Supporting information for manuscript titled "When I relive a positive me: vivid autobiographical memories facilitate autonoetic brain activation and enhance mood".

SUPPORTING INFORMATION

The ability to use imagery was measured using the Spontaneous Use of Imagery Scale (SUIS) by assessing the frequency of using imagery in daily life (Nelis, Holmes, Griffith, & Raes, 2014; Reisberg, Pearson, & Kosslyn, 2003). This self-report scale consisted of 12 items rated on a scale from never appropriate (1) to always completely appropriate (5). The sum of the items was used to represent spontaneous imagery use (possible range: 12-60). The validity and reliability of this scale have been established (McCarthy-Jones, Knowles, & Rowse, 2012; Nelis et al., 2014). The internal consistency was good (Cronbach's alpha = 0.84). This sample had an average ability to use imagery (M = 35.43, SD = 10.11).

SUPPORTING TABLES

TABLE S 1.

Relation between predictors vividness and trait self-esteem to memory characteristics. For the relation with trait self-esteem multilevel analysis was used with trait self-esteem as second level and memory characteristic as first level variables. The chi square test is the result of the model comparison made between a baseline model where the memory characteristic is predicted by valence only and the model of interest where the memory characteristic is predicted by valence and trait self-esteem.

Memory characteristic	Vividness	Trait self-esteem
Pleasantness	$r = .40$, $p < .001$	$\chi^2(1) = 2.84$, $p = .092$, $t = 1.71$, $b = 0.03$, $SE = 0.02$, 95% CI [-0.004, 0.06]
Remoteness	$r = .28$, $p < .001$	$\chi^2(1) = 1.74$, $p = .188$, $t = -1.33$, $b = -1.01$, $SE = 0.76$, 95% CI [-2.49, 0.51]
Word count	$r = .13$, $p < .011$	$\chi^2(1) = 0.74$, $p = .391$, $t = 0.86$, $b = 0.33$, $SE = 0.38$, 95% CI [-0.40, 1.06]
Specificity[1]	$\chi^2(1) = 0.001$, $p = .997$, $z = .004$	$\chi^2(1) = 7.48$, $p = .006$, $z = 2.69$
Vividness	-	$\chi^2(1) = 3.41$, $p = .065$, $t = 1.88$, $b = 0.04$, $SE = 0.02$, 95% CI [-0.003, 0.09]

TABLE S 2.

Parameters of models predicting mood (significant effects in bold).

	Model 1: Valence				Model 2: Vividness				Model 3: Trait self-esteem			
Variable	b	SE	t	95% CI	b	SE	t	95% CI	b	SE	t	95% CI
Neutral valence (Intercept)	**1.38**	**0.13**	**10.68**	**1.13**	**1.64**	**1.33**	**0.13**	**10.35**	**1.08**	**1.59**	**1.38**	**0.13**	**11.03**	**1.13**	**1.63**
Positive valence	**0.91**	**0.08**	**10.77**	**0.75**	**1.09**	**0.47**	**0.13**	**3.55**	**0.20**	**0.73**	**0.91**	**0.08**	**10.80**	**0.75**	**1.08**

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[1] Tested using logistic multilevel analysis where specificity was the dependent variable recoded to non-specific vs specific.

Variable	b	SE	t	95% CI low	95% CI high	b	SE	t	95% CI low	95% CI high
Vividness	0.05	0.05	1.06	-0.04	0.14					
Vividness*Valence (positive > neutral)	**0.20**	**0.06**	**3.13**	**0.07**	**0.32**					
Self-esteem						0.01	0.02	0.57	-0.03	0.06
Self-esteem*Valence (positive > neutral)						0.002	0.02	0.11	-0.03	0.03

TABLE S 3.

Chi-square tests for models predicting mood during the RAM task with valence, vividness and trait self-esteem *(intra-class correlation = .44)*.

Effect	$\chi^2(df), p$	AIC	BIC	Model
Null Model		1126.1	1137.8	
+ Valence	$\chi^2 (1) = 99.3, p < .001$	1028.8	1044.5	Model 1: Valence
+ Vividness	$\chi^2 (1) = 15.01, p < .001$	1015.7	1035.4	
+ Vividness*Valence	$\chi^2 (1) = 9.54, p = .002$	1008.2	1031.8	Model 2: Vividness
+ Trait self-esteem	$\chi^2 (1) = 0.41, p = .522$	1030.3	1050.0	
+ Trait self-esteem*Valence	$\chi^2 (1) = 0.01, p = .913$	1032.3	1055.9	Model 3: Trait self-esteem

TABLE S 4.

Parameters of model predicting state self-esteem after the RAM task (significant effects in bold). Note: negative sign here indicates that mean state self-esteem at that time point is lower compared to after the RAM task.

Variable	b	SE	t	95% CI
Intercept	72.66	1.94	37.38	68.80, 76.42
State self-esteem at baseline	**-8.30**	**1.72**	**-4.82**	**-11.58, -4.93**
State self-esteem before RAM	**-6.49**	**1.72**	**-3.77**	**-9.79, -3.14**
Trait self-esteem	0.49	0.35	1.38	-0.21, 1.16
Trait self-esteem*State self-esteem at baseline	0.56	0.31	1.79	-0.07, 1.18
Trait self-esteem*State self-esteem before RAM	**0.81**	**0.31**	**2.58**	**0.19, 1.42**

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TABLE S 5.

Chi-square tests for models of state self-esteem before and after the RAM task.

Effect	$\chi^2(df), p$	AIC	BIC
Null Model		1122.6	1131.5
1: + Baseline state self–esteem + before RAM state self-esteem	$\chi^2 (2) = 21.33, p < .001$	1105.3	1120.1
2: + Trait self-esteem	$\chi^2 (1) = 8.80, p = .003$	1098.5	1116.2
3: + Trait self-esteem*Time	$\chi^2 (2) = 6.74, p = .034$	1095.8	1119.4

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TABLE S 6.
Cluster, peak voxel and label information of valence contrast. Positive vs neutral reliving: cluster corrected z = 3.1, cluster p < .05. Neutral vs positive reliving: permutation test with TFCE.

Contrast	Cluster size	Cluster p-value	Cluster mean contrast value	Voxel test value	Label peak voxels	MNI coordinates		
			t	Z		X	Y	Z
Positive vs neutral reliving	98	0.0418		4.18	R Precentral gyrus, BA3	28	-26	68
				3.57	R Postcentral gyrus	38	-26	60
				3.46	R Precentral gyrus, BA4	32	-26	56
				3.38	R Precentral gyrus, BA4	38	-22	70
				3.36	R Precentral gyrus, BA4	38	-20	66
				3.19	R Precentral gyrus	42	-16	64
	96	0.0455		3.94	L ACC	-6	40	-2
				3.92	L Paracingulate gyrus	-14	40	0
				3.47	L ACC	-4	44	4
				3.41	L Paracingulate gyrus, BA32	-2	50	0
				3.22	L Paracingulate gyrus, mPFC, BA32	-4	48	-4
				3.19	L Paracingulate gyrus, frontal pole	-6	54	2
Neutral vs positive reliving	1755	<.001	3.64		R Precuneus	16	-66	26
	984	<.001	3.82		L Supramarginal gyrus, Angular gyrus	-40	-48	38
	589	0.009	3.41		R Angular gyrus, IPLC, IPLD, BA40	52	-48	42
	318	<.001	4.19		L PCC, BA23	-2	-28	30

TABLE S 7.
Cluster, peak voxel and label information of contrast on vividness (permutation test with tfce) and trait self-esteem (cluster corrected z = 2.3, cluster p < .05). Contrasts on vividness during neutral memories did not result in above threshold activations.

Contrast	Cluster size	Cluster max p-value	Cluster mean contrast value	Voxel test value	Label peak voxels	MNI coordinates		
			t	Z		X	Y	Z
Vividness (positive relation)	1827	0.004	3.27		R Temporal pole, BA22	56	10	-4
	91	0.026	3.75		R Hippocampus	32	-42	6
	74	0.024	3.61		R Postcentral gyrus, IPLA, BA3	54	-12	46
	39	0.034	4.01		L Hippocampus, Amygdala	-28	-16	-14
	1	0.049	3.30		R Amygdala	14	-14	-14
Vividness (negative relation)	12880	<.001	3.17		L Occipital pole	-26	-92	-16

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	28	0.043	2.83	L Supramarginal gyrus	-34	-50	32
Vividness (positive relation) during positive memories	2028	0.002	3.30	R Putamen, insula, OFC	30	-10	6
	226	0.010	3.60	R Precentral gyrus, BA4	44	-14	46
	52	0.033	3.49	R Postcentral gyrus, BA2	34	-32	64
	16	0.042	3.67	L Precentral gyrus, BA4	-18	-26	62
	6	0.046	4.13	L OFC, insula	-44	16	-4
	3	0.049	3.88	R Precentral gyrus	18	-24	60
	3	0.048	3.65	IPLA	30	-32	26
	1	0.049	3.96	R Precentral gyrus	4	-24	58
Vividness (negative relation) during positive memories	12353	<.001	3.11	L Occipital fusiform gyrus, PCC, Precuneus	-30	-88	-18
Trait self-esteem (negative relation)							
• Positive vs neutral reliving	209	<.001	4.35	R Occipital fusiform gyrus	20	-80	-10
			4.15	R Lingual gyrus	10	-84	-10
			3.90	R Occipital fusiform gyrus	26	-84	-2
			3.37	R Lateral occipital cortex	34	-82	-10
Trait self-esteem (positive relation)							
• No above threshold activations							

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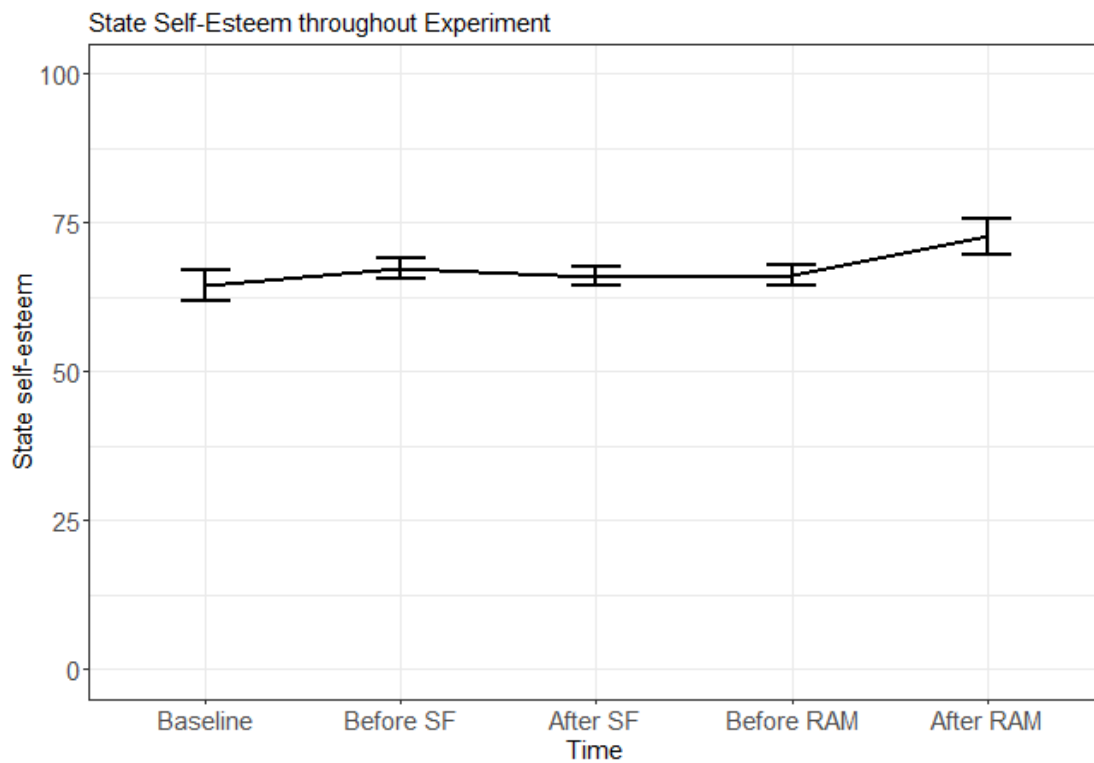
SUPPORTING FIGURES

Trait self-esteem

FIG. S 1. Depiction of the distribution of trait self-esteem as measured by the sum score on the Rosenberg self-esteem scale.

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FIG. S 2.

State self-esteem measured at different time points before and after the tasks and at baseline before entering the scanner. Error bars represent 95% confidence intervals. Before the RAM task, participants performed the social feedback (SF) task in which they were introduced to a confederate to the study who supposedly provided mixed positive, intermediate and negative personal feedback (see full description in (van Schie et al., 2018). In terms of state self-esteem, the SF task had no carryover effect. The social feedback influenced state self-esteem neither after the SF task (χ^2 (2) = 4.89, *p* = .087) nor before the RAM task (χ^2 (2) = 1.11, *p* = .292) compared to before the SF task and with baseline state self-esteem taken into account.
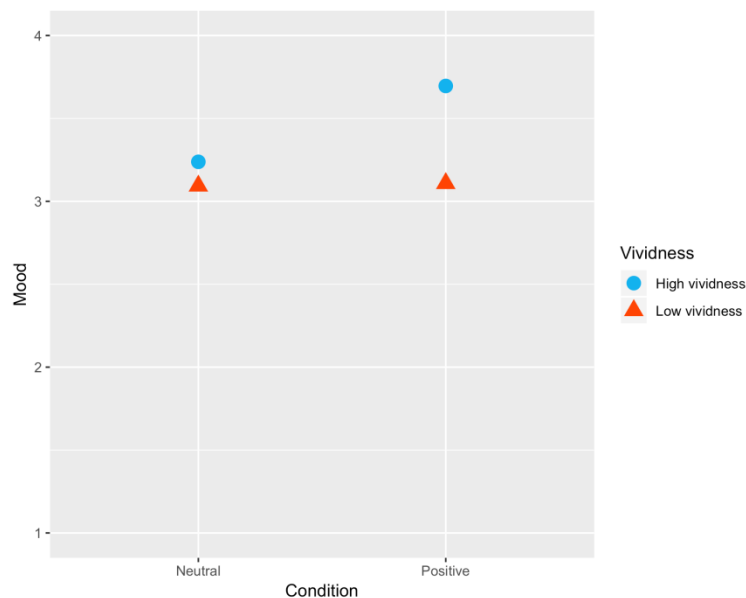

FIG. S 3.
Depiction of mood levels at low (1) and high (4) vividness ratings illustrating the interaction of valence by vividness on mood.

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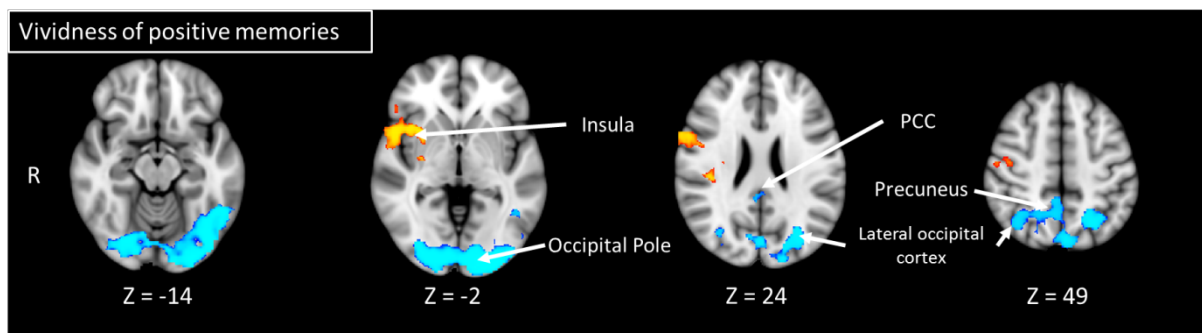

FIG. S 4.

Activation positively (red) and negatively (blue) related to vividness during positive memories only. There was no significant activation for vividness during neutral memories only. Note: brain is depicted in radiological convention, i.e., left = right.
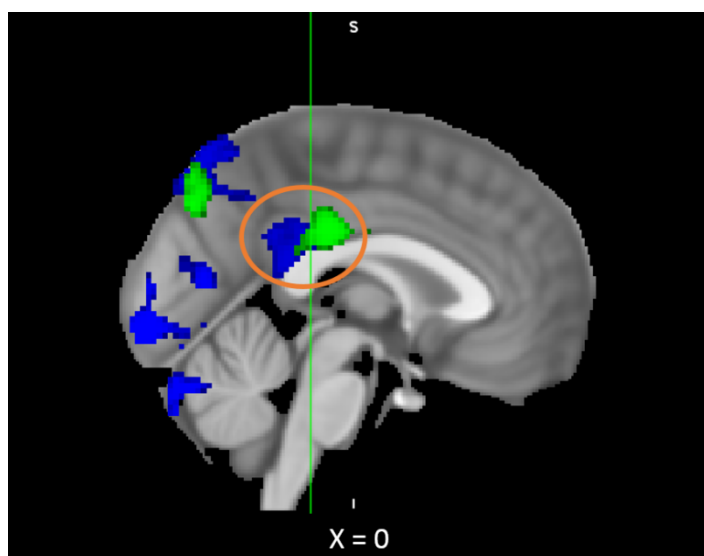

FIG. S 5.
Depiction of overlap between the negative relation of vividness (blue) and activation of neutral more than positive reliving (green) (green orientation ruler at y = -33). Of interest is the region circled in orange which shows that vividness is negatively related to a more caudal part of the PCC whereas neutral compared to positive memory reliving is related to a more rostral PCC/MCC area.