

# Supplement

For the article #Knowledge: Improving food-related knowledge via seeding implemented as a social media intervention

2024-10-17

## Table of contents

<b>Demographics per Condition</b>	<b>2</b>
<b>Reactivity Effects in General Criterion Knowledge Question</b>	<b>2</b>
<b>Number of Likes Posts</b>	<b>3</b>
<b>Seeding Effects on Direct Learning</b>	<b>4</b>
<b>Detailed Modeling Results</b>	<b>5</b>
Hypothesis 1a (OME) . . . . .	5
Hypothesis 1b ( $\rho$ ) . . . . .	8
Hypothesis 2a (OME) . . . . .	10
Hypothesis 2b ( $\rho$ ) . . . . .	13
Hypothesis 3a (OME) . . . . .	16
Hypothesis 3b ( $\rho$ ) . . . . .	18

Trained	Estimated	Age	Perc. Female/Male	Perc. GUEQ/BA/MA/Other
CO2	CO2	30.5 (9.4)	87.5 / 9.4 %	43.8 / 18.8 / 28.1 / 9.4 %
CO2	Kcal	31.1 (10.6)	80.0 / 17.1 %	48.6 / 11.4 / 25.7 / 14.3 %
Kcal	CO2	31.7 (10.4)	89.7 / 10.3 %	48.7 / 5.1 / 28.2 / 17.9 %
Kcal	Kcal	28.4 (9.5)	81.6 / 15.8 %	52.6 / 13.2 / 23.7 / 10.5 %

Estimated Criterion	Knowledge: Kcal	Knowledge: CO2
CO2	4.55 (1.76)	1.86 (1.21)
Kcal	3.71 (1.52)	2.30 (1.40)

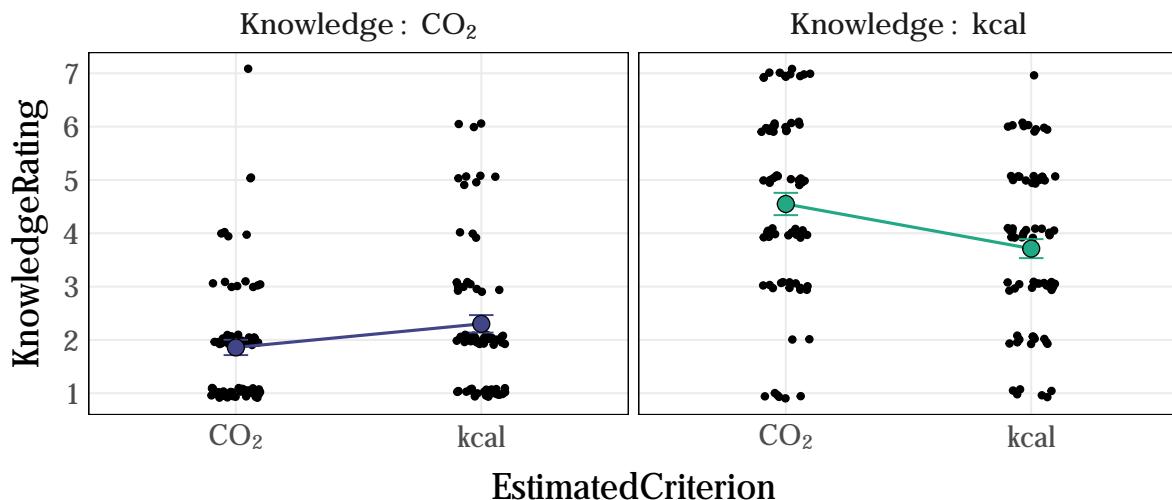
## Demographics per Condition

Note. GUEQ = General University Entrance Qualification , BA = Bachelor's degree, MA = Master's degree

## Reactivity Effects in General Criterion Knowledge Question

As stated in the main manuscript, participants reported knowing in general more about the calorie content of food items ( $M = 4.12$ ,  $SD = 1.69$ ) than their CO<sub>2</sub> footprint ( $M = 2.08$ ,  $SD = 1.32$ ,  $F = 2.02$  [1.67, 2.36],  $BF_{10} > 1000$ ). However, we also found a small reactivity effect, where participants rated their knowledge of a criterion lower when they had to estimate this criterion beforehand. This effect was found when participants had to estimate calories in the main task ( $BF_{10} = 11.71$ ) and also (but to smaller degree) when they had to estimate the carbon footprint ( $BF_{10} = 1.15$ ). See below for descriptive values and the corresponding figure of individual values.

Figure 1: Figure S1. General knowledge ratings for CO<sub>2</sub> footprint and calorie content of food items, depending on the estimated criterion in the main task.

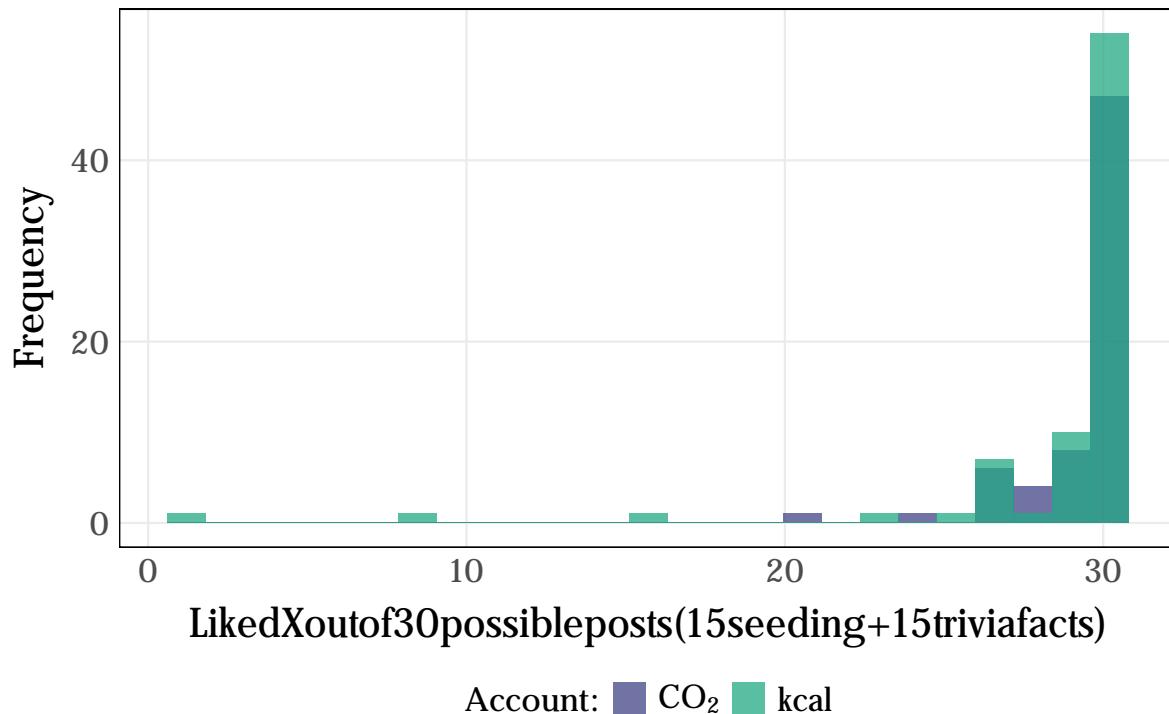


Account	M	SD	Min	Max
CO2	29.25	1.58	21	30
Kcal	28.55	4.48	1	30

## Number of Likes Posts

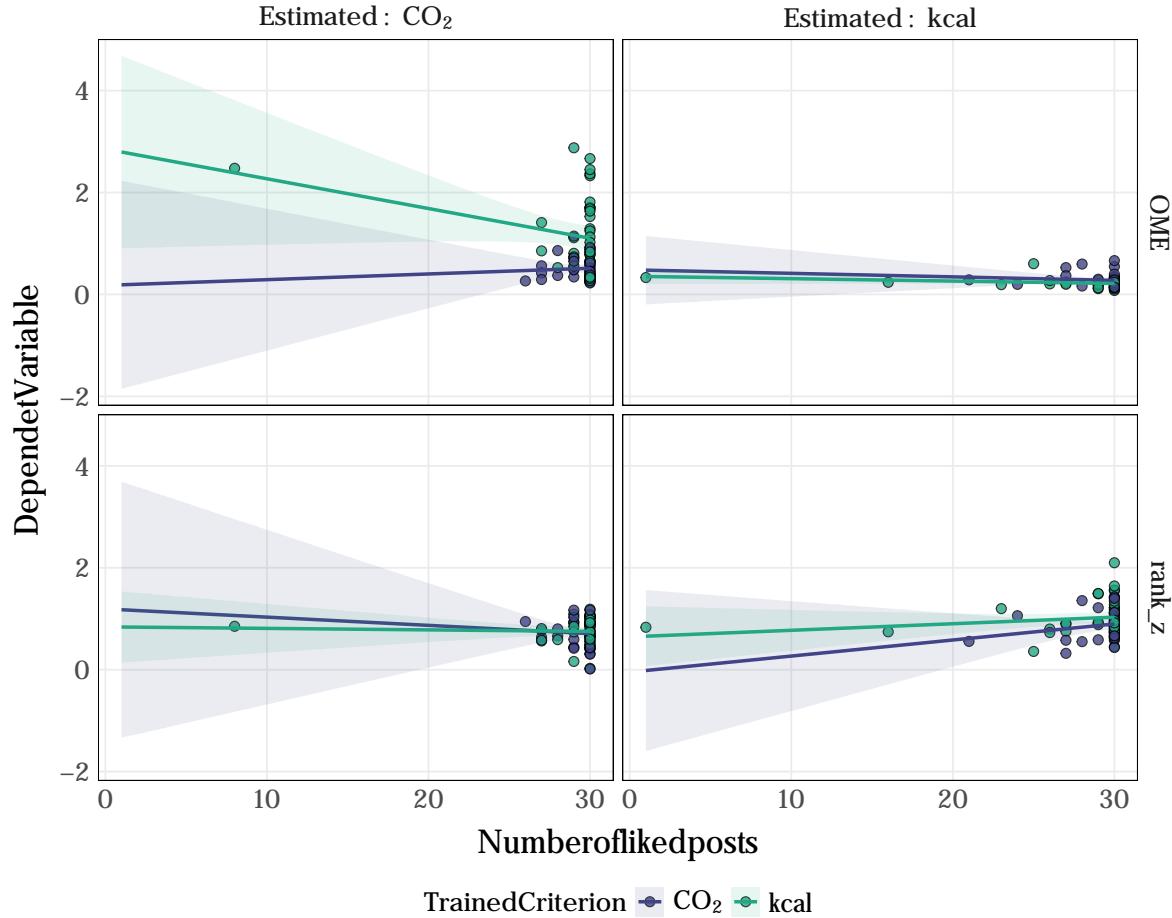
In the preregistration, we also predicted that a greater seeding effect when participants saw more posts as indicated by the number of liked posts. However, as already stated in the main text, almost all participants liked every post, see the table below for the descriptive statistics and the Figure S2 for the distribution of liked posts per participant.

Figure 2: Figure S2. Distribution of number of liked posts per participant.



In addition, Figure S3 shows the scatter plots with the estimated regression line when using the number of liked posts as an predictor of OME or  $\rho$  (all  $p > 0.05$ )

Figure 3: Figure S3. Relationship of number of liked posts and OME/rank correlation (z-transformed) per trained and estimated criterion



## Seeding Effects on Direct Learning

In the analysis of the effects of seeding on calories and CO<sub>2</sub> reported in the main text, we used only the respective 45 transfer items. Here we report the results when using only the seeding items (see file [analysis\\_Hypothesis1\\_seedingItems.R](#) for the underlying analysis code).

**Hypothesis 1a (OME):** We found strong evidence for a large seeding effect on metric knowledge (reduction in OME) on the seeding items for CO<sub>2</sub> ( $BF_{10} = 544.38$ ,  $b = -0.49$  [-0.19, -0.82]) and evidence for a smaller seeding effect for calories ( $BF_{10} = 7.77$ ,  $b = -0.10$  [-0.21, -0.01]).

**Hypothesis 1b ( $\rho$ )** In contrast, there was weak evidence for an effect of seeding on the mapping knowledge (increase in  $\rho$ ) for participants who estimated calories ( $BF_{10} = 1.89$ ,  $b =$

.08 [.01, .16]) but not CO<sub>2</sub> (BF<sub>10</sub> = 0.90).

## Detailed Modeling Results

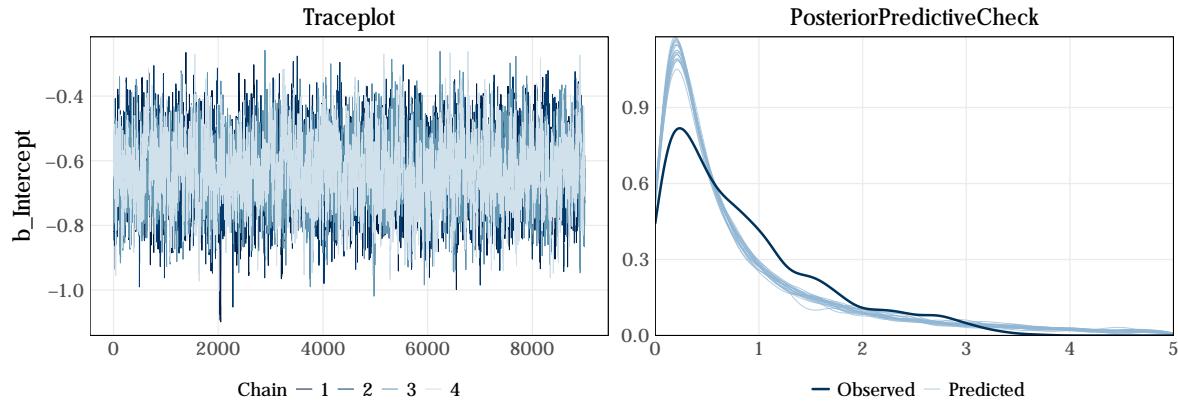
Here we provide for all models reported in the main manuscript more detailed modeling results, including a table with the mean, standard deviation, 95%-HDI, effective sample size (ESS) and  $\hat{R}$  for each estimated parameter (random and fixed), as well as figures showing the MCMC-traces for the main fixed effects parameters (intercept and effect parameter) and posterior predictive distributions of the complete model.

### Hypothesis 1a (OME)

#### CO<sub>2</sub> M0

OME\_corr ~ 1 + (1 | ID) + (match\_domain | ID\_item)

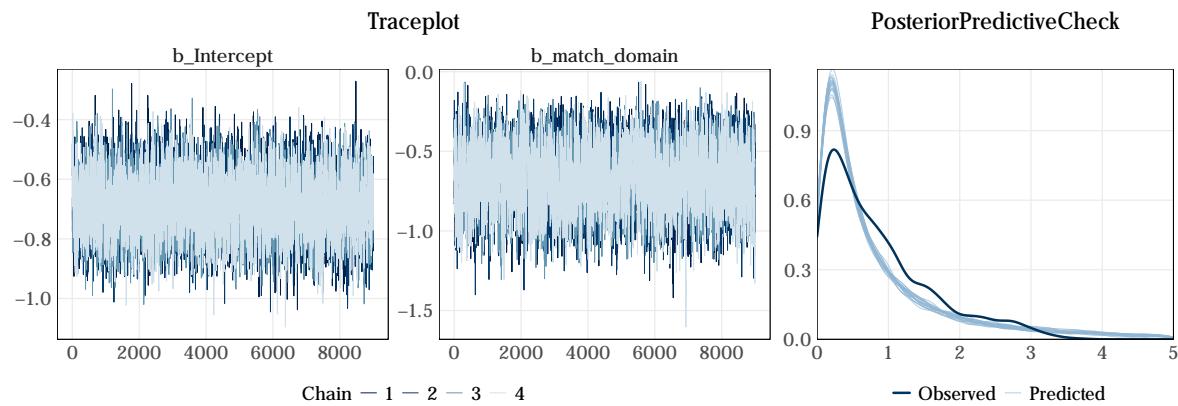
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high
b_Intercept	fixed	conditional	-0.63	0.10	0.95	-0.83	-0.4
sd_ID_Intercept	random	conditional	0.80	0.07	0.95	0.67	0.9
sd_ID_item_Intercept	random	conditional	0.33	0.03	0.95	0.26	0.4
sd_ID_item_match_domain	random	conditional	0.20	0.04	0.95	0.13	0.2
cor_ID_item_Intercept_match_domain	random	conditional	0.81	0.12	0.95	0.57	0.9
sigma	fixed	sigma	0.88	0.01	0.95	0.86	0.9



## CO<sub>2</sub> M1

`OME_corr ~ match_domain + (1 | ID) + (match_domain | ID_item)`

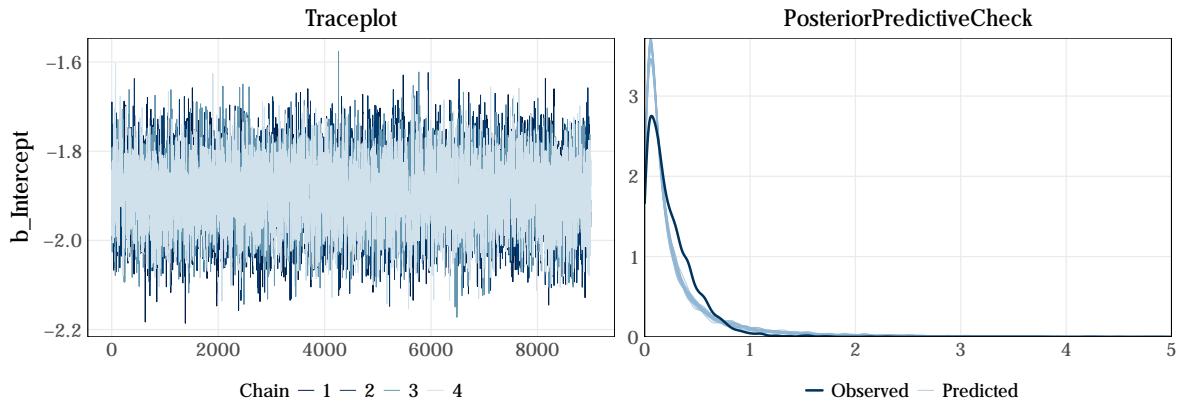
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high
b_Intercept	fixed	conditional	-0.68	0.09	0.95	-0.87	-0.5
b_match_domain	fixed	conditional	-0.67	0.18	0.95	-1.03	-0.3
sd_ID_Intercept	random	conditional	0.70	0.06	0.95	0.58	0.8
sd_ID_item_Intercept	random	conditional	0.33	0.03	0.95	0.26	0.4
sd_ID_item_match_domain	random	conditional	0.20	0.04	0.95	0.13	0.2
cor_ID_item_Intercept_match_domain	random	conditional	0.81	0.12	0.95	0.57	0.9
sigma	fixed	sigma	0.88	0.01	0.95	0.86	0.9



## kcal M0

`OME_corr ~ 1 + (1 | ID) + (match_domain | ID_item)`

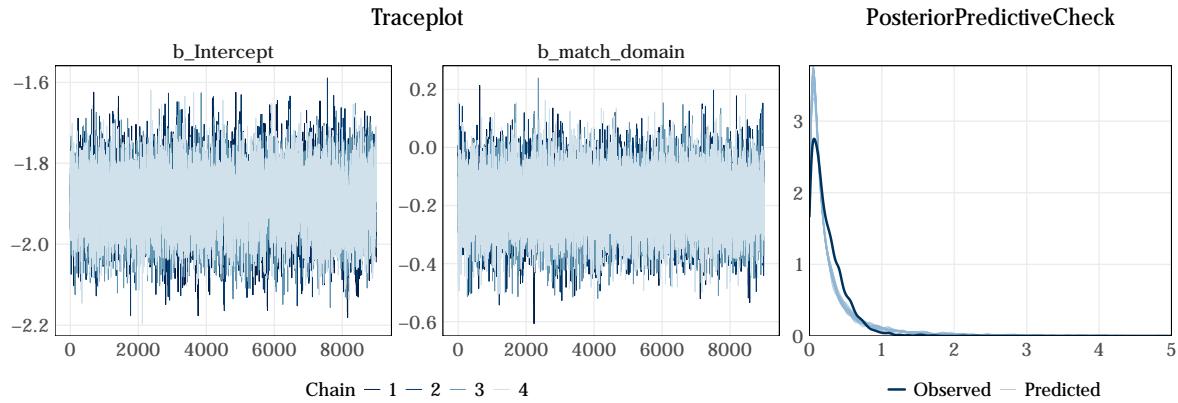
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high
b_Intercept	fixed	conditional	-1.90	0.07	0.95	-2.04	-1.7
sd_ID_Intercept	random	conditional	0.44	0.04	0.95	0.36	0.5
sd_ID_item_Intercept	random	conditional	0.35	0.04	0.95	0.28	0.4
sd_ID_item_match_domain	random	conditional	0.13	0.03	0.95	0.07	0.2
cor_ID_item_Intercept_match_domain	random	conditional	0.08	0.35	0.95	-0.61	0.7
sigma	fixed	sigma	1.19	0.01	0.95	1.17	1.2



## kcal M1

```
OME_corr ~ match_domain + (1 | ID) + (match_domain | ID_item)
```

Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high
<code>b_Intercept</code>	fixed	conditional	-1.90	0.07	0.95	-2.04	-1.76
<code>b_match_domain</code>	fixed	conditional	-0.19	0.09	0.95	-0.37	-0.00
<code>sd_ID_Intercept</code>	random	conditional	0.43	0.04	0.95	0.36	0.50
<code>sd_ID_item_Intercept</code>	random	conditional	0.35	0.04	0.95	0.27	0.43
<code>sd_ID_item_match_domain</code>	random	conditional	0.13	0.03	0.95	0.07	0.20
<code>cor_ID_item_Intercept_match_domain</code>	random	conditional	0.05	0.36	0.95	-0.64	0.74
<code>sigma</code>	fixed	sigma	1.19	0.02	0.95	1.17	1.21

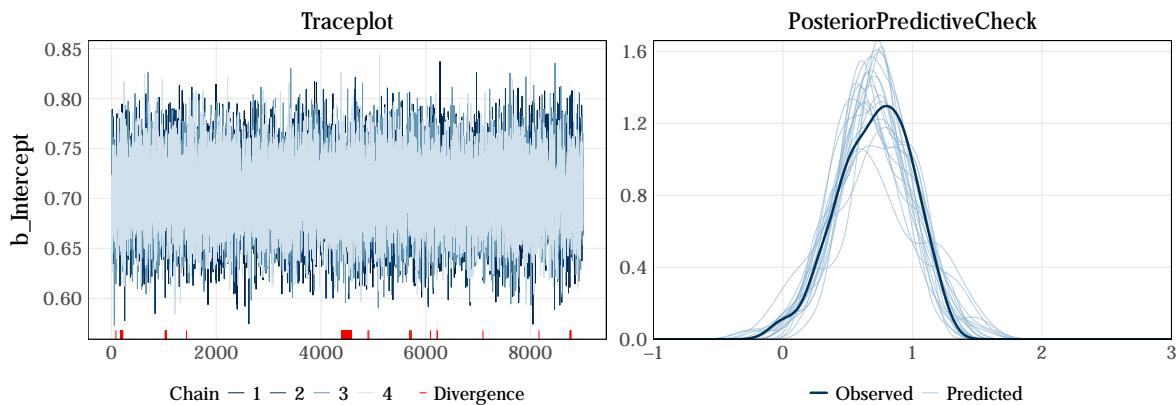


## Hypothesis 1b ( $\rho$ )

### CO<sub>2</sub> M0

`rank_z ~ 1 + (1 | ID)`

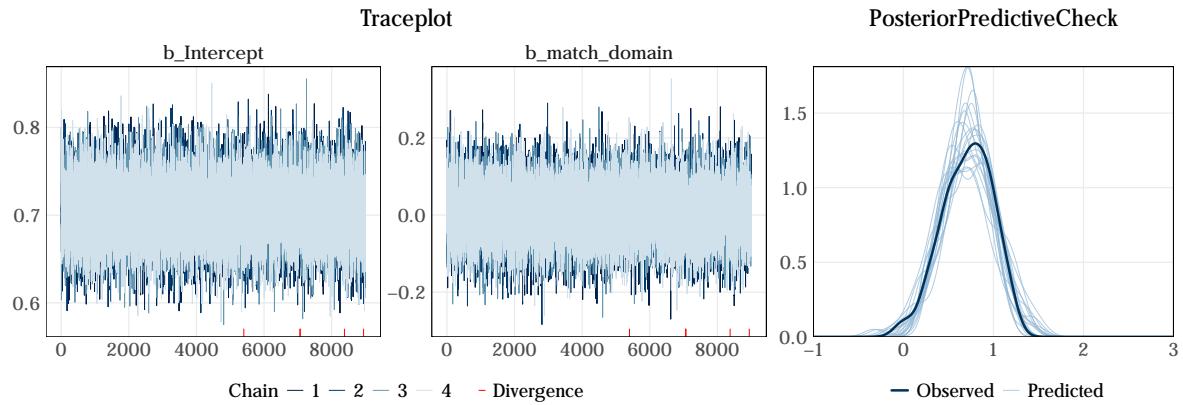
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	ESS
b_Intercept	fixed	conditional	0.71	0.03	0.95	0.64	0.77	1	1	15250.74
sd_ID_Intercept	random	conditional	0.19	0.05	0.95	0.10	0.29	1	1	1795.40
sigma	fixed	sigma	0.19	0.05	0.95	0.10	0.28	1	1	1270.07



### CO<sub>2</sub> M1

`rank_z ~ match_domain + (1 | ID)`

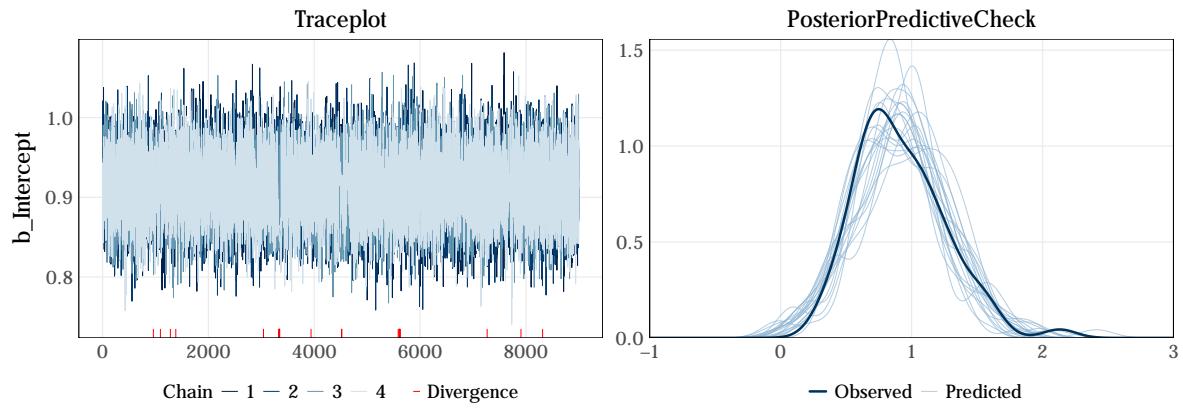
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	ESS
b_Intercept	fixed	conditional	0.71	0.03	0.95	0.64	0.77	1.00	1	20663.2
b_match_domain	fixed	conditional	0.01	0.07	0.95	-0.12	0.14	0.55	1	20138.3
sd_ID_Intercept	random	conditional	0.19	0.05	0.95	0.10	0.28	1.00	1	2315.6
sigma	fixed	sigma	0.20	0.05	0.95	0.10	0.28	1.00	1	1868.1



## kcal M0

```
rank_z ~ 1 + (1 | ID)
```

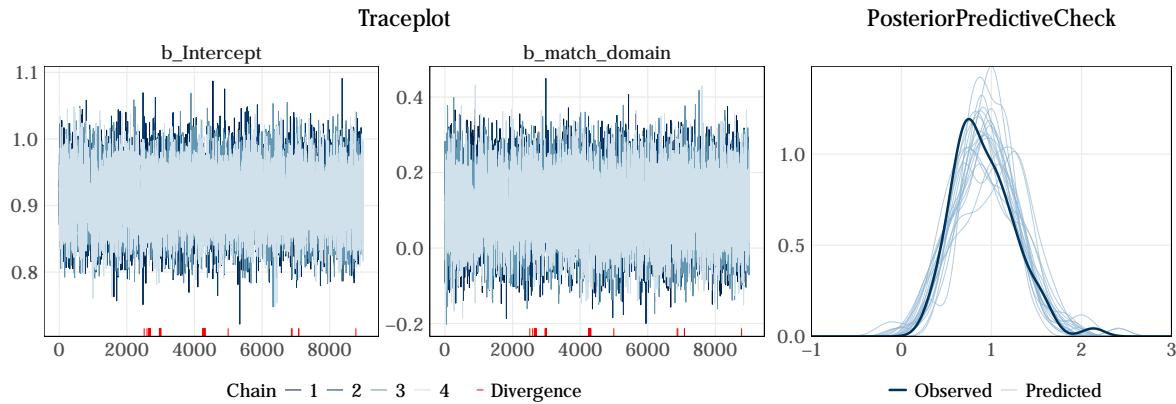
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	ESS
b_Intercept	fixed	conditional	0.91	0.04	0.95	0.83	0.99	1	1	17139.45
sd_ID_Intercept	random	conditional	0.23	0.07	0.95	0.11	0.35	1	1	1609.94
sigma	fixed	sigma	0.24	0.07	0.95	0.11	0.35	1	1	1339.11



## kcal M1

```
rank_z ~ match_domain + (1 | ID)
```

Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	ESS
b_Intercept	fixed	conditional	0.91	0.04	0.95	0.83	0.99	1.00	1	17275.0
b_match_domain	fixed	conditional	0.11	0.08	0.95	-0.05	0.26	0.92	1	15868.2
sd_ID_Intercept	random	conditional	0.23	0.07	0.95	0.11	0.35	1.00	1	1336.8
sigma	fixed	sigma	0.23	0.07	0.95	0.10	0.34	1.00	1	1003.8

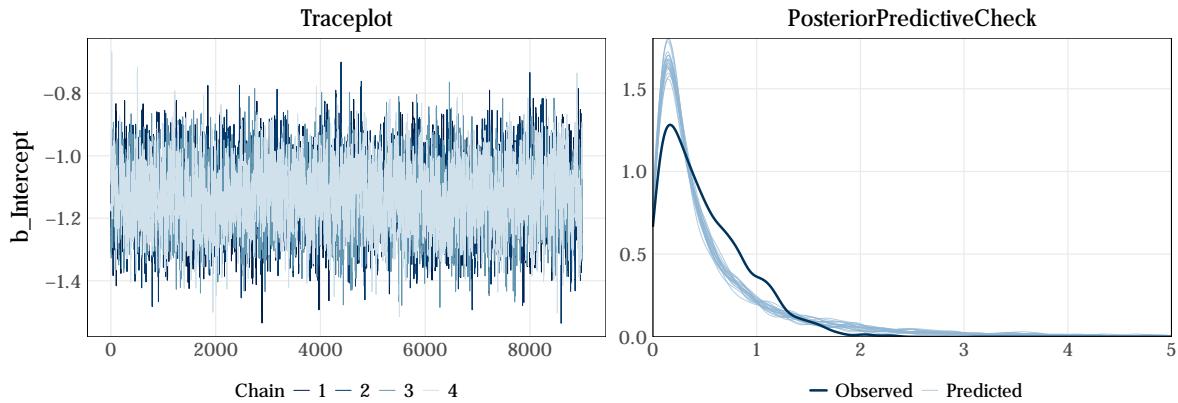


## Hypothesis 2a (OME)

### CO<sub>2</sub> M0

OME\_corr ~ 1 + (item\_type | ID) + (1 | ID\_item)

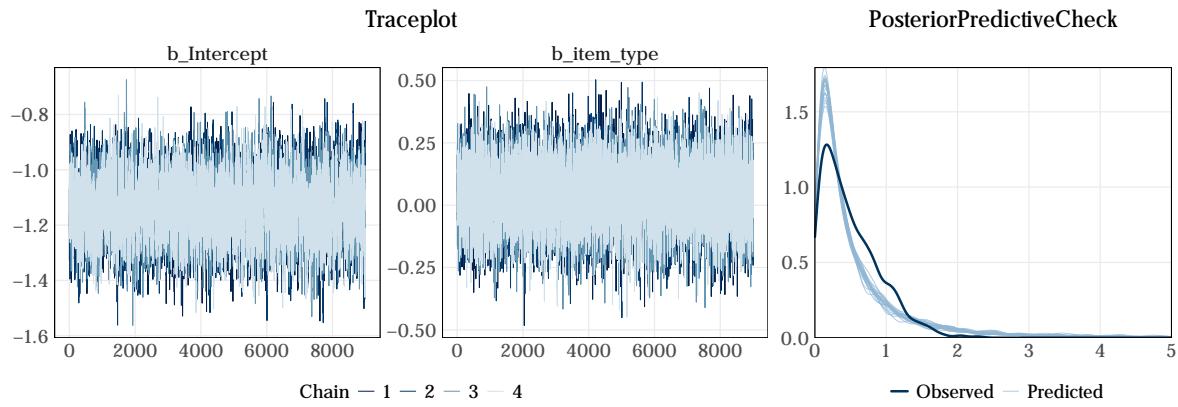
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	ESS
b_Intercept	fixed	conditional	-1.13	0.10	0.95	-1.33	-0.93	1.00	1	17275.0
sd_ID_Intercept	random	conditional	0.47	0.06	0.95	0.36	0.60	1.00	1	15868.2
sd_ID_item_type	random	conditional	0.15	0.04	0.95	0.07	0.24	1.00	1	1336.8
sd_ID_item_Intercept	random	conditional	0.43	0.05	0.95	0.34	0.52	1.00	1	1003.8
cor_ID_Intercept_item_type	random	conditional	-0.14	0.33	0.95	-0.78	0.49	0.67	1	1003.8
sigma	fixed	sigma	0.99	0.02	0.95	0.96	1.02	1.00	1	1003.8



## CO<sub>2</sub> M1

`OME_corr ~ item_type + (item_type | ID) + (1 | ID_item)`

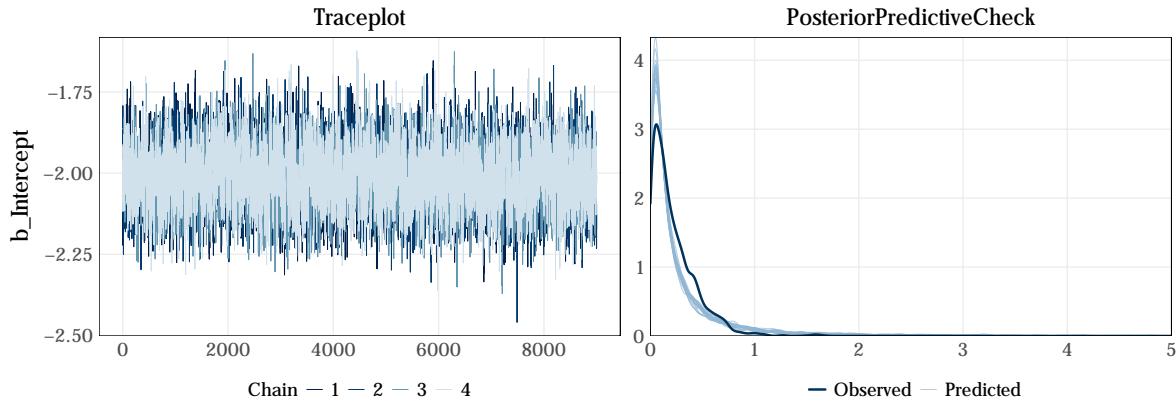
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd
$b_{\text{Intercept}}$	fixed	conditional	-1.14	0.10	0.95	-1.34	-0.93	1.00
$b_{\text{item\_type}}$	fixed	conditional	0.04	0.12	0.95	-0.19	0.27	0.65
$sd_{\text{ID}}_{\text{Intercept}}$	random	conditional	0.47	0.06	0.95	0.36	0.60	1.00
$sd_{\text{ID}}_{\text{item\_type}}$	random	conditional	0.15	0.04	0.95	0.08	0.24	1.00
$sd_{\text{ID}}_{\text{item}}_{\text{Intercept}}$	random	conditional	0.43	0.05	0.95	0.35	0.53	1.00
$\text{cor}_{\text{ID}}_{\text{Intercept}}_{\text{item\_type}}$	random	conditional	-0.14	0.33	0.95	-0.78	0.49	0.67
$\sigma$	fixed	sigma	0.99	0.02	0.95	0.96	1.02	1.00



## kcal M0

`OME_corr ~ 1 + (item_type | ID) + (1 | ID_item)`

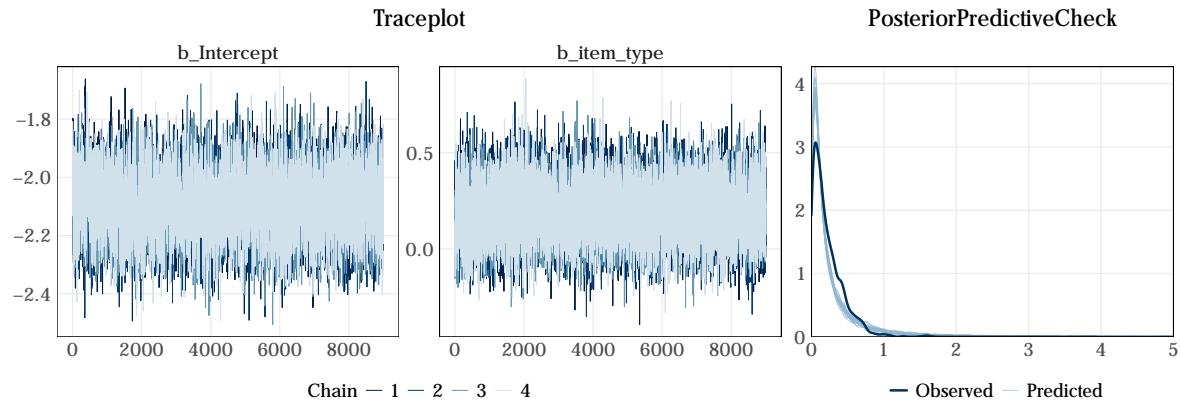
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	R
b_Intercept	fixed	conditional	-2.01	0.09	0.95	-2.19	-1.83	1	
sd_ID_Intercept	random	conditional	0.60	0.07	0.95	0.46	0.73	1	
sd_ID_item_type	random	conditional	0.78	0.10	0.95	0.58	0.97	1	
sd_ID_item_Intercept	random	conditional	0.35	0.04	0.95	0.27	0.44	1	
cor_ID_Intercept_item_type	random	conditional	-0.69	0.10	0.95	-0.86	-0.50	1	
sigma	fixed	sigma	1.21	0.02	0.95	1.18	1.25	1	



## kcal M1

`OME_corr ~ item_type + (item_type | ID) + (1 | ID_item)`

Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	R
b_Intercept	fixed	conditional	-2.09	0.10	0.95	-2.29	-1.88	1.00	
b_item_type	fixed	conditional	0.20	0.14	0.95	-0.07	0.46	0.93	
sd_ID_Intercept	random	conditional	0.59	0.07	0.95	0.46	0.73	1.00	
sd_ID_item_type	random	conditional	0.77	0.10	0.95	0.58	0.97	1.00	
sd_ID_item_Intercept	random	conditional	0.35	0.04	0.95	0.27	0.43	1.00	
cor_ID_Intercept_item_type	random	conditional	-0.68	0.10	0.95	-0.86	-0.49	1.00	
sigma	fixed	sigma	1.21	0.02	0.95	1.18	1.25	1.00	

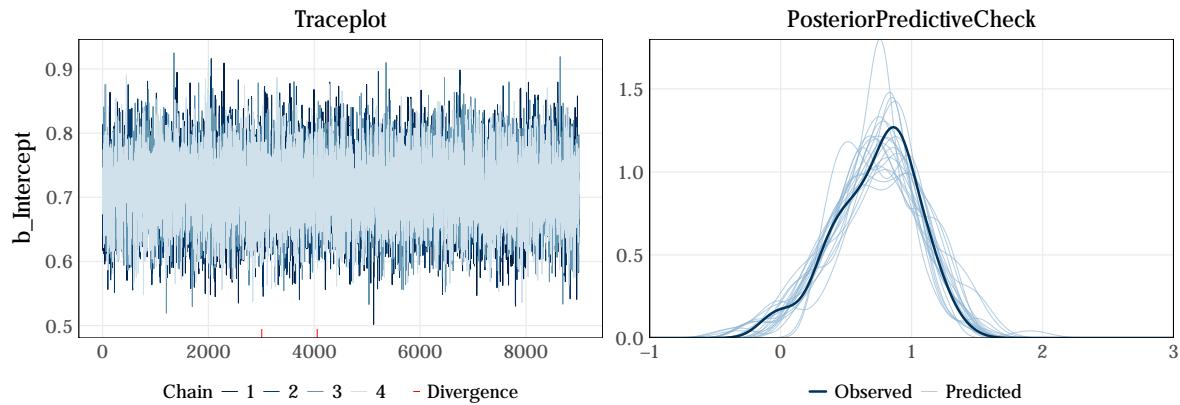


## Hypothesis 2b ( $\rho$ )

$\text{CO}_2 \text{ M0}$

$\text{rank\_z} \sim 1 + (\text{item\_type} \mid \text{ID})$

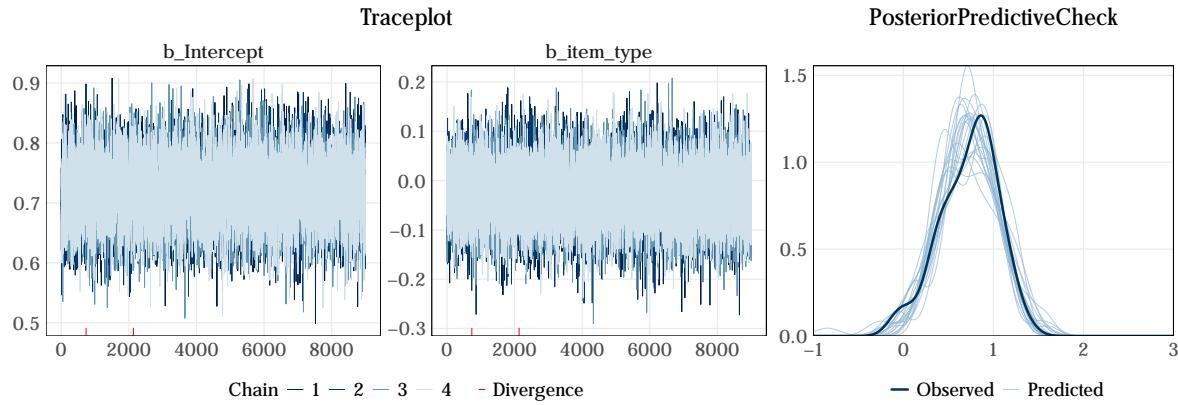
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd
b_Intercept	fixed	conditional	0.71	0.05	0.95	0.62	0.81	1.00
sd_ID_Intercept	random	conditional	0.26	0.04	0.95	0.18	0.34	1.00
sd_ID_item_type	random	conditional	0.18	0.05	0.95	0.09	0.27	1.00
cor_ID_Intercept_item_type	random	conditional	-0.48	0.30	0.95	-1.00	0.03	0.94
sigma	fixed	sigma	0.17	0.03	0.95	0.10	0.24	1.00



## CO<sub>2</sub> M1

`rank_z ~ item_type + (item_type | ID)`

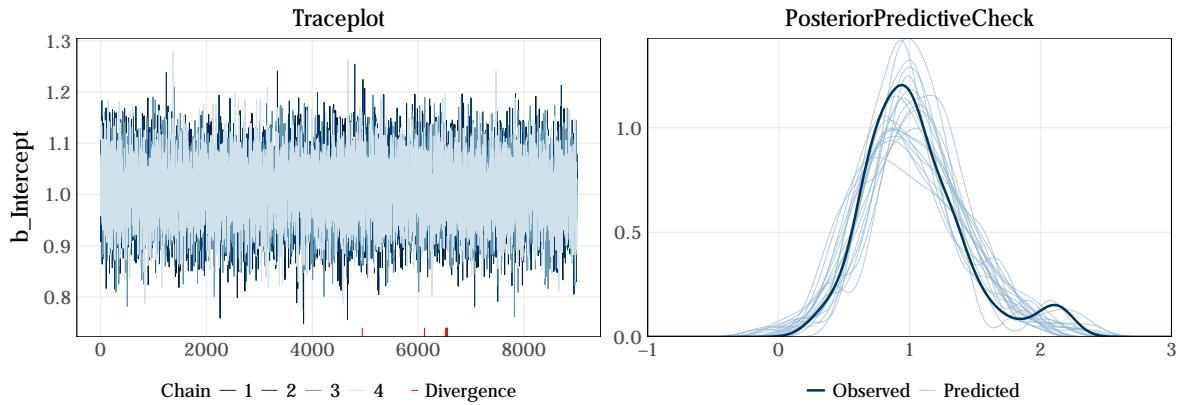
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd
b_Intercept	fixed	conditional	0.72	0.05	0.95	0.62	0.82	1.00
b_item_type	fixed	conditional	-0.03	0.06	0.95	-0.13	0.08	0.69
sd_ID_Intercept	random	conditional	0.26	0.04	0.95	0.18	0.34	1.00
sd_ID_item_type	random	conditional	0.18	0.05	0.95	0.09	0.28	1.00
cor_ID_Intercept_item_type	random	conditional	-0.48	0.30	0.95	-1.00	0.04	0.94
sigma	fixed	sigma	0.17	0.03	0.95	0.10	0.24	1.00



## kcal M0

`rank_z ~ 1 + (item_type | ID)`

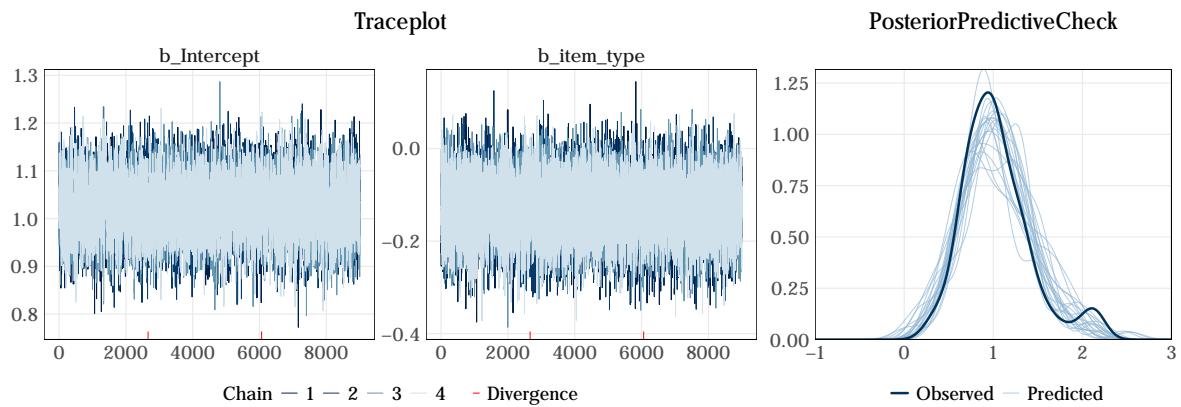
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd
b_Intercept	fixed	conditional	1.01	0.06	0.95	0.89	1.12	1.00
sd_ID_Intercept	random	conditional	0.30	0.05	0.95	0.21	0.40	1.00
sd_ID_item_type	random	conditional	0.20	0.07	0.95	0.08	0.32	1.00
cor_ID_Intercept_item_type	random	conditional	-0.34	0.34	0.95	-1.00	0.25	0.85
sigma	fixed	sigma	0.22	0.04	0.95	0.13	0.31	1.00



### kcal M1

```
rank_z ~ item_type + (item_type | ID)
```

Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd
b_Intercept	fixed	conditional	1.02	0.06	0.95	0.91	1.13	1.00
b_item_type	fixed	conditional	-0.13	0.06	0.95	-0.25	-0.01	0.99
sd_ID_Intercept	random	conditional	0.30	0.05	0.95	0.21	0.40	1.00
sd_ID_item_type	random	conditional	0.19	0.06	0.95	0.08	0.31	1.00
cor_ID_Intercept_item_type	random	conditional	-0.32	0.34	0.95	-1.00	0.26	0.83
sigma	fixed	sigma	0.21	0.04	0.95	0.12	0.29	1.00

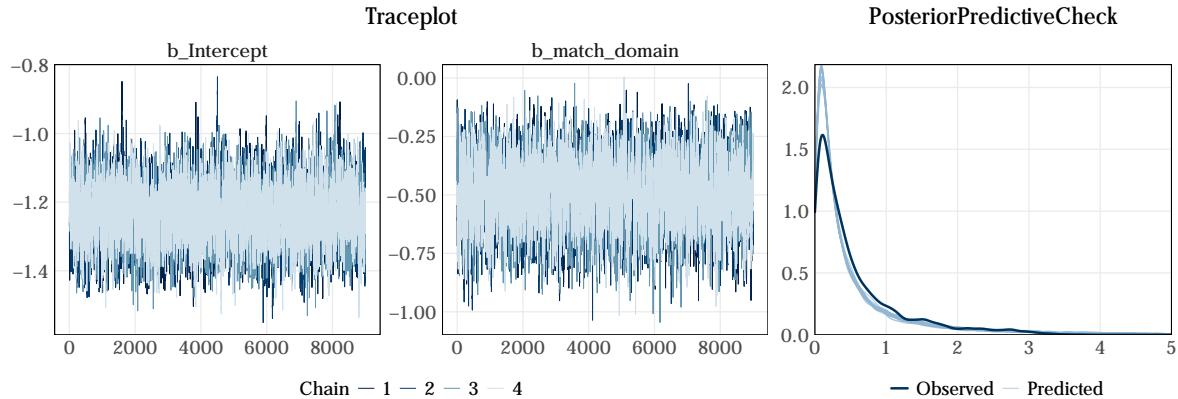


### Hypothesis 3a (OME)

M0

```
OME_corr ~ match_domain + (1 | ID) + (est_criterion * match_domain | ID_item)
```

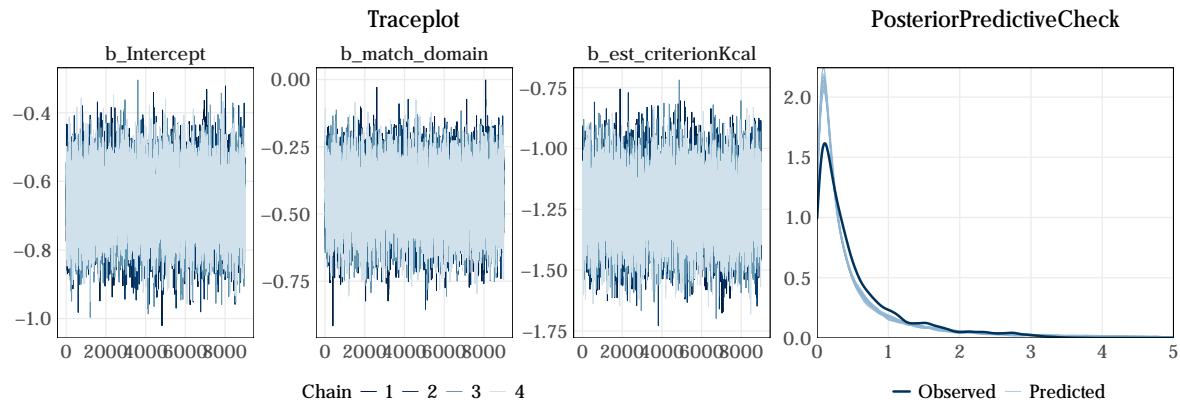
Parameter	Effects	Component	Mean	SD
b_Intercept	fixed	conditional	-1.23	0.08
b_match_domain	fixed	conditional	-0.49	0.13
sd_ID_Intercept	random	conditional	0.75	0.06
sd_ID_item_Intercept	random	conditional	0.33	0.04
sd_ID_item_est_criterionKcal	random	conditional	0.57	0.09
sd_ID_item_match_domain	random	conditional	0.16	0.03
sd_ID_item_est_criterionKcal:match_domain	random	conditional	0.17	0.05
cor_ID_item_Intercept_est_criterionKcal	random	conditional	-0.60	0.11
cor_ID_item_Intercept_match_domain	random	conditional	0.69	0.17
cor_ID_item_est_criterionKcal_match_domain	random	conditional	-0.42	0.24
cor_ID_item_Intercept_est_criterionKcal:match_domain	random	conditional	-0.45	0.20
cor_ID_item_est_criterionKcal_est_criterionKcal:match_domain	random	conditional	0.19	0.31
cor_ID_item_match_domain_est_criterionKcal:match_domain	random	conditional	-0.57	0.25
sigma	fixed	sigma	1.05	0.01



M1

```
OME_corr ~ match_domain + est_criterion + (1 | ID) + (est_criterion * match_domain | ID_item)
```

Parameter	Effects	Component	Mean	SD
b_Intercept	fixed	conditional	-0.66	0.08
b_match_domain	fixed	conditional	-0.44	0.10
b_est_criterionKcal	fixed	conditional	-1.23	0.12
sd_ID_Intercept	random	conditional	0.60	0.04
sd_ID_item_Intercept	random	conditional	0.30	0.03
sd_ID_item_est_criterionKcal	random	conditional	0.44	0.05
sd_ID_item_match_domain	random	conditional	0.16	0.03
sd_ID_item_est_criterionKcal:match_domain	random	conditional	0.17	0.05
cor_ID_item_Intercept_est_criterionKcal	random	conditional	-0.53	0.11
cor_ID_item_Intercept_match_domain	random	conditional	0.70	0.16
cor_ID_item_est_criterionKcal_match_domain	random	conditional	-0.44	0.21
cor_ID_item_Intercept_est_criterionKcal:match_domain	random	conditional	-0.50	0.24
cor_ID_item_est_criterionKcal_est_criterionKcal:match_domain	random	conditional	0.32	0.27
cor_ID_item_match_domain_est_criterionKcal:match_domain	random	conditional	-0.60	0.23
sigma	fixed	sigma	1.05	0.01

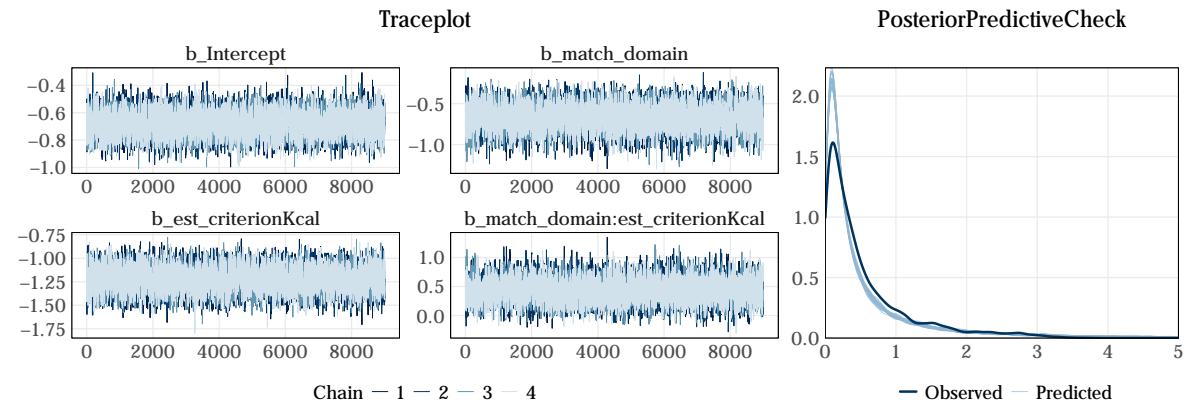


## M2

```
OME_corr ~ match_domain * est_criterion + (1 | ID) + (est_criterion * match_domain | ID_item)
```

Parameter	Effects	Component	Mean	SD
b_Intercept	fixed	conditional	-0.68	0.08
b_match_domain	fixed	conditional	-0.67	0.15
b_est_criterionKcal	fixed	conditional	-1.22	0.12

b_match_domain:est_criterionKcal	fixed	conditional	0.44	0.19
sd_ID_Intercept	random	conditional	0.58	0.04
sd_ID_item_Intercept	random	conditional	0.30	0.03
sd_ID_item_est_criterionKcal	random	conditional	0.44	0.05
sd_ID_item_match_domain	random	conditional	0.16	0.03
sd_ID_item_est_criterionKcal:match_domain	random	conditional	0.17	0.05
cor_ID_item_Intercept_est_criterionKcal	random	conditional	-0.53	0.11
cor_ID_item_Intercept_match_domain	random	conditional	0.70	0.16
cor_ID_item_est_criterionKcal_match_domain	random	conditional	-0.44	0.21
cor_ID_item_Intercept_est_criterionKcal:match_domain	random	conditional	-0.50	0.24
cor_ID_item_est_criterionKcal_est_criterionKcal:match_domain	random	conditional	0.33	0.27
cor_ID_item_match_domain_est_criterionKcal:match_domain	random	conditional	-0.59	0.24
sigma	fixed	sigma	1.05	0.01

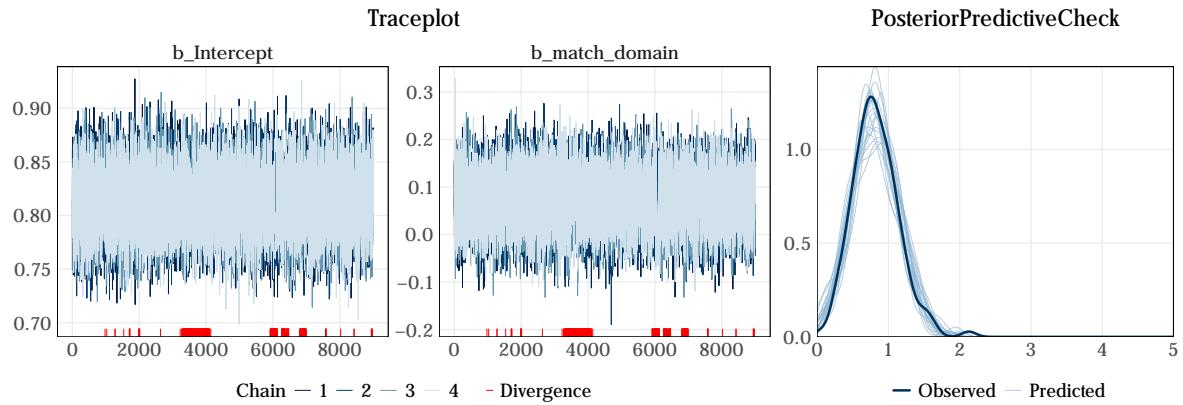


### Hypothesis 3b ( $\rho$ )

M0

rank\_z ~ match\_domain + (1 | ID)

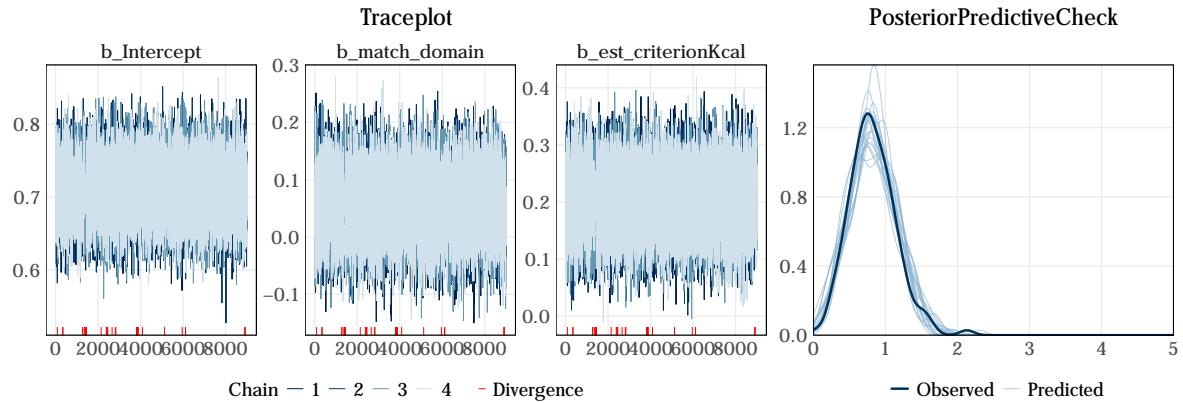
Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	ES
b_Intercept	fixed	conditional	0.81	0.03	0.95	0.76	0.87	1.00	1.00	10661.5
b_match_domain	fixed	conditional	0.07	0.05	0.95	-0.03	0.18	0.92	1.00	12139.0
sd_ID_Intercept	random	conditional	0.22	0.06	0.95	0.11	0.32	1.00	1.00	565.5
sigma	fixed	sigma	0.23	0.06	0.95	0.10	0.32	1.00	1.01	342.1



## M1

```
rank_z ~ match_domain + est_criterion + (1 | ID)
```

Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd	Rhat	E
b_Intercept	fixed	conditional	0.71	0.04	0.95	0.64	0.78	1.00	1.00	17064.
b_match_domain	fixed	conditional	0.06	0.05	0.95	-0.04	0.16	0.87	1.00	14577.
b_est_criterionKcal	fixed	conditional	0.20	0.05	0.95	0.10	0.31	1.00	1.00	15169.
sd_ID_Intercept	random	conditional	0.21	0.05	0.95	0.11	0.30	1.00	1.00	1029.
sigma	fixed	sigma	0.22	0.05	0.95	0.12	0.31	1.00	1.01	862.



## M2

```
rank_z ~ match_domain * est_criterion + (1 | ID)
```

Parameter	Effects	Component	Mean	SD	CI	CI_low	CI_high	pd
b_Intercept	fixed	conditional	0.71	0.04	0.95	0.63	0.78	1.00
b_match_domain	fixed	conditional	0.01	0.07	0.95	-0.13	0.15	0.55
b_est_criterionKcal	fixed	conditional	0.21	0.05	0.95	0.10	0.31	1.00
b_match_domain:est_criterionKcal	fixed	conditional	0.10	0.10	0.95	-0.10	0.30	0.83
sd_ID_Intercept	random	conditional	0.21	0.06	0.95	0.11	0.31	1.00
sigma	fixed	sigma	0.22	0.06	0.95	0.10	0.31	1.00

