

Instant Effects of Semantic Information on Visual Perception
Online Supplementary Information

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Online Table 1. *Unfamiliar Object Stimuli*

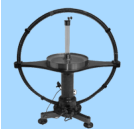










Stimulus	ID	Matching keywords	Non-matching keywords
	1	elektrische Spannung, prüfen [electric current, measuring]	Makkaroni, formen [macaroni, forming]
	2	Makkaroni, formen [macaroni, forming]	Kuh, vom Zaun abhalten [cow, keeping away from the fence]
	3	Knochen, sägen [bones, sawing]	Streckenmaß, Sonnenlicht nutzen [distance measure, using sunrays]
	4	Unkraut, jäten [weed, removing]	Uhr, mit Wärme betreiben [clock, operating with heat]
	5	Mausefalle, zuschnappen [mousetrap, snap-shutting]	Brillenglas, zuschneiden [eyeglass lens, cutting]
	6	Goldmünzen, wiegen [gold coin, weighing]	Farbe, vom Fenster abschleifen [paint, scraping off the window]
	7	Knie, fixieren [knee, fixating]	Buchstaben, tippen [letter, typing]
	8	Eierkarton, pressen [egg carton, pressing]	Tabak, zermahlen [tobacco, pulverize]
	9	Baum, erklettern [tree, climbing]	Rotation, Ladung erzeugen [rotation, creating electric charge]
	10	Buchstaben, tippen [letter, typing]	Pferdehuf, Halt geben [horse hoof, giving grip]
	11	Akkordeon, spielen [accordion, playing]	Seil, schneiden [rope, cutting]

Table 1 continued








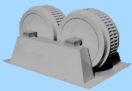

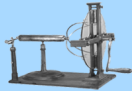



Stimulus	ID	Matching keywords	Non-matching keywords
	12	Körper, trainieren [body, training]	Buch, offen halten [book, binding]
	13	Farbe, vom Fenster abschleifen [paint, scraping off the window]	von Hand, zentrifugieren [by hand, centrifugating]
	14	Außenbereich, heizen [outdoor area, heating]	Rasierklinge, schärfen [razor blade, sharpening]
	15	Pflanzenteile, vergrößern [plant parts, magnifying]	Katzenklo, sich selbst reinigen [litter box, self-cleaning]
	16	Krawatten, aufhängen [necktie, hanging up]	Zeichnungen, vermessen [drawings, measuring]
	17	Schallplatte, abtasten [vinyl record, reading]	Ball, katapultieren [ball, catapulting]
	18	Glas, schneiden [glass, cutting]	Eier, wiegen [eggs, weighing]
	19	Briketts, pressen [briquette, pressing]	Narkosemittel, abgeben [anesthetic, administering]
	20	Orgelton, erzeugen [organ sound, making]	Bandage, rollen [bandage, rolling]
	21	Spannung, erzeugen [electric current, making]	Fußstütze, reiten [footrest, horseback riding]
	22	Narkosemittel, abgeben [anesthetic, administering]	Nüsse, aufbrechen [nuts, cracking]
	23	Bandage, rollen [bandage, rolling]	Schnee, rodeln [snow, sleighing]
	24	Weinfass, Loch einschlagen [wine barrel, smashing a hole]	Tier, einfangen [animal, trapping]

Table 1 continued

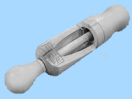





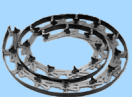

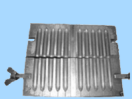



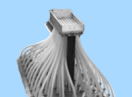
Stimulus	ID	Matching keywords	Non-matching keywords
	25	Flaschenkorken, einführen [bottle cork, inserting]	Pferd, im Moor laufen [horse, walking in the moor]
	26	Automat, Eier ausbrüten [machine, incubating eggs]	Windgeschwindigkeit, messen [wind speed, measuring]
	27	Korngarbe, greifen [sheaf, grabbing]	Treibhaus, heizen [glass house, heating]
	28	Brief, wiegen [letter, weighing]	Korngarbe, greifen [sheaf, grabbing]
	29	Löcher, bohren [hole, drilling]	Sonnenlicht, Intensität messen [sunlight, measure intensity]
	30	Angelschnur, kurbeln [fishing line, winding]	Glaskörper, musizieren [glass body, making music]
	31	Kurven, malen [curve, drawing]	Nussöl, pressen [nut oil, pressing]
	32	Radiofrequenz, einstellen [radio frequency, tuning]	Erektion, helfen [erection, helping]
	33	Zäpfchen, pressen [suppository, pressing]	Unkraut, jäten [weed, removing]
	34	Fass, öffnen [barrel, opening]	Pflanzenteile, vergrößern [plant parts, magnifying]
	35	Bergbaustollen, beleuchten [mining tunnel, lightening]	Knie, fixieren [knee, fixating]
	36	Kuh, vom Zaun abhalten [cow, keeping away from the fence]	Radiofrequenz, einstellen [radio frequency, tuning]
	37	Saatgut, gleichmäßig aussäen [seeds, sowing evenly]	Fass, öffnen [barrel, opening]

Table 1 continued



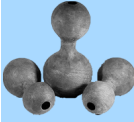

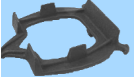








Stimulus	ID	Matching keywords	Non-matching keywords
	38	Flaschen, trocknen [bottles, drying]	Bleistift, anspitzen [pencil, sharpening]
	39	Uhr, mit Wärme betreiben [clock, operating with heat]	Körper, untersuchen [body, training]
	40	Tonpott, trommeln [clay pot, drumming]	Piano, stimmen [piano, tuning]
	41	Sprengstoffexplosion, auslösen [dynamite explosion, triggering]	Fisch, wiegen [fish, weighing]
	42	Pferdehuf, Halt geben [horse hoof, giving grip]	Zäpfchen, pressen [suppository, pressing]
	43	Bleistift, anspitzen [pencil, sharpening]	Angel, Köder markieren [fishing rod, marking bait]
	44	Nussöl, pressen [nut oil, pressing]	Zeichen, einbrennen [marks, burning in]
	45	Rasierklinge, schärfen [razor blade, sharpening]	Kurven, malen [curve, drawing]
	46	heiße Platten, anheben [hot plates, lifting]	Kleidung, im Eimer waschen [clothes, washing in a bucket]
	47	Film, aufspulen [film roll, winding]	Mund, offen halten [mouth, keeping open]
	48	Waffe, entflammen [weapon, inflaming]	Uhrzeit, anzeigen [time, displaying]
	49	Mikroskop-Proben, schneiden [microscopic samples, slicing]	heiße Platten, anheben [hot plates, lifting]
	50	Glaskörper, musizieren [glass body, making music]	Kork, flach pressen [cork, pressing flat]

Table 1 continued














Stimulus	ID	Matching keywords	Non-matching keywords
	51	Dampf, zerstäuben [steam, spraying]	Buch, binden [book, opening]
	52	Mandeln, operieren [kidneys, operating]	Film, aufspulen [film roll, winding]
	53	Toastbrot, rösten [toast, roasting]	Autobatterie, Spannung testen [car battery, measuring voltage]
	54	Fußstütze, reiten [footrest, horseback riding]	Stromstärke, messen [current, measuring]
	55	Türgelenk, Feuer überstehen [door hinge, surviving fires]	Botschaft, telegrafieren [message, telegraphing]
	56	Schnee, rodeln [snow, sleighing]	Dampf, zerstäuben [steam, spraying]
	57	Nüsse, aufbrechen [nuts, cracking]	Ziegelsteine, formen [bricks, forming]
	58	Radiergummi, mit Strom betreiben [eraser, operating with electricity]	Münzen, aufbewahren [coins, storing]
	59	Treibhaus, heizen [glass house, heating]	Messer, schleifen [knife, sharpening]
	60	Botschaft, telegrafieren [message, telegraphing]	Toastbrot, rösten [toast, roasting]
	61	Angel, Köder markieren [fishing rod, marking bait]	Baum, erklettern [tree, climbing]
	62	Katzenklo, sich selbst reinigen [litter box, self-cleaning]	Tankfüllstand, messen [fuel tank level, gauging]
	63	Körper, untersuchen [body, examining]	Schuhe, auf Eis laufen [shoes, walking on ice]

Table 1 continued






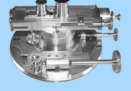







Stimulus	ID	Matching keywords	Non-matching keywords
	64	Brillenglas, zuschneiden [eyeglass lens, cutting]	Saatgut, gleichmäßig aussäen [seeds, sowing evenly]
	65	Draht, wickeln [wire, winding]	Bergbaustollen, beleuchten [mining tunnel, lightening]
	66	Buch, offen halten [book, opening]	Sprengstoffexplosion, auslösen [dynamite explosion, triggering]
	67	Feldanbau, häckseln [harvest, chopping]	Draht, wickeln [wire, winding]
	68	Schnurlot, absenken [plummet, letting down]	Korken, formen [bottle cork, forming]
	69	Sternenbilder, vermessen [stellar constellation, measuring]	Schnurlot, absenken [plummet, letting down]
	70	Nachricht, morsen [message, signaling]	Feldanbau, häckseln [harvest, chopping]
	71	Musikgerät, stampfen [musical instrument, stamping]	Goldmünzen, wiegen [gold coin, weighing]
	72	Schuhe, auf Eis laufen [shoes, walking on ice]	Geschwindigkeit, ermitteln [speed, determining]
	73	Geschwindigkeit, ermitteln [speed, determining]	Mausefalle, zuschnappen [mousetrap, snap-shutting]
	74	Zeichen, einbrennen [marks, burning in]	Luftdruck, messen [air pressure, measuring]
	75	Tabak, zermahlen [tobacco, pulverize]	Flaschen, trocknen [bottles, drying]
	76	Stromstärke, messen [current, measuring]	Mandeln, operieren [kidneys, operating]

Table 1 continued




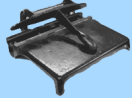



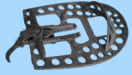





Stimulus	ID	Matching keywords	Non-matching keywords
	77	Tier, einfangen [animal, trapping]	Maiskolben, entkörnen [corn cob, removing grains]
	78	Messer, schleifen [knife, sharpening]	Schritte, vergrößern [steps, extending]
	79	Leierkasten, klingen [barrel organ, making sounds]	Fass, anheben [barrel, lifting]
	80	Buch, binden [book, binding]	Löcher, bohren [hole, drilling]
	81	Kork, flach pressen [cork, pressing flat]	Elektroschock, spielen [electric shock, playing]
	82	Tabletten, zerteilen [pill, splitting]	Blumentopf, sich selbst wässern [flowerpot, self-watering]
	83	Fass, anheben [barrel, lifting]	Mikroskop-Proben, schneiden [microscopic samples, slicing]
	84	Pferd, im Moor laufen [horse, walking in the moor]	Luft, abpumpen [air, pumping out]
	85	altes Ritual, hacken [ancient ritual, chopping]	Spannung, erzeugen [electric current, making]
	86	Kleidung, im Eimer waschen [clothes, washing in a bucket]	Türgelenk, Feuer überstehen [door hinge, surviving fires]
	87	Maiskolben, entkörnen [corn cob, removing grains]	Brief, wiegen [letter, weighing]
	88	Ball, katapultieren [ball, catapulting]	Radiergummi, mit Strom betreiben [eraser, operating with electricity]
	89	Zeichnungen, vermessen [drawings, measuring]	Brenner, löten [burner, soldering]

Table 1 continued



















Stimulus	ID	Matching keywords	Non-matching keywords
	90	Elektroschock, spielen [electric shock, playing]	Weinfass, Loch einschlagen [wine barrel, smashing a hole]
	91	Lieferungen, abzählen [deliveries, counting]	Außenbereich, heizen [outdoor area, heating]
	92	Rotation, Ladung erzeugen [rotation, creating electric charge]	Musikgerät, stampfen [musical instrument, stamping]
	93	Herz, durch Maschine ersetzen [heart, replacing with machine]	Kerzen, löschen [candles, extinguishing]
	94	Seil, schneiden [rope, cutting]	Akkordeon, spielen [accordion, playing]
	95	Fisch, wiegen [fish, weighing]	Herz, durch Maschine ersetzen [heart, replacing with machine]
	96	Kerzen, löschen [candles, extinguishing]	Körper, trainieren [body, examining]
	97	Korken, formen [bottle cork, forming]	Sternenbilder, vermessen [stellar constellation, measuring]
	98	Erektion, helfen [erection, helping]	Waffe, werfen [weapon, throwing]
	99	Streckenmaß, Sonnenlicht nutzen [distance measure, using sunrays]	Kartoffeln, stampfen [potatoes, mashing]
	100	Luftdruck, messen [air pressure, measuring]	Knochen, sägen [bones, sawing]
	101	Piano, stimmen [piano, tuning]	Eierkarton, pressen [egg carton, pressing]
	102	von Hand, zentrifugieren [by hand, centrifugating]	Lieferungen, abzählen [deliveries, counting]

Table 1 continued

Stimulus	ID	Matching keywords	Non-matching keywords
	103	Kartoffeln, stampfen [potatoes, mashing]	Nachricht, morsen [message, signaling]
	104	Waffe, werfen [weapon, throwing]	elektrische Spannung, prüfen [electric current, measuring]
	105	Tankfüllstand, messen [fuel tank level, gauging]	Tonpott, trommeln [clay pot, drumming]
	106	Uhrzeit, anzeigen [time, displaying]	altes Ritual, hacken [ancient ritual, chopping]
	107	Windgeschwindigkeit, messen [wind speed, measuring]	Waffe, entflammen [weapon, inflaming]
	108	Schlüsselloch, stanzen [keyhole, punching]	Automat, Eier ausbrüten [machine, incubating eggs]
	109	Ziegelsteine, formen [bricks, forming]	Schallplatte, abtasten [vinyl record, reading]
	110	Becher, Schall auffangen [drinking cup, picking up sound]	Schlüsselloch, stanzen [keyhole, punching]
	111	Luft, abpumpen [air, pumping out]	Briketts, pressen [briquette, pressing]
	112	Mund, offen halten [mouth, keeping open]	Orgelton, erzeugen [organ sound, making]
	113	Autobatterie, Spannung testen [car battery, measuring voltage]	Becher, Schall auffangen [drinking cup, picking up sound]
	114	Sonnenlicht, Intensität messen [sunlight, measure intensity]	Krawatten, aufhängen [necktie, hanging up]
	115	Kutschrad, anschließen [carriage wheel, locking]	Angelschnur, kurbeln [fishing line, winding]

Table 1 continued

Stimulus	ID	Matching keywords	Non-matching keywords
	116	Eier, wiegen [eggs, weighing]	Leierkasten, klingen [barrel organ, making sounds]
	117	Blumentopf, sich selbst wässern [flowerpot, self-watering]	Glas, schneiden [glass, cutting]
	118	Schritte, vergrößern [steps, extending]	Tabletten, zerteilen [pill, splitting]
	119	Münzen, aufbewahren [coins, storing]	Kutschrad, anschließen [carriage wheel, locking]
	120	Brenner, löten [burner, soldering]	Flaschenkorken einführen, einführen [bottle cork, inserting]

Online Results 1. *Linear Mixed-Effects Models*

P1 Component (100–150 ms)

```
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: P1 ~ 1 + phase + condition + phase:condition + cosine + (1 +
##   phase | participant_id)
## Control: lme4::lmerControl
##
## REML criterion at convergence: 87306.7
##
## Scaled residuals:
##   Min       1Q   Median       3Q      Max
## -6.4625 -0.6237 -0.0031  0.6134  5.8089
##
## Random effects:
##   Groups             Name                Variance Std.Dev. Corr
## participant_id (Intercept)  8.991     2.999
##                   phase1         1.670     1.292   -0.31
##                   phase2         1.822     1.350    0.44 -0.97
## Residual                    25.582     5.058
## Number of obs: 14309, groups: participant_id, 48
##
## Fixed effects:
##              Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)  3.991e+00  4.386e-01  4.857e+01  9.099 4.55e-12 ***
## phase1      -6.827e-01  2.156e-01  4.797e+01 -3.167 0.00268 **
## phase2       1.100e+00  2.230e-01  4.807e+01  4.930 1.02e-05 ***
## condition1   5.105e-02  1.054e-01  1.417e+04  0.484 0.62808
## condition2   1.790e-03  1.219e-01  1.418e+04  0.015 0.98829
## cosine       1.949e-01  7.413e-02  1.416e+04  2.629 0.00859 **
## phase1:condition1 -2.392e-01  2.553e-01  1.350e+04 -0.937 0.34874
## phase2:condition1  7.278e-01  2.563e-01  1.342e+04  2.840 0.00452 **
```

```

## phase1:condition2 -3.668e-01 2.933e-01 1.185e+04 -1.251 0.21113
## phase2:condition2 7.975e-01 2.946e-01 1.164e+04 2.707 0.00680 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
## (Intr) phase1 phase2 cndtn1 cndtn2 cosine phs1:1 phs2:1 phs1:2
## phase1 -0.265
## phase2 0.378 -0.857
## condition1 0.018 0.002 0.001
## condition2 -0.006 0.001 0.000 0.591
## cosine 0.127 0.000 0.001 -0.029 -0.042
## phs1:cndtn1 0.001 0.110 -0.053 0.002 0.002 0.002
## phs2:cndtn1 0.000 -0.055 0.110 0.006 0.005 -0.001 -0.511
## phs1:cndtn2 0.000 -0.002 0.002 0.002 0.002 0.000 0.582 -0.306
## phs2:cndtn2 0.000 0.002 -0.001 0.005 0.008 0.001 -0.306 0.584 -0.519
##
## Type III Analysis of Variance Table with Satterthwaite's method
## Sum Sq Mean Sq NumDF DenDF F value Pr(>F)
## phase 730.61 365.30 2 49.7 14.2799 1.258e-05 ***
## condition 8.91 4.46 2 14172.1 0.1742 0.840161
## cosine 176.75 176.75 1 14159.0 6.9091 0.008585 **
## phase:condition 259.50 64.88 4 11197.7 2.5360 0.038129 *
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Pairwise Contrasts (Simple Effects)
## contrast = Informed - Uninformed:
## phase estimate SE df t.ratio p.value
## Pre-insight -0.0321 0.180 12943 -0.178 1.0000
## Insight -0.2713 0.182 14138 -1.494 0.4060
## Post-insight 0.4565 0.181 13047 2.515 0.0357
##
## contrast = Informed - Unsuccessful:
## phase estimate SE df t.ratio p.value
## Pre-insight -0.0195 0.206 10410 -0.095 1.0000
## Insight -0.3863 0.209 13860 -1.844 0.1956
## Post-insight 0.4112 0.209 10673 1.972 0.1460
##
## Degrees-of-freedom method: satterthwaite
## P value adjustment: bonferroni method for 3 tests

N170 Component (150–200 ms)

## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: N170 ~ 1 + phase + condition + phase:condition + cosine + (1 +
## phase | participant_id)
## Control: lme4::lmerControl
##
## REML criterion at convergence: 86644.7
##
## Scaled residuals:
## Min 1Q Median 3Q Max
## -6.0470 -0.6299 -0.0035 0.6025 5.9459
##
## Random effects:
## Groups Name Variance Std.Dev. Corr
## participant_id (Intercept) 13.660 3.696
## phase1 6.588 2.567 0.15
## phase2 5.724 2.393 0.01 -0.96
## Residual 24.250 4.924
## Number of obs: 14309, groups: participant_id, 48
##

```

```

## Fixed effects:
##              Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)   1.810e+00  5.379e-01  4.801e+01   3.365 0.001511 **
## phase1       -3.057e+00  3.851e-01  4.751e+01  -7.938 2.93e-10 ***
## phase2        2.611e+00  3.612e-01  4.706e+01   7.229 3.65e-09 ***
## condition1   -1.670e-01  1.026e-01  1.417e+04  -1.627 0.103705
## condition2   -2.168e-01  1.187e-01  1.417e+04  -1.826 0.067843 .
## cosine        3.197e-01  7.218e-02  1.416e+04   4.430 9.51e-06 ***
## phase1:condition1 -5.275e-01  2.497e-01  1.413e+04  -2.113 0.034637 *
## phase2:condition1  9.032e-01  2.505e-01  1.402e+04   3.606 0.000313 ***
## phase1:condition2 -8.385e-01  2.879e-01  1.384e+04  -2.913 0.003586 **
## phase2:condition2  1.198e+00  2.888e-01  1.341e+04   4.148 3.37e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) phase1 phase2 cndtn1 cndtn2 cosine phs1:1 phs2:1 phs1:2
## phase1          0.143
## phase2          0.006 -0.922
## condition1      0.014  0.001  0.001
## condition2     -0.005  0.001  0.000  0.592
## cosine          0.101  0.000  0.000 -0.029 -0.042
## phs1:cndtn1     0.000  0.059 -0.032  0.003  0.003  0.002
## phs2:cndtn1     0.000 -0.030  0.065  0.005  0.005  0.000 -0.508
## phs1:cndtn2     0.000 -0.002  0.001  0.003  0.003  0.000  0.587 -0.304
## phs2:cndtn2     0.000  0.001 -0.001  0.005  0.007  0.001 -0.304  0.588 -0.514
##
## Type III Analysis of Variance Table with Satterthwaite's method
##              Sum Sq Mean Sq NumDF  DenDF F value    Pr(>F)
## phase         1529.29   764.64      2    48.1 31.5319 1.784e-09 ***
## condition      92.04    46.02      2 14166.2  1.8976 0.1499606
## cosine         475.81   475.81      1 14157.3 19.6209 9.514e-06 ***
## phase:condition 489.34   122.34      4 13093.5  5.0448 0.0004633 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Pairwise Contrasts (Simple Effects)
## contrast = Informed - Uninformed:
## phase      estimate    SE    df t.ratio p.value
## Pre-insight -0.1163 0.176 13762 -0.662  1.0000
## Insight     -0.6439 0.177 14194 -3.631  0.0008
## Post-insight  0.2593 0.177 13742  1.462  0.4312
##
## contrast = Informed - Unsuccessful:
## phase      estimate    SE    df t.ratio p.value
## Pre-insight -0.0571 0.202 12610 -0.282  1.0000
## Insight     -0.8956 0.205 14203 -4.371 <.0001
## Post-insight  0.3024 0.204 12556  1.479  0.4171
##
## Degrees-of-freedom method: satterthwaite
## P value adjustment: bonferroni method for 3 tests

```

N400 Component (400–700 ms)

```

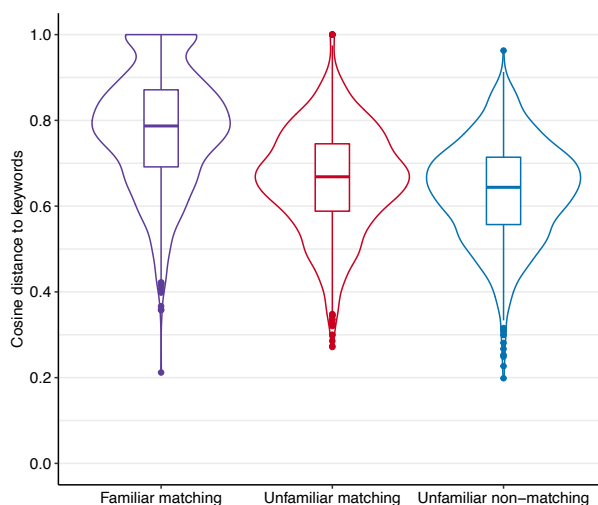
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [
## lmerModLmerTest]
## Formula: N400 ~ 1 + phase + condition + phase:condition + cosine + (1 +
## phase | participant_id)
## Control: lme4::lmerControl
##
## REML criterion at convergence: 82101.6
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max

```

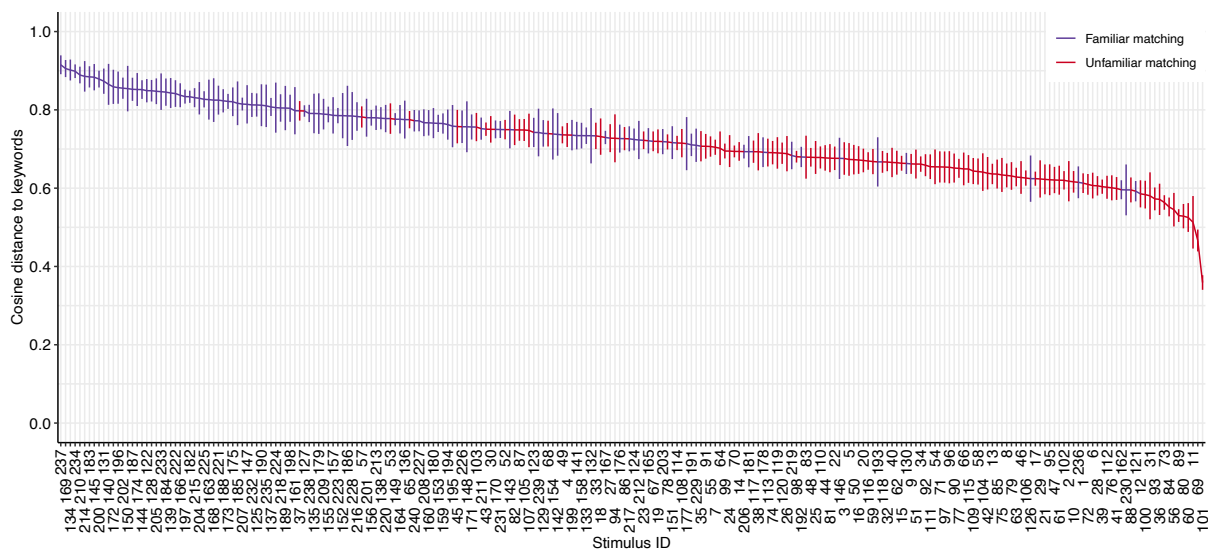
```

## -6.7184 -0.6289 -0.0010 0.6330 5.0726
##
## Random effects:
## Groups      Name      Variance Std.Dev. Corr
## participant_id (Intercept) 2.842  1.686
##              phase1      1.566  1.251   0.19
##              phase2      1.013  1.007  -0.03 -0.61
## Residual              17.754  4.214
## Number of obs: 14309, groups: participant_id, 48
##
## Fixed effects:
##              Estimate Std. Error      df t value Pr(>|t|)
## (Intercept)   1.145e+00 2.504e-01 5.053e+01 4.571 3.16e-05 ***
## phase1        2.628e+00 2.019e-01 4.746e+01 13.018 < 2e-16 ***
## phase2       -1.615e+00 1.712e-01 4.842e+01 -9.433 1.51e-12 ***
## condition1    5.837e-01 8.777e-02 1.418e+04 6.651 3.02e-11 ***
## condition2    5.025e-01 1.015e-01 1.420e+04 4.950 7.51e-07 ***
## cosine        5.312e-02 6.176e-02 1.416e+04 0.860 0.389735
## phase1:condition1 1.216e+00 2.135e-01 1.407e+04 5.694 1.27e-08 ***
## phase2:condition1 -2.903e-01 2.140e-01 1.383e+04 -1.356 0.175088
## phase1:condition2 1.317e+00 2.460e-01 1.362e+04 5.353 8.80e-08 ***
## phase2:condition2 -8.411e-01 2.465e-01 1.286e+04 -3.412 0.000647 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) phase1 phase2 cndtn1 cndtn2 cosine phs1:1 phs2:1 phs1:2
## phase1          0.162
## phase2         -0.027 -0.585
## condition1      0.027 0.002 0.001
## condition2     -0.009 0.001 0.000 0.591
## cosine          0.185 0.000 0.001 -0.029 -0.042
## phs1:cndtn1     0.001 0.097 -0.058 0.003 0.003 0.002
## phs2:cndtn1     0.000 -0.049 0.119 0.005 0.004 0.000 -0.500
## phs1:cndtn2     0.000 -0.003 0.001 0.003 0.003 0.000 0.586 -0.294
## phs2:cndtn2     0.000 0.001 -0.001 0.004 0.006 0.001 -0.294 0.587 -0.501
##
## Type III Analysis of Variance Table with Satterthwaite's method
##              Sum Sq Mean Sq NumDF  DenDF F value  Pr(>F)
## phase          3097.77 1548.88      2    48.1 87.2427 < 2.2e-16 ***
## condition       813.58  406.79      2 14180.1 22.9129 1.162e-10 ***
## cosine          13.13   13.13      1 14159.6 0.7398  0.3897
## phase:condition 831.16  207.79      4 13624.4 11.7040 1.728e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Pairwise Contrasts (Simple Effects)
## contrast = Informed - Uninformed:
## phase      estimate    SE    df t.ratio p.value
## Pre-insight -0.130 0.151 14117 -0.861 1.0000
## Insight      1.086 0.151 14156  7.173 <.0001
## Post-insight  0.795 0.152 14031  5.230 <.0001
##
## contrast = Informed - Unsuccessful:
## phase      estimate    SE    df t.ratio p.value
## Pre-insight -0.095 0.174 13794 -0.546 1.0000
## Insight      1.222 0.175 13925  6.998 <.0001
## Post-insight  0.381 0.176 13495  2.169 0.0903
##
## Degrees-of-freedom method: satterthwaite
## P value adjustment: bonferroni method for 3 tests

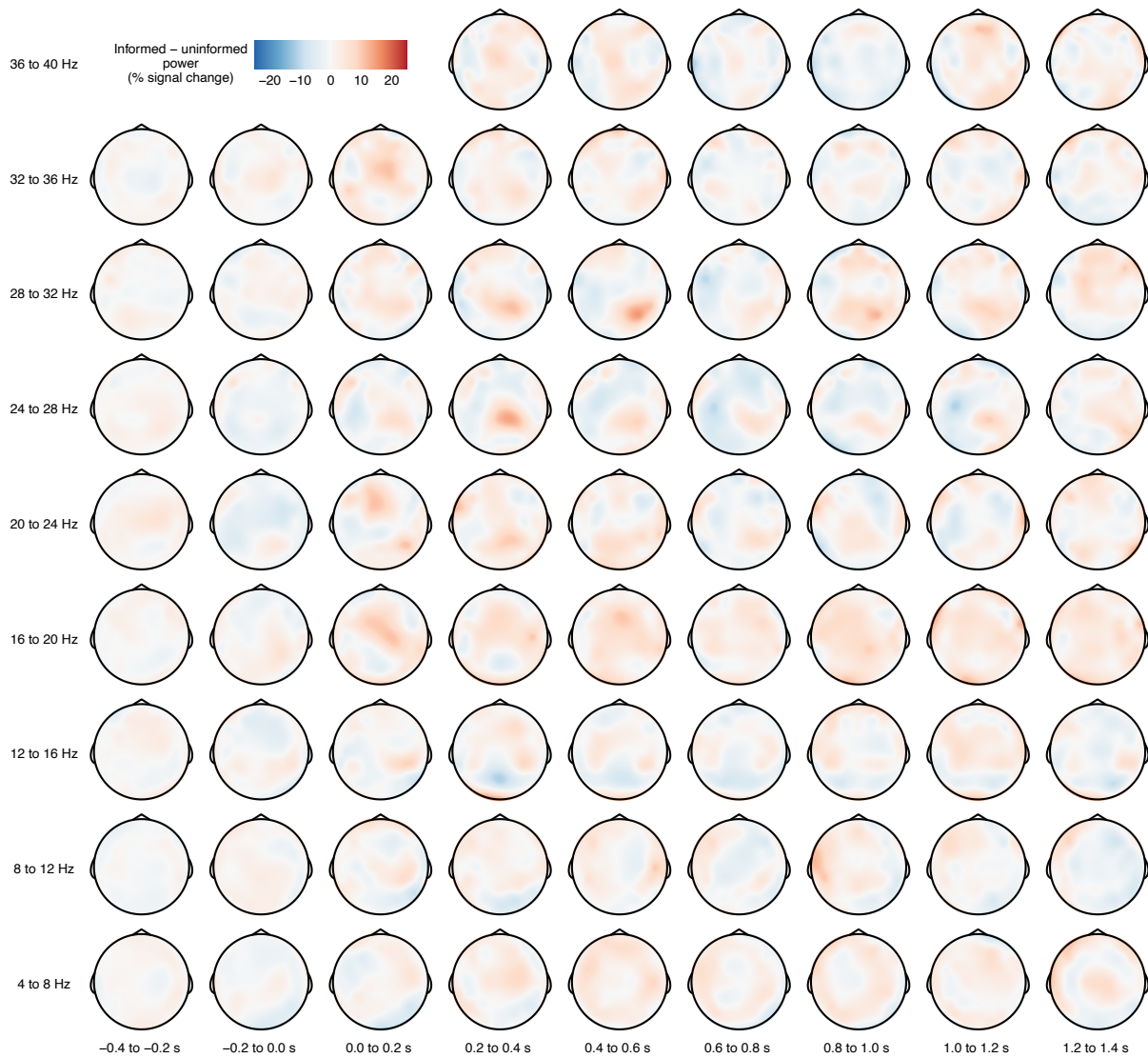
```



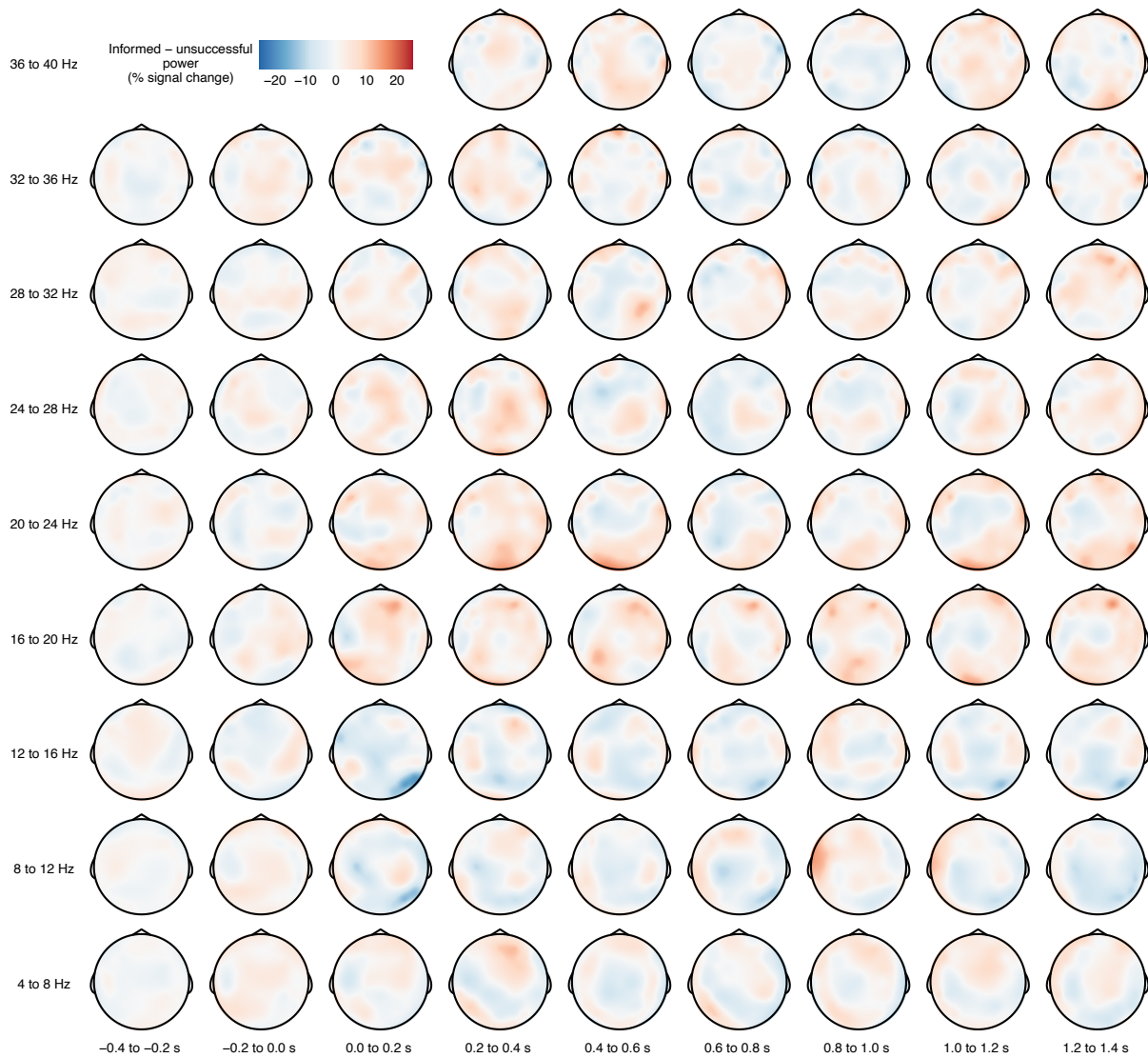
Online Figure 1. Online pre-rating study results. Participants were presented with 240 objects in random order, 120 of which were familiar everyday objects and the other 120 were presumed to be unfamiliar to most people. Participants were asked to describe or guess the function of each object by typing a pair of German keywords. Violins show the distributions of the similarities between these participant-generated keywords and the keywords that we had created for our main EEG experiment (see Materials and Methods; Online Table 1). We computed these similarities separately for (a) participant-generated keywords for the familiar objects and keywords that we had created to match the familiar objects (though these were not part of the main EEG experiment; red), (b) participant-generated keywords for the unfamiliar objects and keywords that we had created to match the unfamiliar objects (blue), and (c) participant-generated keywords for the unfamiliar objects and keywords that we had created to not match the unfamiliar objects (by selecting keywords that matched one of the other unfamiliar objects; purple). Semantic similarities were computed as the cosine similarity between the sums of the two word vectors in a word2vec embedding space pre-trained on the German Wikipedia. Boxplots show the median (thick line), 25th and 75th percentiles (hinges), 1.5 times the interquartile range above and below the hinges (whiskers), and any outlier data points that fall outside of the whiskers (dots).



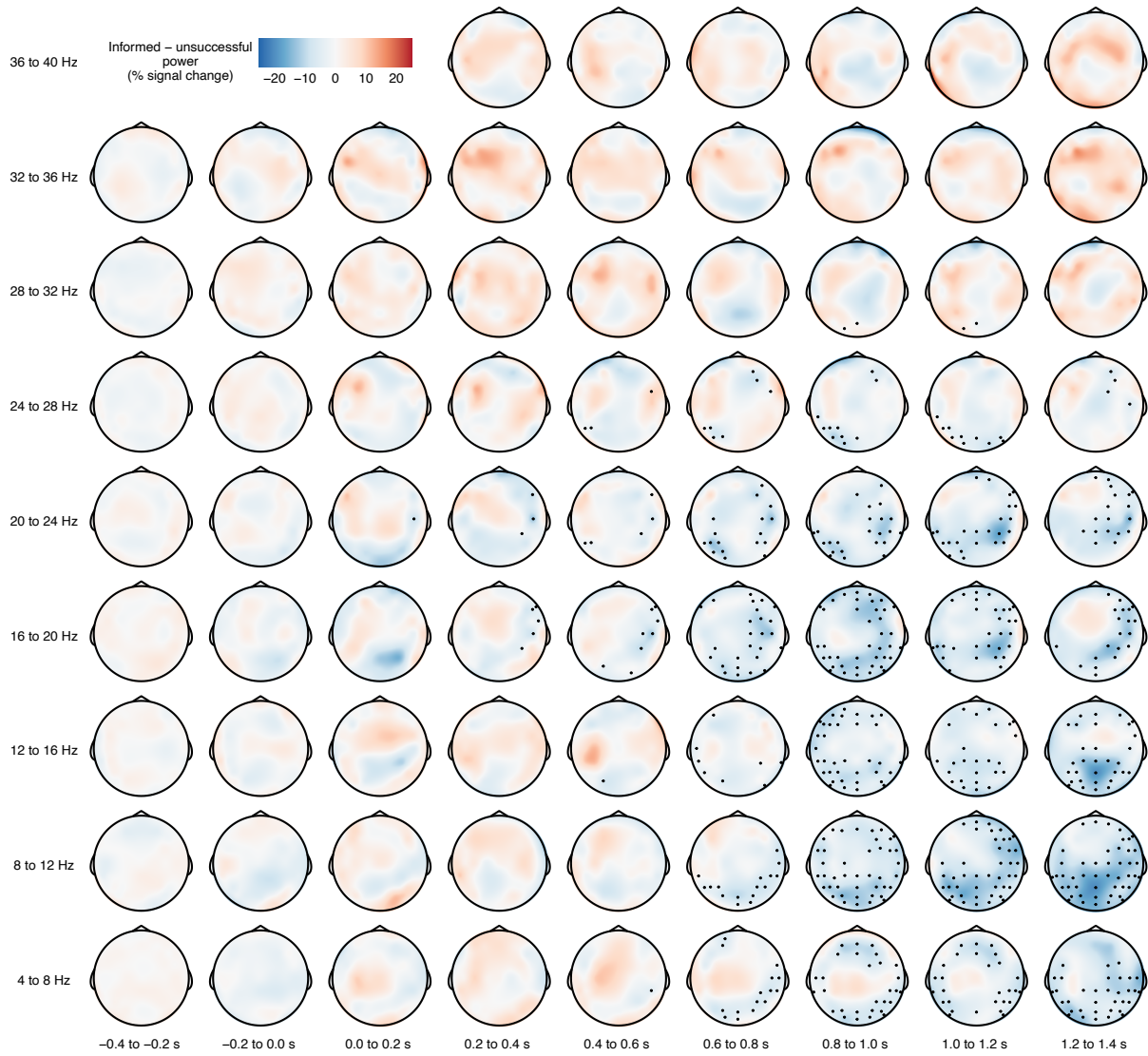
Online Figure 2. Online pre-rating study results on the level of individual object stimuli. Same as Online Figure 1, but showing, for each object stimulus separately, the mean (horizontal line) \pm 1 standard error (vertical lines) of the semantic similarities between participant-generated keywords and the keywords that we had generated. Semantic similarities were generally higher for the familiar objects than for the unfamiliar objects, indicating that it was easier for participants to come up with the correct function for the familiar objects. This mean cosine similarity for each object (i.e., a measure of the difficulty of guessing its function) was entered as a covariate of no interest in all linear mixed-effects models for analyzing the data of the main EEG experiment (see Materials and Methods; Results).



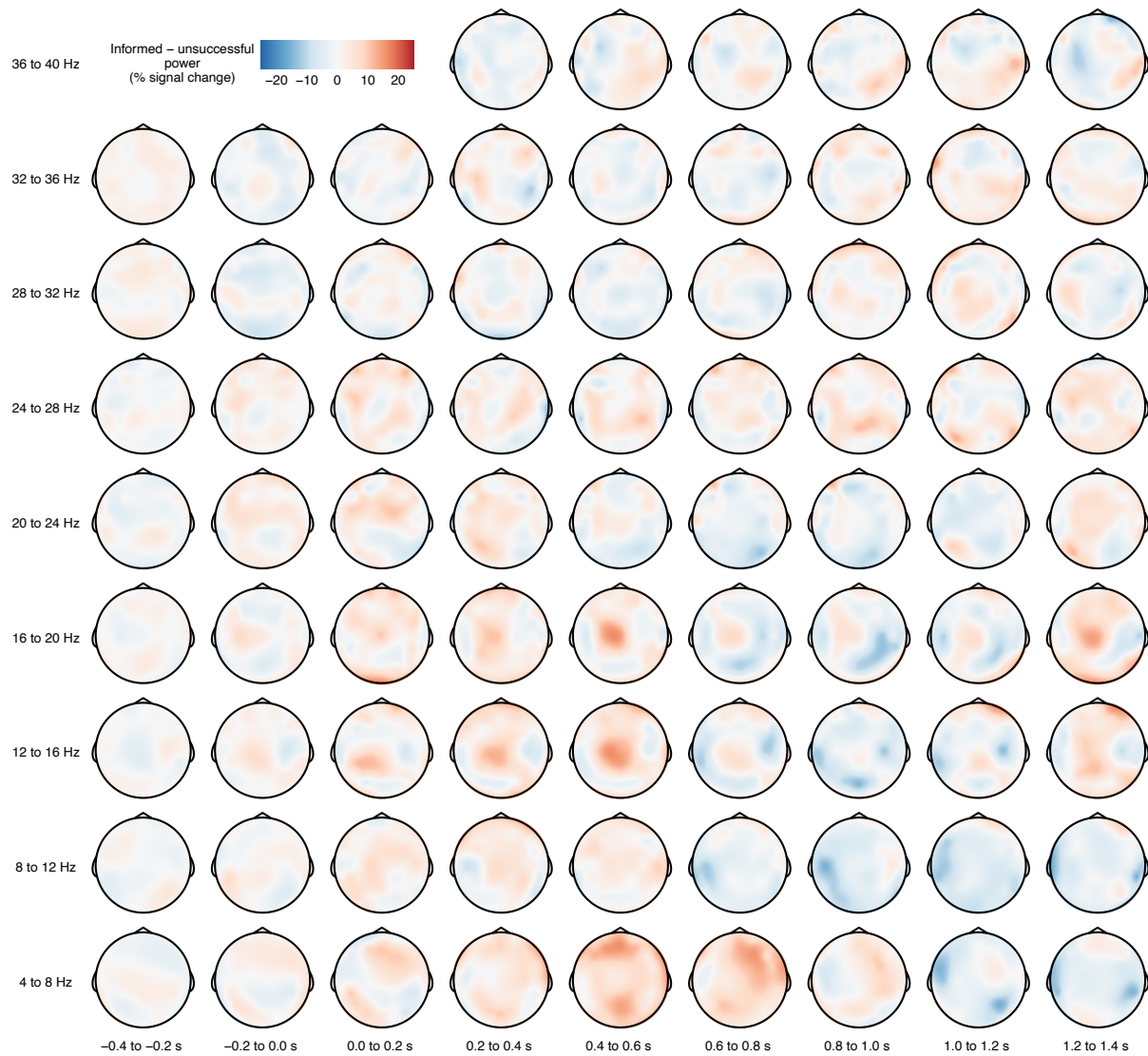
Online Figure 3. Time-frequency results for the pre-insight phase. Each topographic plot shows the difference in event-related power (in units of percent signal change) between the semantically informed condition and the uninformed condition, grand-averaged across participants. A cluster-based permutation test indicated no clusters for which this difference was statistically significant (all $ps > .789$).



Online Figure 4. Time-frequency results for the pre-insight phase (informed minus unsuccessful). Each topographic plot shows the difference in event-related power (in units of percent signal change) between the semantically informed condition and the unsuccessfully informed condition, grand-averaged across participants. A cluster-based permutation test indicated no clusters for which this difference was statistically significant (all $ps > .770$).



Online Figure 5. Time-frequency results for the insight phase (informed minus unsuccessful). Each topographic plot shows the difference in event-related power (in units of percent signal change) between the semantically informed condition and the unsuccessfully informed condition, grand-averaged across participants. Black dots highlight EEG channels that were part of a cluster for which this difference was statistically significant ($p_{\text{cluster}} = .016$).



Online Figure 6. Time-frequency results for the post-insight phase (informed minus unsuccessful). Each topographic plot shows the difference in event-related power (in units of percent signal change) between the semantically informed condition and the unsuccessfully informed condition, grand-averaged across participants. A cluster-based permutation test indicated no clusters for which this difference was statistically significant (all $ps > .216$).