau_4$.

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- For $n = 4$, the are 6 pair comparisons of Things.
- Choosing best and worst gives 5 orderings: $\tau_1 > \tau_2, \tau_3 > \tau_4$.
- Things end up with scores in $[0, 1]$.

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highest valence	happiness, pleasure, positiveness, satisfaction, contentedness, hopefulness
lowest valence	unhappiness, annoyance, negativeness, dissatisfaction, melancholy, despair
highest arousal	arousal, activeness, stimulation, frenzy, jitteriness, alertness
lowest arousal	unarousal, passiveness, relaxation, calmness, sluggishness, dullness, sleepiness
highest dominance	dominant, in control of the situation, powerful, influential, important, autonomous
lowest dominance	submissive, controlled by outside factors, weak, influenced, cared-for, guided

Major problem 5: Imposing dimensions through clouds of endpoint descriptors.

NRC VAD study: 20,007 words:

Standard correlations suggests a bit of Barney Rubble:

$$R(V, A) \simeq -0.268$$
$$R(A, D) \simeq 0.302$$
$$R(D, V) \simeq 0.488$$

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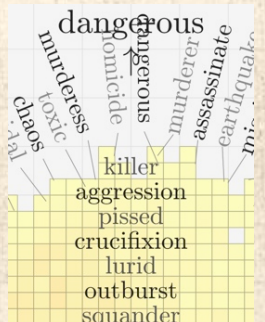
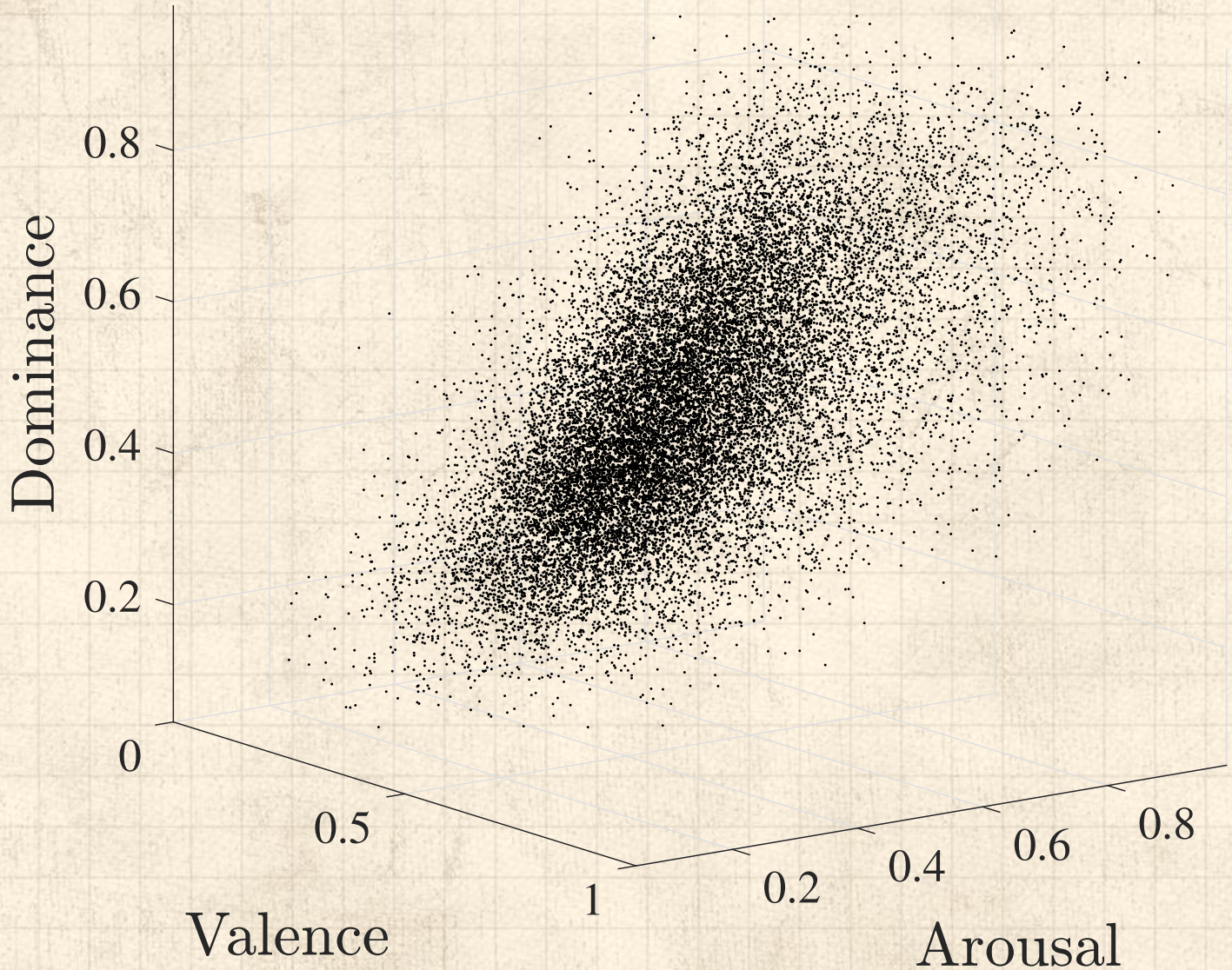


The Delicious English Muffin of Meaning:[1]



[1] Apricot jam, always.

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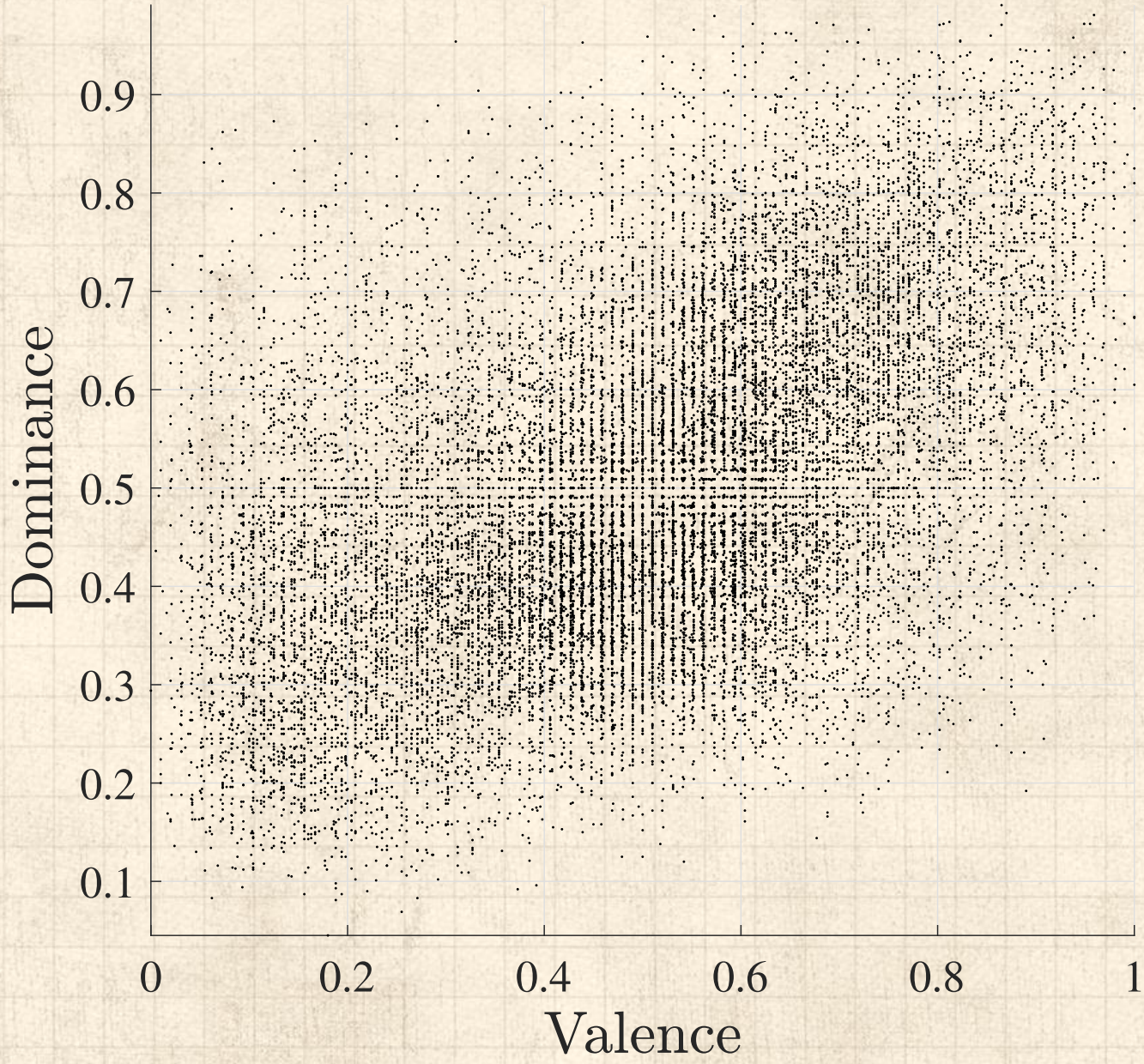
$R(D,V) \simeq 0.488$



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Release the Hounds by which we mean Singular Value Decomposition:

Variance explained:

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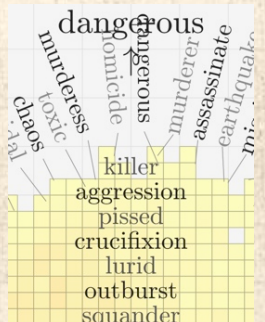

Release the Hounds by which we mean Singular Value Decomposition:

Variance explained:

- VAD: 44.4%, 28.0%, and 27.6%.

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Release the Hounds by which we mean Singular Value Decomposition:

Variance explained:

- VAD: 44.4%, 28.0%, and 27.6%.
- Apply SVD.

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Release the Hounds by which we mean Singular Value Decomposition:

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- Apply SVD.
- Singular values: $\sigma_1 \simeq 34.1$, $\sigma_2 \simeq 27.2$, and $\sigma_3 \simeq 13.8$,

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- Rotate in G-E plane by $\pi/4$ for what will be Power-Danger-Structure (PDS) 45.5%, 45.5%, 9.1%

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- Interpretability enhancements: Ousiograms.

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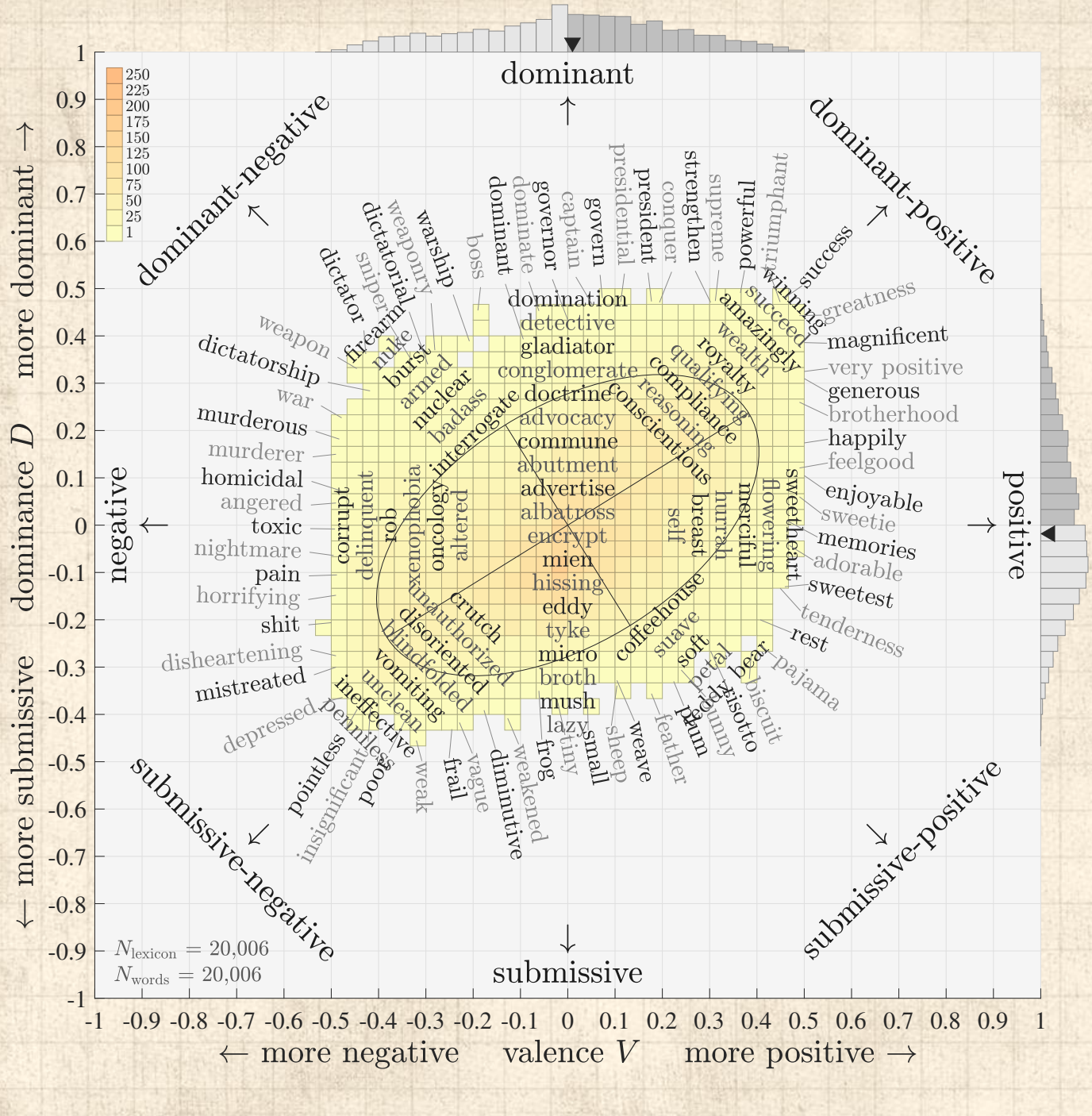

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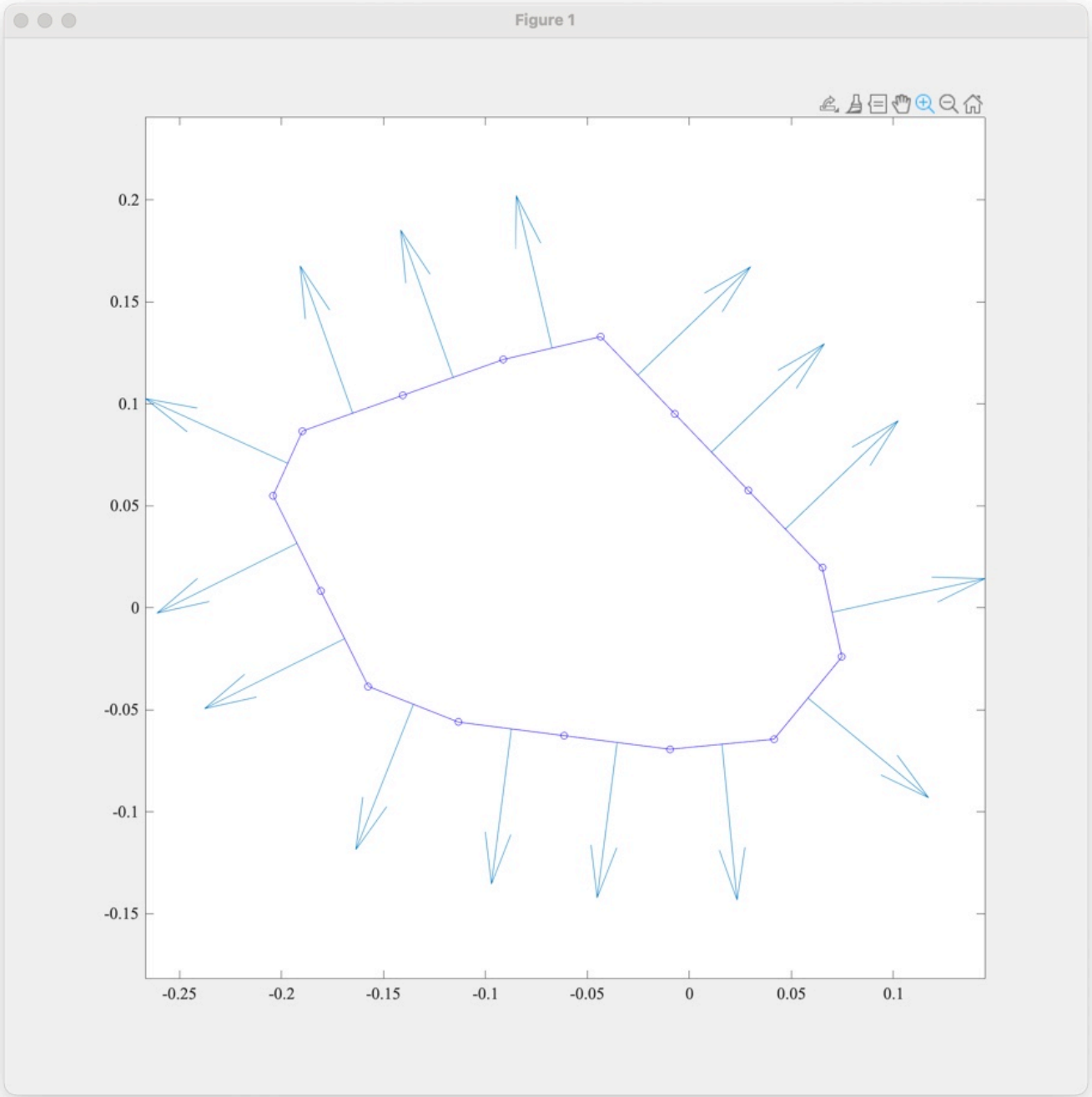

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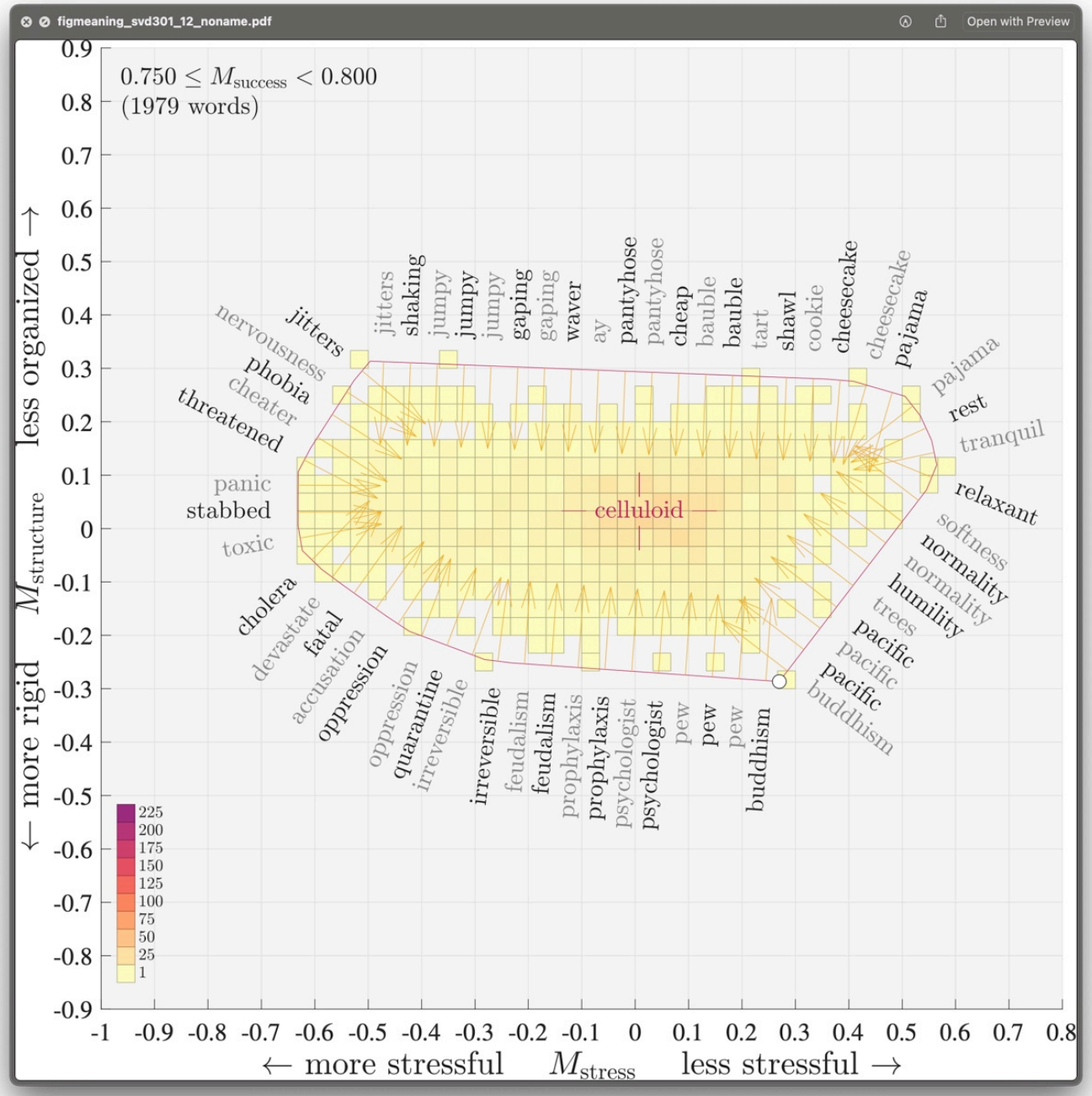

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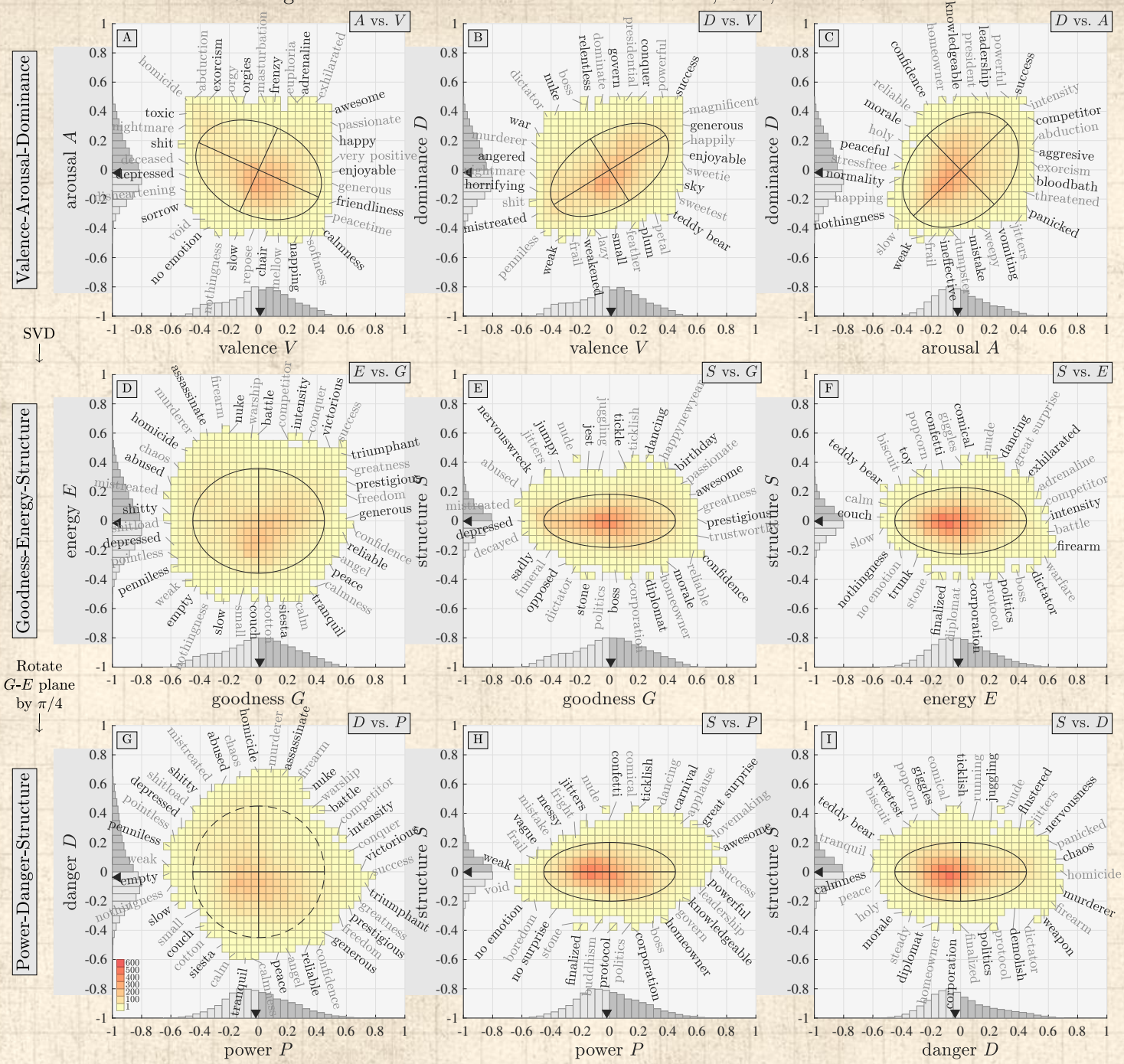

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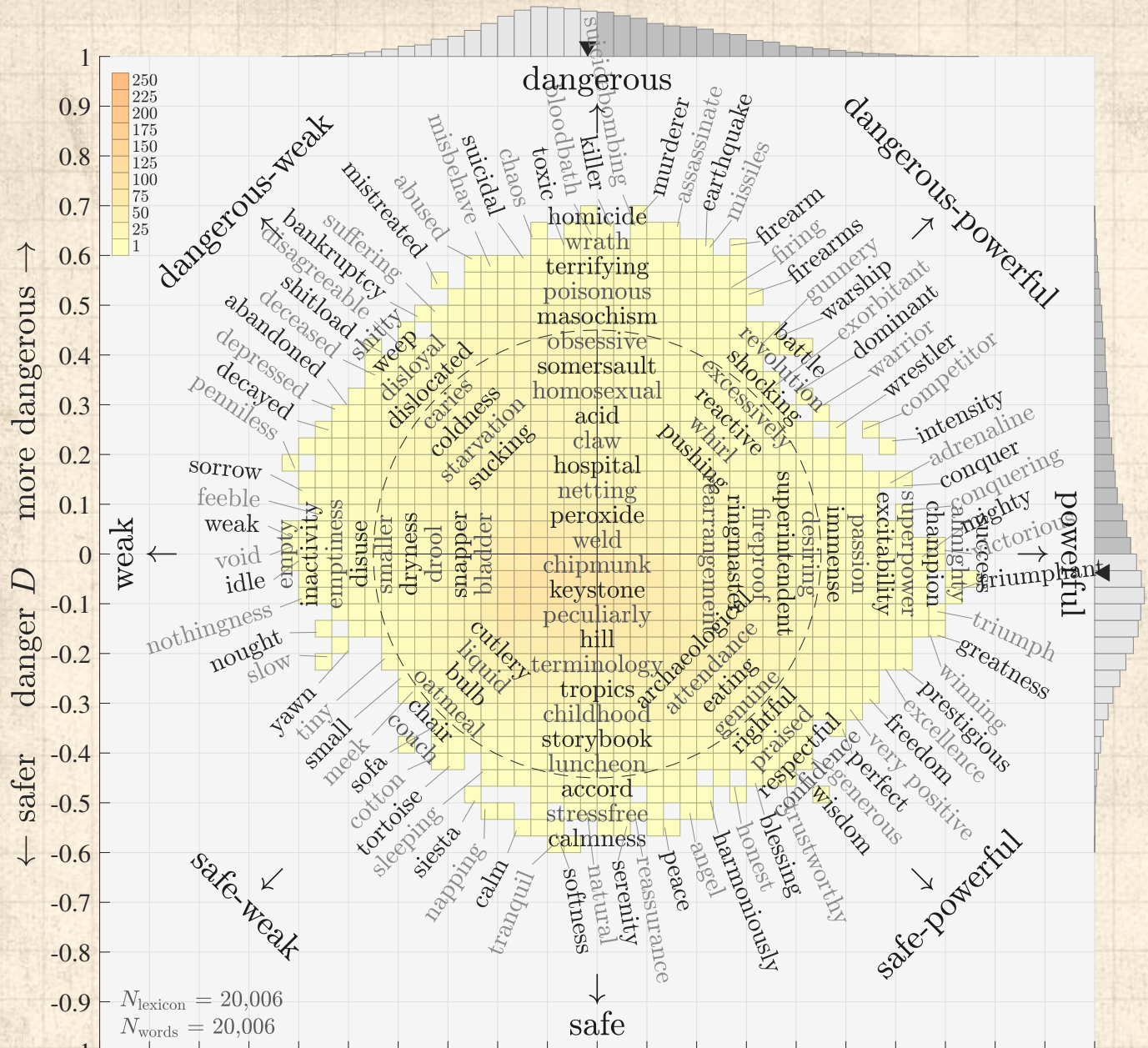

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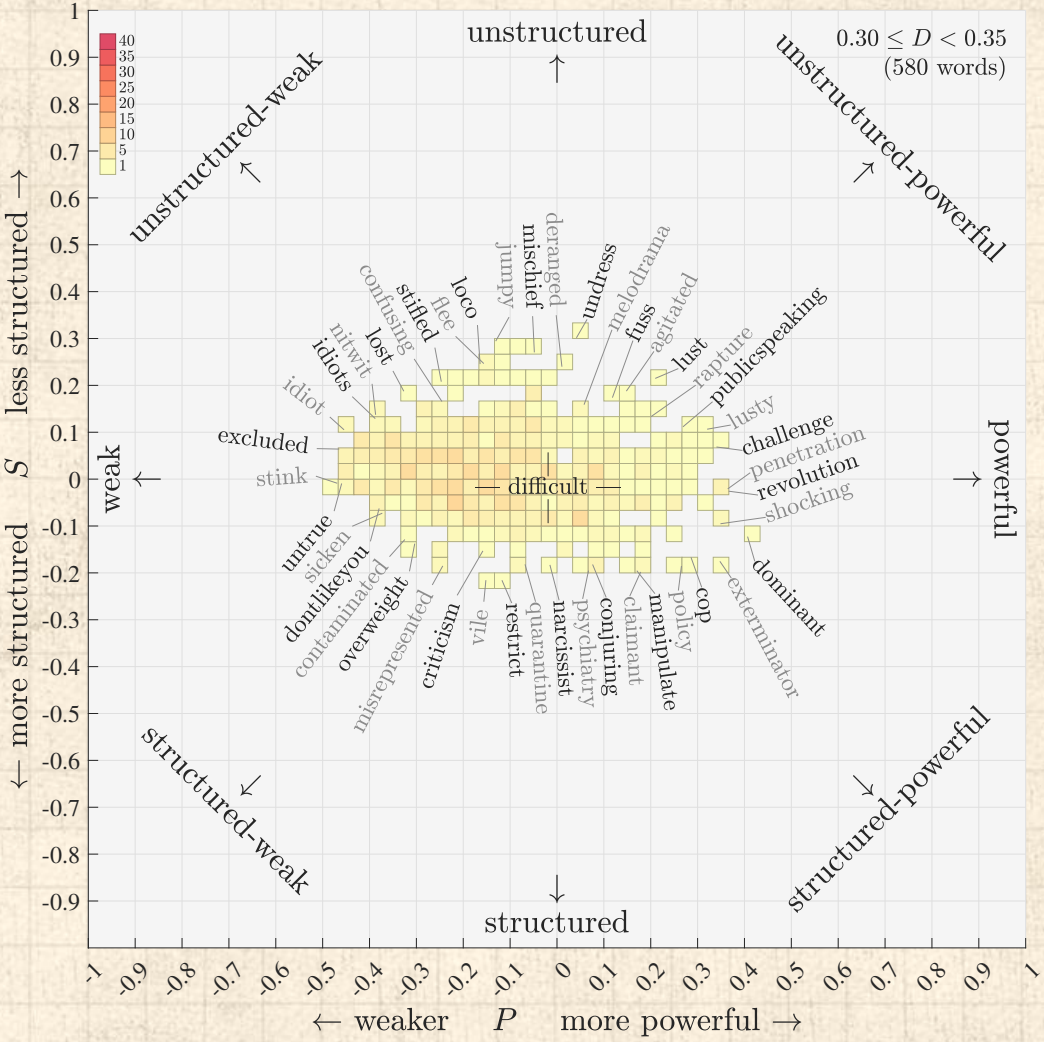
Ousiometric slices:



Slices of Structure Flipbook

Slices of Danger Flipbook

Slices of Power Flipbook

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Extremonyms: Synousionyms and Antousionyms:

Powerful-Safe (Good) to Weak-Dangerous (Bad) axis:

Synousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
Anchor: wisdom	0.430	-0.198	0.371	0.579	-0.031	-0.158	0.388	-0.432	-0.158
education	0.396	-0.225	0.340	0.539	-0.065	-0.167	0.336	-0.427	-0.167
healthy	0.438	-0.181	0.318	0.558	-0.047	-0.108	0.362	-0.428	-0.108
trustworthy	0.469	-0.185	0.324	0.589	-0.052	-0.100	0.379	-0.453	-0.100
reliable	0.412	-0.259	0.375	0.575	-0.076	-0.202	0.353	-0.460	-0.202
Antousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
bullshit	-0.458	0.176	-0.317	-0.575	0.046	0.095	-0.373	0.439	0.095
shitty	-0.480	0.179	-0.337	-0.604	0.042	0.100	-0.397	0.456	0.100
nauseate	-0.438	0.160	-0.324	-0.558	0.026	0.101	-0.376	0.413	0.101
weeping	-0.418	0.188	-0.332	-0.549	0.042	0.131	-0.359	0.418	0.131
shame	-0.440	0.170	-0.345	-0.572	0.023	0.120	-0.388	0.421	0.120
diarrhea	-0.408	0.184	-0.357	-0.552	0.023	0.151	-0.374	0.407	0.151

Powerful to Weak axis:

Synousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
Anchor: success	0.459	0.380	0.481	0.571	0.501	0.095	0.758	-0.050	0.095
almighty	0.438	0.374	0.458	0.543	0.487	0.098	0.728	-0.040	0.098
triumphant	0.449	0.337	0.472	0.565	0.462	0.073	0.726	-0.072	0.073
champion	0.390	0.380	0.445	0.494	0.492	0.087	0.698	-0.001	0.087
victorious	0.384	0.386	0.446	0.489	0.499	0.087	0.698	0.007	0.087
Antousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
sorrow	-0.448	-0.265	-0.336	-0.509	-0.329	-0.127	-0.593	0.127	-0.127
tasteless	-0.354	-0.304	-0.352	-0.430	-0.385	-0.092	-0.576	0.032	-0.092
idle	-0.321	-0.333	-0.388	-0.414	-0.434	-0.068	-0.600	-0.014	-0.068
empty	-0.312	-0.317	-0.419	-0.424	-0.439	-0.033	-0.610	-0.011	-0.033
void	-0.365	-0.337	-0.370	-0.443	-0.420	-0.103	-0.611	0.016	-0.103

Extremonyms: Synousionyms and Antousionyms:

Dangerous-Powerful (High Energy) to Safe-Weak (Low Energy) axis:

Synousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
Anchor: volcanic	-0.156	0.410	0.281	-0.061	0.515	-0.045	0.322	0.407	-0.045
shelling	-0.163	0.417	0.273	-0.072	0.518	-0.039	0.316	0.417	-0.039
artillery	-0.150	0.412	0.294	-0.050	0.523	-0.050	0.335	0.405	-0.050
wild	-0.188	0.422	0.250	-0.105	0.514	-0.032	0.289	0.438	-0.032
rifles	-0.163	0.364	0.265	-0.068	0.470	-0.062	0.284	0.380	-0.062
Antousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
couch	0.094	-0.418	-0.302	-0.002	-0.524	0.025	-0.372	-0.369	0.025
mellow	0.133	-0.431	-0.235	0.066	-0.504	-0.009	-0.310	-0.403	-0.009
pillow	0.163	-0.372	-0.305	0.049	-0.498	0.085	-0.317	-0.387	0.085
tortoise	0.173	-0.422	-0.250	0.092	-0.511	0.025	-0.297	-0.427	0.025
quilt	0.143	-0.377	-0.274	0.048	-0.482	0.052	-0.307	-0.375	0.052
cotton	0.139	-0.429	-0.260	0.059	-0.517	0.012	-0.324	-0.407	0.012

Dangerous to Safe axis:

Synousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
Anchor: homicide	-0.490	0.473	0.018	-0.485	0.478	0.011	-0.005	0.681	0.011
killer	-0.459	0.471	0.043	-0.446	0.485	0.008	0.028	0.658	0.008
psychopath	-0.460	0.443	0.036	-0.446	0.458	-0.003	0.009	0.640	-0.003
bloodshed	-0.452	0.442	0.025	-0.444	0.450	0.008	0.004	0.633	0.008
violate	-0.439	0.470	0.019	-0.440	0.468	0.033	0.020	0.642	0.033
Antousionyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
natural	0.354	-0.382	-0.019	0.354	-0.382	-0.026	-0.020	-0.520	-0.026
tranquil	0.417	-0.406	-0.145	0.351	-0.480	0.078	-0.091	-0.588	0.078
softness	0.375	-0.414	-0.098	0.338	-0.455	0.021	-0.082	-0.561	0.021
serenity	0.400	-0.378	0.057	0.429	-0.345	-0.054	0.060	-0.547	-0.054
comfortable	0.427	-0.337	-0.027	0.406	-0.361	0.039	0.032	-0.542	0.039
calmness	0.434	-0.395	-0.106	0.383	-0.453	0.065	-0.049	-0.591	0.065

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Etymological, taxonomic, and nomenclatural madnesses:

- Physics: Power was once sometimes called Activity

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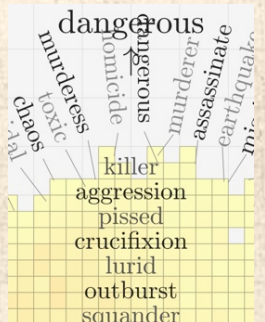

Etymological, taxonomic, and nomenclatural madnesses:

- Physics: Power was once sometimes called Activity
- Danger and Dominance trace back to Dominus (∼ lord/ruler/person of power)

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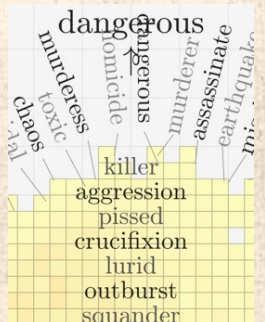

Etymological, taxonomic, and nomenclatural madnesses:

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- Framing words for EPA, VAD, etc., matter greatly.

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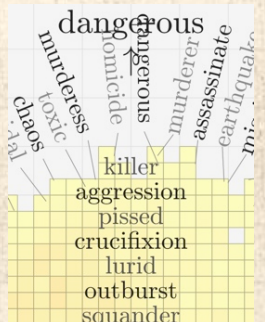

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- Physics: Power was once sometimes called Activity
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Other descriptors that don't hold up:

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- Danger and Dominance trace back to Dominus (∼ lord/ruler/person of power)
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Other descriptors that don't hold up:

- Success-Stress-Structure.

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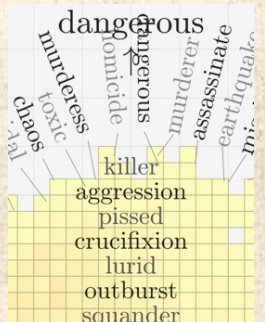

Etymological, taxonomic, and nomenclatural madnesses:

- Physics: Power was once sometimes called Activity
- Danger and Dominance trace back to Dominus (∼ lord/ruler/person of power)
- Framing words for EPA, VAD, etc., matter greatly.

Other descriptors that don't hold up:

- Success-Stress-Structure.
- Energy/Flourishing/Thriving-Threat

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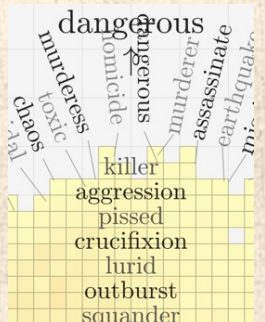

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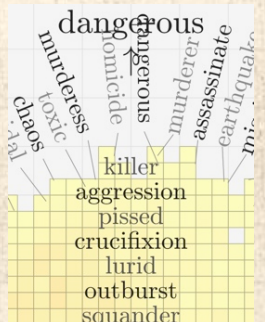

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- Goodness-Energy-Structure (GES) (still fails)

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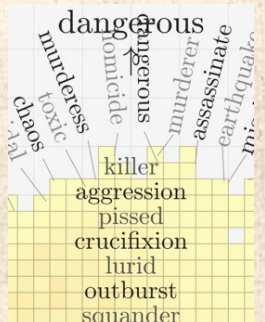

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After much staring at the ceiling:

- Goodness-Energy-Structure (GES) (still fails)
- Power-Danger-Structure (PDS) (succeeds)

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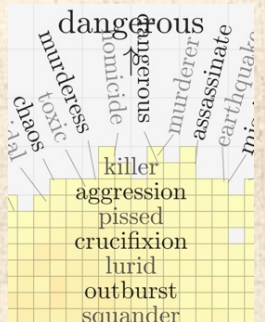

Connections between meaning dimensions:

$$\begin{bmatrix} \textbf{Goodness} \\ \textbf{Energy} \\ \textbf{Structure} \end{bmatrix} \simeq \begin{bmatrix} +0.86 & -0.15 & +0.48 \\ -0.16 & +0.83 & +0.54 \\ +0.48 & +0.55 & -0.69 \end{bmatrix} \begin{bmatrix} \textbf{Valence} \\ \textbf{Arousal} \\ \textbf{Dominance} \end{bmatrix}$$

$$\begin{bmatrix} \textbf{Power} \\ \textbf{Danger} \\ \textbf{Structure} \end{bmatrix} \simeq \begin{bmatrix} 0.53 & 0.45 & 0.72 \\ -0.70 & 0.71 & 0.07 \\ 0.48 & 0.55 & -0.69 \end{bmatrix} \begin{bmatrix} \textbf{Valence} \\ \textbf{Arousal} \\ \textbf{Dominance} \end{bmatrix}$$

$$\begin{bmatrix} \textbf{Power} \\ \textbf{Danger} \end{bmatrix} = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} \textbf{Goodness} \\ \textbf{Energy} \end{bmatrix} \quad (1)$$

From types to tokens: [7]

- Analysis so far is for a lexicon of types: Each word counts once.

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From types to tokens: [7]

- Analysis so far is for a lexicon of types: Each word counts once.
- Must consider how words are used in real texts by frequency: Tokens.
- Rebuild ousiograms with usage frequency incorporated.
- A set of distinct corpora:
  - English fiction from Google Books (120 years). [10, 15]
  - Jane Austen's novels.
  - Sherlock Holmes stories.
  - New York Times (20 years). [19]
  - Wikipedia (2019/03). [20]
  - RadioTalk: Transcriptions of talk radio. [3]
  - Twitter through Storywrangler. [1]

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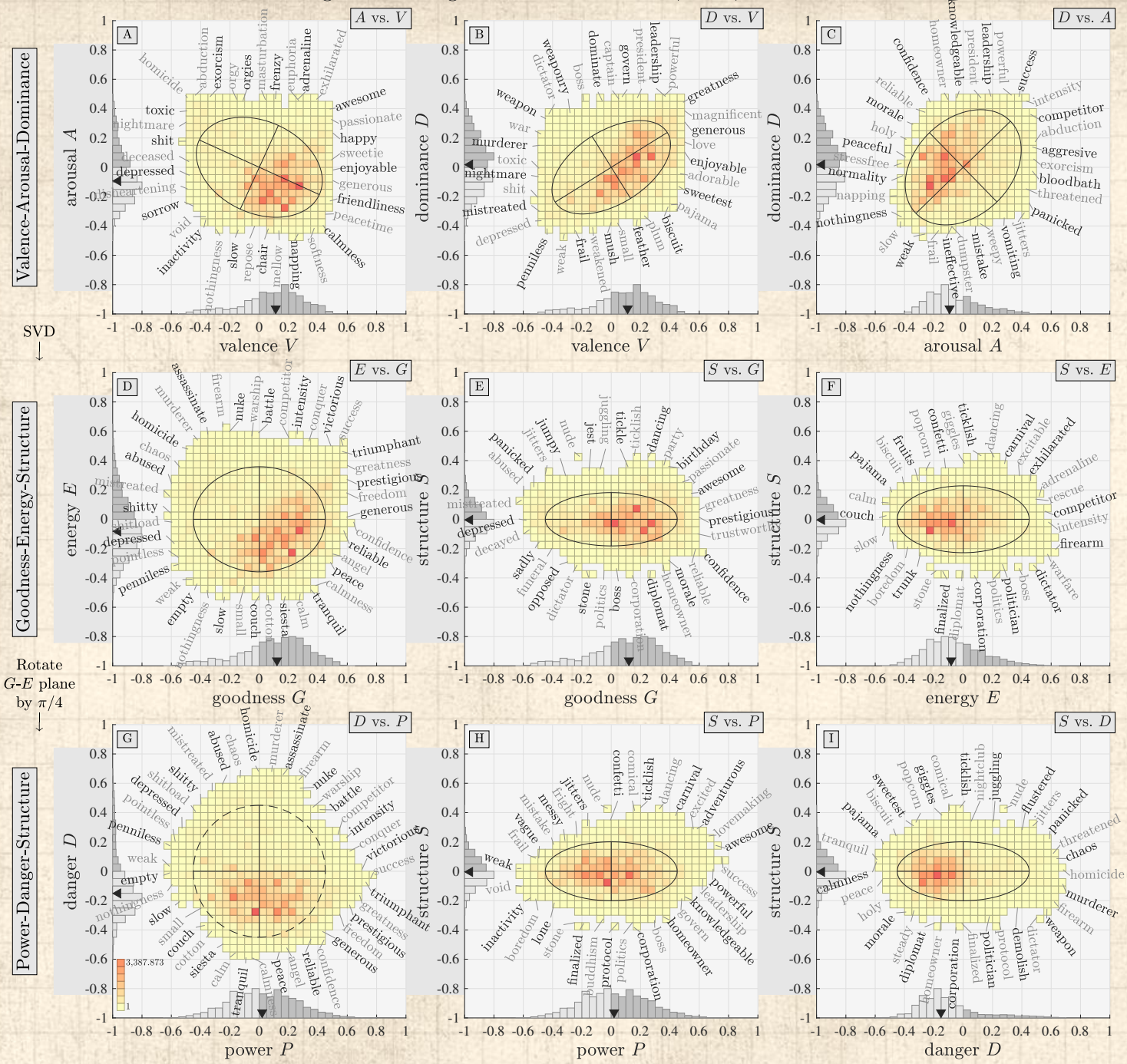

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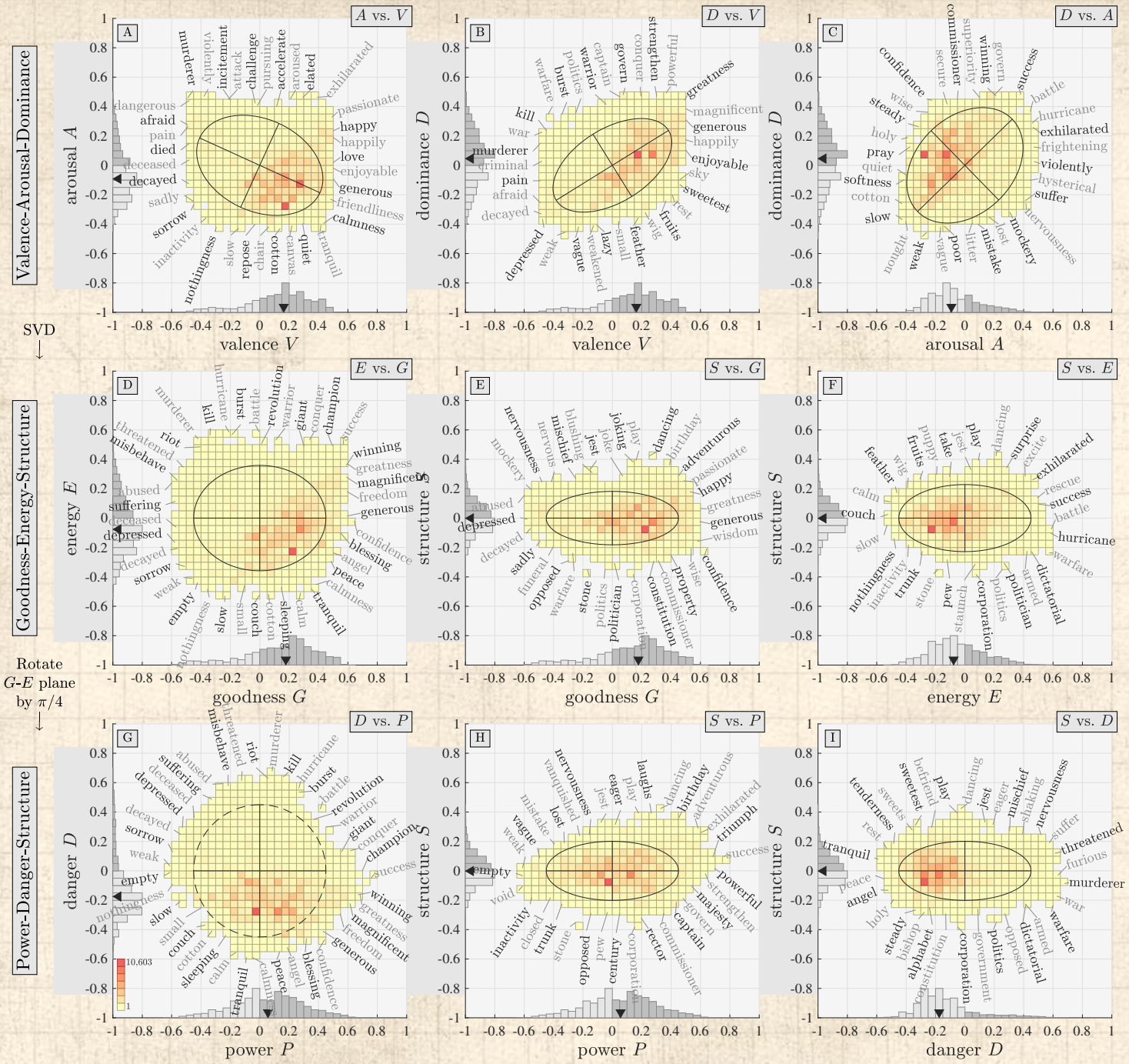
Ousiograms for Jane Austen's novels in the VAD, GES, and PDS frameworks:



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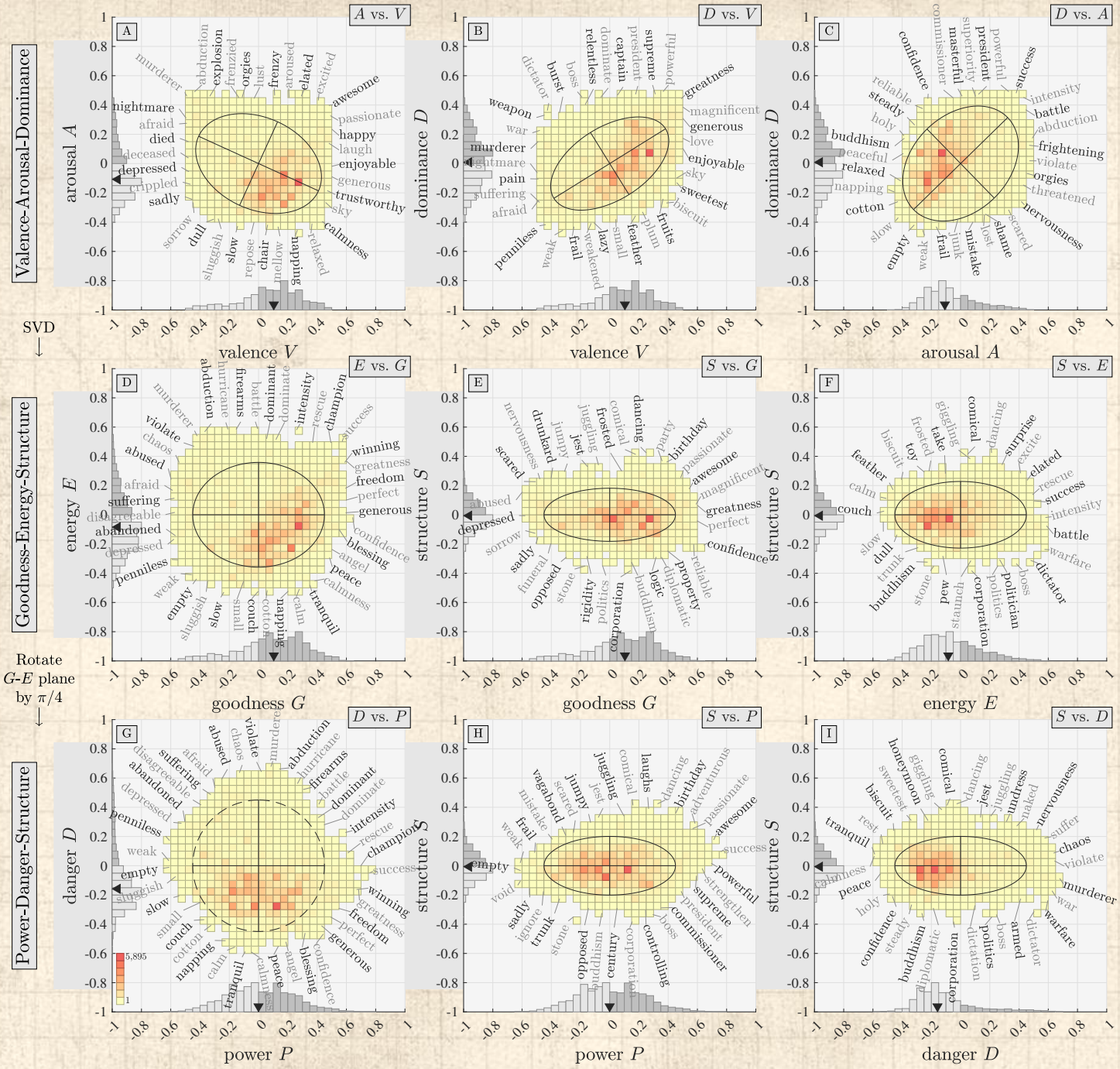
Ousiograms for Sherlock Holmes in the VAD, GES, and PDS frameworks:



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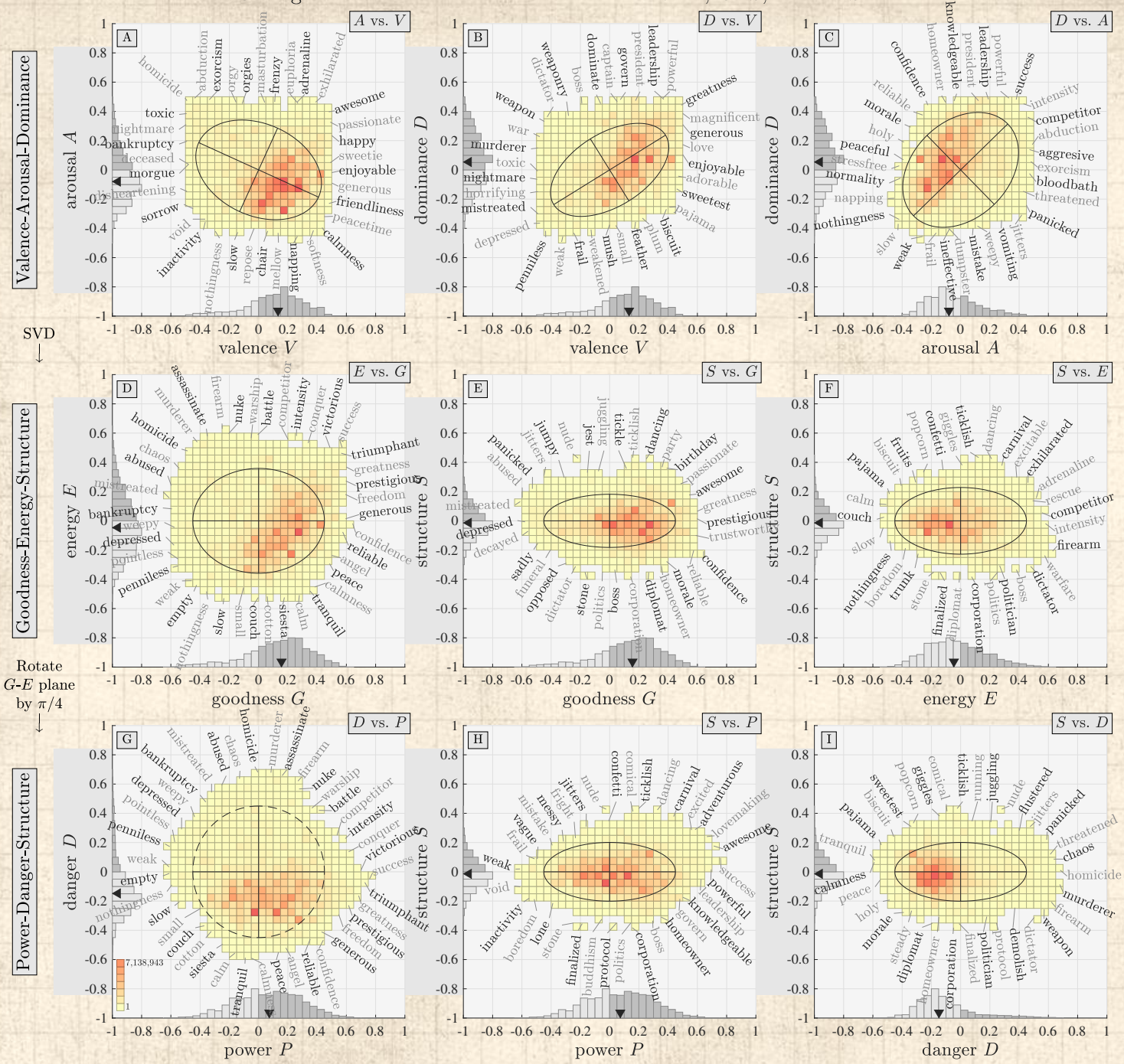

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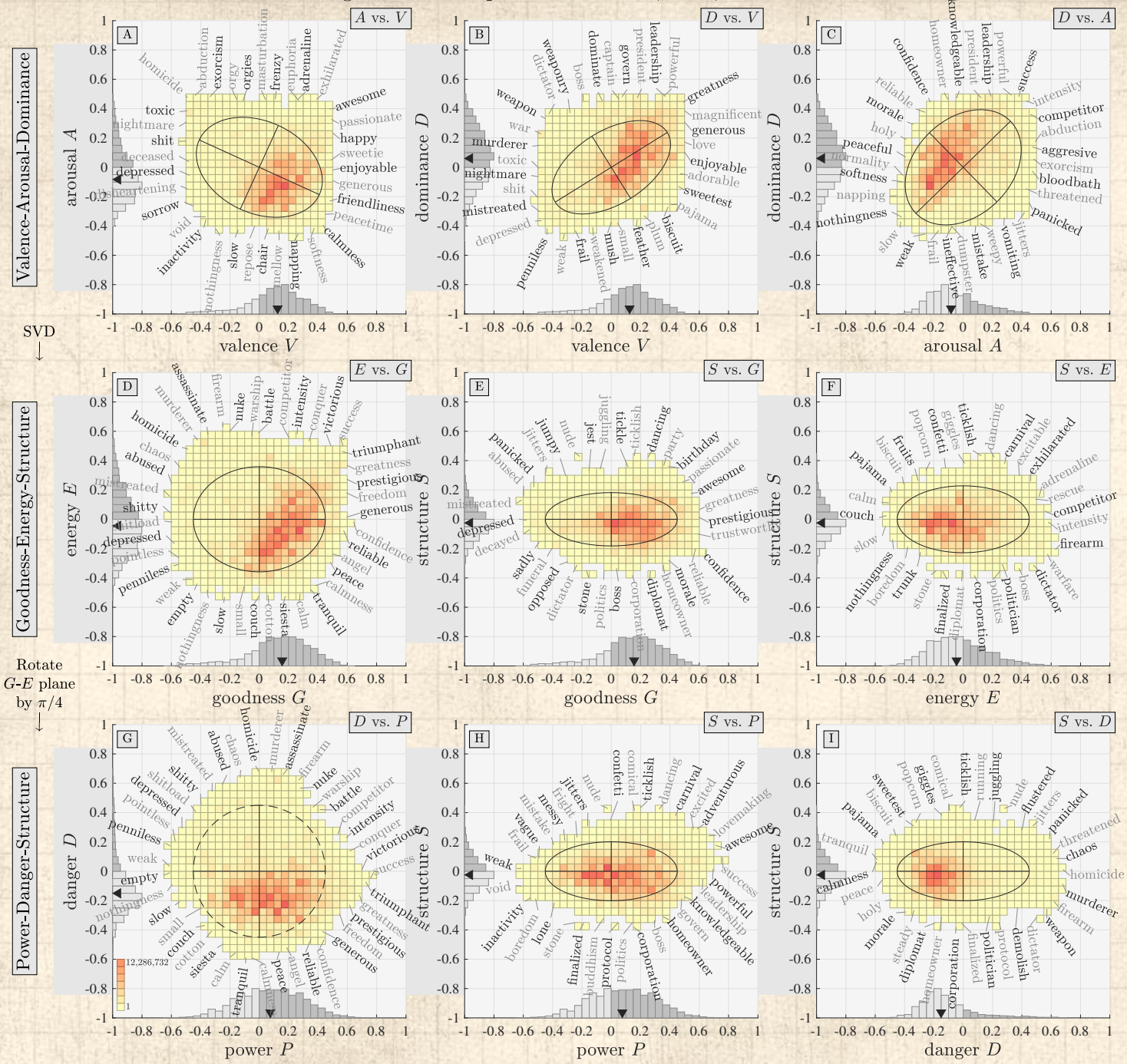

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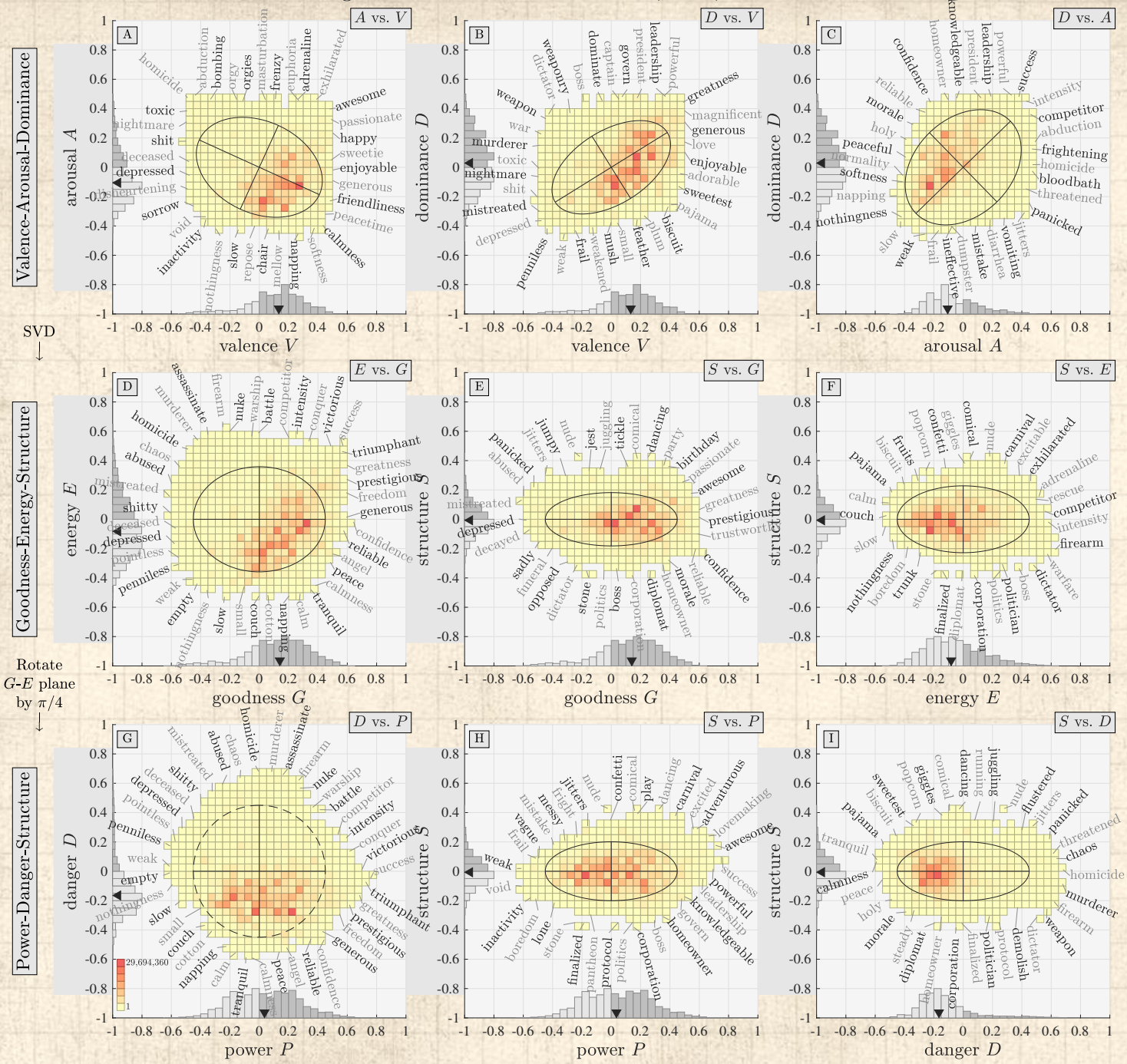

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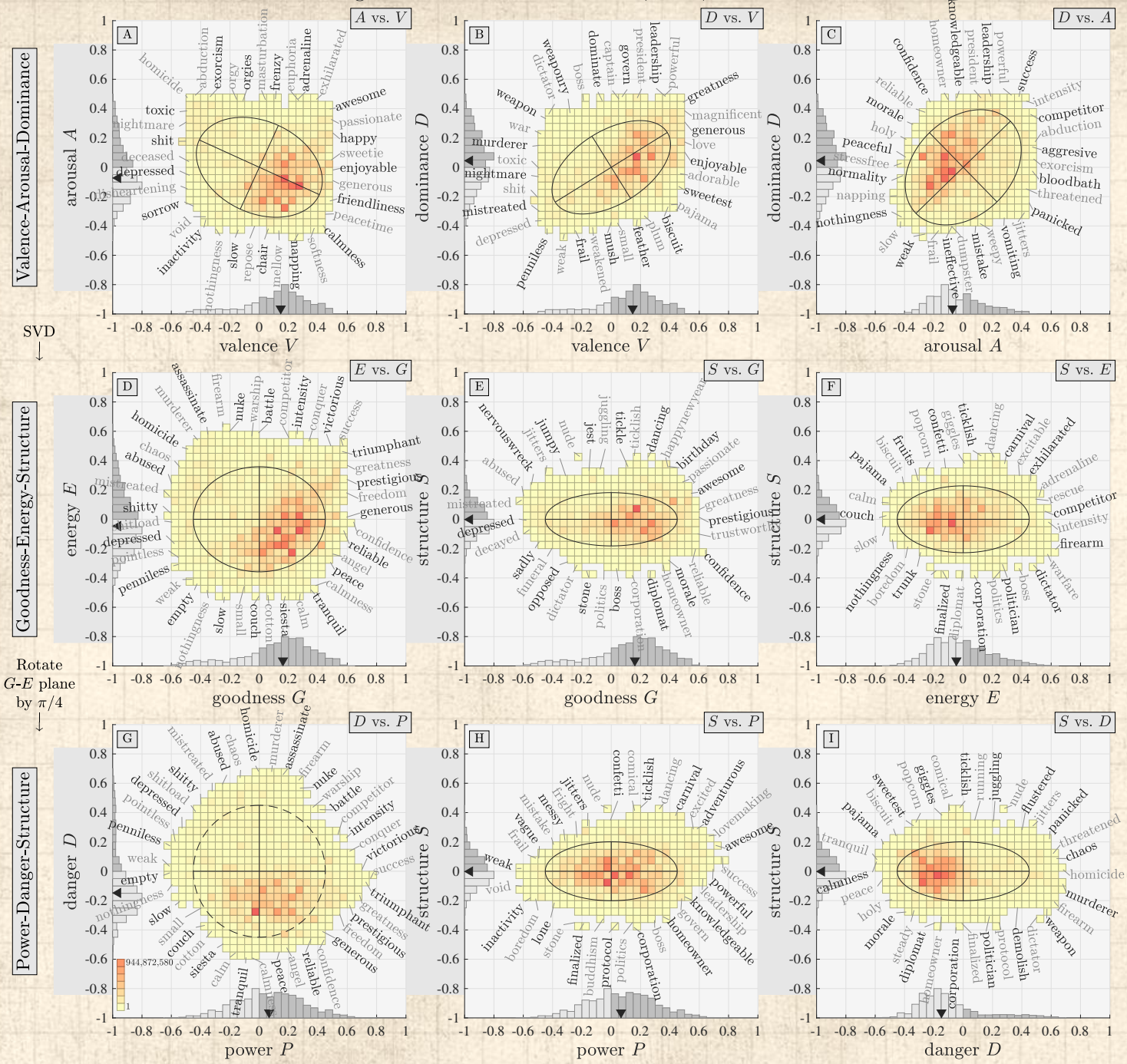

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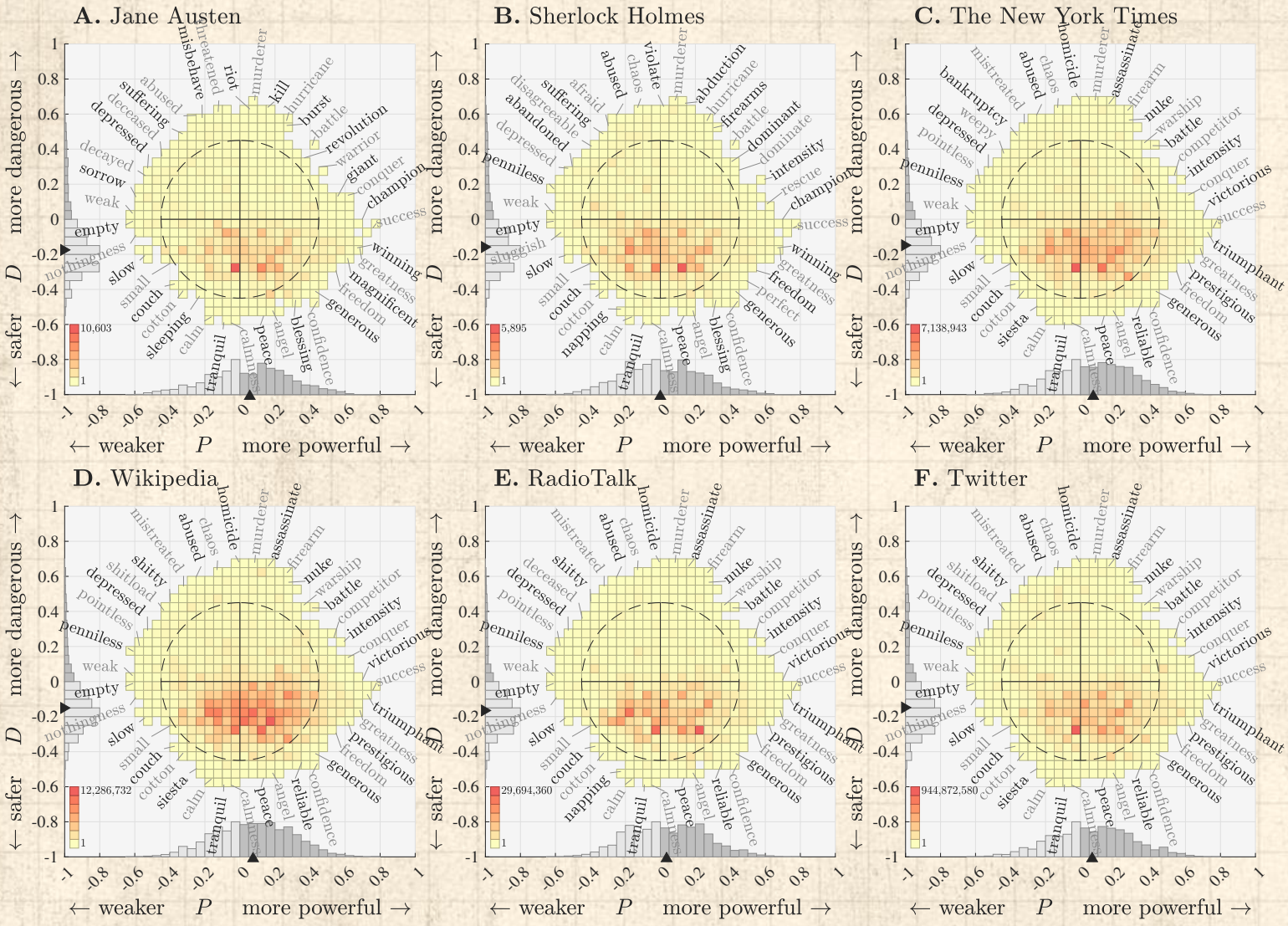

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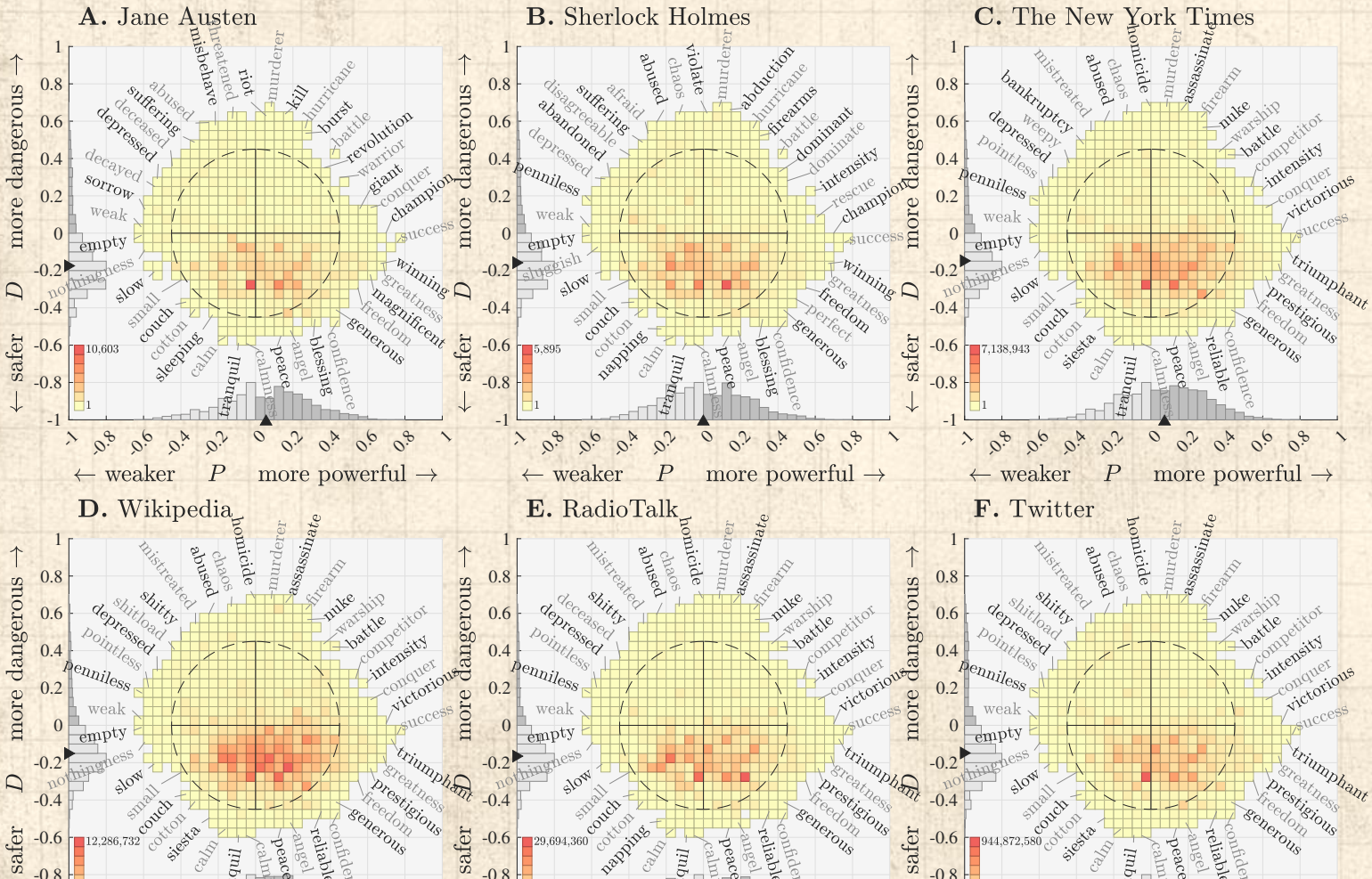
A special thing has happened:

- The PDS framework emerged only from analyzing a lexicon (types).



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A special thing has happened:

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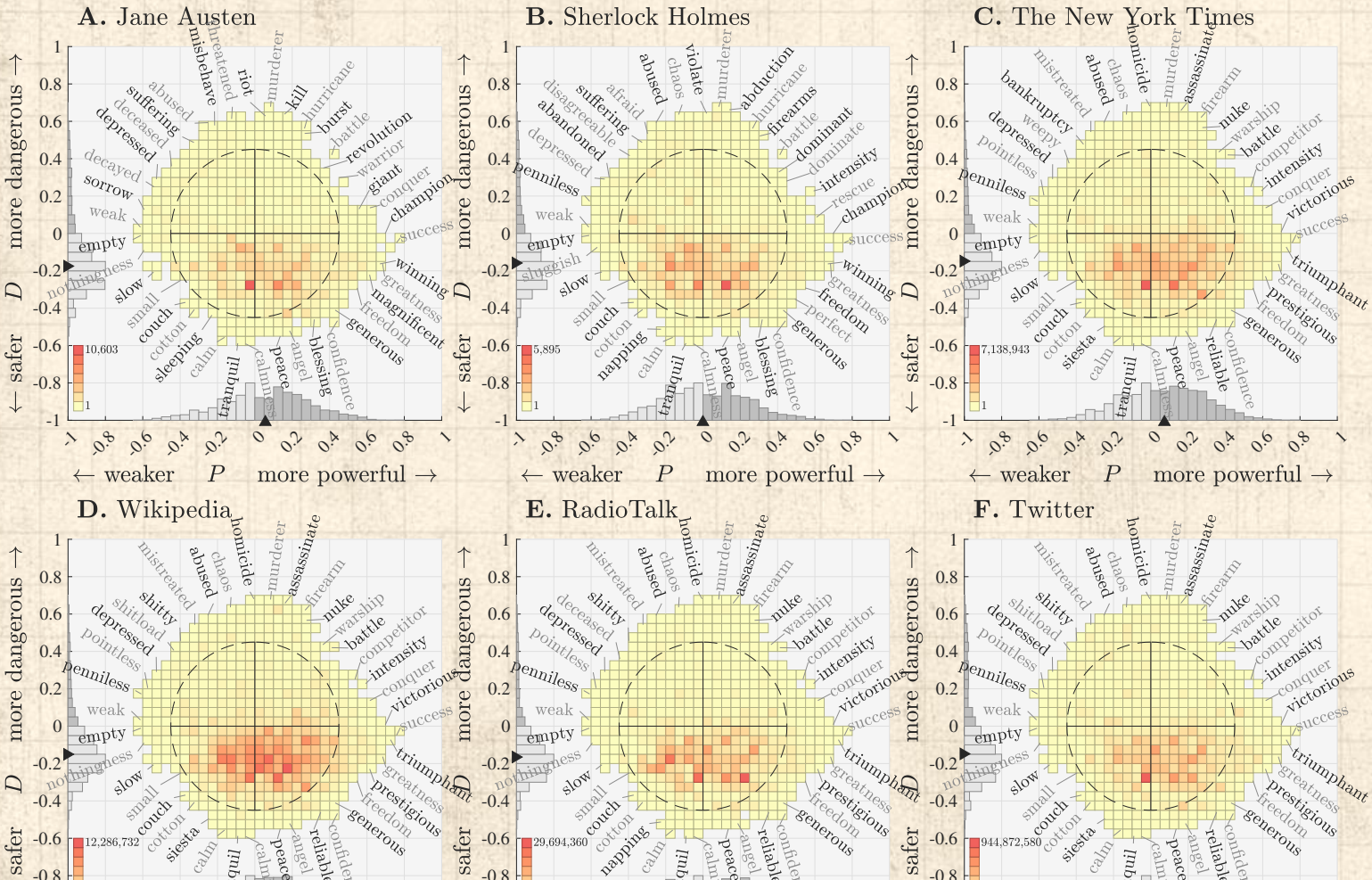
- Applying PDS framework to disparate corpora (tokens) reveals a linguistic ‘safety bias’.



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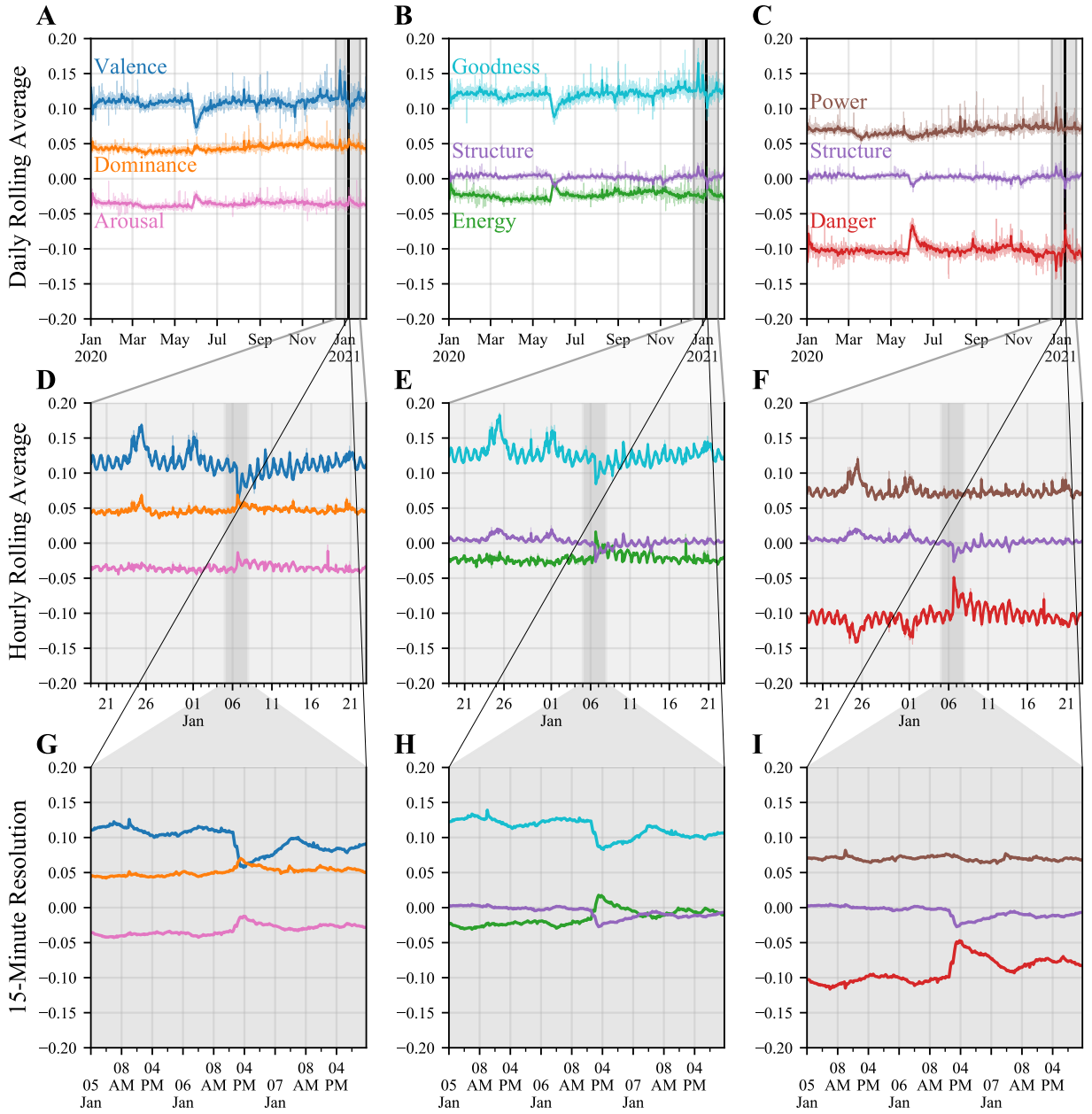
Prototype ousiometer—Twitter:



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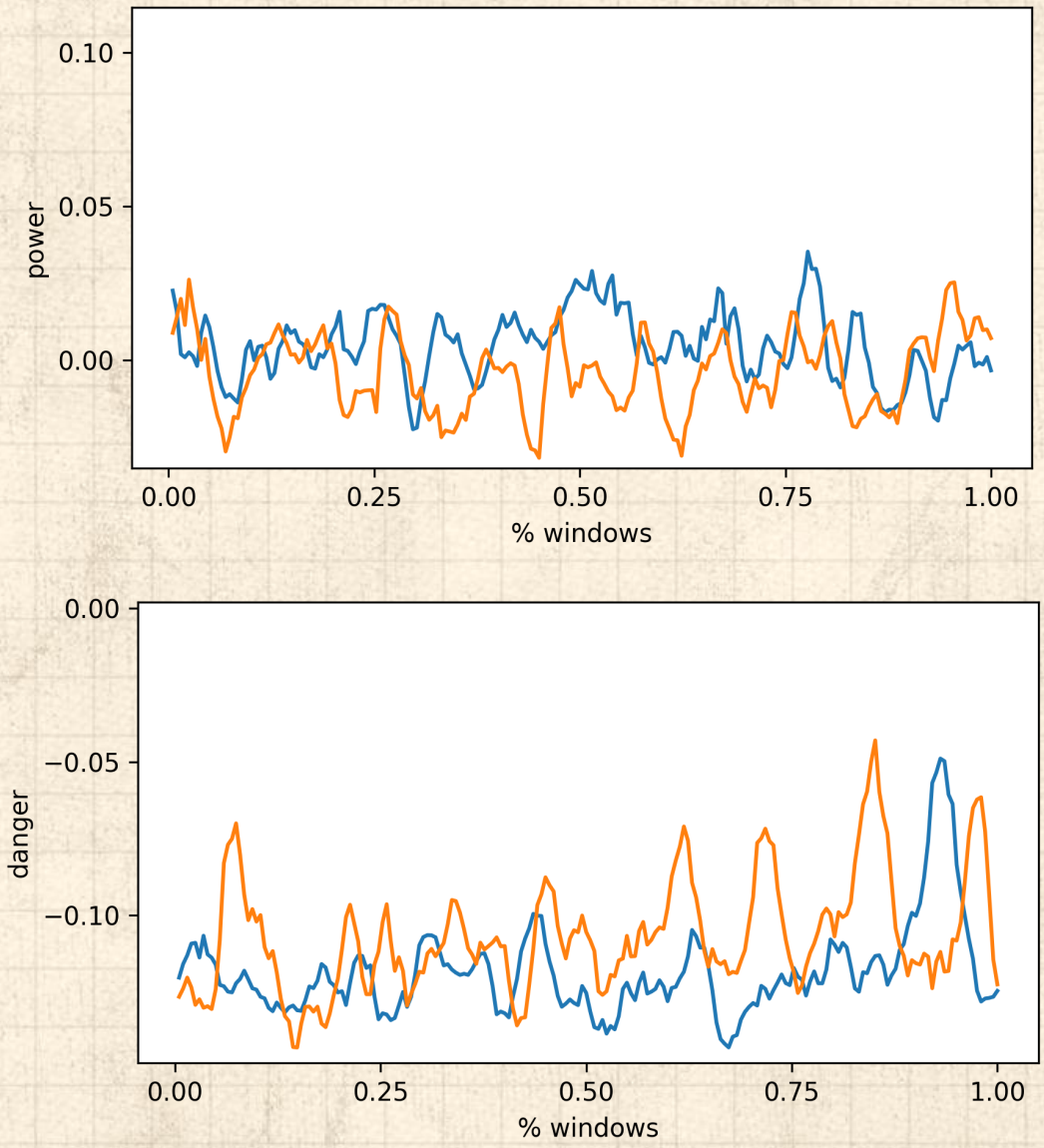
Prototype ousiometer—Harry Potter:



Blue: Harry Potter and the Half-Blood Prince
Orange: Harry Potter and the Deathly Hallows

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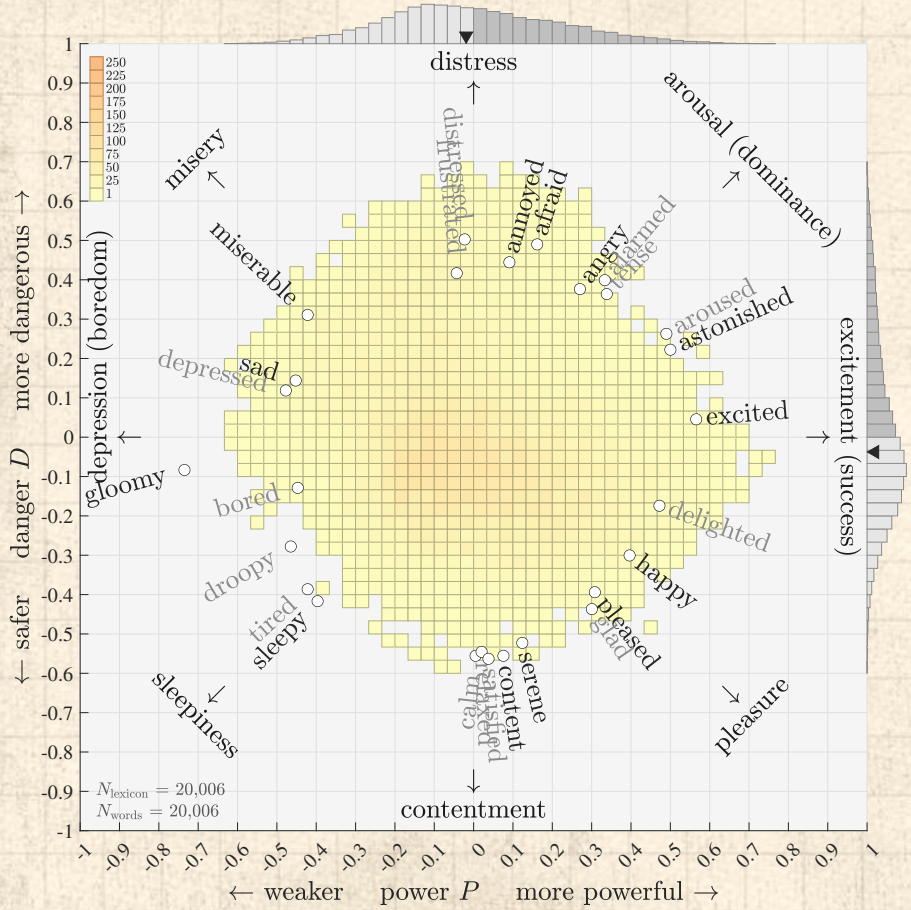
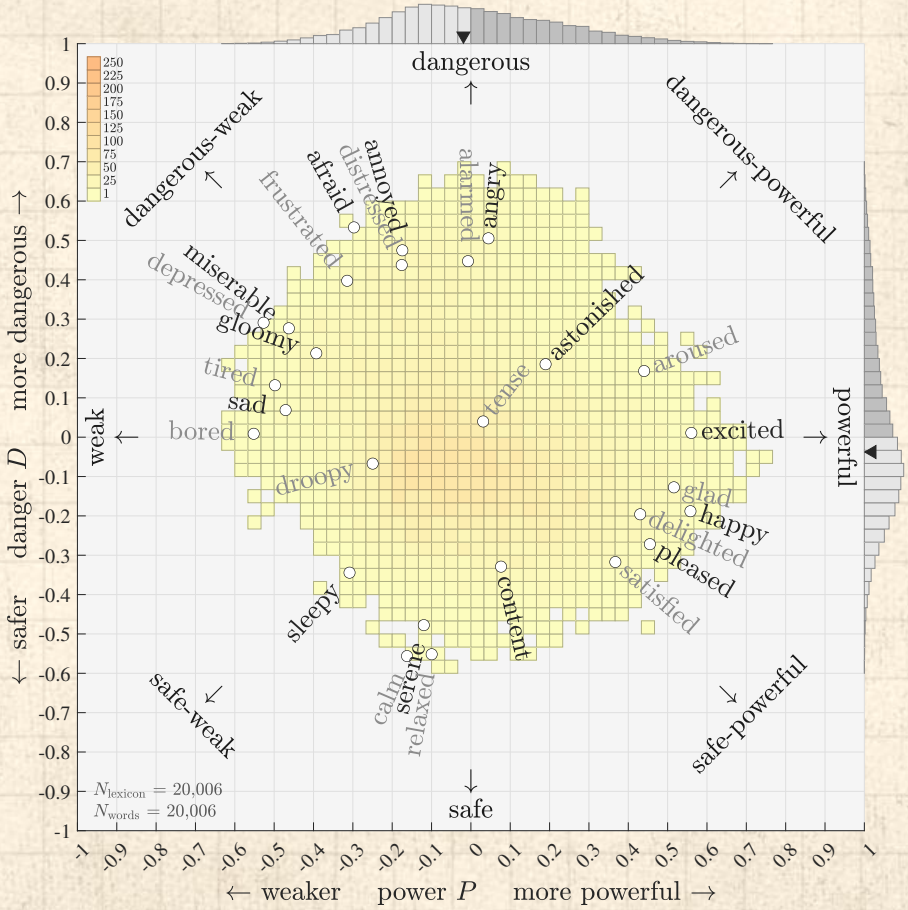
- Rough agreement with Russell's circumplex model, [18] which itself doesn't disagree with a 2-d orthogonal framework.

A. Circumplex model of affect:



B. Power-danger coordinates for Russell's affect words:



Dungeons & Dragons—Two alignment axes for character:

[1]

{lawful ⇔ chaotic} (vertical) and {good ⇔ evil} (horizontal).

[1] From this Reddit thread, where, naturally, the choices are enthusiastically debated.

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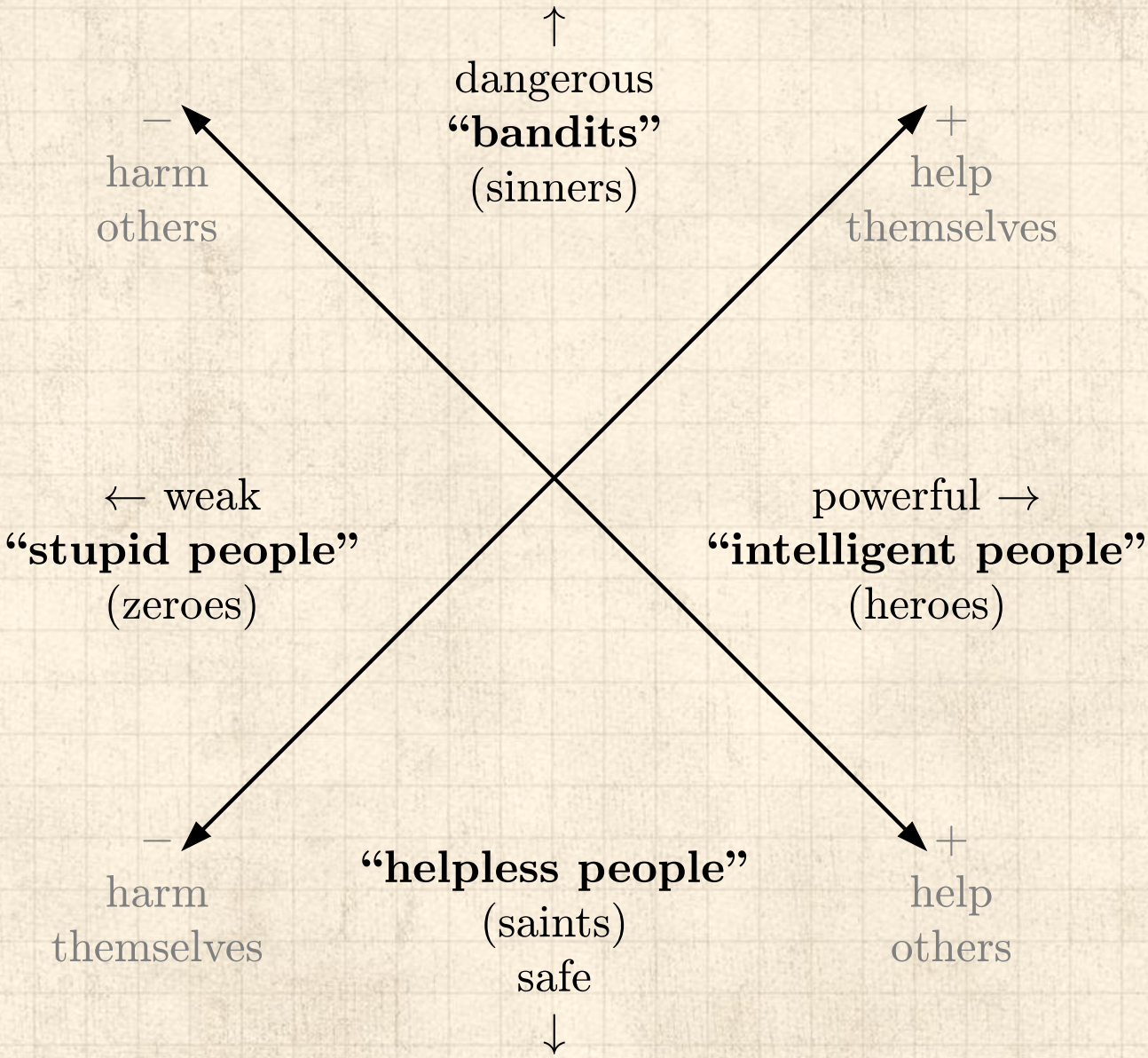
lawful-good ~ structured- powerful-safe	neutral-good ~ neutral- powerful-safe	chaotic-good ~ unstructured- powerful-safe
lawful-neutral ~ structured- neutral	(true) neutral	chaotic-neutral ~ unstructured- neutral
lawful-evil ~ structured- dangerous	neutral-evil ~ neutral- dangerous	chaotic-evil ~ unstructured- dangerous

Aligns with rotated version of Cipolla's Basic Laws of Human Stupidity:



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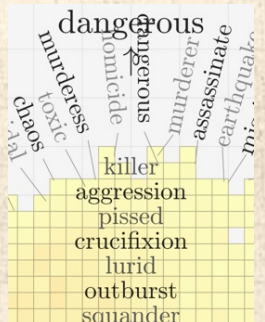

Who is Pratchett the Cat?

The Open-Source Psychometrics Project:
https://openpsychometrics.org

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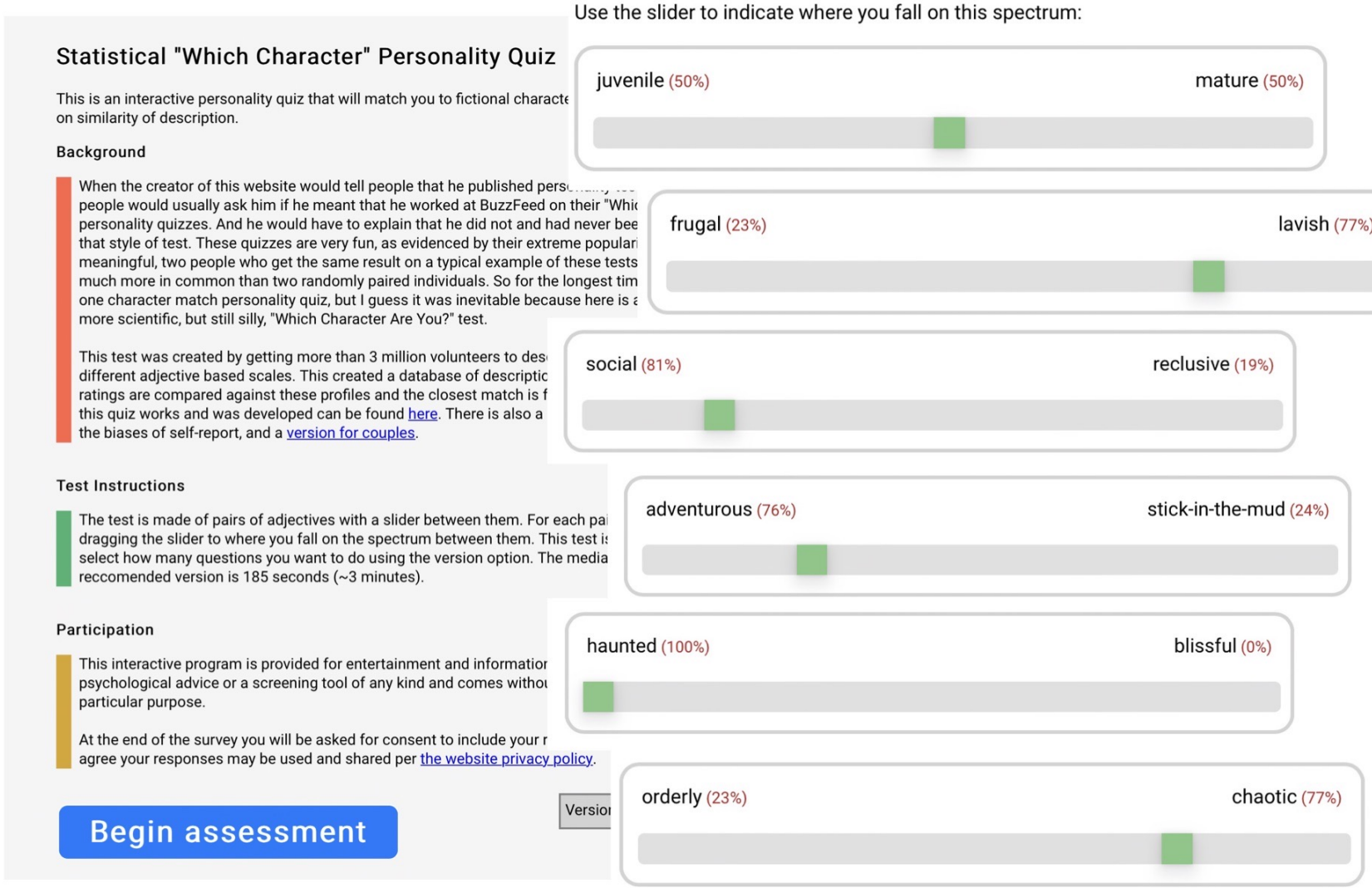
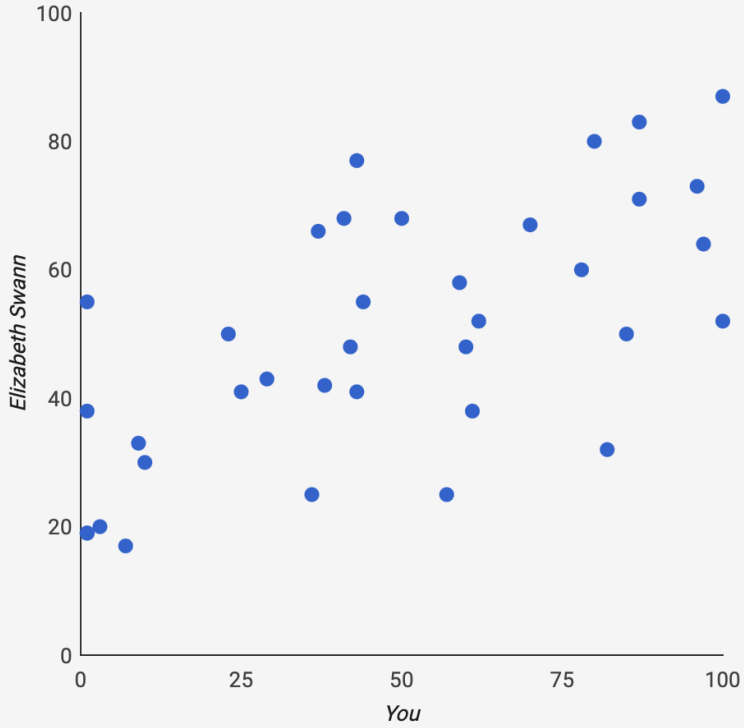

Statistical "Which Character" Personality Quiz
This is an interactive personality quiz that will match you to fictional characte
on similarity of description.
Background
When the creator of this website would tell people that he published pers
people would usually ask him if he meant that he worked at BuzzFeed on their "Whi
personality quizzes. And he would have to explain that he did not and had never bee
that style of test. These quizzes are very fun, as evidenced by their extreme popular
meaningful, two people who get the same result on a typical example of these tests
much more in common than two randomly paired individuals. So for the longest tim
one character match personality quiz, but I guess it was inevitable because here is a
more scientific, but still silly, "Which Character Are You?" test.
This test was created by getting more than 3 million volunteers to des
different adjective based scales. This created a database of descriptic
ratings are compared against these profiles and the closest match is f
this quiz works and was developed can be found here. There is also a
the biases of self-report, and a version for couples.
Test Instructions
The test is made of pairs of adjectives with a slider between them. For each pai
dragging the slider to where you fall on the spectrum between them. This test is
select how many questions you want to do using the version option. The media
reccomended version is 185 seconds (~3 minutes).
Participation
This interactive program is provided for entertainment and informatior
psychological advice or a screening tool of any kind and comes withou
particular purpose.
At the end of the survey you will be asked for consent to include your r
agree your responses may be used and shared per the website privacy policy.
Begin assessment
Use the slider to indicate where you fall on this spectrum:
juvenile (50%)
mature (50%)
frugal (23%)
lavish (77%)
social (81%)
reclusive (19%)
adventurous (76%)
stick-in-the-mud (24%)
haunted (100%)
blissful (0%)
orderly (23%)
chaotic (77%)

The best match between the self assessment you provided and the profile of a fictional character as rated by other people who have taken this survey is the character **Elizabeth Swann** (Pirates of the Caribbean).

83% match

Your traits versus their traits are graphed below (click on points for labels).



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Fictional characters most like Pratchett the Cat:

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Fictional characters most like Pratchett the Cat:

1. Elizabeth Swann (Pirates of the Caribbean): 83%
2. Daenerys Targaryen (Game of Thrones): 82%
3. Margaery Tyrell (Game of Thrones): 82%
4. Francisco d'Anconia (Atlas Shrugged): 82%
5. Dr. Hannibal Lecter (Hannibal): 82%
6. Audrey Horne (Twin Peaks): 81%
7. Princess Anna Karenina (Anna Karenina): 81%
8. Danny Ocean (Ocean's 11): 81%
9. Ragnar Lothbrok (Vikings): 81%
10. Olenna Tyrell (Game of Thrones): 80%

Fictional characters least like Pratchett the Cat:

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Fictional characters least like Pratchett the Cat:

1988. Cyril Figgis (Archer): 22%
1989. Kermit (Shameless): 22%
1990. Stu (The Hangover): 22%
1991. George Michael Bluth (Arrested Dev.): 21%
1992. Morty Smith (Rick and Morty): 21%
1993. Louis Tully (Ghostbusters): 21%
1994. Lenny (After Life): 21%
1995. Eric Forman (That 70's Show): 20%
1996. Milhouse Van Houten (The Simpsons): 19%
1997. Alan Harper (Two and Half Men): 19%
1998. Pete Hornberger (30 Rock): 19%
1999. Chip Dove (Jennifer's Body): 17%
2000. Stuart Bloom (The Big Bang Theory): 16%

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83% match

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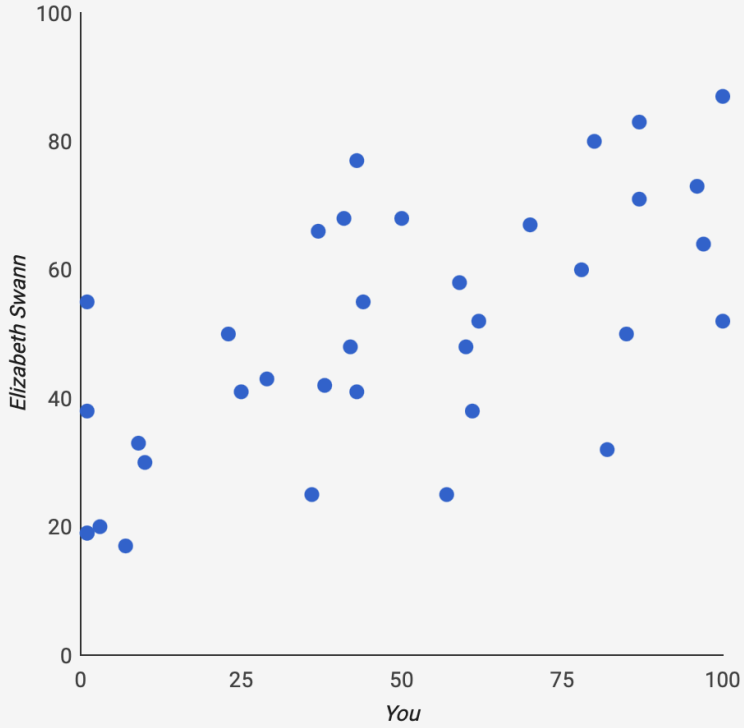

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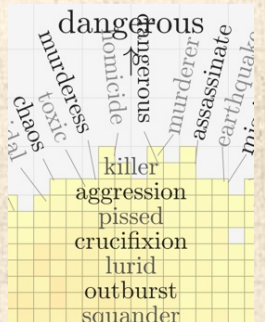
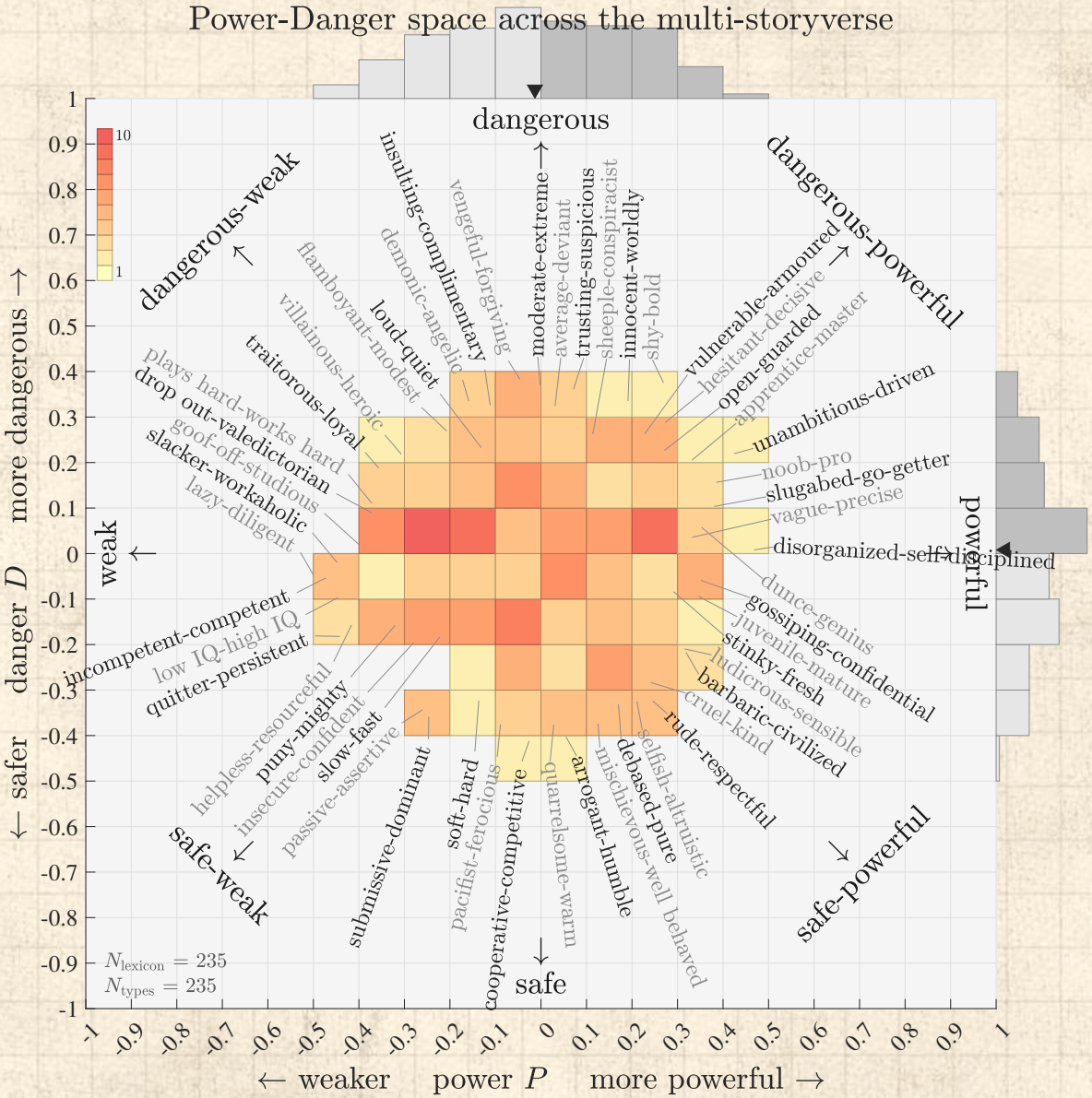


800 characters, 200+ semantic differentials:



Source: https://openpsychometrics.org

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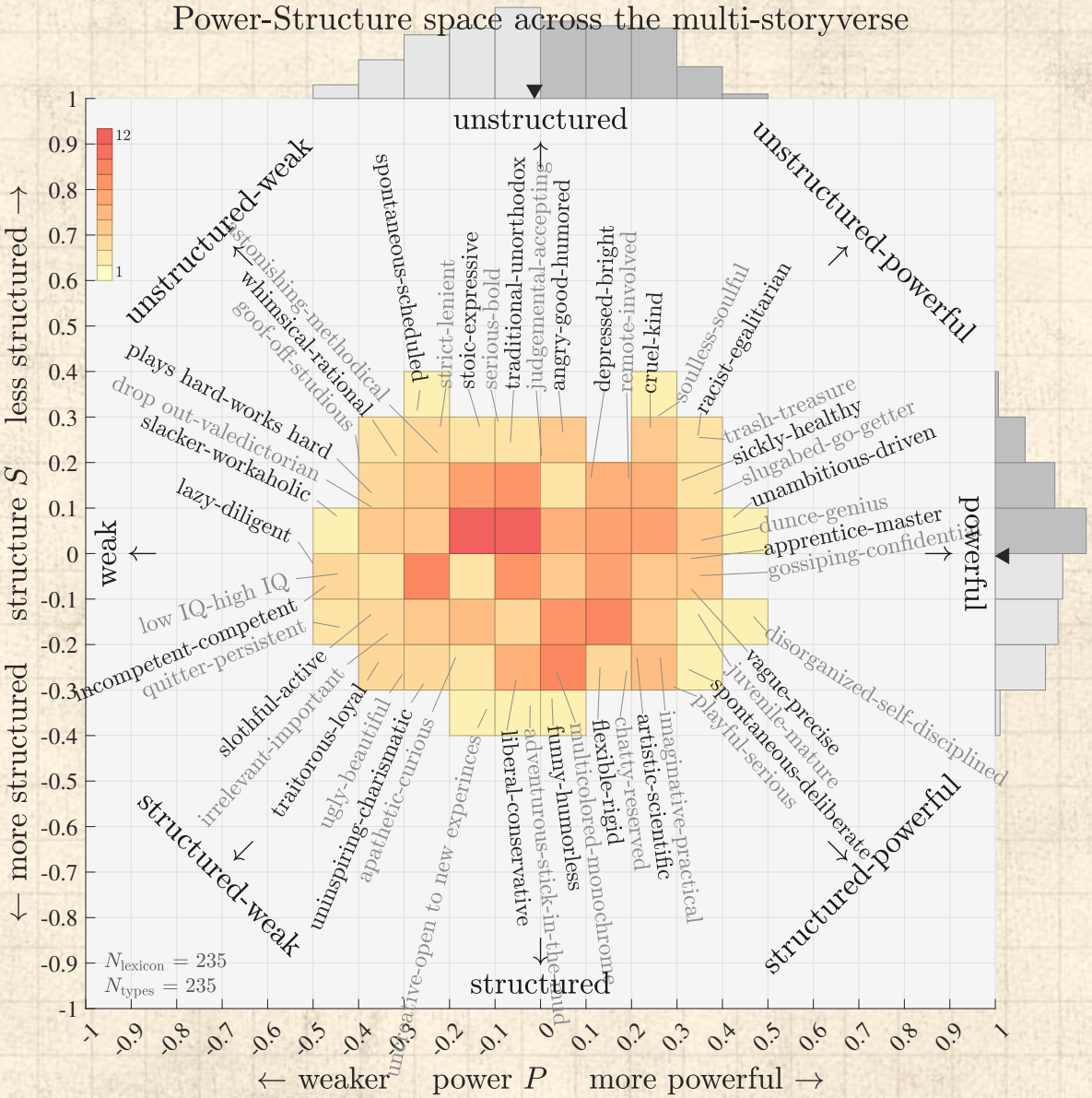

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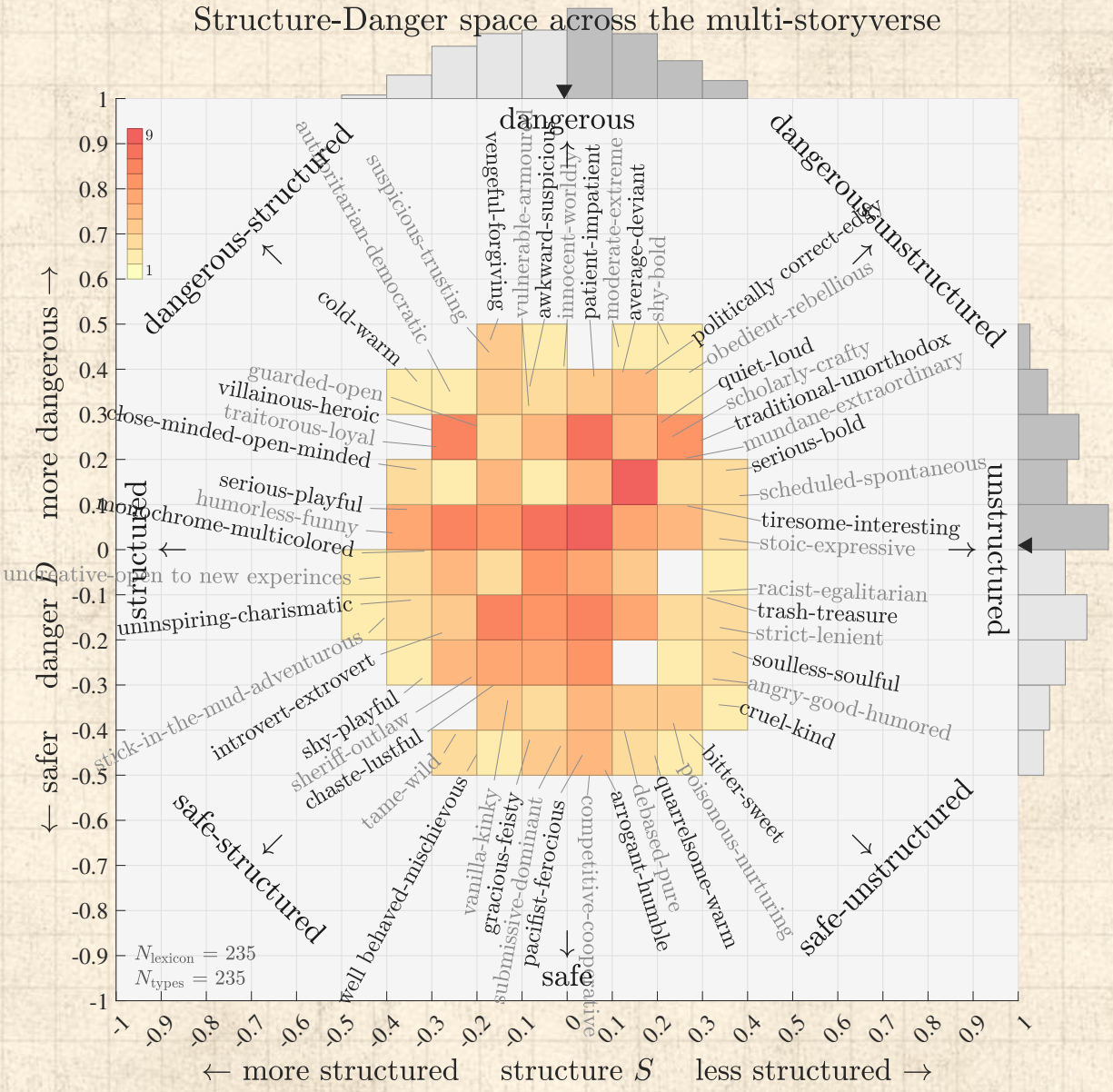

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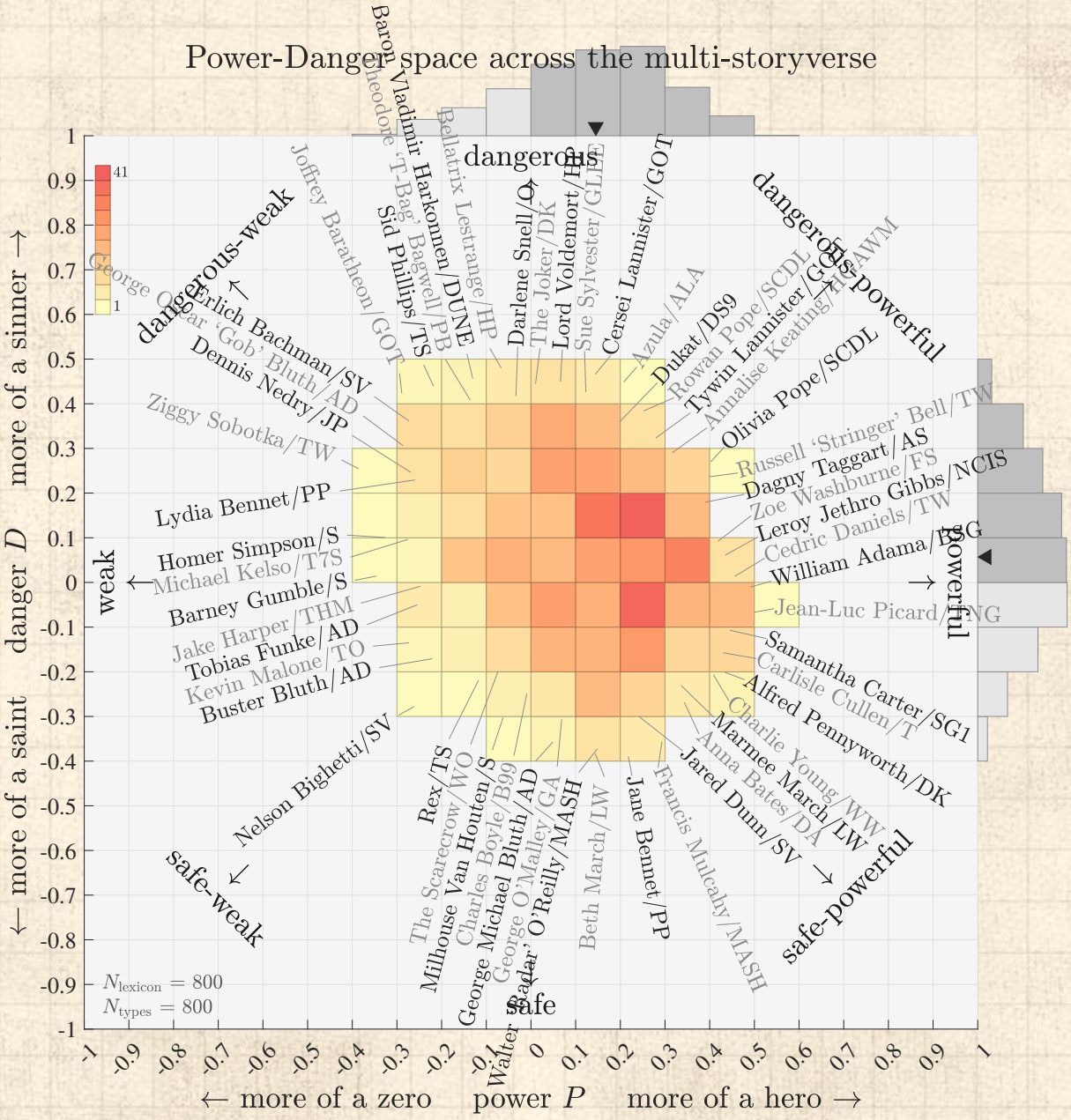

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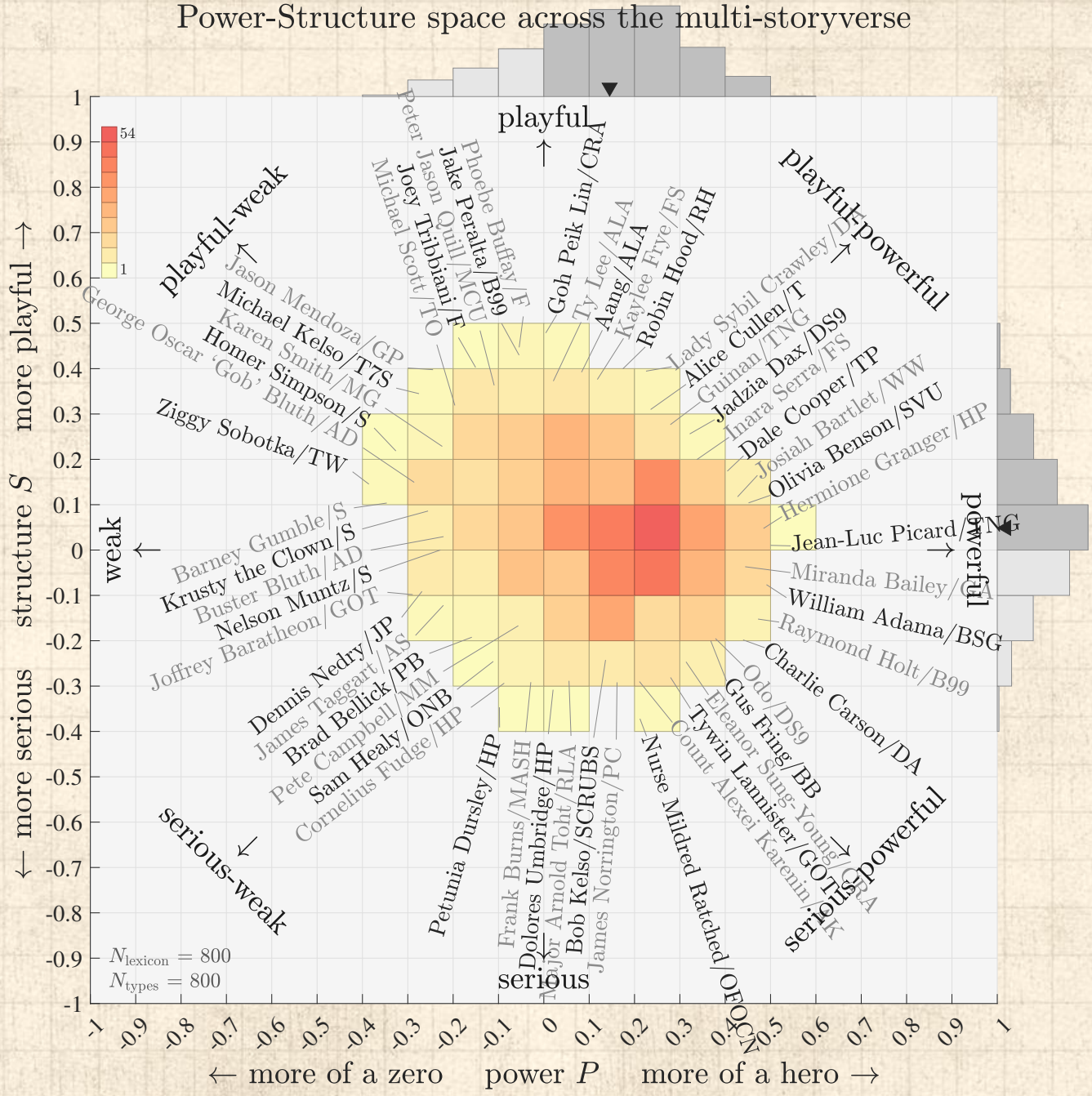

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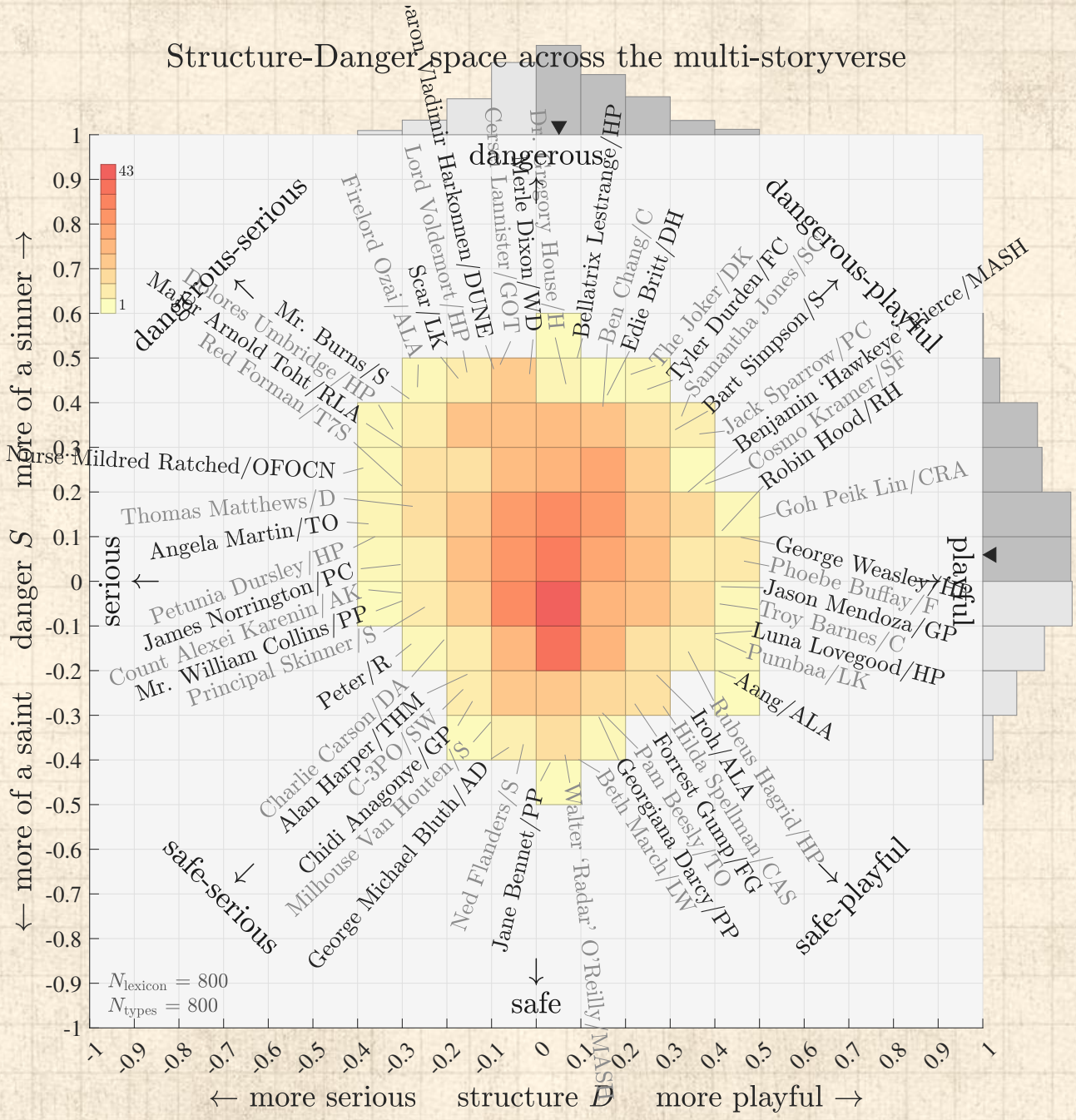

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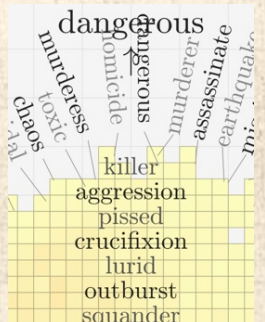

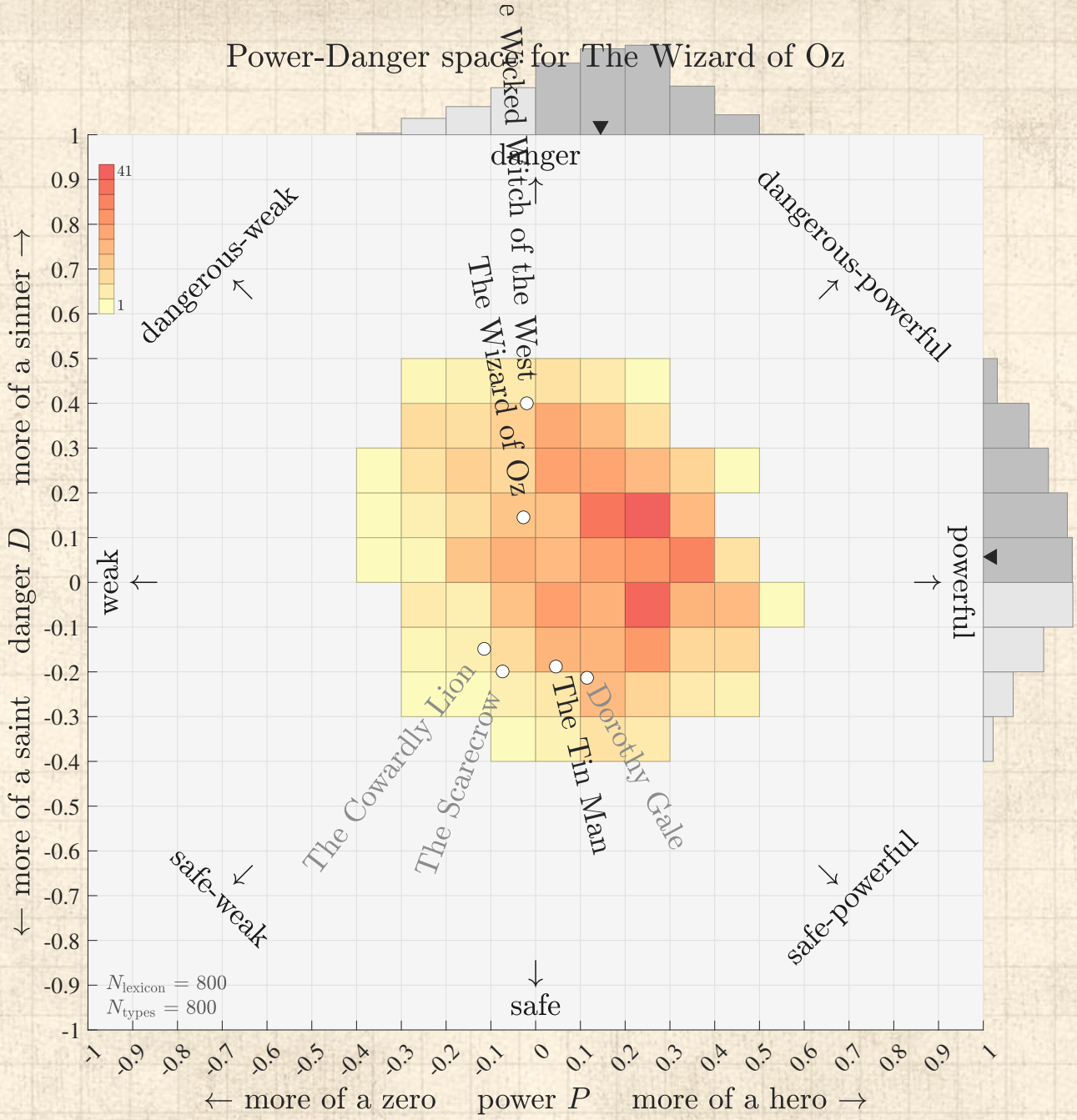

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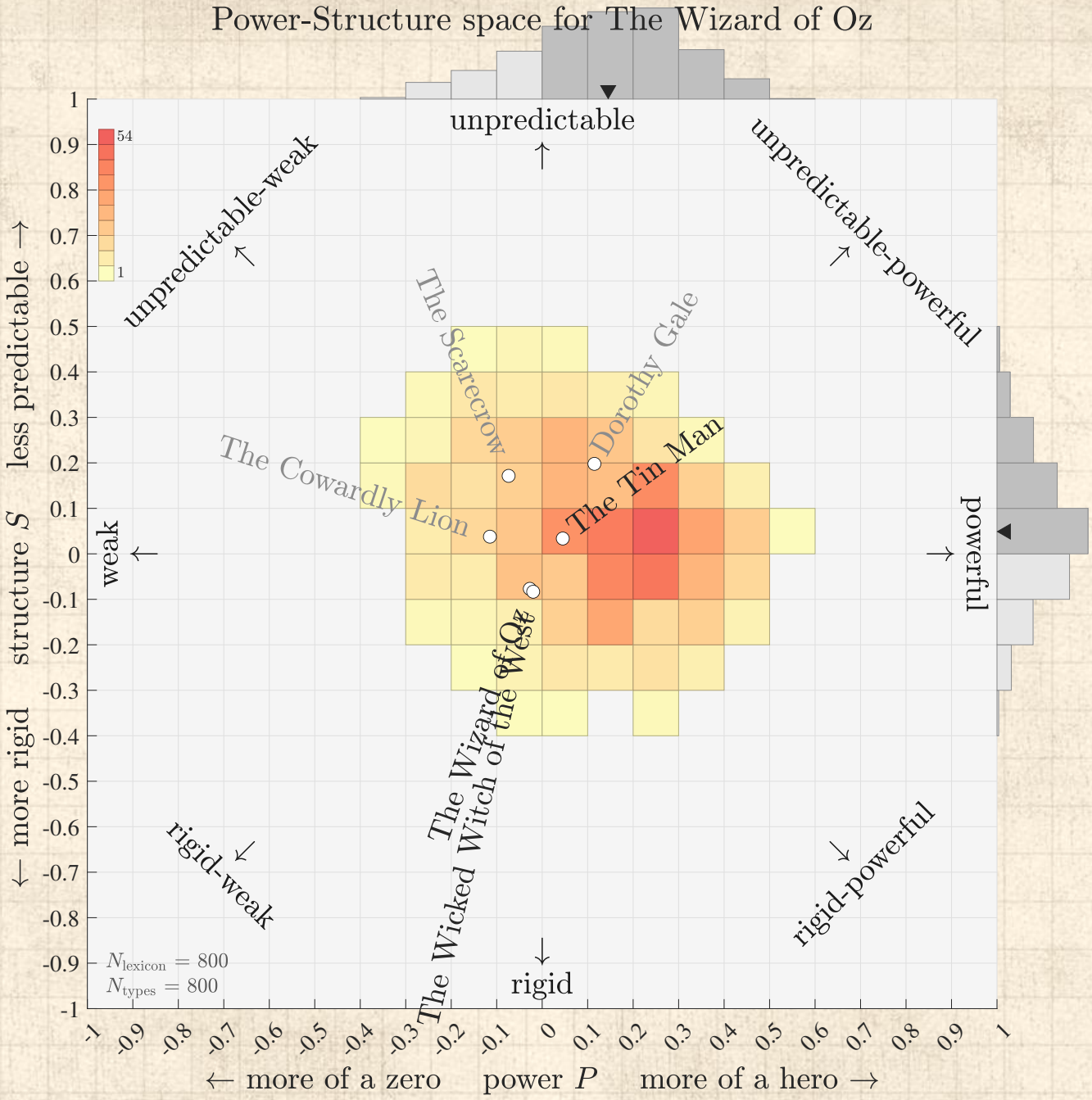

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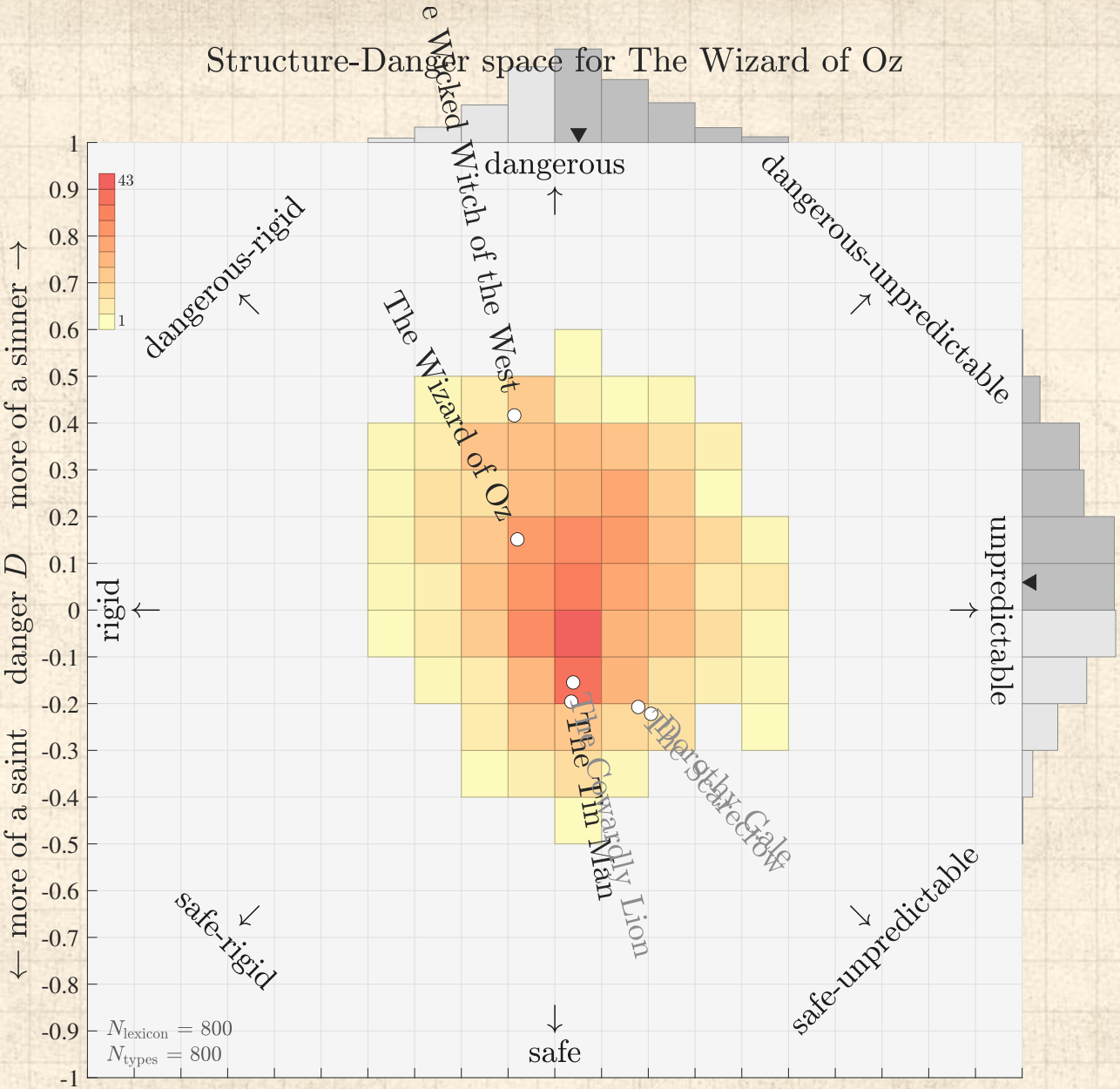

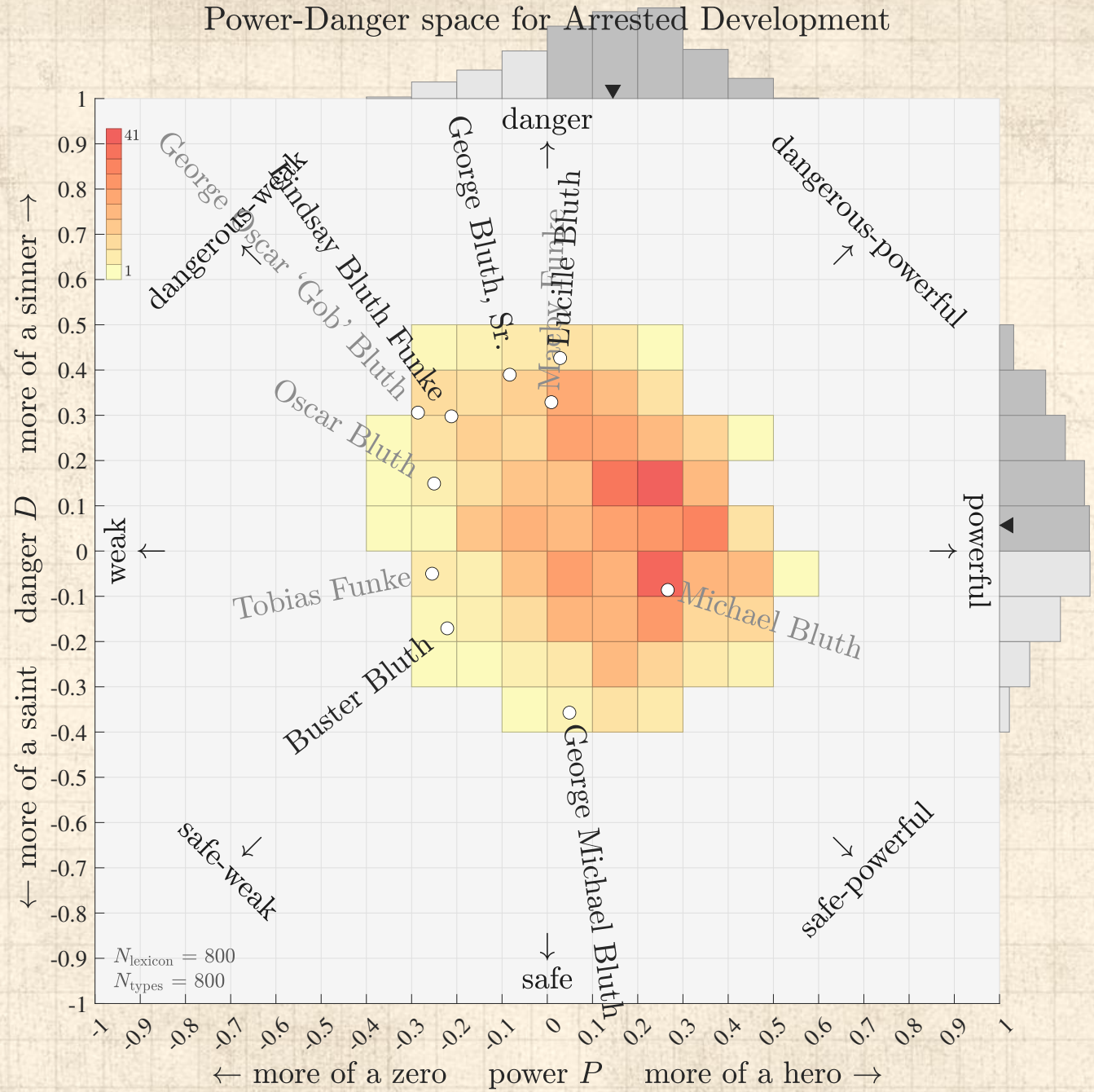

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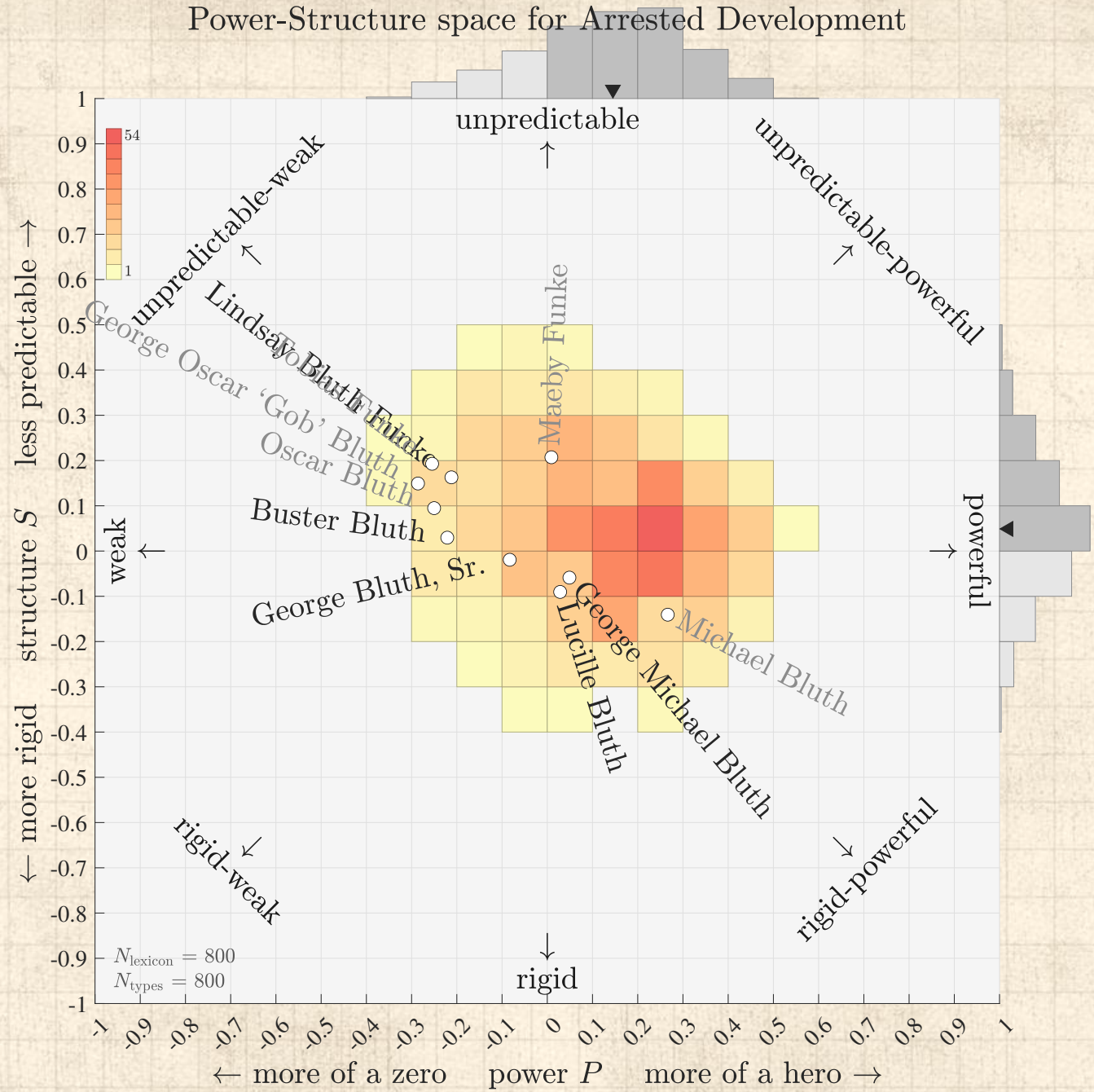

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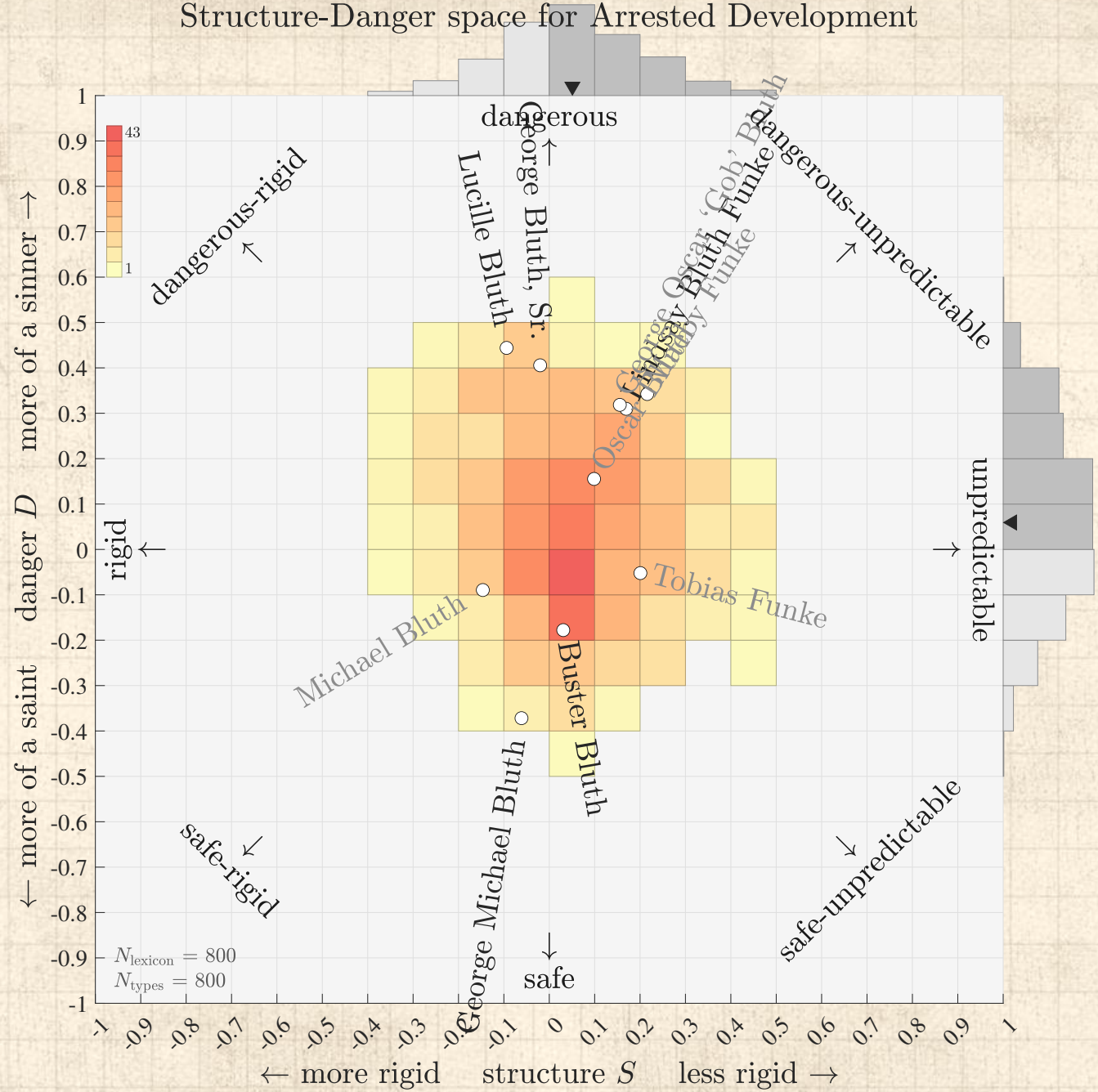

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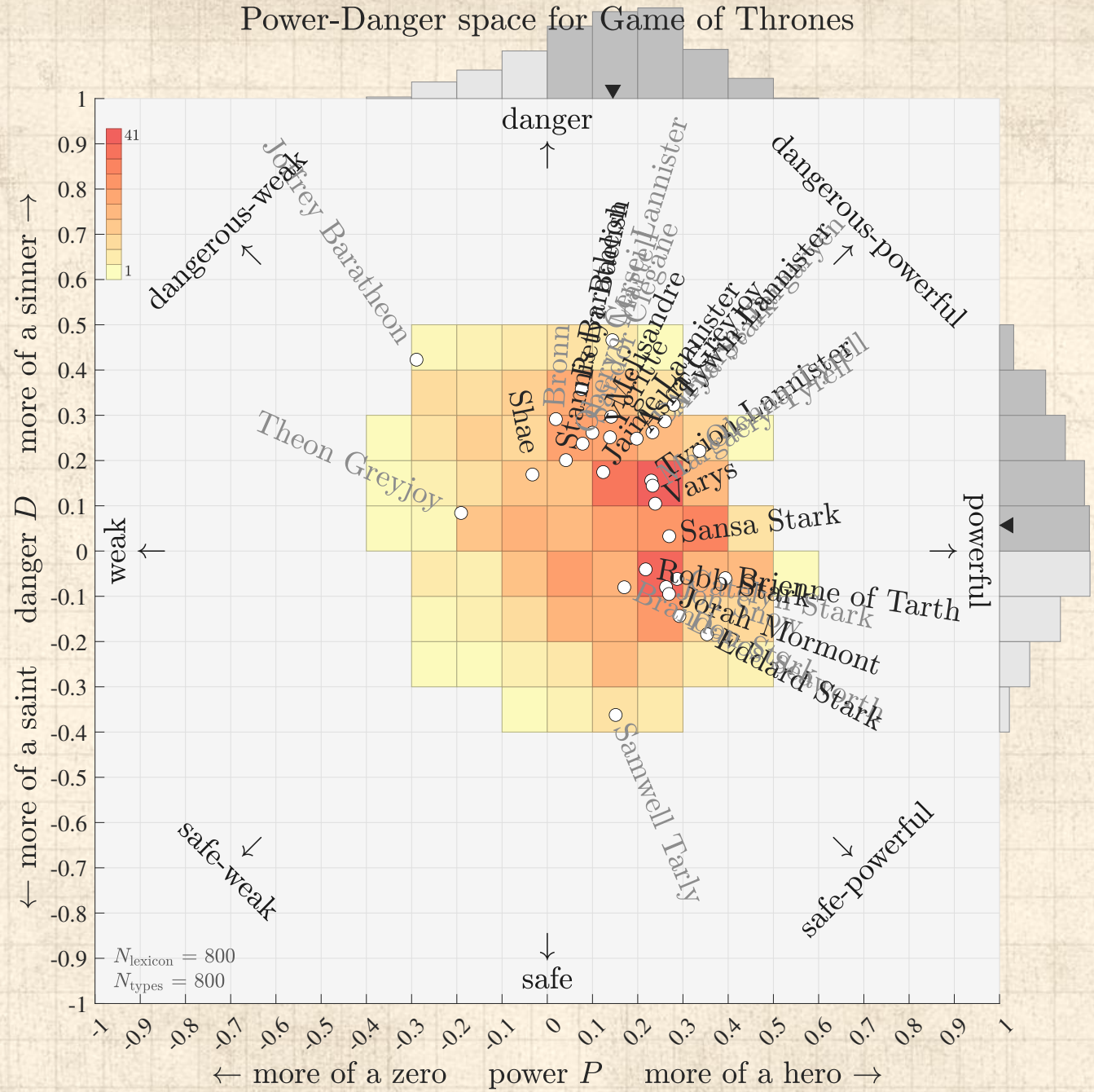

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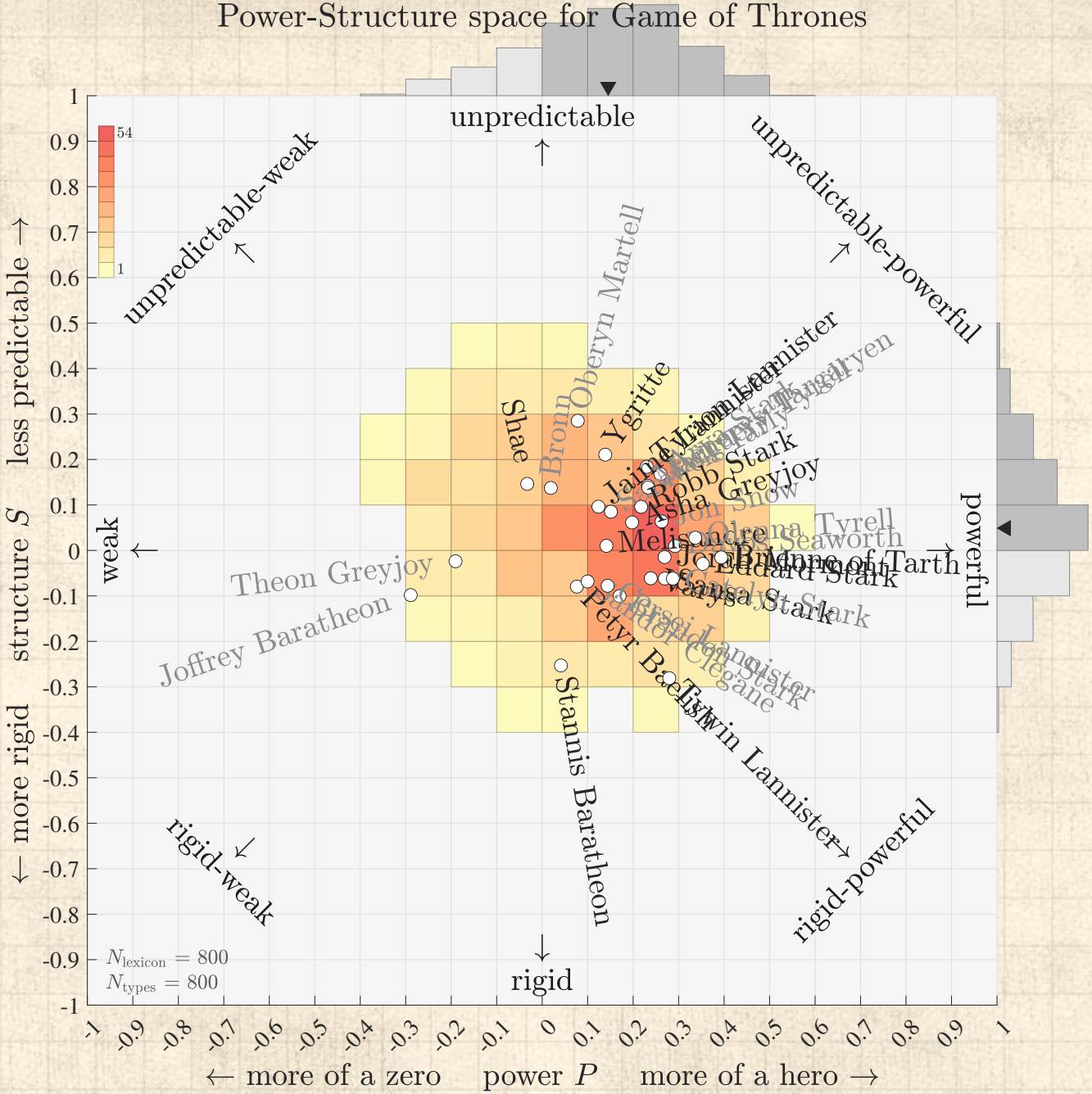

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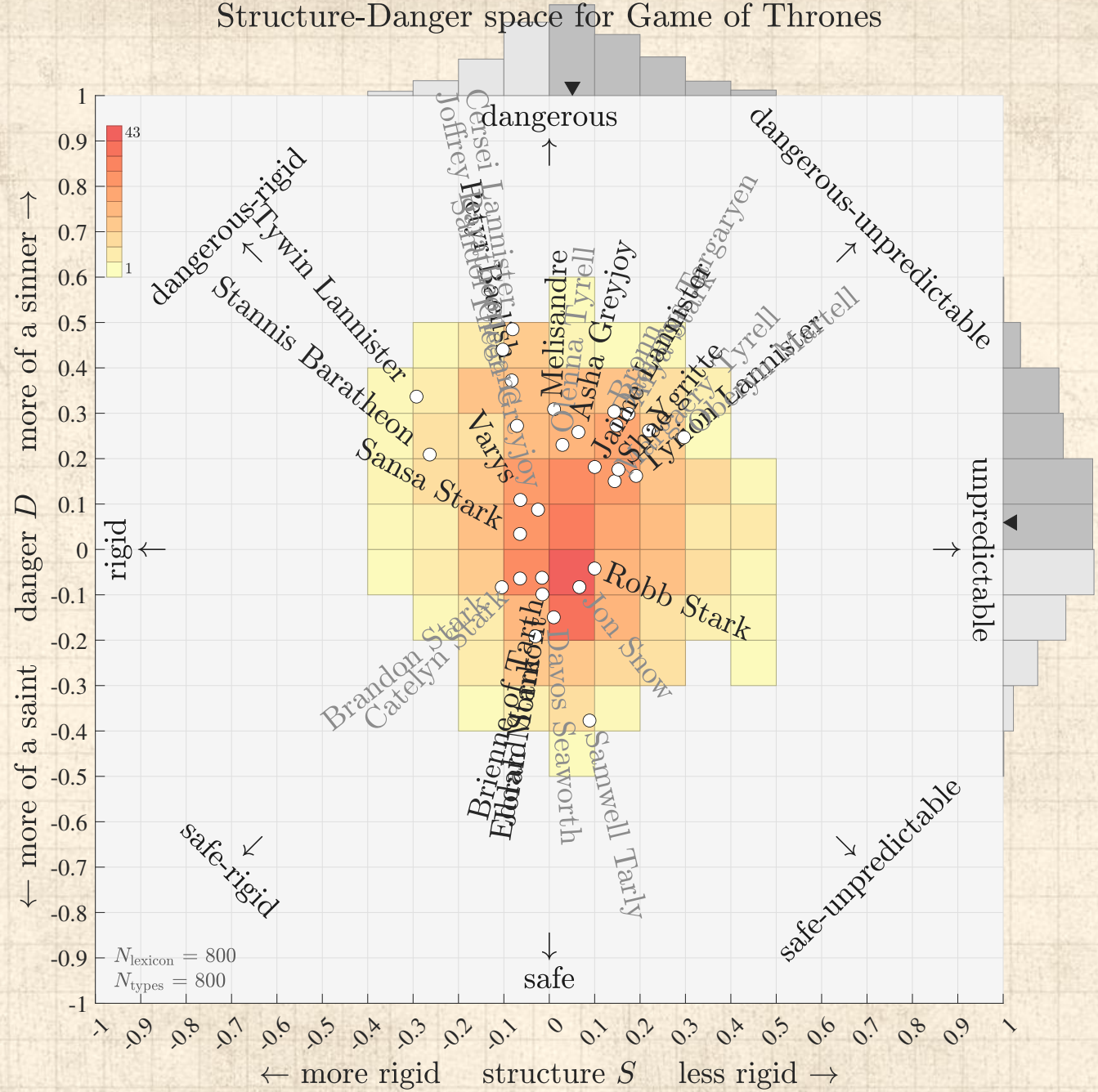

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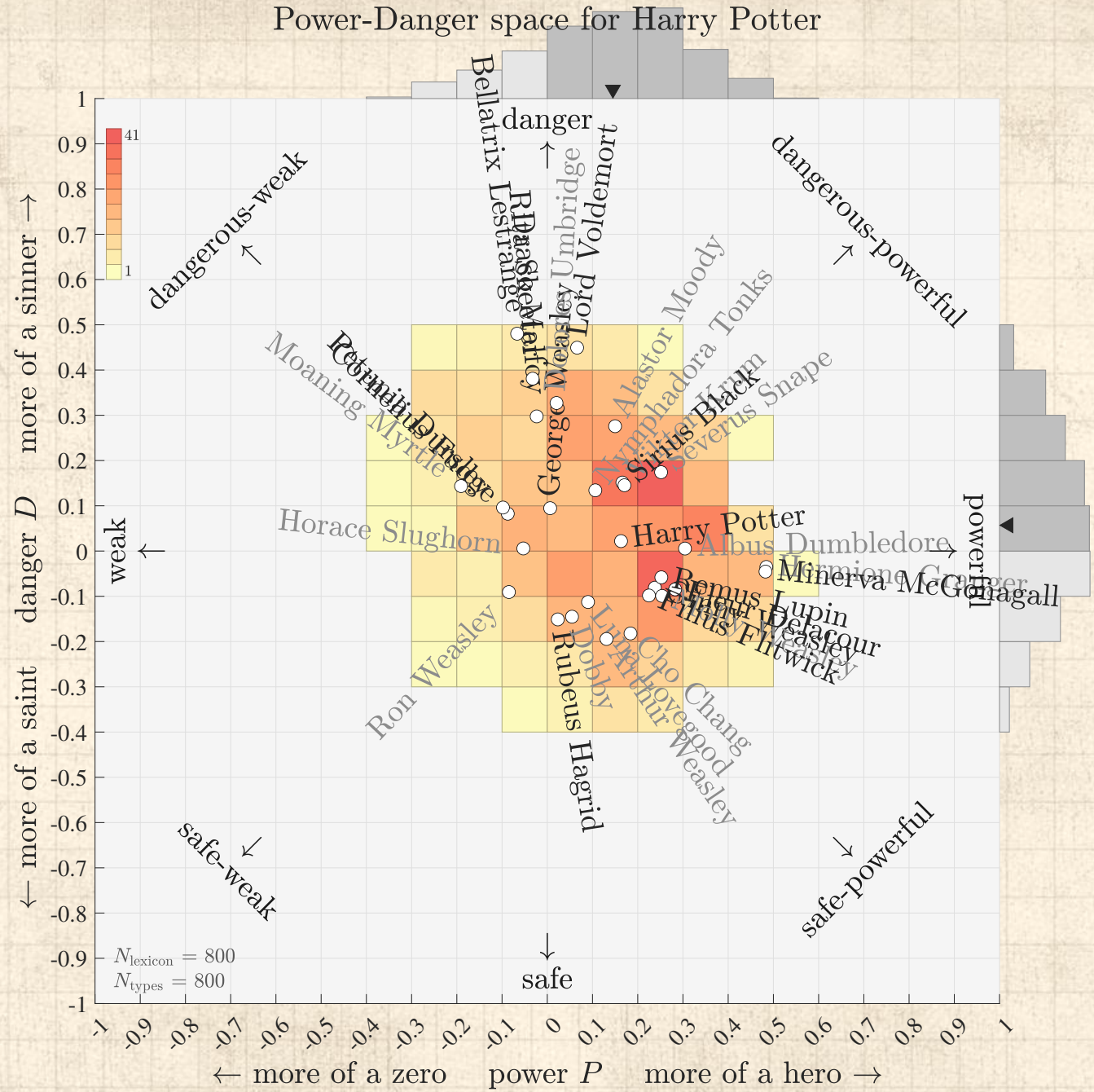

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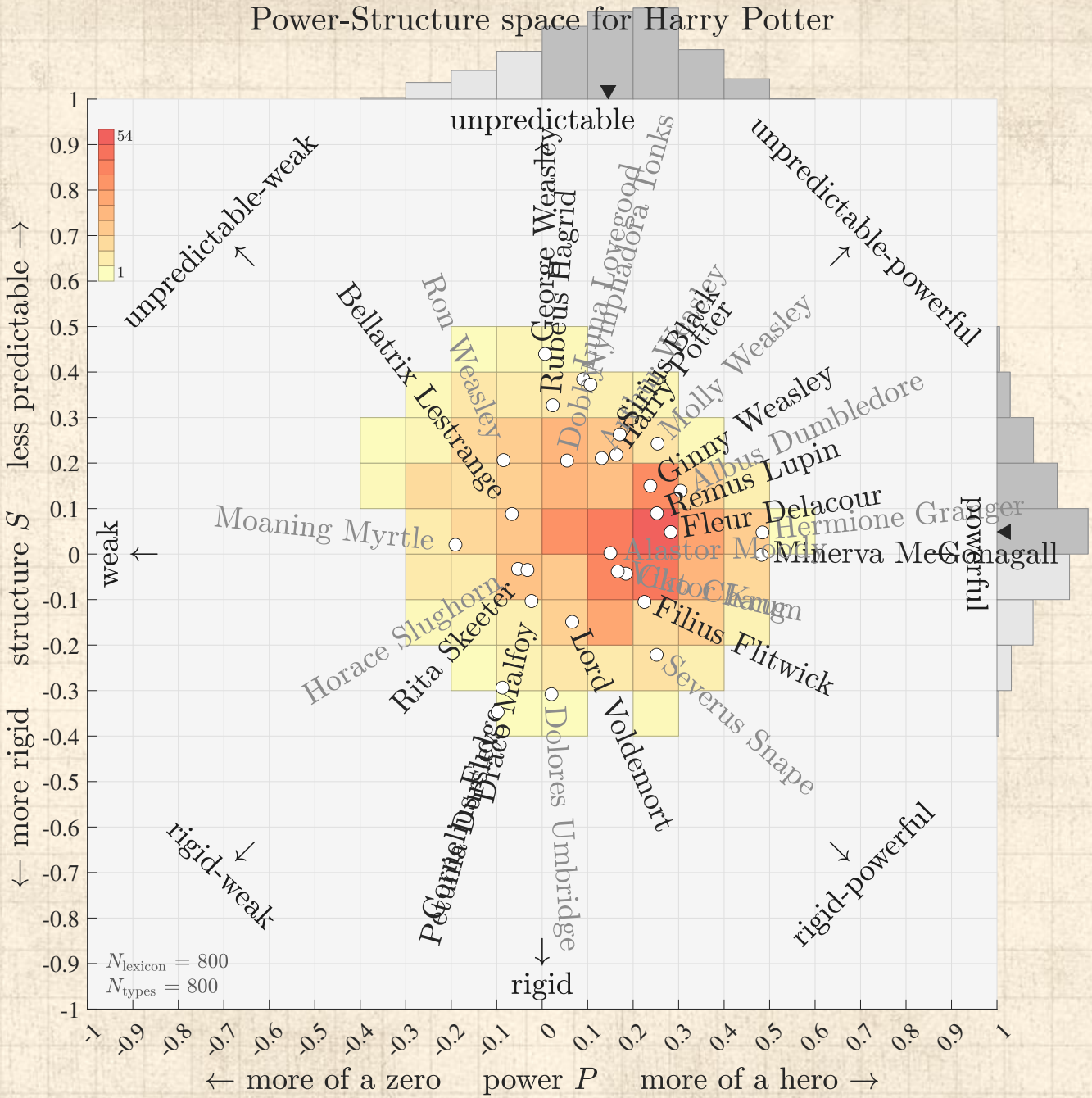

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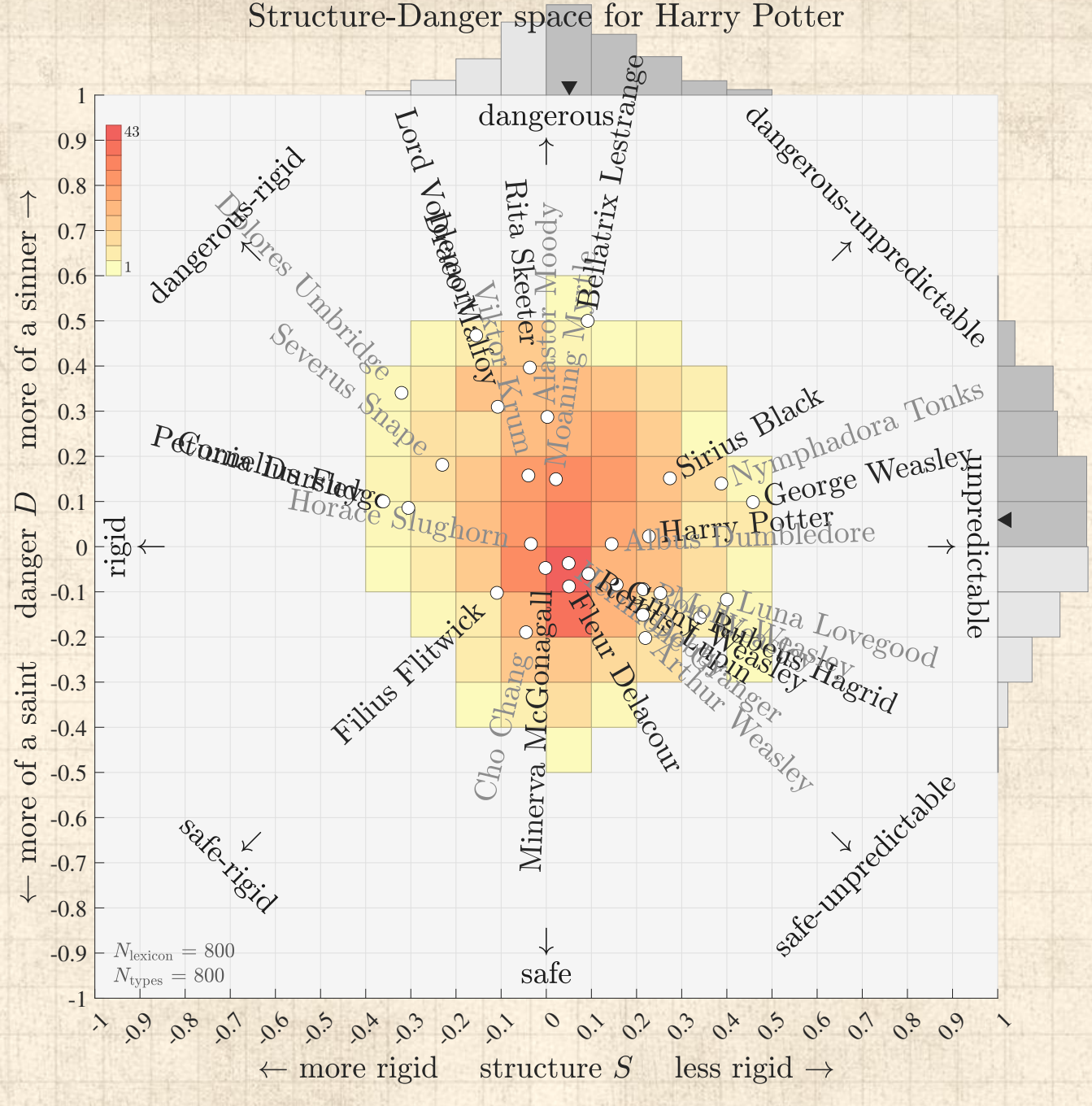

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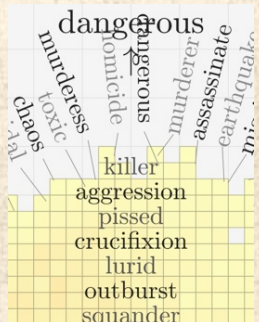

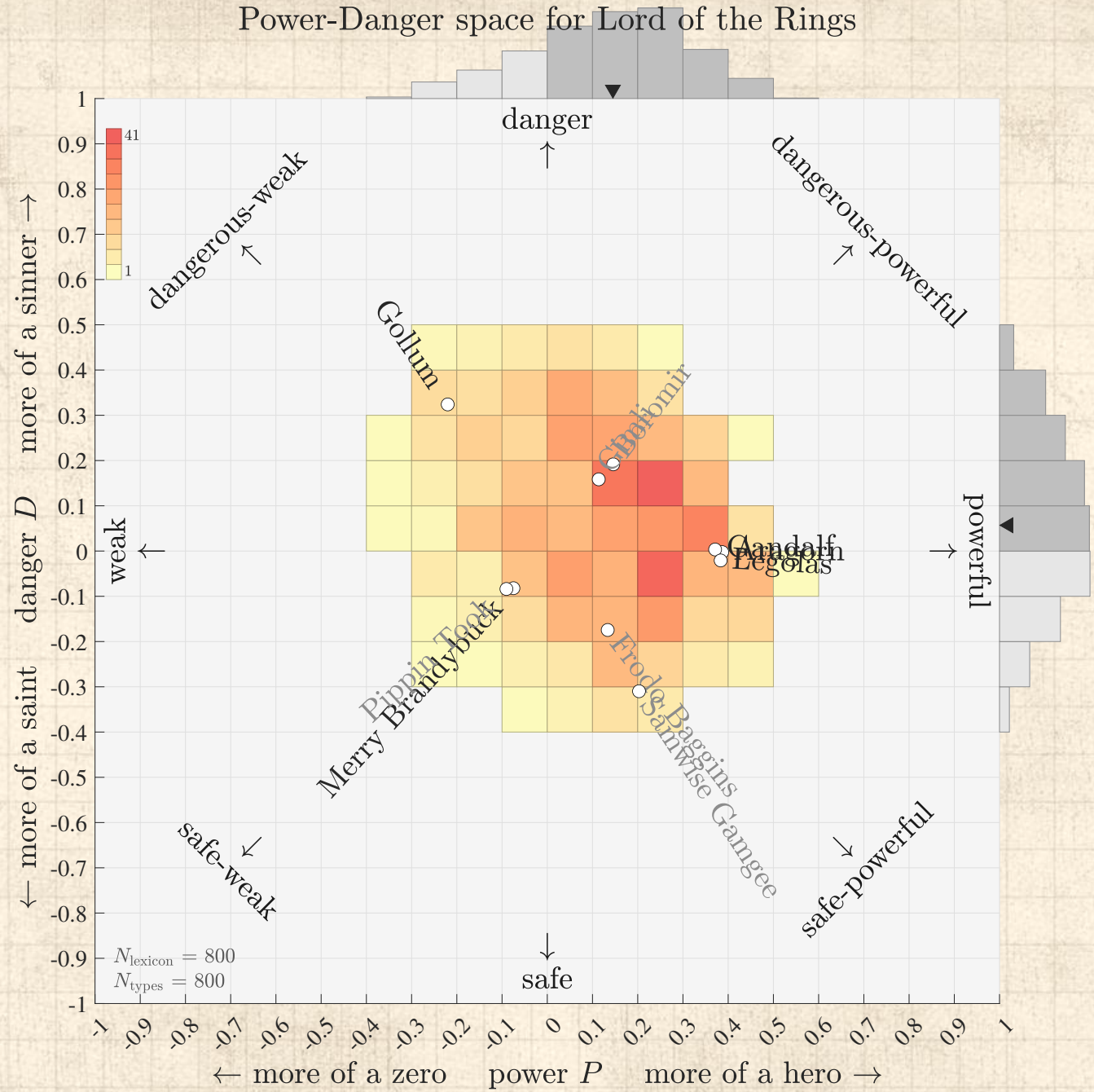

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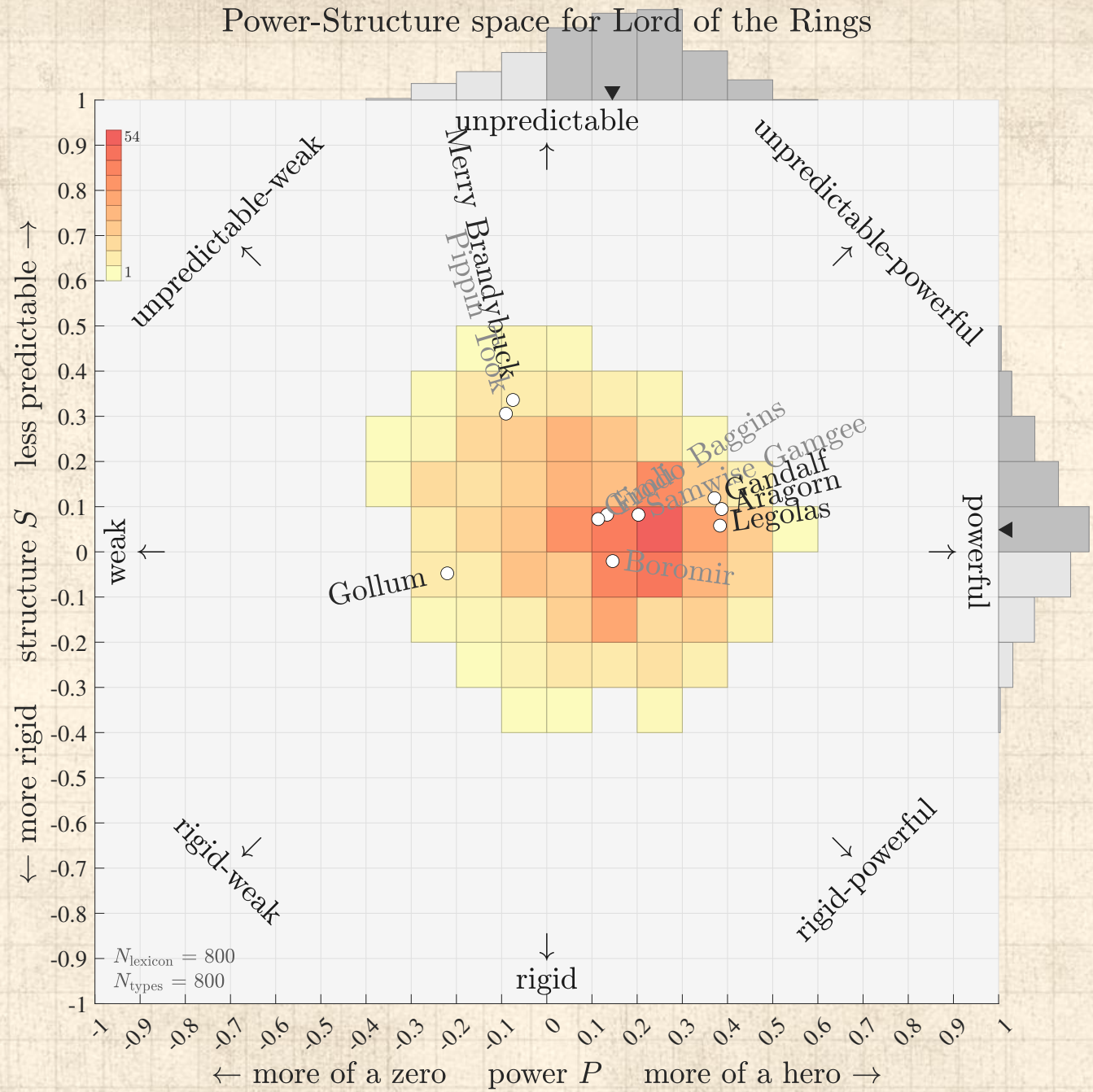

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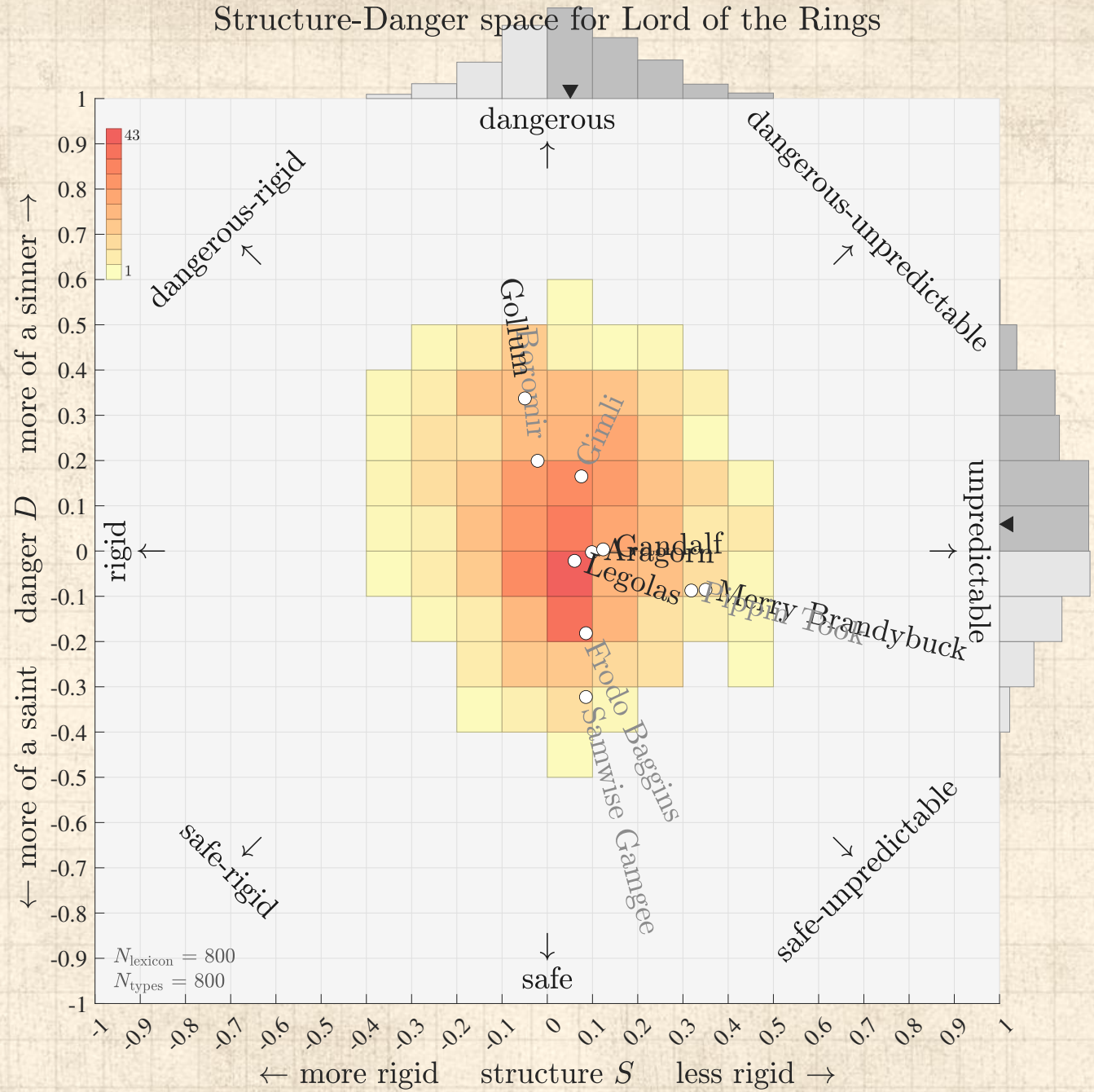

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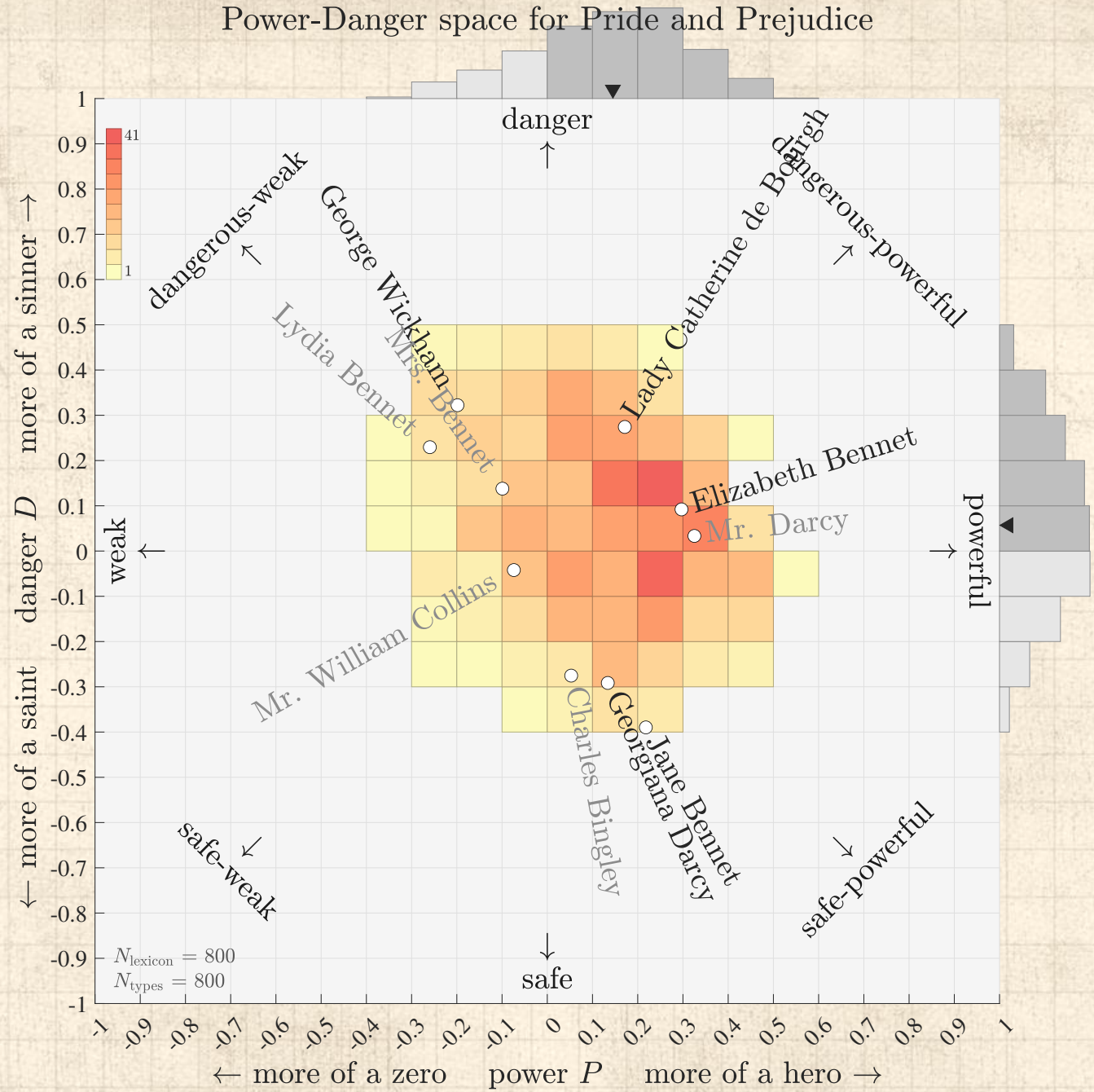

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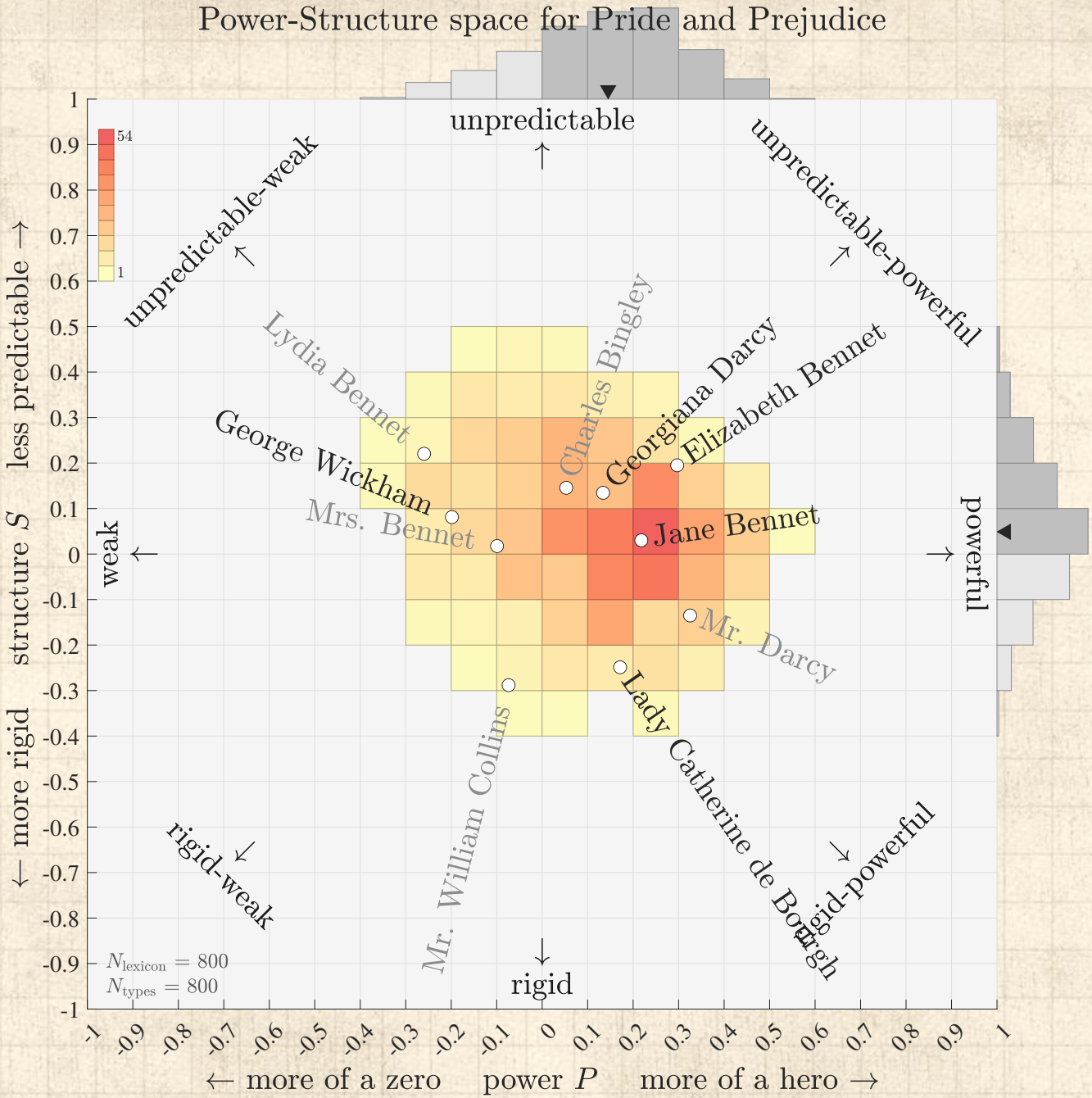

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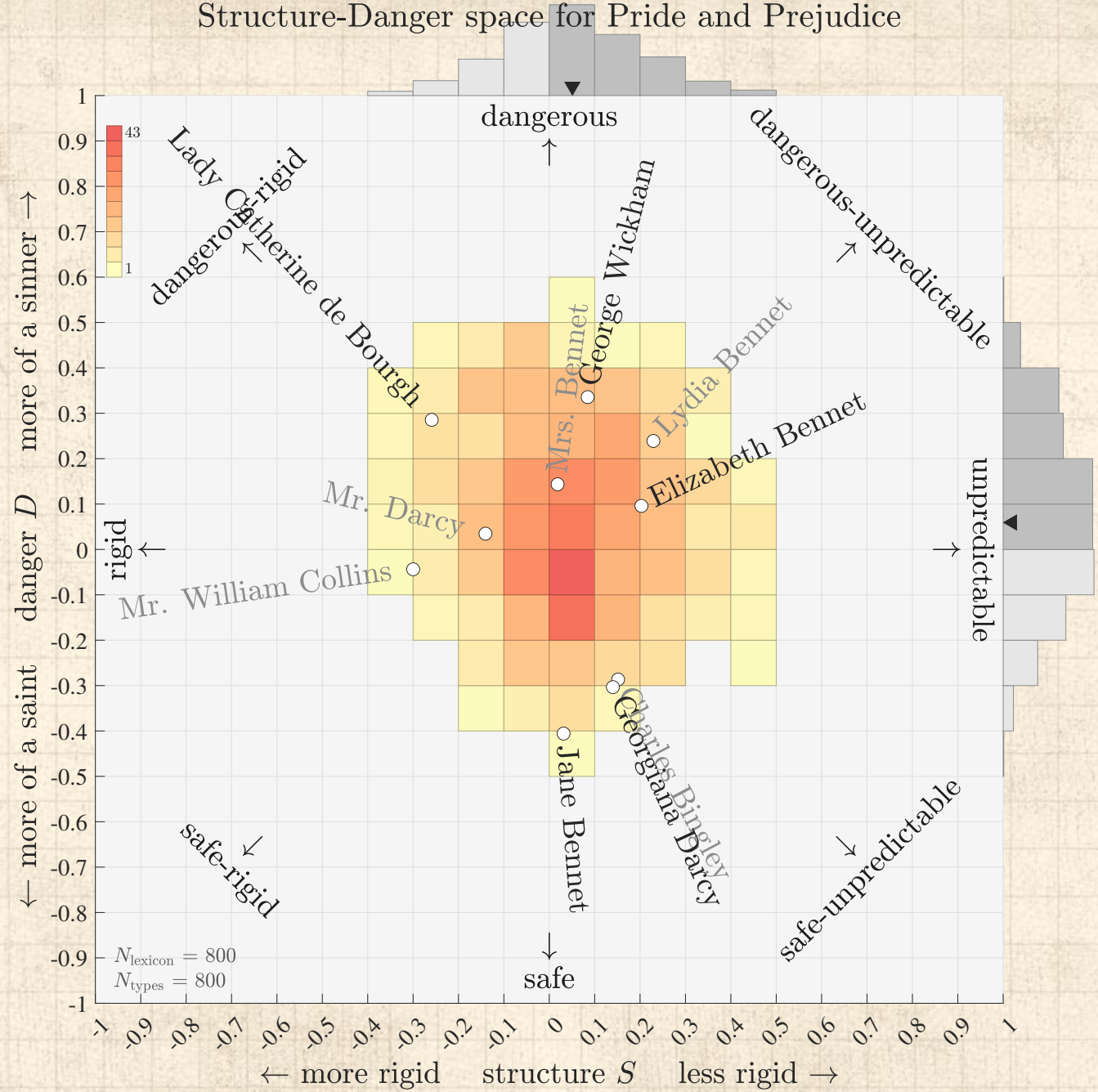

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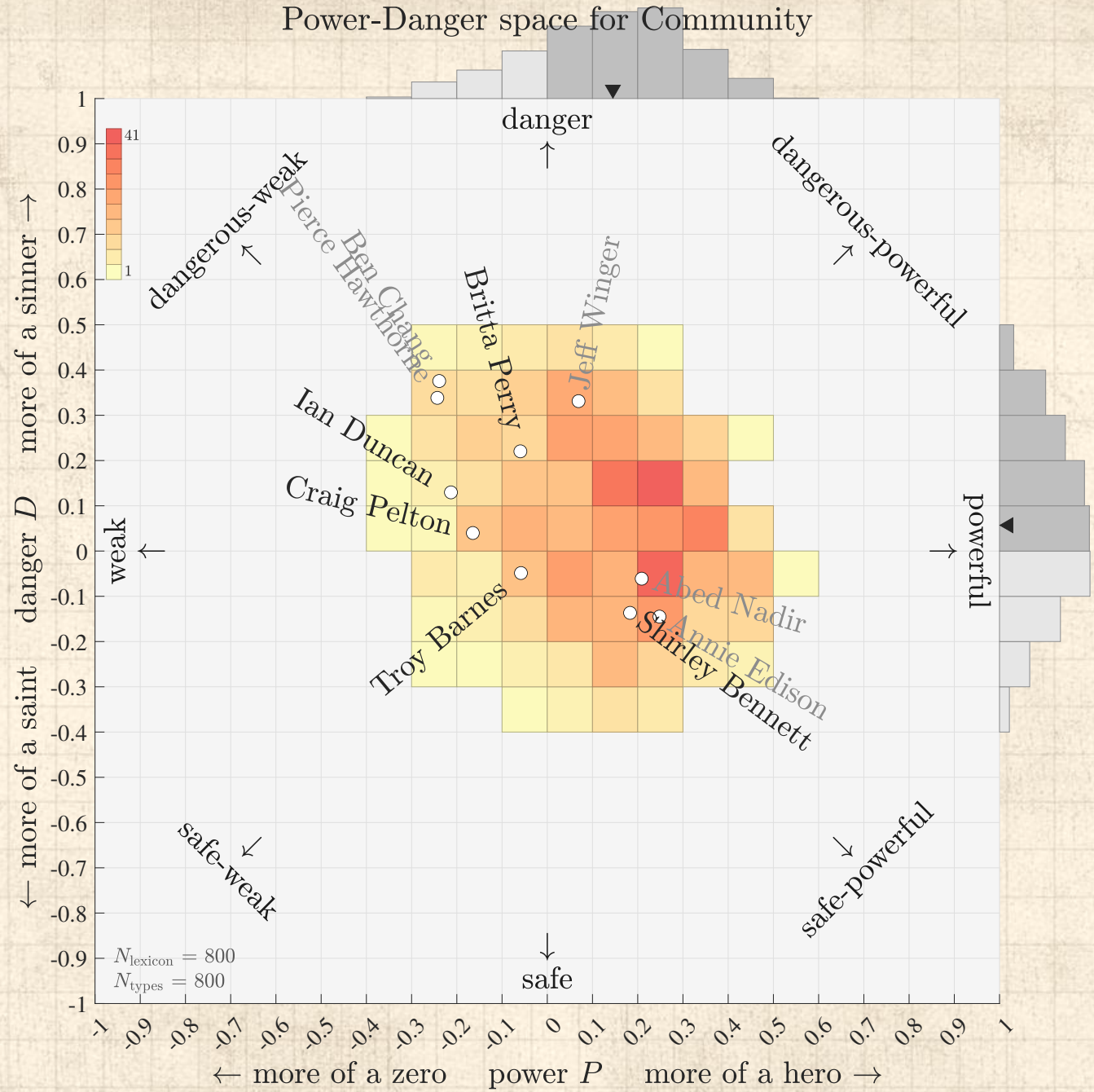

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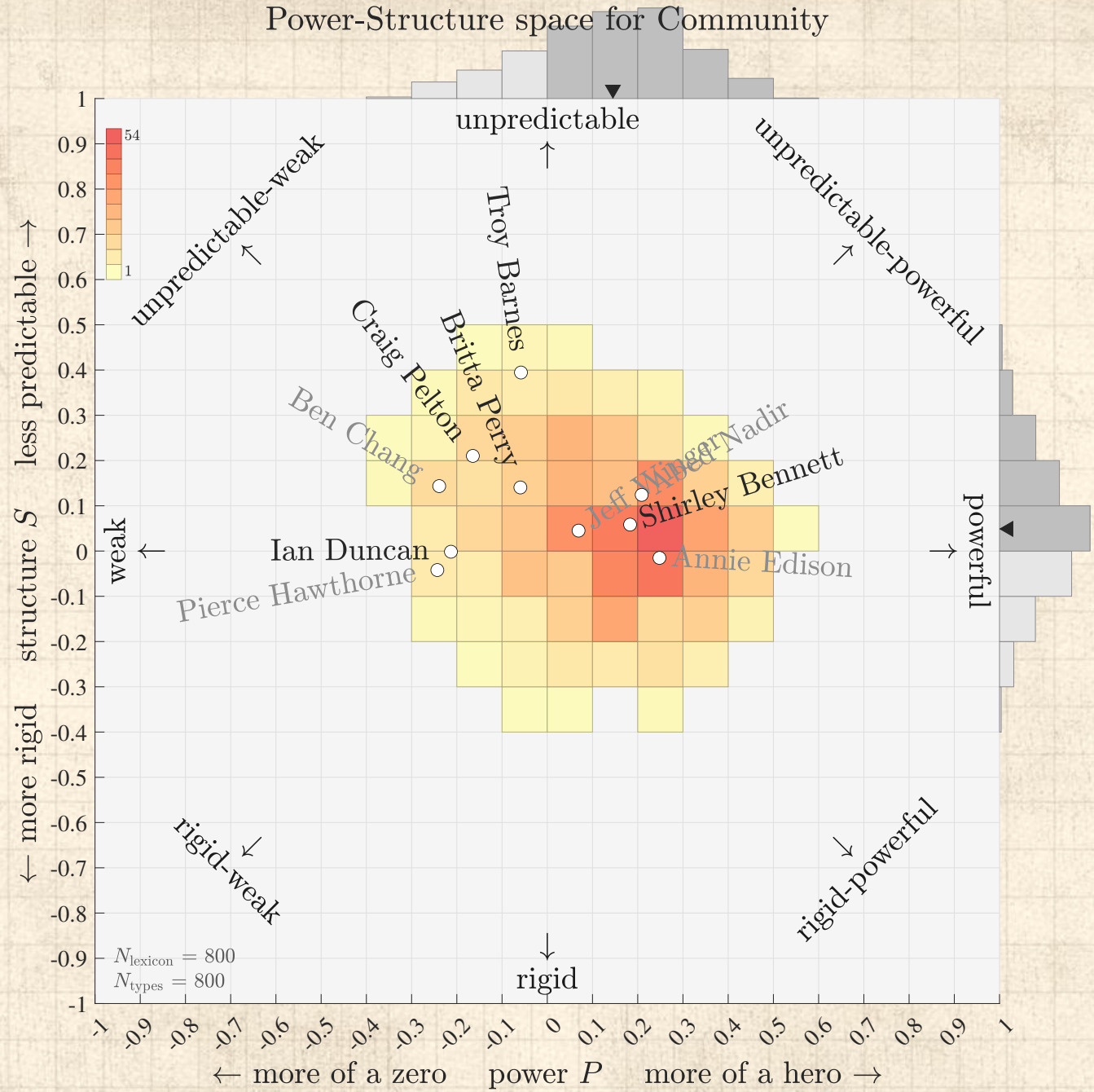

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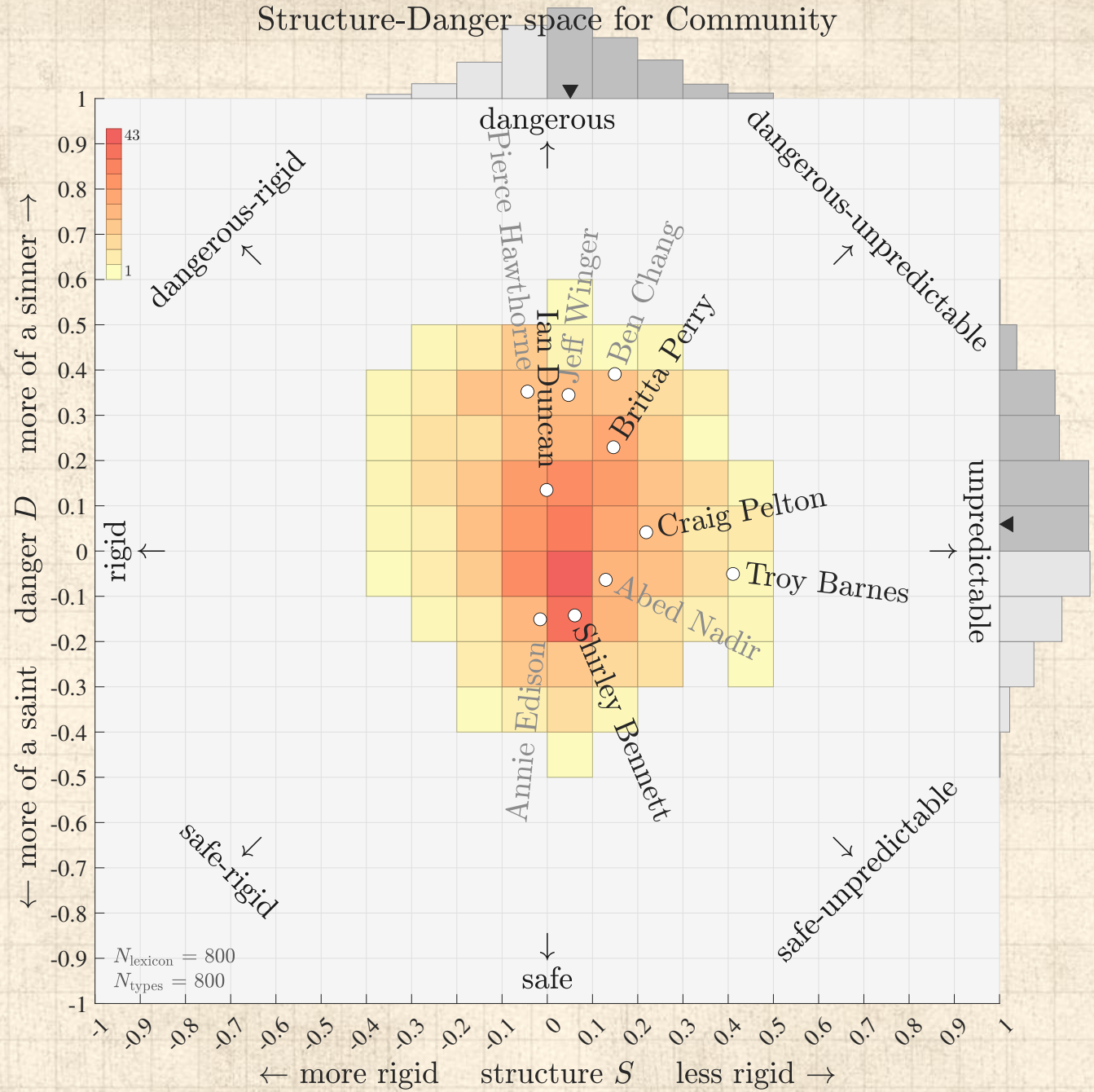

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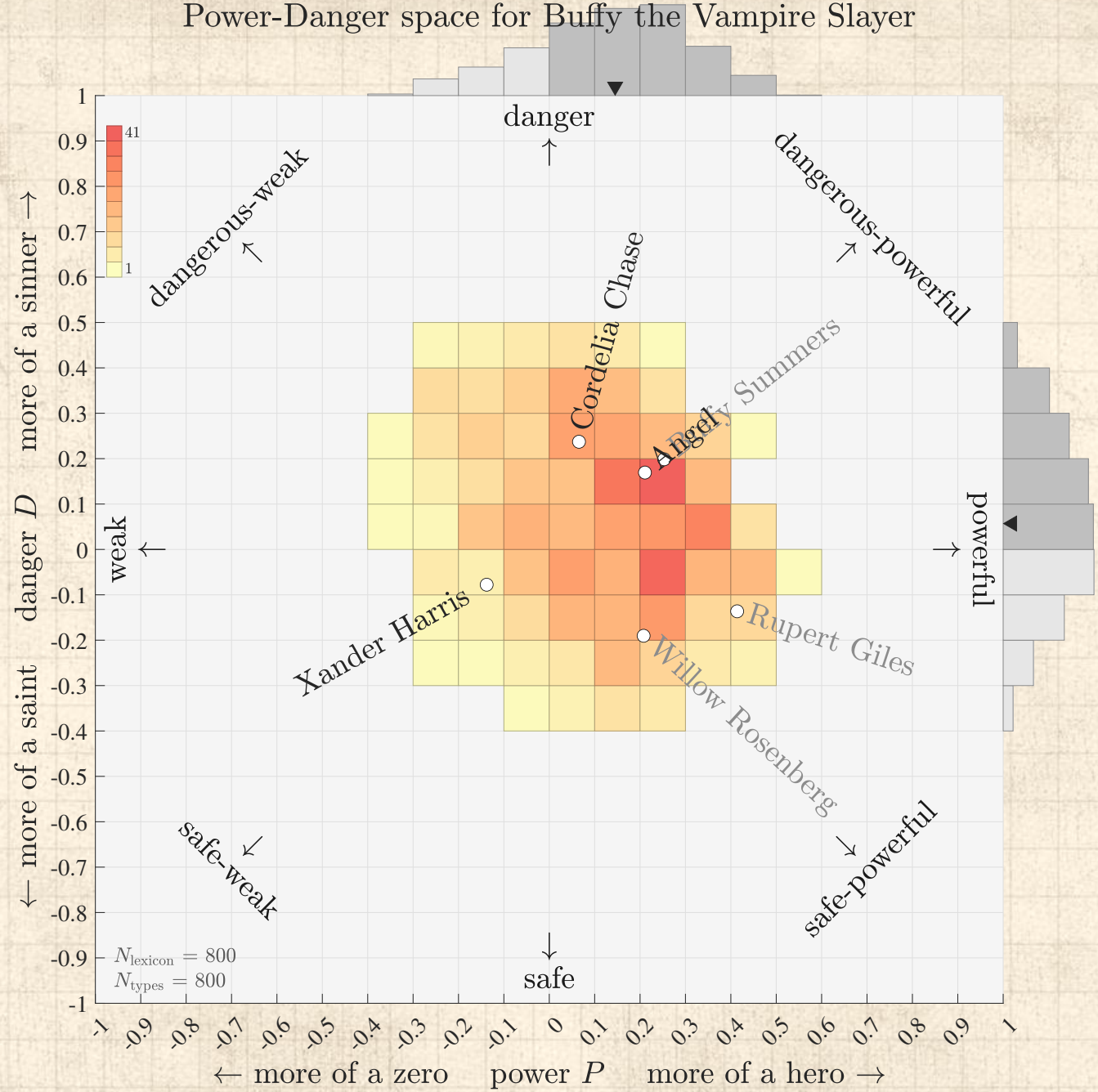

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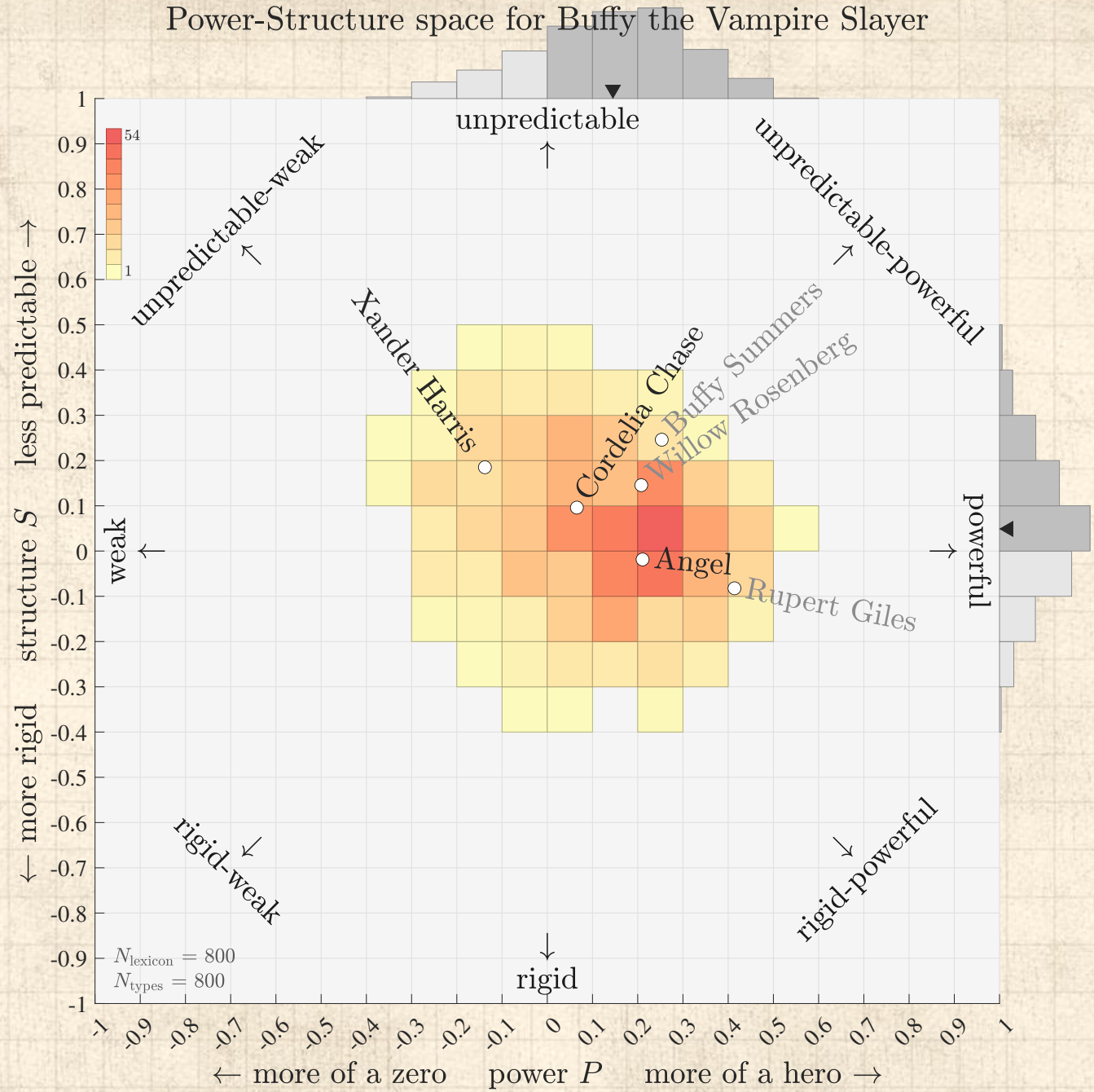

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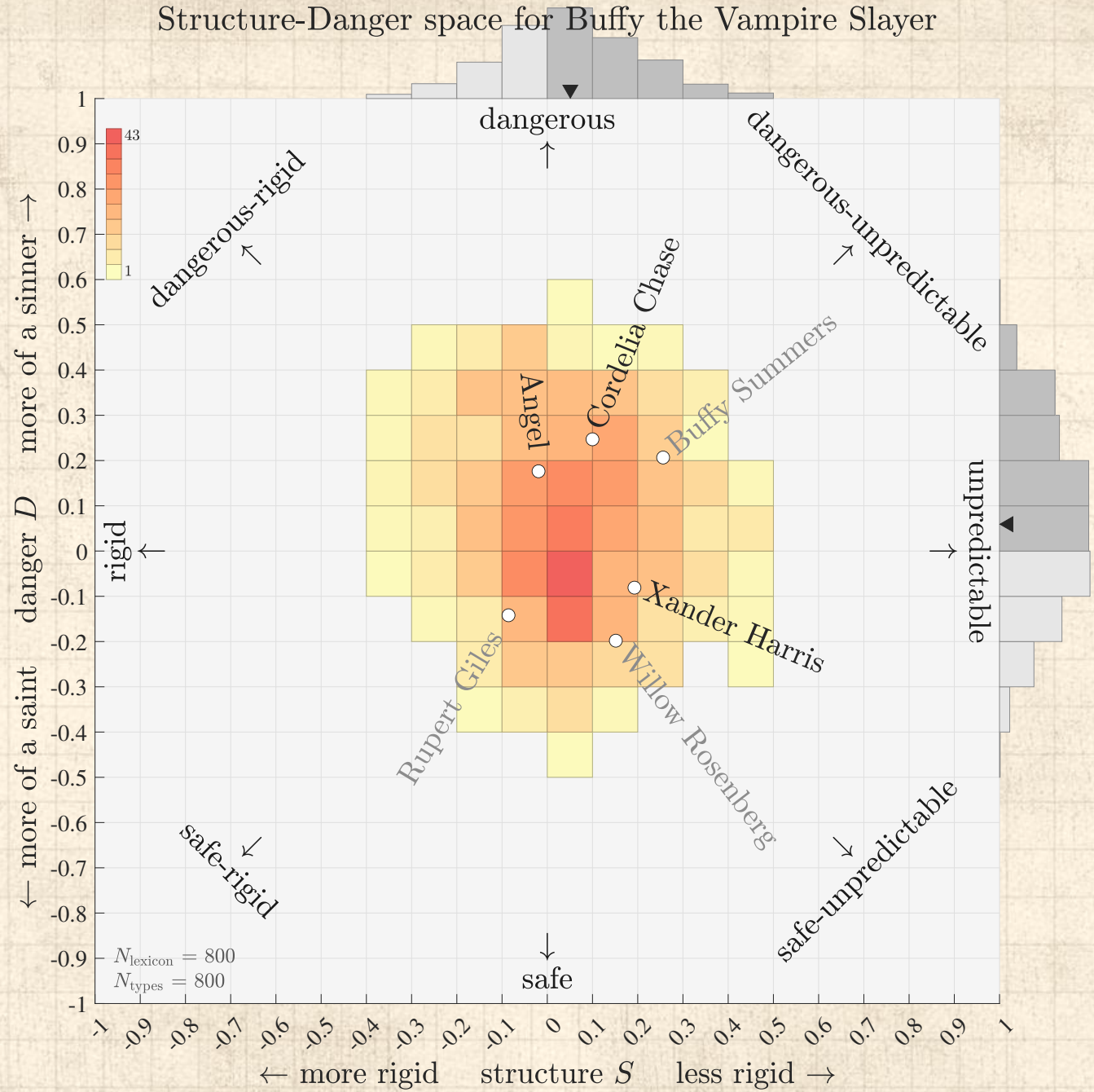

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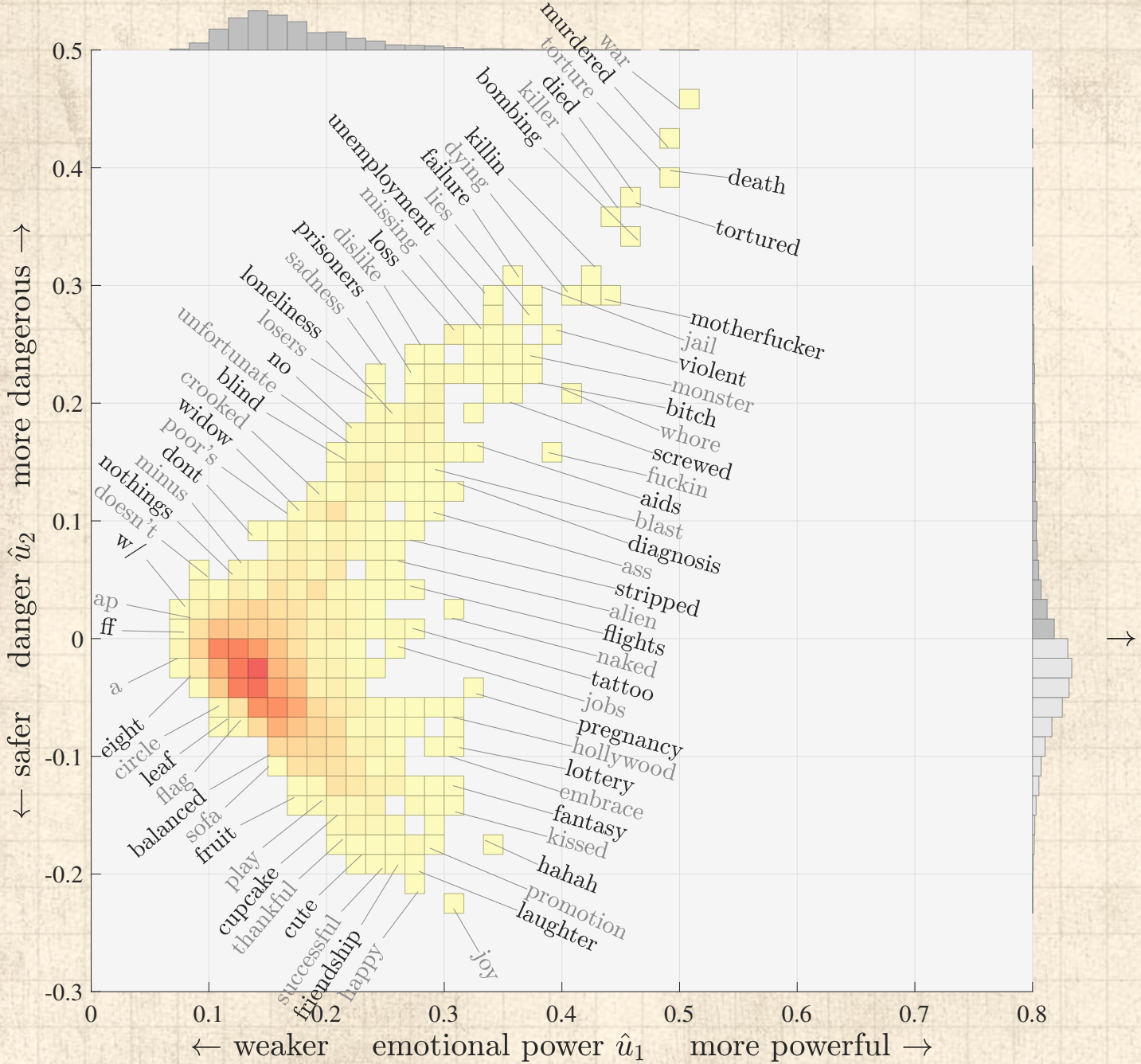
Six emotions, collapsed:



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Findings, observations, possibilities:

- Power-danger-structure framework emerges in distinct settings, fitting types and tokens.

See concluding remarks in the foundational paper. [5]

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Findings, observations, possibilities:

- Power-danger-structure framework emerges in distinct settings, fitting types and tokens.
- Safety bias of communication refines Pollyanna Principle of positivity

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- Safety bias of communication refines Pollyanna Principle of positivity
- Happiness/Goodness = Power + Safety

See concluding remarks in the foundational paper. [5]

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Findings, observations, possibilities:

- Power-danger-structure framework emerges in distinct settings, fitting types and tokens.
- Safety bias of communication refines Pollyanna Principle of positivity
- Happiness/Goodness = Power + Safety
- Ousiometer can be improved and refined.

See concluding remarks in the foundational paper. [5]

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- Happiness/Goodness = Power + Safety
- Ousiometer can be improved and refined.
- Possible: Emotions map onto powerful-safe and danger axes.

See concluding remarks in the foundational paper. [5]

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- Power-danger-structure framework emerges in distinct settings, fitting types and tokens.
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- Happiness/Goodness = Power + Safety
- Ousiometer can be improved and refined.
- Possible: Emotions map onto powerful-safe and danger axes.
- Power-danger framework for survival.

See concluding remarks in the foundational paper. [5]

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- Possible: Telegnomics for stories—Measuring character arcs, plots.

See concluding remarks in the foundational paper. [5]

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- Possible: Emotions map onto powerful-safe and danger axes.
- Power-danger framework for survival.
- Possible: Telegnomics for stories—Measuring character arcs, plots.
- Complement to information theory which is meaning-free. [21]

See concluding remarks in the foundational paper. [5]

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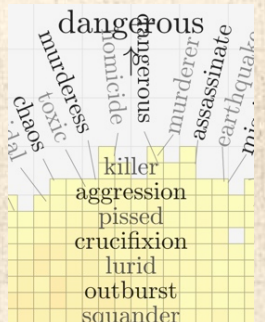

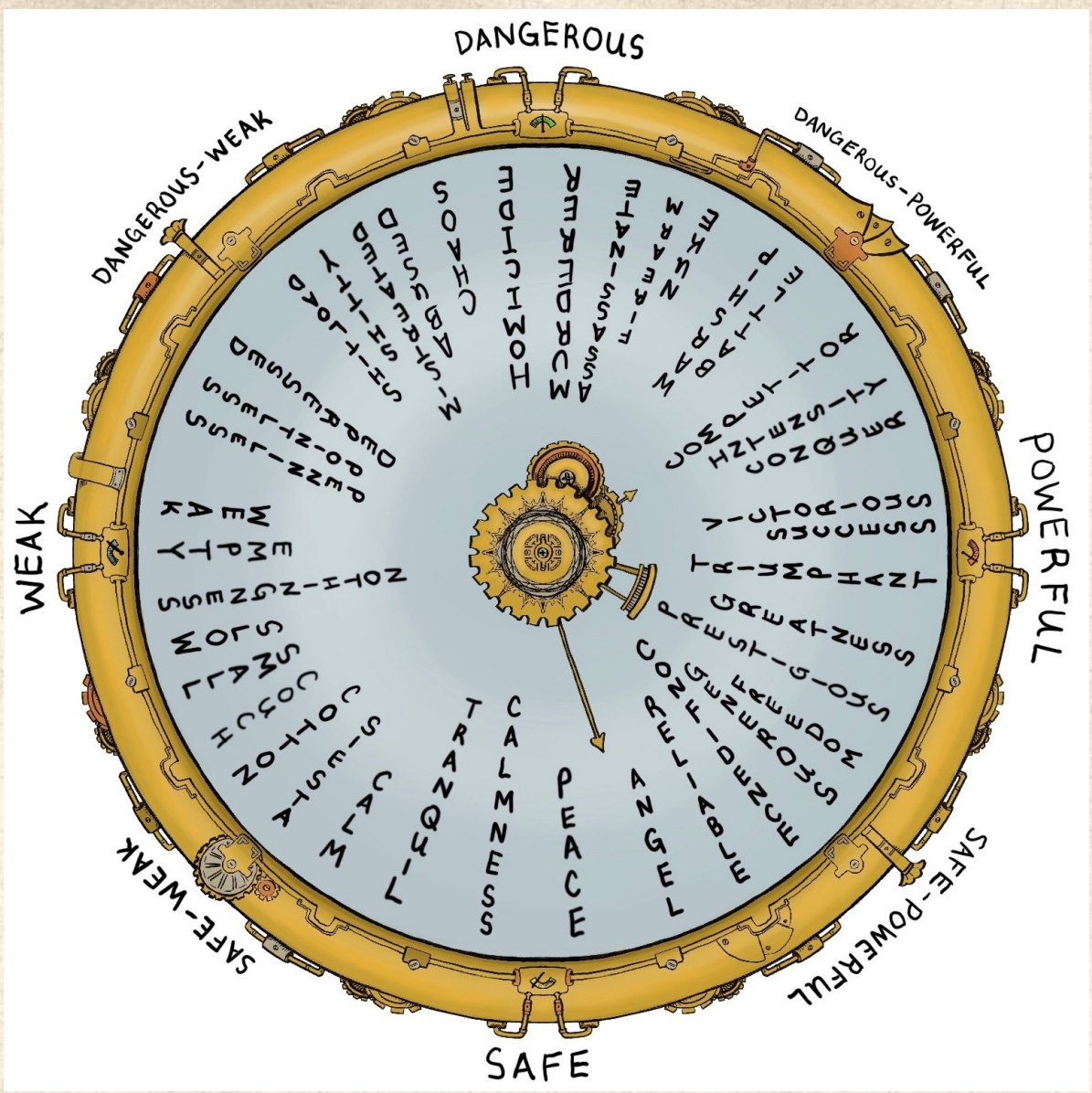
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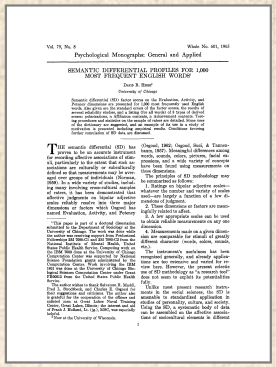
DANGEROUS-WEAK
DANGEROUS-POWERFUL
WEAK
POWERFUL
SAFE-WEAK
SAFE-POWERFUL
SAFE
PEACE
CALMNESS
TRANQUIL
SCARY
ANGEL
CONFLAGRATION
MURDEROUS
HOMICIDE
CHAOS
ASSASSINATE
MURDERER
KILLER
AGGRESSION
PISSED
CRUCIFIXION
LURID
OUTBURST
SQUANDER
KAEMPE
MONSTROUS
TRANSGRESSION
SCHOOL
SCHOOL-SHARK
TRAUMA
TRAUMATIZED
TRAUMATIZING
TRAUMATIZER
TRAUMATIZATION
TRAUMATIZE
TRAUMATIZES

Synonyms	Valence	Arousal	Dominance	Goodness	Energy	Structure	Power	Danger	Structure
happy	0.50	0.24	0.27	0.53	0.26	0.18	0.57	-0.16	0.18
delighted	0.44	0.16	0.18	0.44	0.17	0.17	0.44	-0.18	0.17
excited	0.41	0.43	0.21	0.39	0.40	0.29	0.56	0.04	0.29
astonished	0.01	0.28	0.07	0.00	0.27	0.10	0.18	0.19	0.10
aroused	0.21	0.45	0.17	0.19	0.43	0.23	0.43	0.19	0.23
tense	-0.10	-0.06	0.15	-0.01	0.05	-0.19	0.03	0.04	-0.19
alarmed	-0.31	0.32	-0.01	-0.32	0.31	0.03	-0.03	0.45	0.03
angry	-0.38	0.33	0.10	-0.33	0.39	-0.07	0.02	0.51	-0.07
afraid	-0.49	0.28	-0.26	-0.59	0.17	0.09	-0.32	0.52	0.09
annoyed	-0.40	0.28	-0.16	-0.46	0.21	0.07	-0.19	0.47	0.07
distressed	-0.36	0.27	-0.18	-0.43	0.19	0.10	-0.19	0.43	0.10
frustrated	-0.42	0.15	-0.25	-0.50	0.06	0.05	-0.33	0.38	0.05
miserable	-0.44	-0.04	-0.31	-0.52	-0.13	-0.02	-0.47	0.26	-0.02
sad	-0.28	-0.17	-0.35	-0.38	-0.28	0.02	-0.47	0.05	0.02
gloomy	-0.39	-0.09	-0.21	-0.43	-0.13	-0.09	-0.40	0.20	-0.09
depressed	-0.48	-0.05	-0.36	-0.58	-0.17	-0.01	-0.54	0.27	-0.01
bored	-0.35	-0.33	-0.30	-0.40	-0.38	-0.14	-0.55	-0.02	-0.14
droopy	-0.06	-0.15	-0.20	-0.13	-0.22	0.03	-0.25	-0.08	0.03
tired	-0.38	-0.18	-0.31	-0.45	-0.26	-0.07	-0.50	0.11	-0.07
sleepy	0.10	-0.37	-0.25	0.03	-0.46	0.02	-0.29	-0.36	0.02
calm	0.37	-0.40	-0.22	0.28	-0.51	0.11	-0.14	-0.56	0.11
relaxed	0.36	-0.41	-0.12	0.32	-0.46	0.03	-0.08	-0.56	0.03
satisfied	0.46	0.01	0.18	0.48	0.04	0.10	0.38	-0.30	0.10
at ease	—	—	—	—	—	—	—	—	—
ease	0.30	-0.11	-0.01	0.27	-0.15	0.09	0.10	-0.29	0.09
content	0.26	-0.20	0.06	0.29	-0.18	-0.03	0.09	-0.33	-0.03
serene	0.30	-0.37	-0.13	0.25	-0.42	0.03	-0.10	-0.48	0.03
glad	0.44	0.26	0.24	0.45	0.27	0.19	0.52	-0.10	0.19
pleased	0.44	0.05	0.29	0.51	0.13	0.03	0.47	-0.25	0.03



Psychological Monographs: General and Applied

SEMANTIC DIFFERENTIAL PROFILES FOR 1,000 MOST FREQUENT ENGLISH WORDS

Dora R. Heise
University of Chicago

THE semantic differential (SD) has proven to be an extensive instrument for measuring affect or connotative meaning, particularly to the extent that such connotations are culturally or subculturally shared. It has been employed with many different groups of individuals (Osgood, 1960). In a wide variety of studies, factorial structures of affective meaning, in terms of valence, potency, and activity, have been demonstrated from adjective judgments on bipolar adjective scales reliably resolve into three major dimensions or factors which Osgood has named Evaluation, Activity, and Potency.

This paper is part of a doctoral dissertation (Osgood, 1962, Osgood, Heise, & Tannenbaum, 1967, Mowrer, 1960) in the Department of Psychology at the University of Chicago. The work was also supported in part by Public Health Service Research Grant No. MH-05028 from the National Institute of Mental Health, Public Health Service, and by the Social Science Research Facilities Fund of the University of Chicago. Publication was facilitated by the Center for Comparative Psychology, University of California, Davis, California. Computing was done at the Computation Center, University of Chicago, supported in part by National Science Foundation grants administered by the Computation Center. Work involving the IBM 7090 was done at the University of Wisconsin Computing Center, supported in part by National Science Foundation grant GP-579 and Wisconsin Alumni Research Foundation. Thanks are due Charles E. Osgood for helpful suggestions and criticisms. The author also wishes to express appreciation to Mrs. Lorraine Gaffron and to Grace Lobo, Frank Truong, and Jeffrey Wiseman for assistance in the collection of Study 2. Reprints may be obtained from Dora R. Heise, Department of Psychology, University of Wisconsin, Madison, Wis. 53706.

[1] The author wishes to thank Salvatore R. Maddi, Paul J. Stockhorst, and Charles E. Osgood for their suggestions and criticisms. The author also wishes to express appreciation to Mrs. Lorraine Gaffron and to Grace Lobo, Frank Truong, and Jeffrey Wiseman for assistance in the collection of Study 2. Reprints may be obtained from Dora R. Heise, Department of Psychology, University of Wisconsin, Madison, Wis. 53706.

[2] Now at the University of Wisconsin.

“Semantic differential profiles for 1,000 most frequent English words.”

David R. Heise,
Psychological Monographs: General and Applied, **79**, 1, 1965. [6]

Dimension	Scale
Evaluation	Good-Bad
	Pleasant-Unpleasant
Activity	Active-Passive
	Lively-Still
Potency	Strong-Weak
	Tough-Tender
Stability	Rational-Emotional
	Tamed-Untamed

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DOI 10.1007/s12144-014-9259-4

Pleasure, Arousal, Dominance: Mehrabian and Russell revisited

Iris Bakker · Theo van der Voordt · Peter Vink · Jan de Boon

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Abstract This paper presents a discursive review of the dimensions pleasure, arousal and dominance that Mehrabian and Russell developed in 1974 to assess environmental perception, experience, and psychological responses. Since then numerous researchers applied these dimensions to assess the experience of the physical environment and its perceived qualities. Although the dimensions appeared to be useful, there is a long-lasting debate going on among environmental psychologists about the interpretation of pleasure, arousal and dominance and its underlying mechanisms. Due to the lack of clarity researchers use different adjectives to describe environmental experiences, which makes any comparison between research findings difficult. This paper shows that the three dimensions can be linked to the current ABC Model of Attitudes: pleasure, arousal and dominance can be respectively related to affective, cognitive and conative responses, i.e. Affect, Cognition and Behaviour (ABC). In addition, connecting the three dimensions to the triad feeling, thinking and acting, can also help to improve our understanding, interpretation and measurement of pleasure, arousal and dominance. Based on this review, it is proposed to re-introduce the three dimensions and to replace the nomadays often used two dimensional model with pleasure and arousal by a three dimensional model, including dominance as a third dimension, to represent the complete range of human responses.

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Published online: 11 June 2014 Springer

"Pleasure, arousal, dominance: Mehrabian and Russell revisited"
Bakker et al.,
Current Psychology, **33**, 405–421, 2014. [2]

- Test whether EPA and VAD match.
- Explore historical problems of defining end point descriptors for meaning dimensions.

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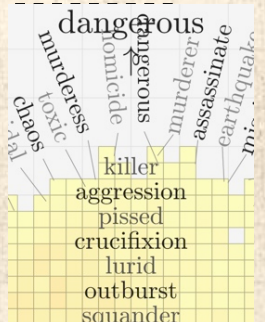

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Ousiometrics and Telegnomics: The essence of meaning conforms to a two-dimensional powerful-weak and dangerous-safe framework

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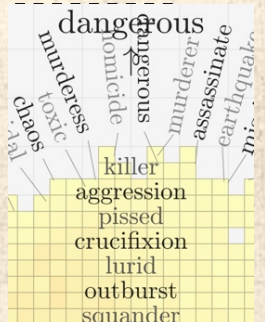

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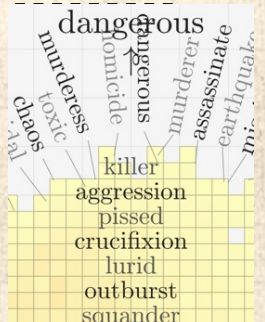

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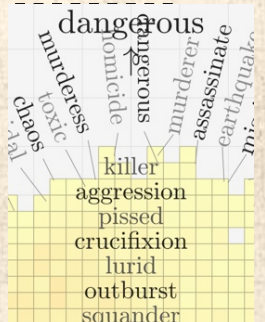

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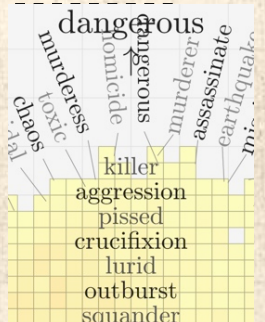

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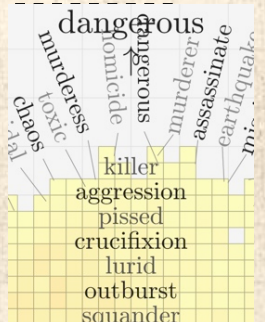

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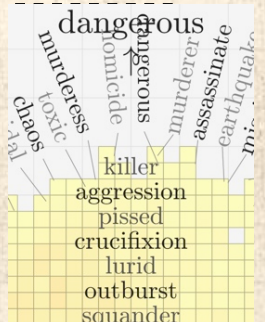

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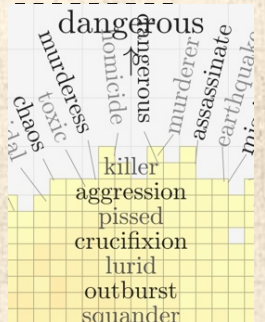

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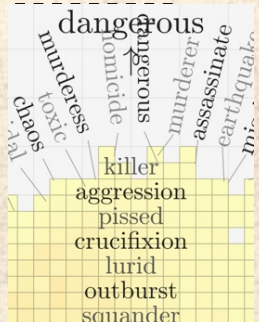
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