

Supplemental Table S1. Social behavior statistics. Bold indicates significant effects, italics indicate trends.

3 Chamber Social Approach			
<u>Analysis</u>	<u>Effect</u>	<u>Statistics in Females</u>	<u>Statistics in Males</u>
2 (Genotype) x 2 (Condition) x 2 (Chamber) ANOVA (% time in chamber)	genotype	$F(1,62)=0.69, p=0.409$	$F(1,56)=2.49, p=0.121$
	condition	$F(1,62)=5.19, p=0.026$	$F(1,56)=0.22, p=0.644$
	chamber	$F(1,62)=31.61, p<0.001$	$F(1,56)=48.51, p<0.001$
	genotype x condition	$F(1,62)=6.09, p=0.016$	$F(1,56)=0.68, p=0.012$
	genotype x chamber	$F(1,62)=2.86, p=0.096$	$F(1,56)=2.18, p=0.146$
	condition x chamber	$F(1,62)=1.82, p=0.182$	$F(1,56)=5.46, p=0.023$
	genotype x condition x chamber	$F(1,62)<0.01, p=0.960$	$F(1,56)=1.73, p=0.194$
Paired-sample t-test (% time in mouse+tube chamber vs. empty tube chamber): <i>Pten</i> ^{+/+}	Standard-housed	$t(13)=3.03, p=0.010$	$t(14)=3.86, p=0.002$
	EE-housed	$t(20)=4.37, p<0.001$	$t(14)=0.93, p=0.370$
Paired-sample t-test (% time in mouse+tube chamber vs. empty tube chamber): <i>Pten</i> ^{+/-}	Standard-housed	$t(14)=1.28, p=0.221$	$t(14)=4.57, p<0.001$
	EE-housed	$t(15)=2.88, p=0.011$	$t(14)=5.08, p<0.001$
Paired-sample t-test (distance to mouse+ tube vs. distance to empty tube): <i>Pten</i> ^{+/+}	Standard-housed	$t(13)=3.55, p=0.004$	$t(14)=3.88, p=0.002$
	EE-housed	$t(20)=4.27, p<0.001$	$t(14)=1.22, p=0.243$
Paired-sample t-test (distance to mouse+ tube vs. distance to empty tube): <i>Pten</i> ^{+/-}	Standard-housed	$t(14)=1.51, p=0.153$	$t(14)=4.69, p<0.001$
	EE-housed	$t(15)=2.97, p=0.010$	$t(14)=5.28, p<0.001$
2 (condition) x 2 (genotype) ANOVA on Distance Traveled	genotype	$F(1,62)=0.93, p=0.339$	$F(1,56)=0.08, p=0.782$
	condition	$F(1,62)=5.31, p=0.025$	$F(1,56)=18.76, p<0.001$
	genotype x condition	$F(1,62)=1.32, p=0.254$	$F(1,56)=3.20, p=0.079$
Genotype <i>t</i> -test (distance traveled)	Standard-housed	$t(27)=0.14, p=0.894$	$t(28)=1.01, p=0.323$
	EE-housed	$t(35)=1.51, p=0.141$	$t(28)=1.56, p=0.129$
Condition <i>t</i> -test (distance traveled)	<i>Pten</i> ^{+/+}	$t(33)=0.96, p=0.344$	$t(28)=4.75, p<0.001$
	<i>Pten</i> ^{+/-}	$t(29)=2.12, p=0.043$	$t(28)=1.66, p=0.108$
Social Recognition			
<u>Analysis</u>	<u>Effect</u>	<u>Statistics in Females</u>	<u>Statistics in Males</u>
2 (Genotype) x 2 (Condition) x 5 (Trial) ANOVA	genotype	$F(1,47)=0.19, p=0.669$	$F(1,43)=1.30, p=0.261$
	condition	$F(1,47)=0.67, p=0.418$	$F(1,43)=0.35, p=0.557$
	trial	$F(4,188)=17.66, p<0.001$	$F(4,172)=16.34, p<0.001$
	genotype x condition	$F(1,47)=0.85, p=0.362$	$F(1,43)=1.32, p=0.258$
	genotype x trial	$F(4,188)=0.79, p=0.534$	$F(4,172)=0.32, p=0.867$
	condition x trial	$F(4,188)=1.06, p=0.377$	$F(4,172)=0.33, p=0.856$
	genotype x condition x trial	$F(4,188)=1.80, p=0.130$	$F(4,172)=0.95, p=0.437$

2 (Genotype) x 2 (Condition) ANOVA: H1	genotype	$F(1,47)=1.35, p=0.252$	$F(1,43)=0.31, p=0.582$
	condition	$F(1,47)=0.28, p=0.601$	$F(1,43)=0.03, p=0.866$
	genotype x condition	$F(1,47)=4.38, p=0.042$	$F(1,43)=3.74, p=0.060$
	Post hocs	Std, WT vs $Pten^{+/-}$: $p=0.471$	Std, WT vs $Pten^{+/-}$: $p=0.155$
		EE, WT vs $Pten^{+/-}$: $p=0.039$	EE, WT vs $Pten^{+/-}$: $p=0.606$
		WT, Std vs EE: $p=0.052$	WT, Std vs EE: $p=0.494$
		$Pten^{+/-}$, Std vs EE: $p=0.305$	$Pten^{+/-}$, Std vs EE: $p=0.838$
2 (Genotype) x 2 (Condition) ANOVA: Test	genotype	$F(1,47)=0.05, p=0.830$	$F(1,43)=1.87, p=0.179$
	condition	$F(1,47)=0.92, p=0.343$	$F(1,43)=0.09, p=0.772$
	genotype x condition	$F(1,47)=0.93, p=0.340$	$F(1,43)=0.37, p=0.548$
2 (Genotype) x 2 (Condition) ANOVA: Habituation	genotype	$F(1,47)=2.83, p=0.099$	$F(1,43)=0.30, p=0.586$
	condition	$F(1,47)<0.01, p=0.983$	$F(1,43)=0.28, p=0.601$
	genotype x condition	$F(1,47)=2.36, p=0.131$	$F(1,43)=0.25, p=0.620$
2 (Genotype) x 2 (Condition) ANOVA: Dishabituation	genotype	$F(1,47)=0.95, p=0.334$	$F(1,43)<0.01, p=0.962$
	condition	$F(1,47)=0.31, p=0.580$	$F(1,43)=0.09, p=0.771$
	genotype x condition	$F(1,47)=1.03, p=0.314$	$F(1,43)=5.07, p=0.030$
	Post hocs	n/a	Std, WT vs $Pten^{+/-}$: $p=0.113$
		n/a	EE, WT vs $Pten^{+/-}$: $p=0.124$
		n/a	WT, Std vs EE: $p=0.057$
		n/a	$Pten^{+/-}$, Std vs EE: $p=0.204$
Trial ANOVA (H1-H4): Standard-housed $Pten^{+/+}$	trial	$F(3,48)=5.83, p=0.002$	$F(3,42)=9.44, p<0.001$
	Post hocs	Hab 1 vs Hab 2: $p=0.529$ Hab 1 vs Hab 3: $p=0.057$ Hab 1 vs Hab 4: $p=0.003$ Hab 2 vs Hab 3: $p=0.971$ Hab 2 vs Hab 4: $p=0.080$ Hab 3 vs Hab 4: $p=0.721$	Hab 1 vs Hab 2: $p=0.443$ Hab 1 vs Hab 3: $p=0.016$ Hab 1 vs Hab 4: $p=0.031$ Hab 2 vs Hab 3: $p=0.016$ Hab 2 vs Hab 4: $p=0.043$ Hab 3 vs Hab 4: $p=0.999$
Trial ANOVA (H1-H4): EE-housed $Pten^{+/+}$	trial	$F(3,33)=20.01, p<0.001$	$F(3,36)=8.08, p<0.001$
	Post hocs	Hab 1 vs Hab 2: $p=0.497$ Hab 1 vs Hab 3: $p<0.001$ Hab 1 vs Hab 4: $p<0.001$ Hab 2 vs Hab 3: $p=0.027$ Hab 2 vs Hab 4: $p=0.013$ Hab 3 vs Hab 4: $p=0.838$	Hab 1 vs Hab 2: $p=0.998$ Hab 1 vs Hab 3: $p=0.009$ Hab 1 vs Hab 4: $p=0.042$ Hab 2 vs Hab 3: $p=0.009$ Hab 2 vs Hab 4: $p=0.075$ Hab 3 vs Hab 4: $p=1.000$

Trial ANOVA (H1-H4): Standard-housed <i>Pten</i> ^{+/-}	trial	<i>F</i>(3,36)=6.17, <i>p</i>=0.002	<i>F</i>(3,33)=4.63, <i>p</i>=0.008
	<i>Post hocs</i>	Hab 1 vs Hab 2: <i>p</i> =0.097 Hab 1 vs Hab 3: <i>p</i> =0.126 Hab 1 vs Hab 4: <i>p</i>=0.011 Hab 2 vs Hab 3: <i>p</i> =0.996 Hab 2 vs Hab 4: <i>p</i> =0.311 Hab 3 vs Hab 4: <i>p</i> =0.765	Hab 1 vs Hab 2: <i>p</i> =0.956 Hab 1 vs Hab 3: <i>p</i> =0.086 Hab 1 vs Hab 4: <i>p</i> =0.205 Hab 2 vs Hab 3: <i>p</i> =0.138 Hab 2 vs Hab 4: <i>p</i> =0.129 Hab 3 vs Hab 4: <i>p</i> =1.000
Trial ANOVA (H1-H4): EE-housed <i>Pten</i> ^{+/-}	trial	<i>F</i> (3,27)=1.73, <i>p</i> =0.186	<i>F</i>(3,24)=5.49, <i>p</i>=0.005
	<i>Post hocs</i>	n/a n/a n/a n/a n/a n/a	Hab 1 vs Hab 2: <i>p</i> =1.000 Hab 1 vs Hab 3: <i>p</i> =0.113 Hab 1 vs Hab 4: <i>p</i> =0.129 Hab 2 vs Hab 3: <i>p</i> =0.222 Hab 2 vs Hab 4: <i>p</i>=0.021 Hab 3 vs Hab 4: <i>p</i> =0.889
Genotype <i>t</i> -test: Standard-housed	H1	<i>t</i> (28)=0.64, <i>p</i> =0.529	<i>t</i> (25)=1.24, <i>p</i> =0.228
	Test	<i>t</i> (28)=0.83, <i>p</i> =0.415	<i>t</i> (23)=1.66, <i>p</i> =0.111
	Habituation	<i>t</i> (28)=0.11, <i>p</i> =0.913	<i>t</i> (25)=0.63, <i>p</i> =0.532
	Dishabituation	<i>t</i> (28)=1.78, <i>p</i> =0.087	<i>t</i> (23)=1.36, <i>p</i> =0.188
Genotype <i>t</i> -test: EE-housed	H1	<i>t</i> (23)=1.36, <i>p</i> =0.186	<i>t</i> (20)=0.70, <i>p</i> =0.494
	Test	<i>t</i> (21)=0.42, <i>p</i> =0.680	<i>t</i> (20)=1.08, <i>p</i> =0.292
	Habituation	<i>t</i> (23)=1.62, <i>p</i> =0.119	<i>t</i> (20)=0.05, <i>p</i> =0.964
	Dishabituation	<i>t</i> (21)=0.02, <i>p</i> =0.983	<i>t</i>(20)=2.18, <i>p</i>=0.041
Condition <i>t</i> -test: <i>Pten</i> ^{+/+}	H1	<i>t</i>(27)=2.34, <i>p</i>=0.027	<i>t</i> (26)=0.70, <i>p</i> =0.490
	Test	<i>t</i> (27)<0.01, <i>p</i> =0.997	<i>t</i> (25)=1.23, <i>p</i> =0.231
	Habituation	<i>t</i> (27)=1.24, <i>p</i> =0.224	<i>t</i> (26)=0.90, <i>p</i> =0.376
	Dishabituation	<i>t</i> (27)=0.38, <i>p</i> =0.706	<i>t</i> (25)=1.67, <i>p</i> =0.108
Condition <i>t</i> -test: <i>Pten</i> ^{+/-}	H1	<i>t</i> (24)=0.06, <i>p</i> =0.953	<i>t</i> (19)=0.11, <i>p</i> =0.913
	Test	<i>t</i> (22)=1.41, <i>p</i> =0.173	<i>t</i> (18)=1.66, <i>p</i> =0.114
	Habituation	<i>t</i> (24)=0.48, <i>p</i> =0.638	<i>t</i> (19)=0.19, <i>p</i> =0.850
	Dishabituation	<i>t</i> (22)=1.04, <i>p</i> =0.310	<i>t</i> (18)=1.85, <i>p</i> =0.080
One-sample <i>t</i> -test (habituation vs. 0): <i>Pten</i> ^{+/+}	Standard-housed	<i>t</i>(16)=4.38, <i>p</i><0.001	<i>t</i>(14)=3.30, <i>p</i>=0.005
	EE-housed	<i>t</i>(11)=7.17, <i>p</i><0.001	<i>t</i>(12)=3.24, <i>p</i>=0.007
One-sample <i>t</i> -test (habituation vs. 0): <i>Pten</i> ^{+/-}	Standard-housed	<i>t</i>(12)=3.98, <i>p</i>=0.002	<i>t</i>(11)=2.36, <i>p</i>=0.038
	EE-housed	<i>t</i>(12)=2.37, <i>p</i>=0.035	<i>t</i>(8)=2.81, <i>p</i>=0.023

One-sample <i>t</i> -test (dishabituation vs. 0): <i>Pten</i> ^{+/+}	Standard-housed	<i>t</i>(16)=3.65, <i>p</i>=0.002	<i>t</i> (13)=1.87, <i>p</i> =0.084
	EE-housed	<i>t</i>(11)=2.57, <i>p</i>=0.026	<i>t</i> (12)=0.23, <i>p</i> =0.821
One-sample <i>t</i> -test (dishabituation vs. 0): <i>Pten</i> ^{+/-}	Standard-housed	<i>t</i> (12)=1.07, <i>p</i> =0.305	<i>t</i> (10)=0.18, <i>p</i> =0.862
	EE-housed	<i>t</i> (10)=1.77, <i>p</i> =0.107	<i>t</i>(8)=4.40, <i>p</i>=0.002