

Lopez, D.A. et al.: The longitudinal association between reward processing and symptoms of video game addiction in the Adolescent Brain Cognitive Development Study

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Supplementary materials

Figure S1. ABCD Gaming Addiction Questionnaire

1. I spend a lot of time thinking about playing video games.
2. I feel the need to play video games more and more.
3. I play video games so I can forget about my problems.
4. I've tried to play video games less but I can't.
5. I've become stressed or upset if I am not allowed to play video games.
6. I play video games so much that it has had a bad effect on my schoolwork or job.

Possible response choices: 0 = Never, 1 = Very Rarely, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often

Figure S2. Contrasts in the Monetary Incentive Delay task

Contrast	Condition A	Condition B
1. Anticipation of reward vs. neutral	1. Anticipation of large reward/ Anticipation of small reward	1. Anticipation of no loss or reward
2. Anticipation of loss vs. neutral	2. Anticipation of large loss/ Anticipation of small loss	2. Anticipation of no loss or reward
3. Reward positive vs. negative feedback	3. Large reward with positive feedback/Small reward with positive feedback	3. Large reward with negative feedback/Small reward with negative feedback
4. Loss positive vs. negative feedback	4. Large loss with positive feedback/ Small loss with positive feedback	4. Large loss with negative feedback/ Small loss with negative feedback
5. Anticipation of large reward vs. neutral	5. Anticipation of large reward	5. Anticipation of no loss or reward
6. Anticipation of small reward vs. neutral	6. Anticipation of small reward	6. Anticipation of no loss or reward
7. Anticipation of large reward vs. small reward	7. Anticipation of large reward	7. Anticipation of small reward
8. Anticipation of large loss vs. neutral	8. Anticipation of large loss	8. Anticipation of no loss or reward
9. Anticipation of small loss vs. neutral	9. Anticipation of small loss	9. Anticipation of no loss or reward
10. Anticipation of large loss vs. small loss	10. Anticipation of large loss	10. Anticipation of small loss

Figure S3. MID task contrasts of conditions

Contrast	Condition A	Condition B
1. Anticipation of large reward vs. neutral	1. Anticipation of large reward	1. Anticipation of no loss or reward
2. Anticipation of large loss vs. neutral	2. Anticipation of large loss	2. Anticipation of no loss or reward
3. Reward positive vs. negative feedback	3. Large reward with positive feedback/ Small reward with positive feedback	3. Large reward with negative feedback/ Small reward with negative feedback
4. Loss positive vs. negative feedback	4. Large loss with positive feedback/ Small loss with positive feedback	4. Large loss with negative feedback/ Small loss with negative feedback

Figure S4. Pre-processing and post-processing task-specific quality control

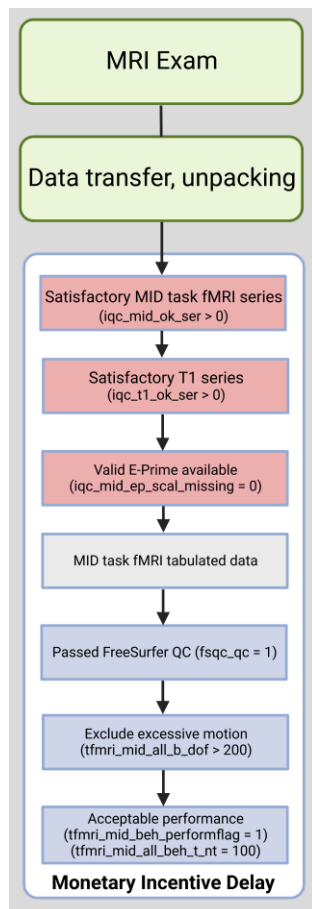


Table S1. Distribution of covariates and missing MID task-fMRI

	MID Task Included (n=6744)	MID Task Excluded (n=4229)	p-value
Age of child (months(SD))	143.57 (7.83)	145.51 (8.19)	<0.001
Child gender			0.005
Male	3610 (53.5)	2146 (50.7)	
Female	3134 (46.5)	2083 (49.3)	
Race/ethnicity of child			<0.001
Asian	116 (1.7)	115 (2.7)	
Black	847 (12.6)	714 (16.9)	
Hispanic	1280 (19.0)	884 (20.9)	
White	3809 (56.5)	2052 (48.5)	
Other	692 (10.3)	464 (11.0)	
Household Income (\$)			<0.001
<50,000	1710 (25.4)	1149 (27.2)	
50,000 to <100,000	1879 (27.9)	1014 (24.0)	
≥100,000	2653 (39.3)	1690 (40.0)	
Do not know	253 (3.8)	175 (4.1)	
Refuse to answer	249 (3.7)	201 (4.8)	
Household Educational Attainment			<0.001
< HS Diploma	392 (5.8)	264 (6.2)	
HS Diploma/GED	618 (9.2)	492 (11.6)	
Some College	1997 (29.6)	1181 (27.9)	
Bachelor	1997 (29.6)	1168 (27.6)	
Post Graduate Degree	1730 (25.7)	1118 (26.4)	
Neighborhood Safety			0.701
Strongly Disagree	158 (2.3)	93 (2.2)	
Disagree	326 (4.8)	191 (4.6)	
Neutral	1220 (18.1)	728 (17.4)	
Agree	2173 (32.2)	1393 (33.2)	
Strongly Agree	2865 (42.5)	1790 (42.7)	
KSADS ADHD Diagnosis (Present)			0.692
Yes	370 (5.6)	235 (5.8)	
No	6295 (94.4)	3850 (94.2)	
Parental Monitoring (mean(SD))	4.49 (0.46)	4.48 (0.47)	0.128
VGAQ score	6.35 (6.20)	6.62 (6.56)	0.07

Note: Distributions are presented as n (%), except where noted.

Table S2. Distribution of covariates and missing VGAQ score

	Missing VGAQ (n=2923)	Not Missing VGAQ (n=8050)	p-value
Age of child (months(SD))	144.27 (7.99)	144.34 (8.04)	0.71
Child sex			<0.001
Male	870 (29.8)	4886 (60.7)	
Female	2053 (70.2)	3164 (39.3)	
Race/ethnicity of child			<0.001
Asian	78 (2.7)	153 (1.9)	
Black	320 (10.9)	1241 (15.4)	
Hispanic	537 (18.4)	1627 (20.2)	
White	1700 (58.2)	4161 (51.7)	
Other	288 (9.9)	868 (10.8)	
Household Income (\$)			<0.001
<50,000	667 (22.8)	2192 (27.2)	
50,000 to <100,000	742 (25.4)	2151 (26.7)	
≥100,000	1294 (44.3)	3049 (37.9)	
Do not know	104 (3.6)	324 (4.0)	
Refuse to answer	116 (4.0)	334 (4.1)	
Household Educational Attainment			<0.001
< HS Diploma	155 (5.3)	501 (6.2)	
HS Diploma/GED	246 (8.4)	864 (10.7)	
Some College	720 (24.6)	2458 (30.5)	
Bachelor	907 (31.0)	2258 (28.0)	
Post Graduate Degree	889 (30.4)	1959 (24.3)	
Neighborhood Safety			0.701
Strongly Disagree	59 (2.0)	192 (2.4)	
Disagree	123 (4.2)	394 (4.9)	
Neutral	434 (15.0)	1514 (18.8)	
Agree	923 (31.8)	2643 (32.9)	
Strongly Agree	1359 (46.9)	3296 (41.0)	
KSADS ADHD Diagnosis (Present)			0.692
Yes	133 (4.6)	472 (6.0)	
No	2735 (95.4)	7410 (94.0)	
Parental Monitoring (mean(SD))	4.56 (0.43)	4.46 (0.48)	<0.001

Note: Distributions are presented as n (%), except where noted.

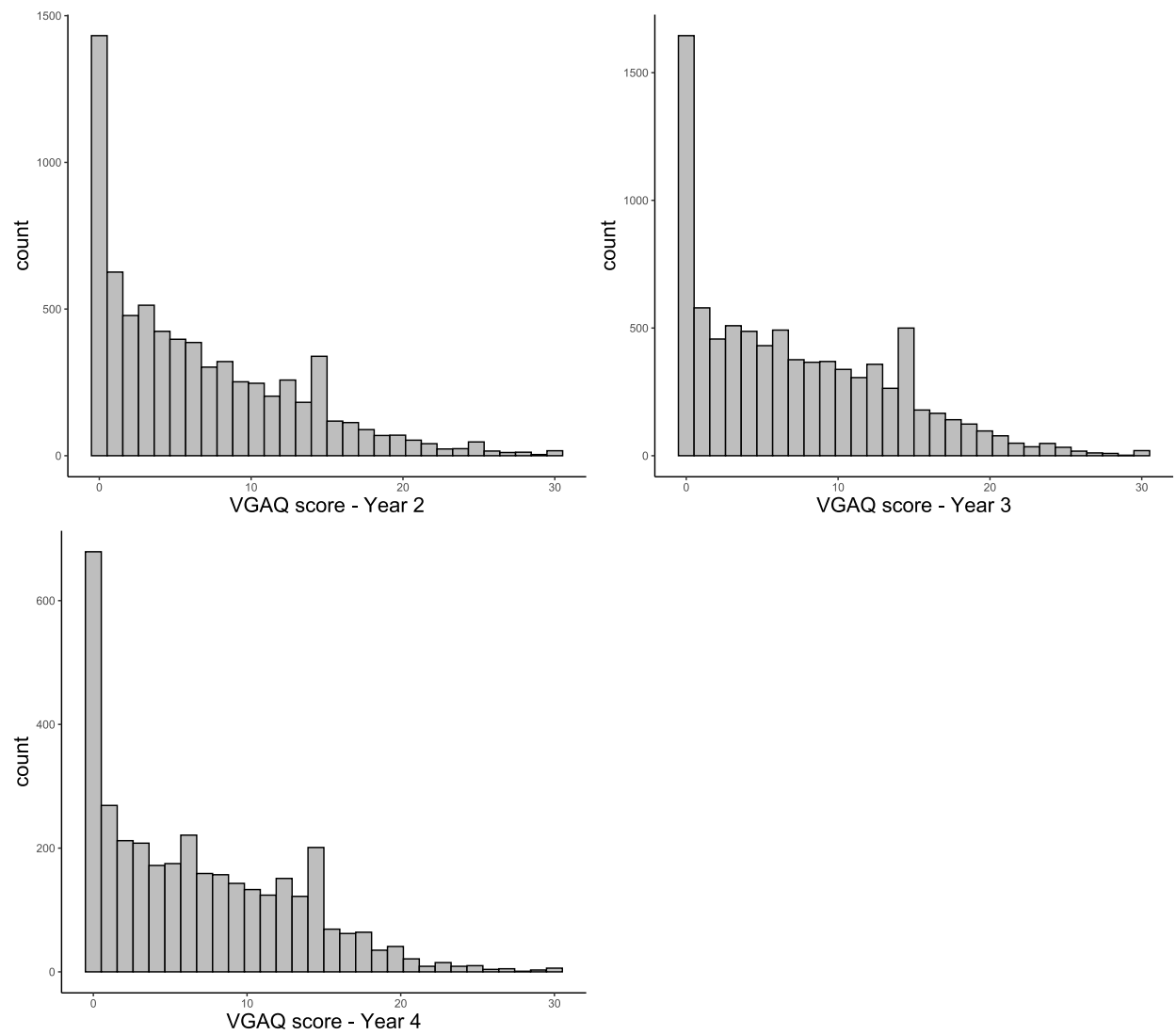


Figure S5. Histogram of the Video Game Addiction questionnaire in the analytic sample

Table S3. Distribution of responses on individual items of the VGAQ across three study visits

	Never	Very Rarely	Rarely	Sometimes	Often	Very Often
1. I spend a lot of time thinking about playing video games	5398 (26.5)	3729 (18.3)	2923 (14.3)	4687 (23.0)	2397 (11.7)	1268 (6.2)
2. I feel the need to play video games more and more	9200 (45.1)	3399 (16.7)	3679 (18.0)	2630 (12.9)	900 (4.4)	586 (2.9)
3. I play video games so I can forget about my problems.	10070 (49.4)	2546 (12.5)	2096 (10.3)	3042 (14.9)	1491 (7.3)	1146 (5.6)
4. I've tried to play video games less but I can't.	12280 (60.3)	2808 (13.8)	2283 (11.2)	1773 (8.7)	703 (3.5)	508 (2.5)
5. I've become stressed or upset if I am not allowed to play video games.	11801 (57.9)	3395 (16.6)	2110 (10.3)	1954 (9.6)	713 (3.5)	419 (2.1)
6. I play video games so much that it has had a bad effect on my schoolwork or job.	14996 (73.6)	2403 (11.8)	1458 (7.2)	1013 (5.0)	303 (1.5)	192 (0.9)