OBIWAN BEHAVIORAL ANALYSIS

David Munoz Tord

2020-12-03

Setup

May I suggest running `repro::automate()`? This will create a `Dockerfile` & `Makefile` based on every RMarkdown in this folder and the special yamls in them. add ENV DEBIAN_FRONTEND=noninteractive If you are unsure weather or not you have `git` `make` & `docker`.

```
## v Git is installed, don't worry.
```

```
## v Make is installed, don't worry.
```

```
## v Docker is installed, don't worry.
```

Demographics

Summary statistics:

Table 1: AGE

intervention	mean	sd	min	max
Placebo	0.04	1.07	-1.69	1.84
Liraglutide	-0.04	0.93	-1.37	2.00

Table 2: BMI

intervention	mean	sd	min	max
Placebo	35.02	2.97	30.5	41.0
Liraglutide	35.74	2.90	31.8	43.5

Table 3: GENDER

gender	intervention	n
Men	Placebo	9
Men	Liraglutide	7
Women	Placebo	16
Women	Liraglutide	16

Table 4: Group

intervention	n
Placebo	25
Liraglutide	23

Description

Pavlvovian Conditioning Task (Analysis: Latency)

Formula = Latency ~ condition*intervention + age + gender + thirsty + hungry + BMI_t1 + diff_base_RT + Error(id/condition)
Latency = time to detect the target (ms) & condition = CS+ or CS-
diff_base = baseline latency differences (mean(CS-) - mean(CS+))

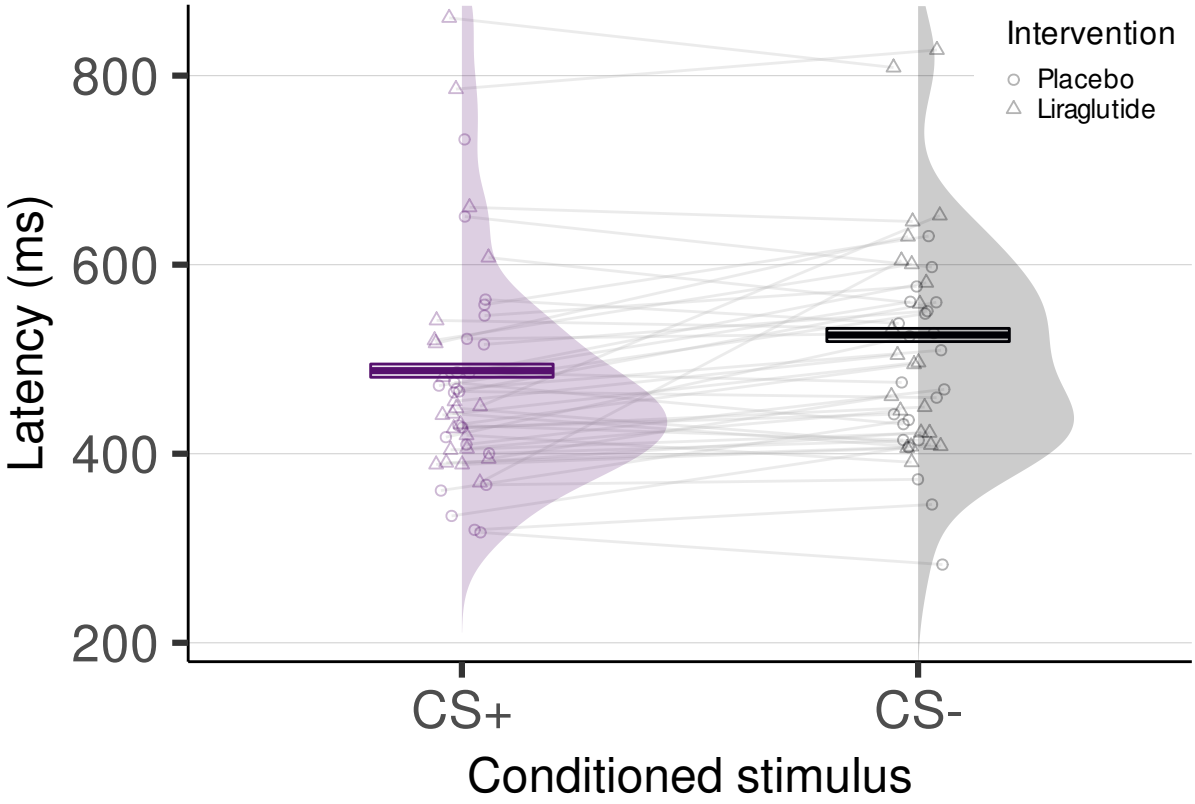
Table 5: Latency (ms)

Predictors	Estimates	std. Error	CI
condition [1]	-17.18	14.97	-46.98 – 12.61
intervention [1]	-9.76	14.35	-38.33 – 18.81
age	28.27	14.56	-0.70 – 57.24
gender [1]	-8.18	16.47	-40.96 – 24.60
thirsty	46.97	15.97	15.19 – 78.75
hungry	-19.11	17.27	-53.48 – 15.26
BMI_t1	-15.71	14.60	-44.76 – 13.35
diff_base	-27.47	14.56	-56.45 – 1.52
condition [1] *intervention [1]	-0.20	14.35	-28.76 – 28.37
condition [1] * age	8.02	14.56	-20.95 – 37.00
condition [1] * gender[1]	5.02	16.47	-27.76 – 37.79
condition [1] * thirsty	-5.58	15.97	-37.36 – 26.20
condition [1] * hungry	-2.73	17.27	-37.10 – 31.64
condition [1] * BMI_t1	-6.23	14.60	-35.29 – 22.82
condition [1] * diff_base	0.98	14.56	-28.00 – 29.96

Observations	96
R2 / R2 adjusted	0.220 / 0.074

Effect	df	MSE	F	p.value	PES	Lower CI	Upper CI	BF10
intervention	1, 40	34755.65	0.25	.622	0.006	0.000	0.095	0.573
age	1, 40	34755.65	2.01	.164	0.048	0.000	0.184	1.240
gender	1, 40	34755.65	0.13	.719	0.003	0.000	0.079	0.719
thirsty	1, 40	34755.65	4.61 *	.038	0.103	0.003	0.258	1.518
hungry	1, 40	34755.65	0.65	.424	0.016	0.000	0.125	1.023
BMI_t1	1, 40	34755.65	0.62	.437	0.015	0.000	0.123	0.941
diff_base	1, 40	34755.65	1.90	.176	0.045	0.000	0.180	1.124
condition	1, 40	2310.03	10.57 **	.002	0.209	0.050	0.371	39.603
intervention:condition	1, 40	2310.03	0.00	.969	0.000	0.000	NA	0.313
age:condition	1, 40	2310.03	2.44	.126	0.057	0.000	0.198	1.331
gender:condition	1, 40	2310.03	0.74	.393	0.018	0.000	0.130	0.535
thirsty:condition	1, 40	2310.03	0.98	.328	0.024	0.000	0.142	0.815
hungry:condition	1, 40	2310.03	0.20	.657	0.005	0.000	0.089	0.401
BMI_t1:condition	1, 40	2310.03	1.46	.234	0.035	0.000	0.163	0.882
diff_base:condition	1, 40	2310.03	0.04	.850	0.001	0.000	0.050	0.449

Latency by condition



Analysis: Pleasantness Ratings (Pavlovian Cue)

Formula = Pleasantness ratings ~ condition*intervention + age + gender + thirsty + hungry + BMI_t1 + diff_base_lik + Error(id/condition)
Ratings = how pleasant is the clue (0-100, no repetitions) & condition = CS+ or CS- diff_base_lik = baseline liking differences (mean(CS+) - mean(CS-))

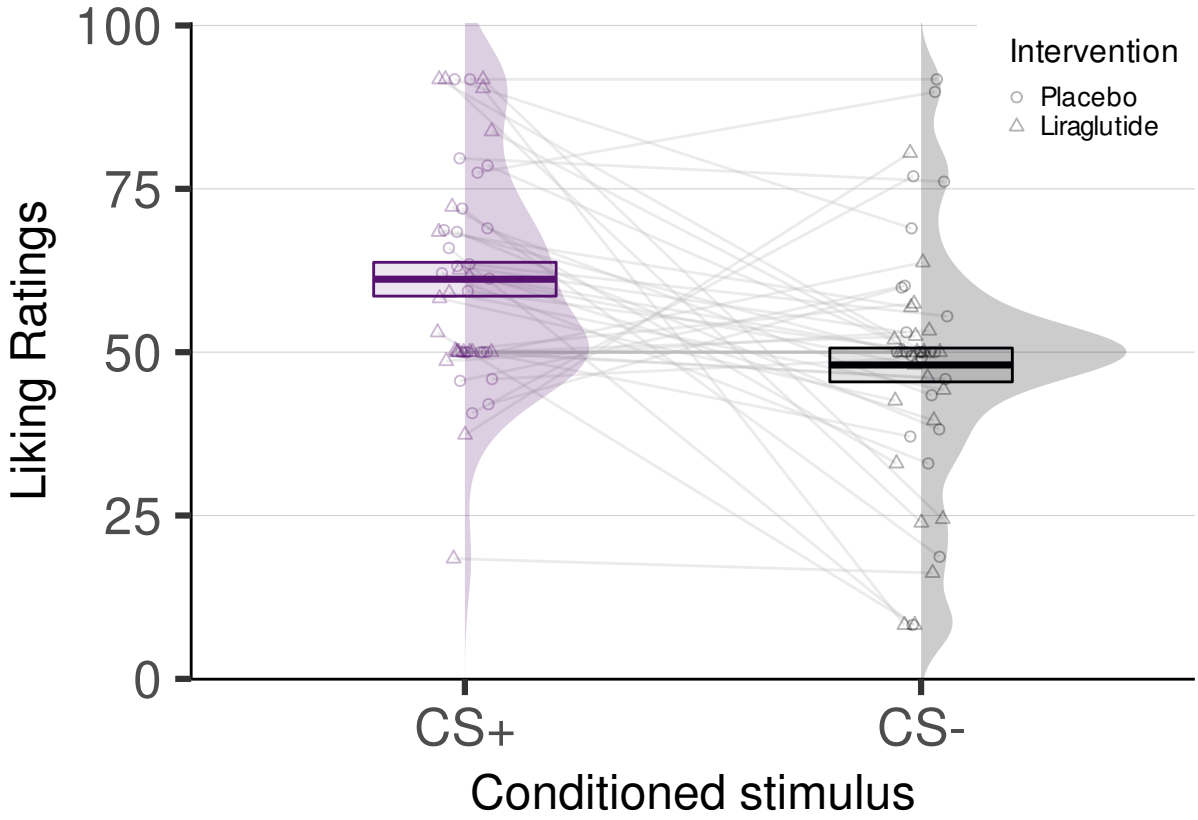
Table 6: Pleasantness Ratings (Pavlovian Cue)

Predictors	Estimates	std. Error	CI
condition [1]	6.25	1.69	2.89 – 9.62
intervention [1]	2.70	1.62	-0.52 – 5.92
age	3.01	1.66	-0.29 – 6.31
gender [1]	1.96	1.87	-1.76 – 5.68
thirsty	1.11	1.82	-2.51 – 4.72
hungry	4.46	1.98	0.53 – 8.39
BMI_t1	0.12	1.65	-3.16 – 3.40
diff_base_lik	1.37	1.66	-1.93 – 4.68
condition [1] *intervention [1]	-1.91	1.62	-5.13 – 1.31
condition [1] * age	-0.32	1.66	-3.61 – 2.98
condition [1] * gender[1]	-1.16	1.87	-4.88 – 2.55
condition [1] * thirsty	0.13	1.82	-3.49 – 3.74
condition [1] * hungry	1.20	1.98	-2.73 – 5.13
condition [1] * BMI_t1	0.55	1.65	-2.73 – 3.83
condition [1] *diff_base_lik	7.66	1.66	4.36 – 10.97

Observations	96
R2 / R2 adjusted	0.435 / 0.329

Effect	df	MSE	F	p.value	PES	Lower CI	Upper CI	BF10
intervention	1, 40	259.91	2.53	.119	0.060	0.000	0.201	0.65
age	1, 40	259.91	2.99 +	.091	0.070	0.000	0.215	1.16
gender	1, 40	259.91	1.00	.323	0.024	0.000	0.143	0.39
thirsty	1, 40	259.91	0.34	.565	0.008	0.000	0.103	0.46
hungry	1, 40	259.91	4.63 *	.037	0.104	0.003	0.259	2.24
BMI_t1	1, 40	259.91	0.00	.944	0.000	0.000	0.005	0.42
diff_base_lik	1, 40	259.91	0.62	.435	0.015	0.000	0.123	0.51
condition	1, 40	212.57	15.17 ***	<.001	0.275	0.093	0.433	481.74
intervention:condition	1, 40	212.57	1.55	.220	0.037	0.000	0.167	0.50
age:condition	1, 40	212.57	0.04	.842	0.001	0.000	0.053	0.32
gender:condition	1, 40	212.57	0.43	.515	0.011	0.000	0.111	0.39
thirsty:condition	1, 40	212.57	0.01	.941	0.000	0.000	0.008	0.46
hungry:condition	1, 40	212.57	0.41	.527	0.010	0.000	0.109	0.34
BMI_t1:condition	1, 40	212.57	0.12	.726	0.003	0.000	0.078	0.35
diff_base_lik:condition	1, 40	212.57	23.65 ***	<.001	0.372	0.173	0.517	7058.24

Pleasantness Ratings by condition (Pavlvovian Cue)



Instrumental Conditioning Task (Analysis)

Formula = Number of grips ~ spline*intervention + age + gender + thirsty + hungry + BMI_t1 + diff_base + Error(id/spline)
grips = number of times participant exceeded the force threshold to acquire the reward (Milkshake) spline = first 5 trials (0), last 20 trials (1)

Table 7: Number of grips

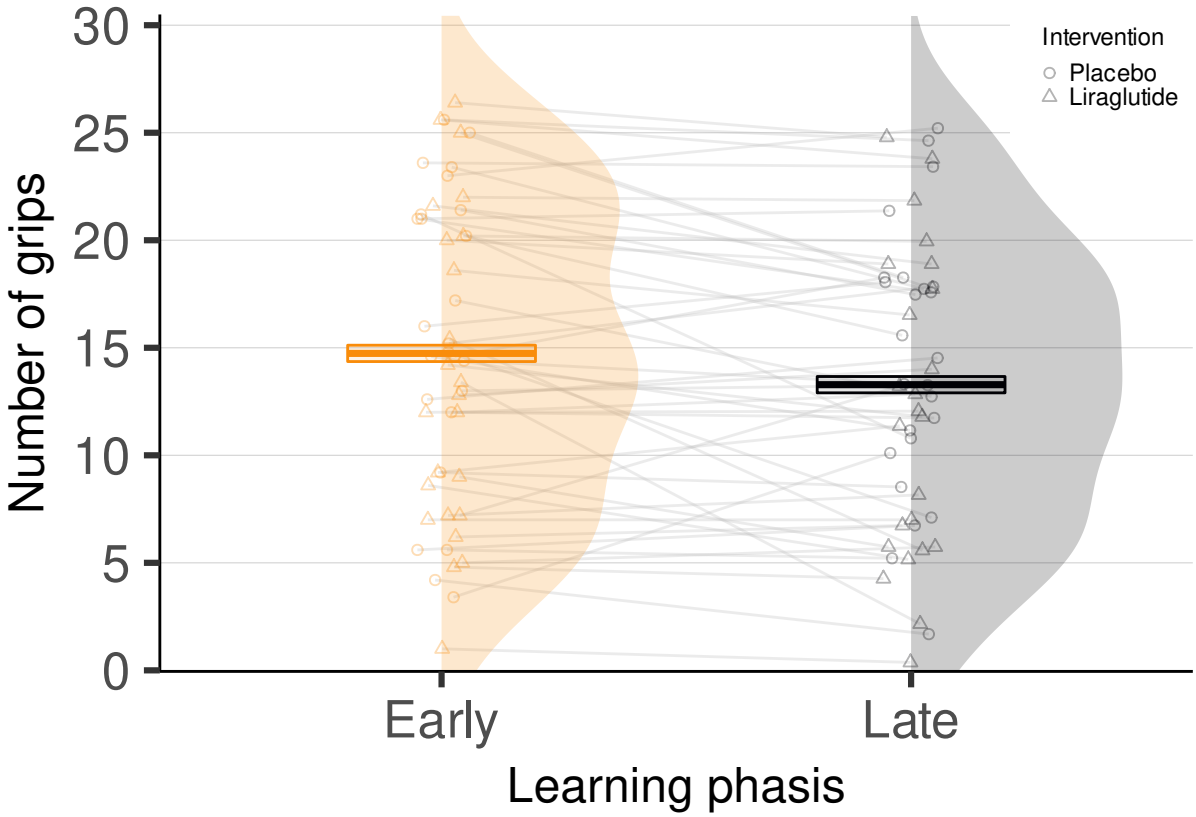
Predictors	Estimates	std. Error	CI
spline [1]	-0.67	0.71	-2.08 – 0.74
intervention [1]	1.30	0.69	-0.07 – 2.67
age	-1.00	0.70	-2.39 – 0.39
gender [1]	-0.38	0.78	-1.94 – 1.18
thirsty	1.31	0.82	-0.32 – 2.95
hungry	1.17	0.88	-0.58 – 2.92
BMI_t1	-1.11	0.67	-2.45 – 0.24
diff_base	0.28	0.70	-1.11 – 1.67
spline [1] * intervention[1]	-0.02	0.69	-1.39 – 1.35
spline [1] * age	0.00	0.70	-1.39 – 1.39
spline [1] * gender [1]	0.18	0.78	-1.37 – 1.74
spline [1] * thirsty	0.44	0.82	-1.19 – 2.08
spline [1] * hungry	-0.60	0.88	-2.35 – 1.15
spline [1] * BMI_t1	-0.10	0.67	-1.44 – 1.24
spline [1] * diff_base	0.07	0.70	-1.33 – 1.46

Observations	98
R2 / R2 adjusted	0.219 / 0.076

Table 8:

Effect	df	MSE	F	p.value	PES	Lower CI	Upper CI	BF10
intervention	1, 41	78.75	1.95	.170	0.045	0.000	0.178	1.04
age	1, 41	78.75	1.12	.297	0.027	0.000	0.145	0.90
gender	1, 41	78.75	0.13	.723	0.003	0.000	0.077	0.56
thirsty	1, 41	78.75	1.40	.243	0.033	0.000	0.158	1.20
hungry	1, 41	78.75	0.98	.329	0.023	0.000	0.139	0.90
BMI_t1	1, 41	78.75	1.47	.232	0.035	0.000	0.160	1.06
diff_base	1, 41	78.75	0.09	.769	0.002	0.000	0.068	1.14
spline	1, 41	7.71	5.05 *	.030	0.110	0.006	0.264	3.46
intervention:spline	1, 41	7.71	0.00	.949	0.000	0.000	0.001	0.30
age:spline	1, 41	7.71	0.00	>.999	0.000	0.000	NA	0.40
gender:spline	1, 41	7.71	0.31	.579	0.008	0.000	0.099	0.37
thirsty:spline	1, 41	7.71	1.62	.210	0.038	0.000	0.166	1.38
hungry:spline	1, 41	7.71	2.60	.114	0.060	0.000	0.200	0.73
BMI_t1:spline	1, 41	7.71	0.13	.723	0.003	0.000	0.077	0.48
diff_base:spline	1, 41	7.71	0.05	.825	0.001	0.000	0.056	0.44

Number of Grips by learning phasis



Pavlvovian-Instrumental Transfer (PIT) Task (Analysis)

Formula = Mobilized effort ~ condition*intervention + age + gender + thirsty + hungry + BMI_t1 + diff_baseline + Error(id/condition)
Mobilized effort = Area under the curve of the force exerted exceeding the delivery threshold during Pavlvoian cue presentation

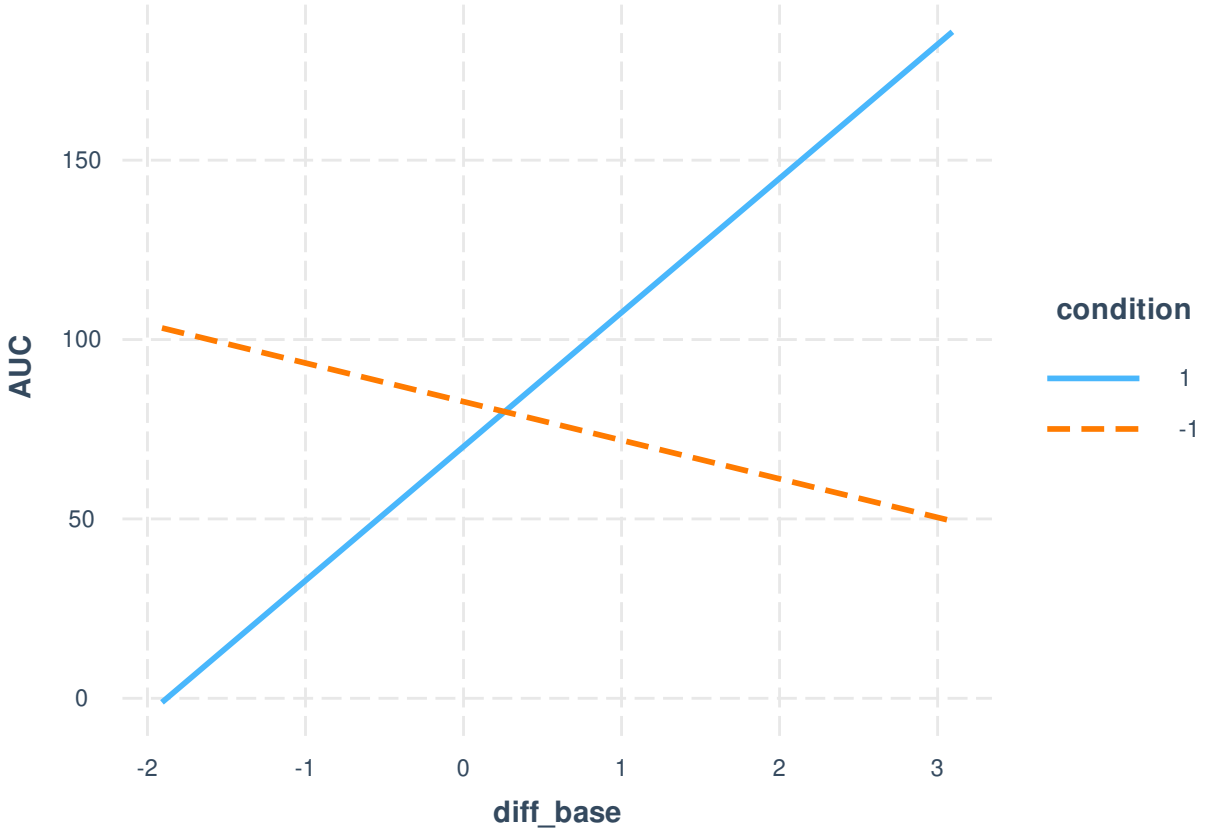
Table 9: Mobilized effort (a.u.)

Predictors	Estimates	std. Error	CI
condition [1]	8.16	11.09	-13.91 – 30.23
intervention [1]	-6.87	10.85	-28.46 – 14.72
age	42.00	11.56	18.99 – 65.01
gender [1]	-25.26	11.44	-48.01 – -2.50
thirsty	1.87	13.07	-24.14 – 27.88
hungry	9.12	13.58	-17.90 – 36.14
BMI_t1	-25.45	10.80	-46.93 – -3.96
diff_base	13.30	11.46	-9.49 – 36.10
condition [1] *intervention [1]	-6.20	10.85	-27.79 – 15.39
condition [1] * age	6.57	11.56	-16.44 – 29.58
condition [1] * gender[1]	-8.22	11.44	-30.98 – 14.53
condition [1] * thirsty	6.12	13.07	-19.89 – 32.13
condition [1] * hungry	6.92	13.58	-20.10 – 33.94
condition [1] * BMI_t1	-7.91	10.80	-29.39 – 13.58
condition [1] * diff_base	24.06	11.46	1.27 – 46.86

Observations	96
R2 / R2 adjusted	0.266 / 0.129

Effect	df	MSE	F	p.value	PES	Lower CI	Upper CI	BF10
intervention	1, 40	19331.67	0.22	.640	0.006	0.000	0.092	0.51
age	1, 40	19331.67	7.30 *	.010	0.154	0.022	0.316	2.97
gender	1, 40	19331.67	2.70	.108	0.063	0.000	0.206	1.06
thirsty	1, 40	19331.67	0.01	.916	0.000	0.000	0.024	0.76
hungry	1, 40	19331.67	0.25	.620	0.006	0.000	0.095	0.70
BMI_t1	1, 40	19331.67	3.07 +	.087	0.071	0.000	0.218	1.39
diff_base	1, 40	19331.67	0.75	.393	0.018	0.000	0.130	0.81
condition	1, 40	2064.63	2.81	.102	0.066	0.000	0.210	0.85
intervention:condition	1, 40	2064.63	1.69	.201	0.041	0.000	0.172	0.50
age:condition	1, 40	2064.63	1.67	.203	0.040	0.000	0.171	0.69
gender:condition	1, 40	2064.63	2.68	.110	0.063	0.000	0.206	0.82
thirsty:condition	1, 40	2064.63	1.13	.293	0.028	0.000	0.149	0.55
hungry:condition	1, 40	2064.63	1.35	.253	0.033	0.000	0.158	0.54
BMI_t1:condition	1, 40	2064.63	2.78	.103	0.065	0.000	0.209	1.07
diff_base:condition	1, 40	2064.63	22.86 ***	<.001	0.364	0.166	0.511	1229.03

Mobilized effort (AUC) difference (CS+ > CS-) by group



Mobilized effort (AUC) over time

Hedonic Reactivity Test (Analysis)

Formula = Pleasantness ratings ~ condition*intervention + age + gender + thirsty + hungry + BMI_t1 + diff_base + intensity + Error(id/condition)
Pleasantness ratings = how pleasant is the liquid solution rated (0-100, with repetitions) & condition = Milshake or Tasteless & intensity = difference on how intense the liquid solution were rated (mean(Milshake) - mean(Tasteless))

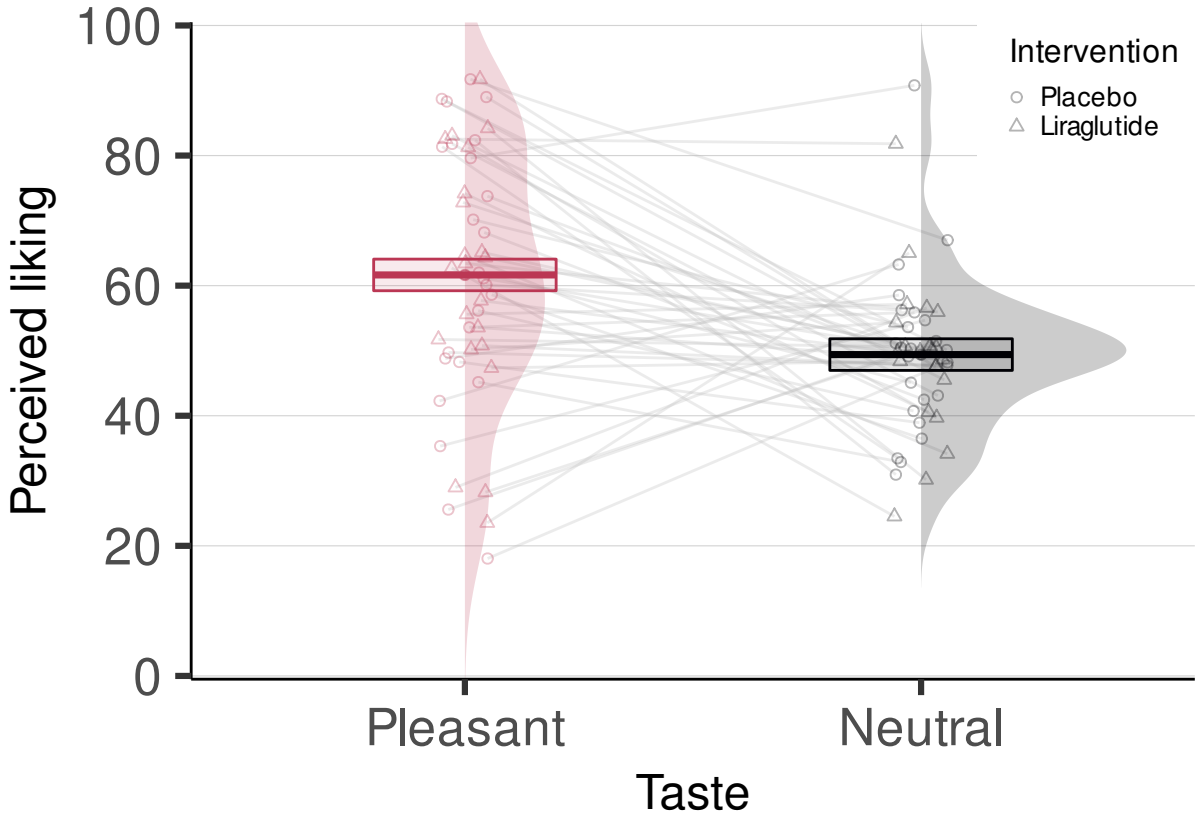
Table 10: Pleasantness ratings (taste)

Predictors	Estimates	std. Error	CI
condition [1]	7.17	1.50	4.19 – 10.15
intervention [1]	-0.72	1.43	-3.56 – 2.12
age	3.25	1.49	0.28 – 6.21
gender [1]	-1.75	1.66	-5.06 – 1.57
thirsty	0.80	1.74	-2.67 – 4.27
hungry	1.47	1.91	-2.33 – 5.28
BMI_t1	-1.32	1.46	-4.22 – 1.59
diff_base	3.36	1.42	0.52 – 6.19
int	5.15	1.52	2.13 – 8.18
condition [1] *intervention [1]	-0.13	1.43	-2.97 – 2.71
condition [1] * age	1.40	1.49	-1.56 – 4.37
condition [1] * gender[1]	2.87	1.66	-0.45 – 6.18
condition [1] * thirsty	-1.38	1.74	-4.85 – 2.09
condition [1] * hungry	0.11	1.91	-3.70 – 3.92
condition [1] * BMI_t1	-1.67	1.46	-4.57 – 1.24
condition [1] * diff_base	8.01	1.42	5.18 – 10.85
condition [1] * int	0.79	1.52	-2.24 – 3.82

Observations	94
R2 / R2 adjusted	0.516 / 0.408

Effect	df	MSE	F	p.value	PES	Lower CI	Upper CI	BF10
intervention	1, 38	199.65	0.22	.640	0.006	0.000	0.096	0.35
age	1, 38	199.65	4.18 *	.048	0.099	0.001	0.257	1.52
gender	1, 38	199.65	0.97	.331	0.025	0.000	0.148	0.47
thirsty	1, 38	199.65	0.18	.670	0.005	0.000	0.091	0.48
hungry	1, 38	199.65	0.52	.475	0.014	0.000	0.122	0.54
BMI_t1	1, 38	199.65	0.72	.403	0.018	0.000	0.134	0.57
diff_base	1, 38	199.65	4.87 *	.033	0.114	0.005	0.274	2.74
int	1, 38	199.65	10.08 **	.003	0.210	0.047	0.376	12.16
condition	1, 38	150.86	26.61 ***	<.001	0.412	0.206	0.553	2.96e+04
intervention:condition	1, 38	150.86	0.01	.920	0.000	0.000	0.023	0.33
age:condition	1, 38	150.86	1.04	.315	0.027	0.000	0.151	0.59
gender:condition	1, 38	150.86	3.45 +	.071	0.083	0.000	0.237	1.54
thirsty:condition	1, 38	150.86	0.73	.399	0.019	0.000	0.135	0.66
hungry:condition	1, 38	150.86	0.00	.952	0.000	0.000	NA	0.44
BMI_t1:condition	1, 38	150.86	1.52	.225	0.038	0.000	0.172	0.81
diff_base:condition	1, 38	150.86	36.79 ***	<.001	0.492	0.289	0.617	4.24e+05
int:condition	1, 38	150.86	0.31	.580	0.008	0.000	0.106	0.51

Pleasantness Ratings (Taste) by condition



Pleasantness Ratings over time