Post-Weaning Housing Conditions Influence Freezing during Contextual Fear Conditioning in Adult Rats

Natalie Schroyens, Crhistian Luis Bender, Joaquín Matias Alfei, Victor Alejandro Molina, Laura Luyten, Tom Beckers

-- Appendix B: Bayesian Statistical Analyses performed in JASP (Version 0.8.5.1) --

This overview contains results of all preregistered Bayesian statistical analyses (https://osf.io/g92v8):

1. The amnestic effect of MDZ in the standard housing (SH) group
   → *One-sided T-tests*
2. The influence of enriched housing (EH) on the amnestic effect of MDZ
   → *ANOVAs with factors Housing (EH vs. SH) and Treatment (SAL vs. MDZ)*
3. The influence of impoverished housing (IH) on the amnestic effect of MDZ
   → *ANOVAs with factors Housing (IH vs. SH) and Treatment (SAL vs. MDZ)*
4. Group differences in the temporal pattern of % freezing during the test session
   → *ANOVAs with BS factors Housing and Treatment and WS factor Time*
5. The influence of housing conditions on % freezing during pre- and post-shock period and reactivation.
   → *ANOVAs with factor Housing (EH, IH, SH)*
6. The influence of housing conditions on body weight
   → *ANOVA with factor* Housing *(EH, IH, SH)* and ANOVA *with WS factor Age and BS factor Housing (EH, IH, SH)*

Bayesian analyses were performed to quantify the support in favor of the null hypothesis or the alternative hypothesis provided by the data. Analyses were performed in JASP, and the default Cauchy prior width of r = .707 was adopted.

Interpretation of the Bayes factors was accomplished using the classification scheme proposed by Jeffreys (1961). A BF_{10} indicates how likely the observed data are under the alternative hypothesis (postulating the presence of an effect) versus the null hypothesis (postulating the absence of an effect). For example, a BF_{10} of 5 indicates that the data are 5 times more likely to occur under the alternative hypothesis than under the null hypothesis. According to the classification scheme, this Bayes factor suggests substantial evidence for the presence of an effect. On the other hand, a BF_{10} of .2 indicates that the data are 5 times more likely to occur under the null hypothesis than under the alternative hypothesis, and this Bayes factor thus suggests substantial evidence for the absence of an effect.

1. The amnestic effect of MDZ in the standard housing (SH) group

A one-sided T-test (SAL > MDZ) was used to compare % freezing during the test session (first 5 min and complete 10-min session) between rats that received post-reactivation SAL vs. MDZ.

*Conclusion. Bayesian analysis suggests anecdotal evidence for the absence of a MDZ effect when considering % freezing during the **complete 10-min test session.** Bayesian analysis suggests anecdotal evidence in favor of a MDZ effect when considering the **first 5 min of the test session.***

A. For the complete 10-min test session

Bayesian Independent Samples T-Test

	BF_{-0}	error %
T_10min	0.487	~ 1.611e -6

Note. For all tests, the alternative hypothesis specifies that group *MDZ* is less than group *SAL* .

B. For the first 5 min of the test session

Bayesian Independent Samples T-Test

	BF_{-0}	error %
T_5min	1.536	~ 5.492e -5

Note. For all tests, the alternative hypothesis specifies that group *MDZ* is less than group *SAL* .

As a control, a two-sided T-test was used to assess whether there was a difference in % freezing during reactivation between rats of the SAL vs. MDZ group. In case of a between-group difference in % freezing during reactivation, we planned to perform a mixed ANOVA with within-subjects factor Session (reactivation vs. test) and between-subjects factor Treatment (SAL vs. MDZ).

Conclusion. Bayesian analysis suggests anecdotal evidence in favor of the null hypothesis (i.e., no difference in freezing between SAL and MDZ during reactivation). Therefore, no mixed ANOVA was performed.

Bayesian Independent Samples T-Test

	BF_{10}	error %
R_5min	0.491	7.303e -5

2. The influence of enriched housing (EH) on the amnestic effect of MDZ

A two-way ANOVA with factors Housing (EH vs. SH) and Treatment (SAL vs. MDZ) was performed to assess the influence of enriched housing on the amnestic effect of MDZ on % freezing during test (first 5 min and complete 10-min session).

*Conclusion. Bayesian analysis suggests anecdotal evidence for the absence of a Housing x Treatment interaction when considering the **complete 10-min test session.** Bayesian analysis suggests anecdotal evidence for a Housing x Treatment interaction when considering the **first 5 min of the test session**.*

A. For the complete 10-min test session

Model Comparison - T_10min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.200	0.495	3.923	1.000	
Housing	0.200	0.222	1.139	0.448	9.118e -4
Treatment	0.200	0.172	0.833	0.348	0.035
Housing + Treatment	0.200	0.075	0.323	0.151	1.429
Housing + Treatment + Housing ✻ Treatment	0.200	0.036	0.150	0.073	1.188

Model Comparison - T_10min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %

Evidence for interaction: 0.073/0.151 = 0.483

B. For the first 5 min of the test session

Model Comparison - T_min5

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.200	0.403	2.704	1.000	
Housing	0.200	0.217	1.110	0.539	1.621e -4
Treatment	0.200	0.155	0.732	0.383	4.681e -4
Housing + Treatment	0.200	0.082	0.358	0.203	1.907
Housing + Treatment + Housing ✻ Treatment	0.200	0.143	0.665	0.354	0.973

Evidence for interaction: 0.354/0.203 = 1.744

As a control, a one-way ANOVA was performed to assess whether there was a difference in % freezing during reactivation between the four groups (EH-SAL, EH-MDZ, SH-SAL, SH-MDZ). In case of a between-group difference in % freezing during reactivation, we planned to perform a mixed ANOVA with within-subjects factor Session (Reactivation vs. Test) and between-subjects factors Housing (EH vs. SH) and Treatment (SAL vs. MDZ).

Conclusion. Bayesian analysis suggests substantial evidence for the absence of a group effect on freezing during reactivation. Therefore, no mixed ANOVA was performed.

Model Comparison - R_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	0.845	5.465	1.000	
Group	0.500	0.155	0.183	0.183	6.587e -4

3. The influence of impoverished housing (IH) on the amnestic effect of MDZ

A two-way ANOVA with factors Housing (IH vs. SH) and Treatment (SAL vs. MDZ) was performed to assess the influence of impoverished housing on the amnestic effect of MDZ on % freezing during test (first 5 min and complete 10-min session).

Conclusion. Bayesian analyses suggest substantial (10-min test) or anecdotal (5-min test) evidence for an effect of Housing (IH vs. SH), and anecdotal evidence for the absence of a Housing by Treatment interaction when 8 rats with low freezing during reactivation were excluded.

On the other hand, when all rats were included in the analyses, decisive (10-min test) or strong (5-min test) evidence was obtained in favor of a Housing effect on % freezing during the test session. Due to very strong evidence for a Group effect on % freezing during reactivation, mixed ANOVAs were performed. These analyses suggest anecdotal evidence for the absence of Session x Housing x Treatment interactions, and anecdotal (10-min test) or substantial (5-min test) evidence for a Session x Housing interaction.

According to a predefined exclusion criterium, 8 rats (3 IH-SAL, 5 IH-MDZ) were excluded since they showed freezing levels of <25% during the reactivation session. Statistical analyses were performed without these 8 rats (3.1) and with all rats included (3.2).

3.1 Analyses in which 8 rats were excluded

A. For the complete 10-min test session

Model Comparison - T_10min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.200	0.067	0.289	1.000	
Housing	0.200	0.562	5.140	8.351	4.802e -4
Treatment	0.200	0.028	0.113	0.409	0.014
Housing + Treatment	0.200	0.218	1.117	3.241	0.771
Housing + Treatment + Housing ✻ Treatment	0.200	0.125	0.569	1.849	4.219

Evidence for interaction: 1.849/3.241 = .571

B. For the first 5 min of the test session

Model Comparison - T_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.200	0.245	1.298	1.000	
Housing	0.200	0.359	2.242	1.466	0.003
Treatment	0.200	0.107	0.480	0.437	0.015
Housing + Treatment	0.200	0.177	0.857	0.720	1.779
Housing + Treatment + Housing ✻ Treatment	0.200	0.112	0.506	0.458	1.510

Evidence for interaction: .458/.720 = .636

As a control, a one-way ANOVA was performed to assess whether there was a difference in % freezing during reactivation between the four groups (IH-SAL, IH-MDZ, SH-SAL, SH-MDZ).
Conclusion. Bayesian analysis suggests anecdotal evidence for the absence of a Group effect. Therefore, no mixed ANOVA was performed.

Model Comparison - R_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	0.518	1.073	1.000	
Group	0.500	0.482	0.932	0.932	4.808e -5

3.2 Analyses in which all rats were included

A. For the complete 10-min test session

Model Comparison - T_10min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.200	0.003	0.013	1.000	
Housing	0.200	0.656	7.617	208.008	4.766e -6
Treatment	0.200	0.001	0.004	0.356	1.839e -4
Housing + Treatment	0.200	0.238	1.251	75.585	1.757
Housing + Treatment + Housing ✻ Treatment	0.200	0.102	0.453	32.296	1.758

Evidence for interaction: 32/75 = 0.427

B. For the first 5 min of the test session

Model Comparison - T_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.200	0.017	0.071	1.000	
Housing	0.200	0.471	3.564	27.081	1.203e -5
Treatment	0.200	0.010	0.042	0.597	3.291e -4
Housing + Treatment	0.200	0.348	2.136	20.006	0.714
Housing + Treatment + Housing ✻ Treatment	0.200	0.153	0.722	8.793	1.012

Evidence for interaction: 8/20 = 0.440

As a control, a one-way ANOVA was performed to assess whether there was a difference in % freezing during reactivation between the four groups (IH-SAL, IH-MDZ, SH-SAL, SH-MDZ).

Conclusion. Bayesian analysis suggests very strong evidence for an effect of Group on freezing during reactivation.

Model Comparison - R_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	0.015	0.016	1.000	
Group	0.500	0.985	63.764	63.764	0.011

Since there was a between-group difference in % freezing during reactivation, a mixed ANOVA with within-subjects factor Session (Reactivation vs. Test) and between-subjects factors Housing (IH vs. SH) and Treatment (SAL vs. MDZ) was conducted.

Conclusion. Bayesian analysis suggests anecdotal evidence for the absence of Session x Housing x Treatment interactions. Bayesian analysis suggests anecdotal evidence for a Session x Housing interaction when considering the complete 10-min test session and substantial evidence for a Session x Housing interaction when considering the first 5 min of the test session.

A. For the complete 10-min test session

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model (incl. subject)	0.053	3.790e -8	6.823e -7	**1.000**	
Session	0.053	6.513e -5	0.001	**1718.319**	0.722
Housing	0.053	4.519e -5	8.135e -4	**1192.299**	0.978
Session + Housing	0.053	0.196	4.384	**5.167e +6**	1.384
Session + Housing + Session ✻ Housing	0.053	0.288	7.273	**7.592e +6**	1.876
Treatment	0.053	1.597e -8	2.874e -7	**0.421**	0.858
Session + Treatment	0.053	3.292e -5	5.926e -4	**868.537**	1.521
Housing + Treatment	0.053	1.934e -5	3.481e -4	**510.172**	2.311
Session + Housing + Treatment	0.053	0.107	2.157	**2.823e +6**	12.389
Session + Housing + **Session ✻ Housing** + Treatment	0.053	0.142	2.970	**3.737e +6**	1.819
Session + Treatment + Session ✻ Treatment	0.053	1.416e -5	2.549e -4	**373.637**	2.124
Session + Housing + Treatment + Session ✻ Treatment	0.053	0.038	0.717	**1.010e +6**	3.230
Session + Housing + Session ✻ Housing + Treatment + Session ✻ Treatment	0.053	0.059	1.132	**1.561e +6**	2.441
Housing + Treatment + Housing ✻ Treatment	0.053	2.383e -5	4.290e -4	**628.712**	65.394
Session + Housing + Treatment + Housing ✻ Treatment	0.053	0.044	0.838	**1.174e +6**	3.219

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Session + Housing + Session ✻ Housing + Treatment + Housing ✻ Treatment	0.053	0.063	1.210	**1.661e +6**	2.447
Session + Housing + Treatment + Session ✻ Treatment + Housing ✻ Treatment	0.053	0.018	0.324	**466331.955**	3.041
Session + Housing + Session ✻ Housing + Treatment + Session ✻ Treatment + Housing ✻ Treatment	0.053	0.033	0.606	**859371.942**	19.466
Session + Housing + Session ✻ Housing + Treatment + Session ✻ Treatment + Housing ✻ Treatment **+ Session ✻ Housing ✻ Treatment**	0.053	0.012	0.225	**325034.056**	5.948

Note. All models include subject.

Evidence for Session x Housing x Treatment interaction: 325034.056/859371.942 = .378
Evidence for Session x Housing interaction: 7.592e +6/5.167e +6 = 1.470

B. For the first 5 min of the test session

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model (incl. subject)	0.053	1.879e -10	3.382e -9	1.000	
Session	0.053	1.279e -4	0.002	680621.280	1.573
Housing	0.053	3.660e -8	6.588e -7	194.823	1.719
Session + Housing	0.053	0.067	1.287	3.551e +8	1.325
Session + Housing + **Session ✻ Housing**	0.053	0.339	9.247	1.806e +9	5.037
Treatment	0.053	9.425e -11	1.697e -9	0.502	1.605
Session + Treatment	0.053	7.935e -5	0.001	422380.922	1.425
Housing + Treatment	0.053	2.024e -8	3.643e -7	107.740	2.805
Session + Housing + Treatment	0.053	0.052	0.983	2.755e +8	3.409
Session + Housing + Session ✻ Housing + Treatment	0.053	0.237	5.596	1.262e +9	2.043
Session + Treatment + Session ✻ Treatment	0.053	2.591e -5	4.665e -4	137930.827	3.020
Session + Housing + Treatment + Session ✻ Treatment	0.053	0.018	0.334	9.693e +7	10.059
Session + Housing + Session ✻ Housing + Treatment + Session ✻ Treatment	0.053	0.079	1.547	4.212e +8	4.759
Housing + Treatment + Housing ✻ Treatment	0.053	7.549e -9	1.359e -7	40.181	1.388
Session + Housing + Treatment + Housing ✻ Treatment	0.053	0.025	0.458	1.321e +8	6.879
Session + Housing + Session ✻ Housing + Treatment + Housing ✻ Treatment	0.053	0.119	2.424	6.317e +8	3.305
Session + Housing + Treatment + Session ✻ Treatment + Housing ✻ Treatment	0.053	0.008	0.138	4.057e +7	2.104
Session + Housing + Session ✻ Housing + Treatment + Session ✻ Treatment + Housing ✻ Treatment	0.053	0.039	0.728	2.069e +8	3.512
Session + Housing + Session ✻ Housing + Treatment + Session ✻ Treatment + Housing ✻ Treatment + **Session ✻ Housing ✻ Treatment**	0.053	0.017	0.320	9.291e +7	3.462

Note. All models include subject.

Evidence for Session x Housing x Treatment interaction: 9.291e +7/2.069e +8 = .449
Evidence for Session x Housing interaction: 1.806e +9/3.551e +8 = 5.086

4. Group differences in the temporal pattern of % freezing during the test session

In addition to the analyses described above, and based upon pilot data from two animals showing a substantial increase in freezing during the first minutes of testing, we also assessed **temporal changes throughout the 10-min test session**, using mixed repeated-measures ANOVAs including within-subjects factor Time (freezing per minute), and between-subjects factors Treatment and Housing. A graphical presentation of these data can be found in **Appendix C**.

Conclusion. Bayesian analysis suggests strong evidence for the absence of a Housing x Treatment x Test min interaction (and suggest the presence of a main effect of Housing and Test min).

4.1 Analyses in which 8 rats were excluded

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model (incl. subject)	0.053	1.276e -16	2.296e -15	1.000	
Test min	0.053	0.087	1.723	6.849e +14	0.394
Housing	0.053	5.651e -16	1.017e -14	4.429	0.610
Test min + Housing	0.053	0.465	15.676	3.649e +15	0.763
Test min + Housing + Test min ✻ Housing	0.053	0.203	4.589	1.592e +15	1.236
Treatment	0.053	3.534e -17	6.361e -16	0.277	1.034
Test min + Treatment	0.053	0.026	0.483	2.046e +14	0.637
Housing + Treatment	0.053	1.352e -16	2.434e -15	1.060	2.125
Test min + Housing + Treatment	0.053	0.120	2.466	9.443e +14	5.326
Test min + Housing + Test min ✻ Housing + Treatment	0.053	0.052	0.993	4.096e +14	1.513
Test min + Treatment + Test min ✻ Treatment	0.053	9.677e -4	0.017	7.585e +12	0.968
Test min + Housing + Treatment + Test min ✻ Treatment	0.053	0.004	0.079	3.418e +13	1.702
Test min + Housing + Test min ✻ Housing + Treatment + Test min ✻ Treatment	0.053	0.002	0.043	1.878e +13	16.947
Housing + Treatment + Housing ✻ Treatment	0.053	2.346e -17	4.222e -16	0.184	1.685
Test min + Housing + Treatment + Housing ✻ Treatment	0.053	0.025	0.458	1.945e +14	1.262
Test min + Housing + Test min ✻ Housing + Treatment + Housing ✻ Treatment	0.053	0.011	0.204	8.772e +13	1.756
Test min + Housing + Treatment + Test min ✻ Treatment + Housing ✻ Treatment	0.053	9.105e -4	0.016	7.136e +12	2.177
Test min + Housing + Test min ✻ Housing + Treatment + Test min ✻ Treatment + Housing ✻ Treatment	0.053	4.393e -4	0.008	3.444e +12	2.100
Test min + Housing + Test min ✻ Housing + Treatment + Test min ✻ Treatment + Housing ✻ Treatment + Test min ✻ Housing ✻ Treatment	0.053	5.916e -5	0.001	4.637e +11	1.490

Note. All models include subject.

4.2 Analyses in which all rats were included

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model (incl. subject)	0.053	5.185e -22	9.332e -21	1.000	
Housing	0.053	3.191e -19	5.745e -18	615.555	2.312
Treatment	0.053	1.164e -22	2.094e -21	0.224	1.090
Housing + Treatment	0.053	5.790e -20	1.042e -18	111.675	1.318
Housing + Treatment + Housing ✻ Treatment	0.053	9.198e -21	1.656e -19	17.741	1.286
Test min	0.053	2.809e -4	0.005	5.417e +17	0.267
Housing + Test min	0.053	0.203	4.575	3.909e +20	0.847
Treatment + Test min	0.053	7.002e -5	0.001	1.351e +17	0.832
Housing + Treatment + Test min	0.053	0.043	0.803	8.242e +19	2.478
Housing + Treatment + Housing ✻ Treatment + Test min	0.053	0.008	0.144	1.534e +19	2.448

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Housing + Test min + Housing ✻ Test min	0.053	0.590	25.921	1.138e +21	0.941
Housing + Treatment + Test min + Housing ✻ Test min	0.053	0.125	2.565	2.406e +20	2.495
Housing + Treatment + Housing ✻ Treatment + Test min + Housing ✻ Test min	0.053	0.026	0.476	4.972e +19	4.439
Treatment + Test min + Treatment ✻ Test min	0.053	1.726e -6	3.107e -5	3.330e +15	0.813
Housing + Treatment + Test min + Treatment ✻ Test min	0.053	0.001	0.019	2.067e +18	1.389
Housing + Treatment + Housing ✻ Treatment + Test min + Treatment ✻ Test min	0.053	2.089e -4	0.004	4.028e +17	2.530
Housing + Treatment + Test min + Housing ✻ Test min + Treatment ✻ Test min	0.053	0.004	0.064	6.829e +18	1.240
Housing + Treatment + Housing ✻ Treatment + Test min + Housing ✻ Test min + Treatment ✻ Test min	0.053	7.495e -4	0.014	1.446e +18	8.289
Housing + Treatment + Housing ✻ Treatment + Test min + Housing ✻ Test min + Treatment ✻ Test min + Housing ✻ Treatment ✻ Test min	0.053	4.455e -5	8.020e -4	8.594e +16	1.453

Note. All models include subject.

5. The influence of housing conditions on % freezing during pre- and post-shock period and reactivation.

ANOVAs with factor Housing (EH vs. SH vs. IH) were performed to compare % freezing during training (pre- and post-shock period) and reactivation between the three housing conditions.

5.1 Analyses in which all rats were included

Conclusion. Bayesian analyses suggest decisive evidence in favor of a Housing effect during all test phases.

A. Effect of Housing on baseline freezing (Day 1)

Model Comparison - pre_3 min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	1.356e -6	1.356e -6	1.000	
Housing	0.500	1.000	737625.214	737625.214	1.410e -7

Post Hoc Comparisons - Housing

		Prior Odds	Posterior Odds	$BF_{10, U}$	error %
EH	IH	0.587	122240.765	208104.436	1.754e -10
	SH	0.587	0.359	0.612	5.627e -4
IH	SH	0.587	5918.057	10074.985	4.944e -9

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

B. Effect of Housing on post-shock freezing (Day 1)

Model Comparison - post3

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	0.007	0.007	1.000	
Housing	0.500	0.993	142.089	142.089	0.008

Post Hoc Comparisons - Housing

		Prior Odds	Posterior Odds	$BF_{10, U}$	error %
EH	IH	0.587	8.679	14.775	4.214e -5
	SH	0.587	0.324	0.552	4.544e -5
IH	SH	0.587	83.070	141.420	1.096e -5

Post Hoc Comparisons - Housing

		Prior Odds	Posterior Odds	$BF_{10, U}$	error %

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

C. Effect of Housing on freezing during reactivation (Day 2)

Model Comparison - R_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	7.014e -5	7.014e -5	1.000	
Housing	0.500	1.000	14256.659	14256.659	1.617e -5

Post Hoc Comparisons - Housing

		Prior Odds	Posterior Odds	$BF_{10, U}$	error %
EH	IH	0.587	1549.482	2637.860	7.027e -8
	SH	0.587	0.209	0.356	1.835e -4
IH	SH	0.587	321.325	547.028	5.199e -7

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

5.2 Analyses in which 8 rats were excluded

Conclusion. Bayesian analyses suggest decisive evidence in favor of a Housing effect on baseline freezing.

The preregistration of the current study (https://osf.io/8ezmq/register/565fb3678c5e4a66b5582f67) contained the following exclusion criterion: 'Rats that freeze less than 25% during the reactivation session will be excluded from the analysis. Explorative analyses including all subjects will also be performed.' The aim of this predefined criterion was to exclude rats that did not sufficiently acquire the context-shock association because this could have hampered the investigation of memory interference.

On the other hand, in order to study the effect of housing conditions on % freezing during training and reactivation (preregistered under 'exploratory analyses'), it is not necessarily relevant to exclude rats that show low freezing during reactivation. Nevertheless, since the exclusion criterion was included in the preregistration and applied for analyzing other freezing data, we present the results of these analyses based on this subset of the data as well.

A. Effect of Housing on baseline freezing (Day 1)

Model Comparison - pre_3 min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	1.510e -4	1.510e -4	1.000	
Housing	0.500	1.000	6620.716	6620.716	9.566e -7

Post Hoc Comparisons - Housing

		Prior Odds	Posterior Odds	$BF_{10, U}$	error %
EH	IH	0.587	3046.248	5185.977	5.096e -8
	SH	0.587	0.359	0.612	5.627e -4
IH	SH	0.587	479.468	816.253	9.550e -7

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

B. Effect of Housing on post-shock freezing (Day 1)

Model Comparison - post3

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	0.460	0.852	1.000	
Housing	0.500	0.540	1.174	1.174	0.020

C. Effect of Housing on freezing during reactivation (Day 2)

Model Comparison - R_5min

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	0.352	0.542	1.000	
Housing	0.500	0.648	1.844	1.844	0.011

6. The influence of housing conditions on body weight

An ANOVA with factor Housing (EH vs. SH vs. IH) was performed to assess whether housing conditions influenced body weight as measured before the start of the fear-conditioning protocol (PND66).

Conclusion. Bayesian analyses suggest decisive evidence in favor of a Housing effect on changes in weight throughout development and on weight at PND 66.

Model Comparison - PND66

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model	0.500	6.529e -13	6.529e -13	1.000	
Group	0.500	1.000	1.532e +12	1.532e +12	4.795e -6

Post Hoc Comparisons - Group

		Prior Odds	Posterior Odds	$BF_{10,U}$	error %
EH	IH	0.587	2.573e +8	4.381e +8	5.882e -14
	SH	0.587	3.080	5.244	2.428e -4
IH	SH	0.587	5.704e +7	9.710e +7	7.070e -13

Note. The posterior odds have been corrected for multiple testing by fixing to 0.5 the prior probability that the null hypothesis holds across all comparisons (Westfall, Johnson, & Utts, 1997). Individual comparisons are based on the default t-test with a Cauchy (0, r = 1/sqrt(2)) prior. The "U" in the Bayes factor denotes that it is uncorrected.

A mixed ANOVA with within-subjects factor Age and between-subject factor Housing (EH vs. SH vs. IH) was performed to assess whether housing conditions influenced the increase in body weight throughout development.

Model Comparison

Models	P(M)	P(M|data)	BF_M	BF_{10}	error %
Null model (incl. subject)	0.200	4.574e -767	1.830e -766	1.000	
Age	0.200	9.575e -213	3.830e -212	2.093e +554	0.323
Group	0.200	8.096e -765	3.239e -764	177.017	3.214
Age + Group	0.200	1.361e -202	5.443e -202	2.975e +564	0.988
Age + Group + Age ✻ Group	0.200	1.000	2.940e +202	2.186e +766	1.198

Note. All models include subject.