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Differential Neural Processing of Value During Decision-Making in Adults with ADHD and Healthy Controls

Chun-Yi Lee, Joshua Goh Oon Soo, Susan Shur-Fen Gau

Supplementary Material

Method S1. Participants

Adults with ADHD were clinical diagnosed according to the DSM-IV criteria by S.S.G. at the Department of Psychiatry, National Taiwan University Hospital (NTUH), Taipei, Taiwan. Healthy controls were recruited using local advertisements and were screened for medical or neuropsychiatric illness and current or past history of using psychotropic agents. All participants underwent the same semi-structured Conners' Adult ADHD Diagnostic Interview as described in the DSM-IV (CAADID, Multi-Health Systems for current ADHD), the modified adult version of the ADHD supplement of the Schedule for Affective Disorders and Schizophrenia–Epidemiological Version (K-SADS-E; Chinese version) for current and past ADHD[1] and SADS for other psychiatric disorders[2], and the Wechsler Adult Intelligence Scale-III[3] (see Table S1). Within the final sample of 29 ADHD patients, five received medication concurrently from one to 14 months duration prior to scanning (coded as -1 in covariate regressors), four used medicines at least two months before participation with durations from two to 36 months (coded as 0), and the rest were drug naïve (coded as -1) (see Table S2). The five participants treated with medications intended to treat ADHD were asked to discontinue medications at least 48 hours before the assessment to minimize the effect of medications on this task-functional MRI assessments. While healthy controls scored higher than adults with ADHD in verbal ability, driving group differences in Full-Scale IQ, there were no significant differences in the other IQ profiles, consistent with comparable cognitive

maturity between adults with ADHD and age-matched healthy controls in this sample. Sub-

scores of ADHD symptoms derived from the ADHD supplement of the K-SADS-E were

used in further analysis against Lottery Choice Task (LCT) brain responses.

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Table S1. Participant demographics and neuropsychological assessment performances.

	ADHD (N=29) Mean (SD)	HC (N=28) Mean (SD)	Between group p-value (unc.)
Age	27.6 (7.36)	24.5 (4.56)	0.07
Gender (male, female)	18, 11	15, 13	-
WAIS-III			
Full Scale IQ	105.69 (8.47)	109.86 (7.95)	0.061
Full IQ Range	86-123	89-126	-
Verbal IQ	104.07 (9.76)	108.61 (7.33)	0.053
Performance IQ	107.41 (8.22)	110.36 (9.67)	0.22
Verbal Comprehension	103.21 (9.10)	108.54 (8.21)	0.024
Perceptual Organization	109.41 (8.92)	109.54 (8.93)	0.959
Working Memory	104.72 (14.41)	107.75 (10.17)	0.365
Number of ADHD Symptoms in K-SADS-E			
Life Time Inattention	8.24 (0.99)	0.61 (1.26)	<0.001
Current Inattention	7.55 (1.82)	0.25 (0.80)	<0.001
Life Time Hyperactivity	4.00 (1.98)	0.29 (0.60)	<0.001
Current Hyperactivity	2.93 (1.81)	0.14 (0.45)	<0.001
Life Time Impulsivity	1.97 (0.91)	0.11 (0.31)	<0.001
Current Impulsivity	1.34 (1.14)	0.11 (0.31)	<0.001
Life Time Total severity	14.21 (3.12)	1.00 (1.81)	<0.001
Current Total severity	11.83 (3.69)	0.50 (1.17)	<0.001

Abbreviations: HC: Healthy Controls; K-SADS-E: ADHD supplement of the Schedule for Affective Disorders and Schizophrenia–Epidemiological Version; WAIS: Wechsler Adult Intelligence Scale.

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Table S2. ADHD participant medication usage details.

No.	Current Use	Past Use	Medication type	Dosage	Duration (months)
1	Yes	-	Ritalin	10 mg x 1	1
2	Yes	-	Concerta	36 mg x 2	14
3	Yes	-	Ritalin	10 mg x 8	2
4	Yes	-	Ritalin	10 mg x 1.5	2
5	Yes	-	Ritalin	10 mg x 3	2
6	No	Yes	Ritalin	Unavailable	36
			Concerta	Unavailable	36
7	No	Yes	Concerta	36 mg x 1	24
8	No	Yes	Ritalin	mg unknown x 3	6
			Concerta	36 mg x 1	6
9	No	Yes	Ritalin	10 mg x 2	2

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Method S2. fMRI Lottery Choice Task Stimuli and Procedures

Ranges and details of P, M, and EV of trials across the choice conditions are described in Table S2. Positive EVs denoted winning stakes, for example, when a trial has middle-high P of winning low M (e.g., 75 % chance of 8 points; $P_{MH}M_{L}$). Negative EVs denoted losing stakes, for example, when a trial has low-low P of winning high M (e.g., 5% chance of 100 points, which is also 95% chance of -100 points; $P_{LL}M_{H}$). Although choice conditions are described as discrete conditions with ranges of P and M (and EV), participants perceived P and M as continuously distributed across trials. Participants were instructed to accumulate as many points as possible over the entire LCT experiment by indicating whether they accepted or rejected the stakes presented in each trial using assigned button presses. Choice stimuli remained on screen for a full 4 s within which responses were made and following which the outcome was presented.

Outcomes in each trial were predetermined according to the actual stakes with the limitation that no choice condition outcome could have only winning or only losing outcomes. Outcomes for trials in which participants failed to respond within the 4 s choice phase (null responses) resulted in an outcome of zero points as well as a reminder to respond on time in subsequent trials. Choice and outcome phases were separated from each other by fixation inter-stimulus intervals (ISI) jittered between 1 to 5 s with a mean of 3 s. Participants underwent a practice version of the task before scanning to ensure they were familiar with and fully understood the task goal and the meaning and range of probabilities and magnitudes.

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Table S3. Means (ranges) of the different discretized levels of probability of winning (P; across columns), magnitude (M; across rows), and expected value (EV; in cells) across the 10 choice conditions.

Probability (%) / Magnitude (pts)		9.33 (4 ~ 15)	28.1 (24 ~ 34)	50.5 (44 ~ 55)	69.2 (64 ~ 75)	89.9 (84 ~ 95)
		LL	ML	MM	MH	HH
104.1 (99 ~ 110)	H	-86.6 (-97.2 ~ -75.6)	-48.6 (-56.2 ~ -39.2)	0.22 (-12.2 ~ 10.9)	40.8 (33.0~ 50.1)	84.9 (72.0~ 98.1)
6.12 (1 ~ 12)	L	-4.77 (-9.84 ~ -0.74)	-2.38 (-5.00 ~ -0.64)	0.11 (-1.44 ~ 0.72)	2.63 (0.56 ~ 5.5)	5.13 (0.74 ~ 9.84)

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Method S3. fMRI Lottery Choice Task Behavioral Analysis

Behavioral analyses of responses across the 10 choice conditions were conducted using R 3.4.0 (www.r-project.org). For response times (RT), we note that RT distributions tend to be skewed[4,5] and applied an ex-Gaussian model, which combines exponential and normal distributions, to characterize the RT distribution (38) better. Specifically, for each participant, RT data were first modeled as ex-Gaussian distributions using the DISTRIB toolbox in MATLAB (https://www.fss.ulaval.ca/logiciel-distrib[6]) with Statistics Toolbox Release 2017a (The MathWorks, Inc.; Natick, MA, USA). This approach estimated individual μ (mean), σ (standard deviation), and τ (exponential) parameters in the RT data. Individual ex-Gaussian parameter estimates were then separately submitted to repeated measures ANOVAs to evaluate the effects of group, probability, magnitude, and their interactions on RTs in the LCT. See Result S1 for ex-Gaussian parameter results.

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Method S4. fMRI Whole-Brain Data Analysis

The P^2 modulation is not of central interest here but was applied to covary out the effect of uncertainty, which is maximum when P is around 0.5 and minimum when P is near 0 or 1, based on our previous studies as well as reflected in the RT results below. The second and third model-based subject-level GLMs thus afforded individual voxel-wise regression coefficients reflecting neural sensitivity in each voxel to P, M, and EV. For example, for the trial-wise EV regressor, positive neural EV sensitivity coefficient values indicate that higher trial-wise EV induced higher neural activity in the voxel. Conversely, negative neural EV sensitivity coefficient values indicate that higher trial-wise EV induced lower neural activity in the voxel.

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Table S4. Means (SD) acceptance rates (AR) across the 10 choice conditions for ADHD and control groups along with t-values for group difference contrasts (ADHD > Control).

Choice condition	ADHD		Control		t(ADHD vs. Control)	P(unc.), one-tailed
	Mean	SD	Mean	SD		
$P_{LL}M_L$	0.063	0.096	0.112	0.206	-1.21	0.883
$P_{ML}M_L$	0.083	0.131	0.160	0.274	-1.44	0.922
$P_{MM}M_L$	0.658	0.222	0.623	0.278	0.560	0.289
$P_{MH}M_L$	0.952	0.060	0.955	0.084	-0.145	0.558
$P_{HH}M_L$	0.963	0.092	0.966	0.099	-0.109	0.543
$P_{LL}M_H$	0.067	0.139	0.019	0.419	1.88	0.034
$P_{ML}M_H$	0.099	0.178	0.040	0.087	1.69	0.049
$P_{MM}M_H$	0.652	0.226	0.538	0.291	1.76	0.042
$P_{MH}M_H$	0.969	0.055	0.995	0.205	-2.52	0.992
$P_{HH}M_H$	0.992	0.026	0.997	0.015	-1.05	0.850

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Table S5. Means (SD) of parameter estimates of the ex-Gaussian model applied on RT data across the 10 choice conditions for ADHD and control groups.

Parameter	Choice condition	ADHD		Control		t(ADHD vs.Control)	P(FDR), one-tailed
		Mean	SD	Mean	SD		
μ	$P_{LL}M_L$	1292	385	1124	343	1.84	0.073
	$P_{ML}M_L$	1348	463	1149	411	1.83	0.073
	$P_{MM}M_L$	1379	411	1320	426	0.565	0.410
	$P_{MH}M_L$	1123	336	1087	333	0.424	0.421
	$P_{HH}M_L$	1060	303	883	213	2.69	0.047
	$P_{LL}M_H$	1222	384	1022	281	2.38	0.052
	$P_{ML}M_H$	1246	385	1090	262	1.89	0.073
	$P_{MM}M_H$	1310	498	1289	389	0.191	0.472
	$P_{MH}M_H$	1133	378	1040	355	1.01	0.263
	$P_{HH}M_H$	922	189	948	183	-0.557	0.710
σ	$P_{LL}M_L$	258	240	171	168	1.68	0.120
	$P_{ML}M_L$	277	288	171	247	1.58	0.120
	$P_{MM}M_L$	316	277	305	288	0.158	0.486
	$P_{MH}M_L$	200	211	208	184	-0.163	0.564
	$P_{HH}M_L$	192	213	89	113	2.41	0.073
	$P_{LL}M_H$	279	302	129	231	2.24	0.073
	$P_{ML}M_H$	208	252	181	198	0.483	0.398
	$P_{MM}M_H$	254	290	224	217	0.474	0.398
	$P_{MH}M_H$	227	227	146	175	1.60	0.120
	$P_{HH}M_H$	123	139	106	82.9	0.600	0.398
τ	$P_{LL}M_L$	297	237	322	286	-0.388	0.712
	$P_{ML}M_L$	280	278	303	220	-0.364	0.712
	$P_{MM}M_L$	357	270	316	294	0.584	0.702
	$P_{MH}M_L$	333	284	235	212	1.58	0.302
	$P_{HH}M_L$	281	220	307	176	-0.517	0.712
	$P_{LL}M_H$	290	301	326	214	-0.561	0.712
	$P_{ML}M_H$	395	289	332	241	0.942	0.584
	$P_{MM}M_H$	404	283	409	301	-0.075	0.712

$P_{MH}M_H$	261	240	286	185	-0.462	0.712
$P_{HH}M_H$	300	206	198	167	2.18	0.165

Result S1. Behavioral Response Time Ex-Gaussian Parameters

The σ component reflecting RT variance (Figure S1A) also showed significant main effects of probability ($F_{4,620} = 6.90$, $p < 0.001$) and group ($F_{1,620} = 11.5$, $p < 0.001$) with no significant interactions. Simple effects analysis revealed higher RT variance for P_{MM} (mean (SD): 275 (269) ms) than P_{HH} (mean (SD): 128 (149) ms; $P_{MM} – P_{HH}$: $t_{198}= 5.39$, p(FDR) < 0.001) and P_{LL} (mean (SD): 209 (245) ms; $P_{MM} – P_{LL}$: $t_{252}= 2.03$, p(FDR) = 0.022) conditions, and higher RT variance for adult with ADHD (mean (SD): 233 (250) ms) than controls (mean (SD): 173 (205) ms; ADHD – Control: $t_{614}= 3.34$, p(FDR) < 0.001). Finally, the τ exponential component (Figure S1B) showed a significant main effect of probability ($F_{4,620} = 3.36$, $p = 0.010$) with greater positive skew for P_{MM} (mean (SD): 371 (286) ms) than P_{HH} (mean (SD): 272 (196) ms; $P_{MM} – P_{HH}$; $t_{225}= 3.25$, p(FDR) < 0.001) and P_{LL} (mean (SD): 309 (259) ms; $P_{MM} – P_{LL}$; $t_{252}= 1.82$, p(FDR) = 0.034) probability conditions with no effects of group or interactions.

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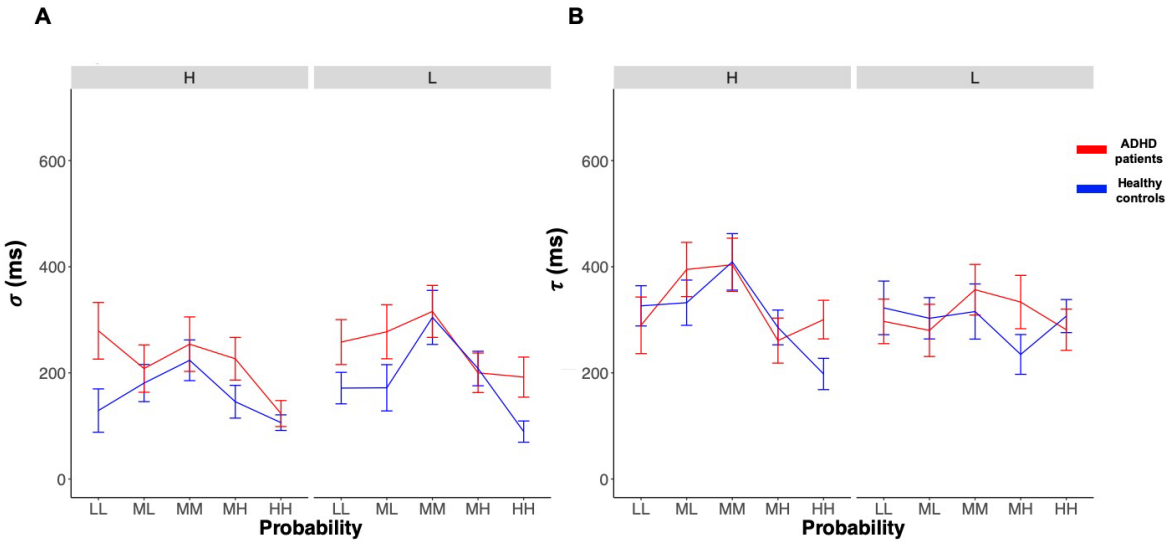

Figure S1. Mean ex-Gaussian parameters σ and τ (μ is shown in Figure 1C) across the different levels of probability to win (or lose) and points magnitudes for ADHD patients and healthy controls. Error bars denote S.E.M.

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Table S6. Coordinates in MNI template space and accompanying statistics of cluster peak voxels that showed significantly higher mean neural activity in the choice phase for healthy controls than ADHD patients. The whole-brain cluster-wise significance threshold was set at $p < 0.05$ adjusted for multiple comparisons using family-wise error rate.

					MNI coordinate		
Regions	**H**	**BA**	**Voxels**	**t score**	**x**	**y**	**z**
Medial Frontal gyrus*[1]	L	6	25	4.51	-3	9	52
Inferior parietal lobule	R	7	16	4.14	36	-51	52
Precentral gyrus	L	6	40	4.03	-36	-18	68
Middle Frontal gyrus*[2]	L	46	24	3.99	-39	33	20
Insula	L	6	14	3.88	-39	-3	16
Inferior frontal gyrus*[3]	R	9	57	3.81	39	27	24
Middle frontal gyrus	L	6	20	3.68	-30	6	56

*Brain areas submitted to ROI analyses; [1]DMPFC: dorsomedial prefrontal cortex, [2]L DLPFC: left dorsolateral prefrontal cortex, [3]R DLPFC: right dorsolateral prefrontal cortex.

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Table S7. Coordinates in MNI template space and accompanying statistics of cluster peak voxels that showed significantly negative linear probability effects in the choice phase neural responses for both ADHD and control groups in the whole-brain repeated measures ANOVA. The whole-brain cluster-wise significance threshold was set at $p < 0.05$ adjusted for multiple comparisons using family-wise error rate.

					MNI coordinate		
Regions	**H**	**BA**	**Voxels**	**t score**	**x**	**y**	**z**
Lingual gyrus	R	18	171	-6.47	18	-72	-4
Postcentral gyrus	L	4	666	-6.44	-39	-24	56
Middle temporal gyrus	L	21	483	-5.08	-60	-48	0
Middle occipital gyrus	R	39	272	-4.80	33	-72	20
Supplementary motor area*	L	6	82	-4.75	-3	9	52
Supplementary motor area*	R	6	43	-3.85	3	9	48
Inferior frontal gyrus (tri.)*	L	45	73	-3.82	-48	24	16
Putamen*	L	49	46	-3.81	-18	9	4
Medial Orbitofrontal*[1]	L	32	19	-3.69	-6	30	-12
Superior frontal gyrus*	R	6	23	-3.41	27	-3	68
Superior temporal gyrus	R	41	14	-3.40	51	-9	0

*Brain areas submitted to ROI analyses; [1]VMPFC: ventromedial prefrontal cortex.

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Table S8. Coordinates in MNI template space and accompanying statistics of cluster peak voxels that showed significant interaction effects between probability and magnitude in the choice phase neural responses in the whole-brain repeated measures ANOVA. The whole-brain cluster-wise significance threshold was set at $p < 0.05$ adjusted for multiple comparisons using family-wise error rate.

					MNI coordinate		
Regions	**H**	**BA**	**Voxels**	**F score**	**x**	**y**	**z**
Fusiform gyrus	L	19	1134	13.99	-33	-78	-20
Superior Parietal lobule	R	7	76	9.05	42	-54	56
Supramarginal gyrus	R	40	332	8.61	54	-27	28
Insula	R		23	7.36	36	-12	24
Superior Temporal gyrus	L		131	6.92	-45	-42	16
Precentral gyrus	R	6	73	6.88	51	-12	44
Superior Temporal gyrus	R	19	18	6.35	60	-60	12
Precuneus	R		54	6.22	15	-45	56
Precuneus	L	31	22	5.88	-9	-42	48

Table S9. Coordinates in MNI template space and accompanying statistics of cluster peak voxels showing a significant effect of accept and lose (AL) in the whole-brain repeated measures ANOVA. Whole-brain cluster-wise significance threshold was set at $p < 0.05$ adjusted for multiple comparisons using family-wise error rate.

					MNI coordinates		
Regions	**H**	**BA**	**Voxels**	**Z test**	**x**	**y**	**z**
Supramarginal gyrus	R	40	114	4.08	63	-18	20
Fusiform gyrus	L	37	246	4.04	-36	-57	-20
Hippocampus	L	54	33	3.74	-21	-18	-12
Precuneus	L	7	30	3.59	-6	-81	44
Precuneus	L	7	88	3.59	-3	-45	56
Precuneus	R	31	54	3.57	3	-45	56
Putamen	R		20	3.46	33	9	-8
Inferior frontal gyrus (oper.)	L	44	45	3.43	-57	12	4
Hippocampus	R		29	3.37	21	-15	-8
Superior temporal gyrus	R	44	22	3.31	51	15	-4

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Method S5. fMRI Functional ROI Model Comparison Analysis

To further evaluate the VMPFC differential group response to probability, we applied a third model-based subject-level GLM to quantify voxel-wise estimates of neural responses to trial-wise continuous variations in EV for ROI analyses. This subject-level GLM included one regressor for all choice event onsets convolved with the HRF, three regressors that modulated the choice event regressor by trial-wise EV, Var (to model uncertainty; Method S4), and previous trial cumulative scores, and four regressors for the outcome phase condition onsets convolved with the HRF. Critically, we evaluated whether choice phase neural EV sensitivity in identified ROIs predicted LCT acceptance behavior in ADHD relative to the control group beyond the contribution of stimuli value information using model comparisons as well as how they were related to ADHD clinical severity (see below).

For the model comparison analysis, for each ROI from the main exploratory whole-brain results, we applied a logistic regression full model that predicted binary acceptance responses (accept = 1, reject = 0) based on trial-wise stimuli EV, the coefficients indexing neural sensitivity to EV of the ROI (based on the above model-based GLM), group, and the interactions between these variables as fixed effects, and subjects as a random effect with age, sex, and drug usage as covariates. We then applied a reduced model that excluded ROI neural sensitivity to EV and compared the likelihood ratios of the full and reduced models. For any given ROI, a significant change in likelihood ratios indicates that the neural sensitivity to EV in that ROI improves the prediction of the individual's propensity to accept or reject an offer beyond just knowing the given stakes in the stimuli. Moreover, examining the regression coefficients of group interactions with stimuli EV and neural sensitivity to EV in the full model reveals how behavior outcome prediction specifically differs between the ADHD and control groups.

Further, we determined how ADHD clinical severity was associated with choice phase neural sensitivity to EV in ROIs. The full model above had a significant contribution beyond the reduced model toward LCT performance. We applied linear mixed-models with neural sensitivity to EV as the outcome variable and clinical severity score and group as fixed effects, subject as the random effect, and age, sex, and drug usage as covariates. Clinical severity scores included Lifetime Inattention, Current Inattention, Lifetime Hyperactivity, Current Hyperactivity, Lifetime Impulsivity, Current Impulsivity, Lifetime Total severity, and Current Total severity (Table S1) and were used in separate models. Note, clinical scores were log-transformed to reduce the effect of skewness in these analyses.

Result S2. Model Comparison Analysis in the VMPFC ROI

The model comparison analysis revealed that a full model with neural sensitivity to EV in VMPFC (EVS_{VMPFC}) significantly improved prediction of trial-wise decision behaviors over and above the reduced model with only stimuli EV information (X^2 (4, N=64) = 10.3, p = 0.036). Specifically, whereas higher EV increased acceptance decisions (EV: β(SEM) = 0.296 (0.067), $t_\beta = 4.37$, $p < 0.001$), the effect of stimuli EV on decisions was modulated by VMPFC sensitivity to EV more in healthy controls than ADHD adults (EV × EVS_{VMPFC} × Group: β(SEM) = -14.0 (6.33), $t_\beta = -2.22$, p = 0.027) (Table S9). Moreover, the effect of K-SADS-E Current Total Severity on EVS_{VMPFC} significantly interacted with group ($t_{50} = 2.03$, p = 0.048) such that there was a negative association between severity with EVS_{VMPFC} in ADHD adults (β (SEM) = -0.019 (0.011)) but a smaller positive association in healthy controls (β (SEM) = 0.005 (0.006)). Associations between EVS_{VMPFC} and other sub-scores are showed in Table S10 and Figure S2 for interested readers. Associations between LCT acceptance decisions and other clinical scores with neural sensitivity to EV in the other ROIs were not significant.

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Table S10. Regression coefficients of the full model of the effect of trial-wise expected value (EV), ventromedial prefrontal (VMPFC) neural sensitivity to EV (EVS_{VMPFC}), group (ADHD = -1; Control = 1), and their interactions effects on lottery choice task (LCT) binary decision responses (Accept = 1; Reject = 0).

Regressor	Coefficient, β	SEM_β	t_β	p
Intercept	-0.706	0.450	-1.57	0.116
EV	0.296	0.067	4.37	< 0.001 ***
EVS_{VMPFC}	8.69	5.29	1.64	0.100
Group	0.155	0.190	0.816	0.415
EV × EVS_{VMPFC}	-0.769	2.88	-0.267	0.790
EVS_{VMPFC} × Group	-1.00	9.90	-0.101	0.919
EV × Group	0.075	0.093	0.811	0.417
EV × EVS_{VMPFC} × Group	-14.0	6.33	-2.22	0.027 *

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Table S11. Statistical details of contrasts performed on coefficient (s.e.m., in parentheses) from the linear regression model of neural sensitivity to the expected value in VMPFC ROI (EVS_{VMPFC}). Contrasts are shown for the group, log-transformed clinical score (All, ADHD, and HC), and their interactions separately for each clinical score (each row).

	Group	**Score**	**Group * Score**	**Score$_{ADHD}$**	**Score$_{HC}$**
Lifetime Inattention	-0.0169 (0.0789)	-0.00451 (0.0356)	0.00801 (0.0365)	-0.00189 (0.0438)	0.00330 (0.00572)
Current Inattention	-0.0418 (0.0204) *	-0.0161 (0.00915) .	0.0252 (0.0133) .	-0.0161 (0.0108)	0.00922 (0.00800)
Lifetime Hyperactivity	-0.00715 (0.0124)	-0.000235 (0.00773)	0.00447 (0.0133)	0.000283 (0.00929)	0.00199 (0.00941)
Current Hyperactivity	-0.0132 (0.0105)	-0.00595 (0.00709)	0.00581 (0.0165)	-0.00607 (0.00856)	-0.00526 (0.0130)
Lifetime Impulsivity	-0.0164 (0.0117)	-0.0111 (0.0109)	0.0129 (0.0212)	-0.0104 (0.0130)	0.00208 (0.0159)
Current Impulsivity	-0.0151 (0.00720) *	-0.0143 (0.00684) *	0.0159 (0.0189)	-0.0140 (0.00798) .	0.00208 (0.0159)
Lifetime Total Severity	-0.0343 (0.0496)	-0.0102 (0.0186)	0.0132 (0.0196)	-0.00868 (0.0226)	0.00268 (0.00476)
Current Total Severity	-0.0548 (0.0250) *	-0.0188 (0.00969).	0.0246 (0.0121) *	-0.0185 (0.0114)	0.00540 (0.00626)

* denotes p(unc.) < 0.05, two-tailed; . denotes p(unc.) < 0.1, two-tailed.

Appendix 1 to Lee C-Y, Goh JOS, Gau SS-F. Differential neural processing of value during decision-making in adults with attention-deficit/hyperactivity disorder and healthy controls. *J Psychiatry Neurosci* 2023. doi: 10.1503/jpn.220123.

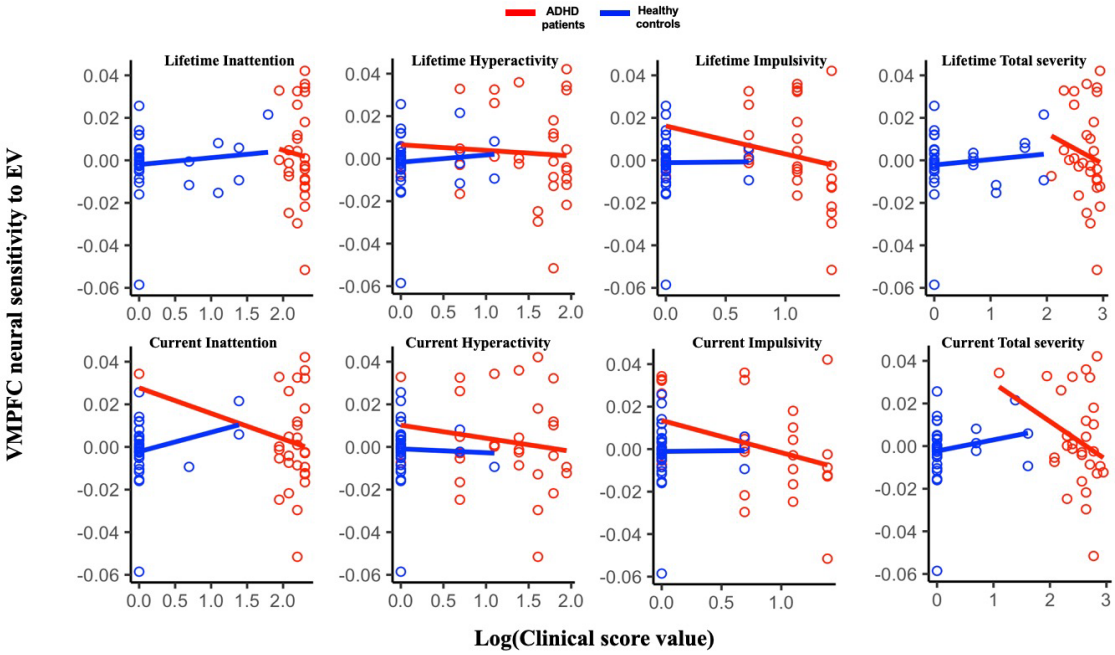

Figure S2. A) Scatterplots depicting correlations between individual Ventromedial Prefrontal Cortex (VMPFC) neural sensitivity to expected value and different clinical score (log transformed) in ADHD patients (red) and healthy controls (blue).

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Supplementary Bibliography

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