

Supplementary Material

Title: Can deep learning predict human intelligence from structural brain MRI?

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Absolute and Residual IQ Prediction by 2D CNNs

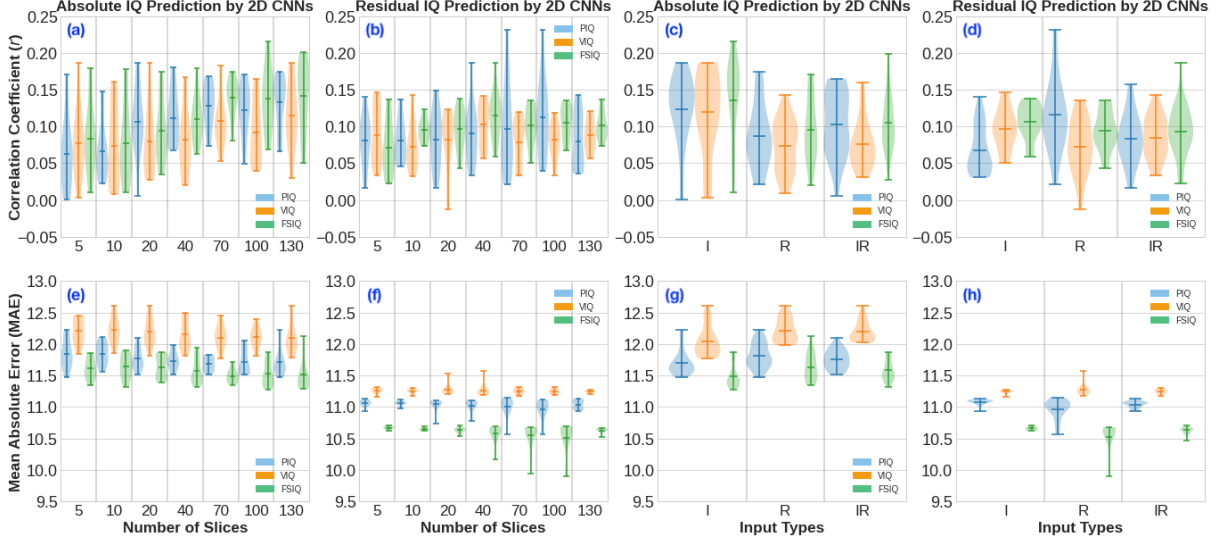


Figure 1: Violin plots showing absolute and residual IQ prediction performance in terms of Pearson correlation coefficient (r) (a-d) and mean absolute error (e-h) by both 2D-ResNet18 and 2D-VGG8 in settings 1 and 2. (a, e) Predicted absolute PIQ, VIQ, and FSIQ scores *vs.* numbers of slices, (b, f) predicted residual PIQ, VIQ, and FSIQ scores *vs.* numbers of slices, (c, g) predicted absolute PIQ, VIQ, and FSIQ scores *vs.* input types, and (d, h) predicted residual PIQ, VIQ, and FSIQ scores *vs.* input types.

Table 1: Absolute IQ prediction performance by 2D-ResNet18 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
1	PIQ	I	5	11.47±9.29	0.171	0.0001
2			10	11.56±9.28	0.148	0.0001
3			20	11.52±9.11	0.186	0.0001
4			40	11.59±9.05	0.181	0.0001
5			70	11.51±9.22	0.168	0.0001
6			100	11.60±9.09	0.164	0.0001
7			130	11.56±9.16	0.162	0.0001
8	PIQ	R	5	11.71±9.29	0.023	0.5045
9			10	11.75±9.27	0.060	0.0813
10			20	11.64±9.30	0.112	0.0010
11			40	11.68±9.44	0.090	0.0085
12			70	11.63±9.43	0.112	0.0011
13			100	11.57±9.27	0.154	0.0001

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Table 1 – continued from previous page

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
14			130	11.47±9.51	0.174	0.0001
15	PIQ	IR	5	11.65±9.36	0.072	0.0353
16			10	11.76±9.30	0.058	0.0936
17			20	11.66±9.30	0.097	0.0047
18			40	11.51±9.25	0.162	0.0001
19			70	11.54±9.33	0.140	0.0001
20			100	11.51±9.43	0.128	0.0002
21			130	11.67±9.21	0.119	0.0005
22	VIQ	I	5	11.84±9.18	0.186	0.0001
23			10	11.85±9.30	0.161	0.0001
24			20	11.82±9.19	0.187	0.0001
25			40	11.89±9.26	0.158	0.0001
26			70	11.77±9.28	0.183	0.0001
27			100	11.82±9.34	0.157	0.0001
28			130	11.87±9.24	0.176	0.0001
29	VIQ	R	5	12.06±9.25	0.085	0.0130
30			10	12.13±9.40	0.143	0.0001
31			20	12.07±9.33	0.060	0.0795
32			40	11.98±9.44	0.090	0.0088
33			70	12.04±9.28	0.118	0.0006
34			100	12.04±9.48	0.040	0.2495
35			130	12.00±9.40	0.082	0.0169
36	VIQ	IR	5	12.05±9.23	0.105	0.0022
37			10	12.15±9.45	0.046	0.1770
38			20	12.11±9.27	0.065	0.0571
39			40	12.04±9.29	0.069	0.0451
40			70	12.06±9.23	0.090	0.0084
41			100	12.04±9.42	0.067	0.0497
42			130	12.06±9.33	0.069	0.0446
43	FSIQ	I	5	11.35±8.61	0.179	0.0001
44			10	11.32±8.62	0.178	0.0001
45			20	11.39±8.64	0.160	0.0001
46			40	11.37±8.61	0.179	0.0001
47			70	11.35±8.75	0.139	0.0001
48			100	11.28±8.69	0.176	0.0001
49			130	11.29±8.56	0.201	0.0001
50	FSIQ	R	5	11.49±8.79	0.078	0.0234
51			10	11.53±8.74	0.048	0.1624
52			20	11.44±8.64	0.136	0.0001
53			40	11.44±8.74	0.100	0.0035
54			70	11.36±8.86	0.163	0.0001
55			100	11.45±8.92	0.153	0.0001
56			130	11.38±8.77	0.163	0.0001
57	FSIQ	IR	5	11.44±8.76	0.105	0.0022
58			10	11.44±8.87	0.122	0.0004
59			20	11.50±8.68	0.084	0.0144
60			40	11.32±8.85	0.144	0.0001
61			70	11.40±8.75	0.145	0.0001
62			100	11.38±8.79	0.189	0.0001
63			130	11.38±8.85	0.121	0.0004

Table 2: Absolute IQ prediction performance by 2D-ResNet18 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
64	FSIQ	I	5	11.44±8.56	0.156	0.0001
	PIQ			11.58±9.22	0.131	0.0001
	VIQ			12.00±9.20	0.126	0.0002
65	FSIQ	I	10	11.42±8.54	0.166	0.0001
	PIQ			11.65±9.12	0.137	0.0001
	VIQ			12.00±9.34	0.100	0.0034
66	FSIQ	I	20	11.41±8.56	0.174	0.0001
	PIQ			11.61±9.15	0.154	0.0001
	VIQ			12.04±9.18	0.133	0.0001
67	FSIQ	I	40	11.46±8.59	0.135	0.0001
	PIQ			11.67±9.18	0.110	0.0014
	VIQ			12.00±9.24	0.108	0.0015
68	FSIQ	I	70	11.35±8.60	0.174	0.0001
	PIQ			11.58±9.28	0.132	0.0001
	VIQ			12.00±9.28	0.112	0.0010
69	FSIQ	I	100	11.38±8.63	0.155	0.0001
	PIQ			11.64±9.17	0.127	0.0002
	VIQ			11.99±9.23	0.121	0.0004
70	FSIQ	I	130	11.35±8.59	0.178	0.0001
	PIQ			11.58±9.19	0.142	0.0001
	VIQ			11.90±9.29	0.136	0.0001
71	FSIQ	R	5	11.59±8.79	0.097	0.0045
	PIQ			11.85±9.51	0.073	0.0333
	VIQ			12.12±9.39	0.069	0.0431
72	FSIQ	R	10	11.63±8.82	0.020	0.5540
	PIQ			11.78±9.33	0.022	0.5155
	VIQ			12.32±9.37	0.009	0.8025
73	FSIQ	R	20	11.53±8.75	0.089	0.0097
	PIQ			11.71±9.26	0.091	0.0078
	VIQ			12.08±9.52	0.032	0.3459
74	FSIQ	R	40	11.46±8.72	0.096	0.0053
	PIQ			11.74±9.38	0.068	0.0482
	VIQ			11.99±9.38	0.086	0.0120
75	FSIQ	R	70	11.46±8.70	0.106	0.0020
	PIQ			11.65±9.35	0.073	0.0322
	VIQ			12.00±9.28	0.095	0.0054
76	FSIQ	R	100	11.36±8.77	0.130	0.0001
	PIQ			11.53±9.35	0.131	0.0001
	VIQ			12.13±9.40	0.045	0.1895
77	FSIQ	R	130	11.35±8.70	0.171	0.0001
	PIQ			11.59±9.25	0.167	0.0001
	VIQ			11.99±9.40	0.118	0.0006
78	FSIQ	IR	5	11.54±8.65	0.082	0.0166
	PIQ			11.78±9.24	0.046	0.1827
	VIQ			12.13±9.16	0.076	0.0258
79	FSIQ	IR	10	11.56±8.70	0.070	0.0412
	PIQ			11.67±9.30	0.068	0.0486
	VIQ			12.21±9.29	0.039	0.2523

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Table 2 – continued from previous page

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
80	FSIQ	IR	20	11.51±8.69	0.102	0.0030
	PIQ			11.69±9.29	0.104	0.0024
	VIQ			12.05±9.32	0.086	0.0121
81	FSIQ	IR	40	11.45±8.65	0.123	0.0003
	PIQ			11.60±9.38	0.119	0.0005
	VIQ			12.08±9.25	0.086	0.0125
82	FSIQ	IR	70	11.50±8.84	0.081	0.0180
	PIQ			11.58±9.43	0.084	0.0140
	VIQ			12.16±9.31	0.053	0.1218
83	FSIQ	IR	100	11.47±8.60	0.140	0.0001
	PIQ			11.55±9.23	0.146	0.0001
	VIQ			12.11±9.31	0.063	0.0666
84	FSIQ	IR	130	11.50±8.69	0.091	0.0078
	PIQ			11.63±9.33	0.087	0.0115
	VIQ			12.08±9.20	0.092	0.0070

Table 3: Absolute IQ prediction performance by 2D-VGG8 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
85	PIQ	I	5	12.23±9.78	0.005	0.8890
86			10	11.90±9.43	0.050	0.1452
87			20	11.75±9.24	0.118	0.0006
88			40	11.72±9.17	0.116	0.0007
89			70	11.73±9.26	0.113	0.0010
90			100	11.55±9.24	0.171	0.0001
91			130	11.61±9.18	0.150	0.0001
92	PIQ	R	5	11.80±9.41	0.077	0.0252
93			10	12.01±9.51	0.038	0.2717
94			20	11.93±9.38	0.083	0.0152
95			40	11.75±9.28	0.121	0.0004
96			70	11.81±9.47	0.111	0.0011
97			100	12.06±9.37	0.073	0.0325
98			130	12.22±9.58	0.066	0.0532
99	PIQ	IR	5	11.96±9.65	0.063	0.0671
100			10	11.95±9.47	0.035	0.3136
101			20	11.74±9.31	0.158	0.0001
102			40	11.93±9.33	0.149	0.0001
103			70	11.81±9.30	0.162	0.0001
104			100	11.87±9.41	0.123	0.0003
105			130	11.81±9.24	0.155	0.0001
106	VIQ	I	5	12.44±9.69	0.047	0.1752
107			10	12.45±9.29	0.023	0.5007
108			20	12.16±9.61	0.098	0.0044
109			40	11.82±9.33	0.167	0.0001
110			70	11.84±9.44	0.163	0.0001
111			100	11.90±9.42	0.165	0.0001

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Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
112			130	11.79±9.27	0.186	0.0001
113	VIQ	R	5	12.23±9.67	0.094	0.0061
114			10	12.21±9.45	0.094	0.0059
115			20	12.17±9.27	0.123	0.0003
116			40	12.50±9.49	0.020	0.5576
117			70	12.22±9.73	0.099	0.0040
118			100	12.27±9.61	0.104	0.0025
119			130	12.49±9.53	0.113	0.0009
120	VIQ	IR	5	12.33±9.46	0.040	0.2497
121			10	12.02±9.32	0.147	0.0001
122			20	12.37±9.43	0.043	0.2135
123			40	12.44±9.82	0.031	0.3741
124			70	12.29±9.49	0.073	0.0345
125			100	12.19±9.31	0.129	0.0002
126			130	12.23±9.48	0.100	0.0035
127	FSIQ	I	5	11.70±8.96	0.060	0.0782
128			10	11.85±8.98	0.011	0.7547
129			20	11.78±8.93	0.035	0.3090
130			40	11.51±8.71	0.106	0.0019
131			70	11.51±8.53	0.160	0.0001
132			100	11.37±8.79	0.216	0.0001
133			130	11.40±8.74	0.165	0.0001
134	FSIQ	R	5	11.62±9.00	0.074	0.0307
135			10	11.90±8.94	0.036	0.2924
136			20	11.68±8.94	0.074	0.0309
137			40	11.94±9.12	0.075	0.0294
138			70	11.62±8.79	0.122	0.0004
139			100	11.67±8.92	0.120	0.0005
140			130	11.90±9.08	0.080	0.0203
141	FSIQ	IR	5	11.81±9.11	0.028	0.4096
142			10	11.70±8.83	0.089	0.0093
143			20	11.85±9.09	0.062	0.0697
144			40	11.80±8.94	0.096	0.0052
145			70	11.51±9.00	0.128	0.0002
146			100	11.76±8.87	0.093	0.0064
147			130	11.58±8.80	0.124	0.0003

Table 4: Absolute IQ prediction performance by 2D-VGG8 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
148	FSIQ	I	5	11.84±8.89	0.010	0.7643
	PIQ			12.14±9.58	0.001	0.9795
	VIQ			12.45±9.74	0.003	0.9397
149	FSIQ	I	10	11.87±8.91	0.069	0.0432
	PIQ			12.11±9.35	0.086	0.0123
	VIQ			12.60±9.73	0.008	0.8251
	FSIQ			11.84±8.74	0.072	0.0357

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Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
150	PIQ VIQ	I	20	11.91±9.35 12.43±9.54	0.078 0.027	0.0235 0.4289
151	FSIQ PIQ VIQ	I	40	11.49±8.70 11.78±9.33 12.16±9.32	0.119 0.079 0.084	0.0005 0.0213 0.0142
152	FSIQ PIQ VIQ	I	70	11.47±8.78 11.70±9.16 12.17±9.31	0.146 0.147 0.108	0.0001 0.0001 0.0017
153	FSIQ PIQ VIQ	I	100	11.54±8.86 11.74±9.43 12.14±9.57	0.125 0.111 0.097	0.0003 0.0012 0.0046
154	FSIQ PIQ VIQ	I	130	11.36±8.75 11.62±9.31 12.10±9.24	0.161 0.132 0.123	0.0001 0.0001 0.0003
155	FSIQ PIQ VIQ	R	5	11.86±8.89 12.17±9.33 12.41±9.48	0.050 0.021 0.038	0.1447 0.5488 0.2661
156	FSIQ PIQ VIQ	R	10	11.81±9.10 12.07±9.51 12.44±9.50	0.045 0.032 0.035	0.1874 0.3504 0.3055
157	FSIQ PIQ VIQ	R	20	11.83±8.95 11.97±9.33 12.42±9.46	0.093 0.094 0.058	0.0068 0.0063 0.0927
158	FSIQ PIQ VIQ	R	40	11.83±9.05 11.98±9.54 12.38±9.64	0.063 0.068 0.048	0.0657 0.0479 0.1591
159	FSIQ PIQ VIQ	R	70	11.71±8.81 11.78±9.37 12.45±9.49	0.155 0.163 0.091	0.0001 0.0001 0.0077
160	FSIQ PIQ VIQ	R	100	11.76±8.98 12.00±9.55 12.23±9.63	0.069 0.049 0.055	0.0446 0.1568 0.1061
161	FSIQ PIQ VIQ	R	130	12.12±9.30 12.10±9.49 12.60±9.85	0.051 0.075 0.030	0.1367 0.0297 0.3900
162	FSIQ PIQ VIQ	IR	5	11.64±9.09 11.81±9.58 12.44±9.50	0.080 0.071 0.061	0.0203 0.0396 0.0750
163	FSIQ PIQ VIQ	IR	10	11.64±8.92 11.95±9.37 12.23±9.43	0.080 0.066 0.075	0.0201 0.0545 0.0291
164	FSIQ PIQ VIQ	IR	20	11.87±8.95 12.09±9.57 12.60±9.29	0.053 0.006 0.047	0.1236 0.8540 0.1743
165	FSIQ PIQ VIQ	IR	40	11.72±8.75 11.87±9.30 12.49±9.25	0.088 0.073 0.039	0.0103 0.0337 0.2541
166	FSIQ PIQ VIQ	IR	70	11.59±8.82 11.83±9.32 12.20±9.50	0.152 0.138 0.112	0.0001 0.0001 0.0011
167	FSIQ PIQ VIQ	IR	100	11.87±8.94 11.94±9.41 12.40±9.74	0.083 0.089 0.058	0.0159 0.0098 0.0928
	FSIQ			11.51±8.67	0.199	0.0001

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Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
168	PIQ	IR	130	11.73±9.42	0.165	0.0001
	VIQ			12.03±9.50	0.160	0.0001

Table 5: Residual IQ prediction performance by 2D-ResNet18 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
169	PIQ	I	5	10.94±9.05	0.140	0.0001
170			10	11.02±8.99	0.119	0.0005
171			20	11.06±8.94	0.115	0.0008
172			40	11.05±8.96	0.114	0.0008
173			70	11.07±9.01	0.076	0.0258
174			100	11.07±9.01	0.088	0.0101
175			130	11.09±9.03	0.036	0.2996
176	PIQ	R	5	11.05±8.98	0.105	0.0021
177			10	10.98±8.97	0.137	0.0001
178			20	11.08±9.01	0.065	0.0565
179			40	11.08±8.96	0.110	0.0014
180			70	10.94±9.02	0.138	0.0001
181			100	10.91±8.99	0.162	0.0001
182			130	10.96±9.07	0.117	0.0007
183	PIQ	IR	5	11.06±9.01	0.088	0.0104
184			10	11.04±9.23	0.083	0.0159
185			20	11.08±9.13	0.043	0.2068
186			40	11.04±9.14	0.063	0.0674
187			70	11.02±9.04	0.106	0.0019
188			100	10.94±9.07	0.157	0.0001
189			130	10.93±9.09	0.143	0.0001
190	VIQ	I	5	11.16±8.99	0.146	0.0001
191			10	11.23±9.03	0.107	0.0018
192			20	11.25±9.03	0.098	0.0042
193			40	11.19±9.00	0.141	0.0001
194			70	11.24±9.02	0.095	0.0057
195			100	11.19±9.04	0.119	0.0005
196			130	11.24±8.97	0.121	0.0004
197	VIQ	R	5	11.18±8.99	0.136	0.0001
198			10	11.22±9.08	0.085	0.0135
199			20	11.21±9.06	0.107	0.0018
200			40	11.21±9.03	0.114	0.0009
201			70	11.21±9.00	0.120	0.0004
202			100	11.24±9.10	0.082	0.0167
203			130	11.25±9.00	0.105	0.0021
204	VIQ	IR	5	11.24±8.98	0.108	0.0016
205			10	11.17±8.97	0.143	0.0001
206			20	11.26±8.97	0.123	0.0003
207			40	11.24±9.00	0.120	0.0004
208			70	11.25±9.09	0.052	0.1320
209			100	11.22±9.12	0.094	0.0062

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Table 5 – continued from previous page

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
210			130	11.21±9.09	0.078	0.0231
211	FSIQ	I	5	10.63±8.41	0.128	0.0002
212			10	10.64±8.40	0.123	0.0003
213			20	10.62±8.35	0.138	0.0001
214			40	10.64±8.39	0.127	0.0002
215			70	10.63±8.43	0.129	0.0002
216			100	10.62±8.47	0.099	0.0037
217			130	10.63±8.40	0.137	0.0001
218	FSIQ	R	5	10.68±8.50	0.059	0.0877
219			10	10.64±8.48	0.081	0.0182
220			20	10.59±8.54	0.098	0.0044
221			40	10.62±8.49	0.099	0.0040
222			70	10.63±8.50	0.084	0.0149
223			100	10.62±8.51	0.078	0.0227
224			130	10.63±8.48	0.104	0.0024
225	FSIQ	IR	5	10.63±8.51	0.085	0.0131
226			10	10.64±8.48	0.089	0.0093
227			20	10.67±8.45	0.080	0.0199
228			40	10.47±8.39	0.186	0.0001
229			70	10.67±8.46	0.066	0.0539
230			100	10.60±8.57	0.081	0.0183
231			130	10.65±8.49	0.086	0.0124

Table 6: Residual IQ prediction performance by 2D-ResNet18 in setting 2. MAE and correlation coefficient r are averaged over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
232	FSIQ	I	5	10.63±8.37	0.137	0.0001
	PIQ			11.12±8.90	0.113	0.0009
	VIQ			11.24±8.92	0.132	0.0001
233	FSIQ	I	10	10.68±8.40	0.100	0.0036
	PIQ			11.07±9.04	0.067	0.0525
	VIQ			11.27±9.05	0.055	0.1086
234	FSIQ	I	20	10.64±8.38	0.122	0.0004
	PIQ			11.06±8.98	0.100	0.0037
	VIQ			11.25±8.96	0.113	0.0010
235	FSIQ	I	40	10.70±8.39	0.091	0.0078
	PIQ			11.09±9.02	0.046	0.1783
	VIQ			11.28±9.03	0.063	0.0679
236	FSIQ	I	70	10.67±8.41	0.099	0.0038
	PIQ			11.11±9.00	0.041	0.2365
	VIQ			11.26±9.00	0.097	0.0045
237	FSIQ	I	100	10.70±8.44	0.067	0.0494
	PIQ			11.11±9.03	0.039	0.2575
	VIQ			11.21±9.09	0.081	0.0185
238	FSIQ	I	130	10.67±8.43	0.088	0.0102
	PIQ			11.13±8.99	0.039	0.2599

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Table 6 – continued from previous page

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
	VIQ			11.27±9.04	0.056	0.1030
239	FSIQ	R	5	10.67±8.41	0.102	0.0030
	PIQ			11.12±8.95	0.080	0.0191
	VIQ			11.28±8.98	0.084	0.0140
240	FSIQ	R	10	10.67±8.48	0.086	0.0123
	PIQ			11.12±9.00	0.051	0.1412
	VIQ			11.26±9.08	0.054	0.1147
241	FSIQ	R	20	10.66±8.53	0.079	0.0219
	PIQ			11.09±8.95	0.104	0.0025
	VIQ			11.26±9.11	0.015	0.6645
242	FSIQ	R	40	10.63±8.37	0.086	0.0536
	PIQ			10.78±8.97	0.082	0.0631
	VIQ			11.57±9.22	0.057	0.2012
243	FSIQ	R	70	10.28±8.50	0.050	0.3554
	PIQ			11.15±9.31	0.021	0.6998
	VIQ			11.29±8.79	0.035	0.5157
244	FSIQ	R	100	09.90±8.55	0.119	0.1224
	PIQ			10.69±9.48	0.127	0.0991
	VIQ			11.32±9.18	0.081	0.2932
245	FSIQ	R	130	10.63±8.49	0.084	0.0140
	PIQ			11.11±9.08	0.042	0.2178
	VIQ			11.25±9.05	0.074	0.0313
246	FSIQ	IR	5	10.71±8.48	0.051	0.1402
	PIQ			11.13±9.05	0.016	0.6311
	VIQ			11.30±9.03	0.056	0.1034
247	FSIQ	IR	10	10.63±8.45	0.098	0.0043
	PIQ			11.09±9.13	0.046	0.1833
	VIQ			11.28±9.04	0.063	0.0653
248	FSIQ	IR	20	10.59±8.46	0.116	0.0007
	PIQ			11.08±9.01	0.085	0.0129
	VIQ			11.29±8.95	0.109	0.0014
249	FSIQ	IR	40	10.56±8.56	0.135	0.0001
	PIQ			11.07±9.00	0.111	0.0012
	VIQ			11.23±8.97	0.129	0.0002
250	FSIQ	IR	70	10.67±8.40	0.097	0.0046
	PIQ			11.06±9.02	0.080	0.0203
	VIQ			11.31±9.03	0.033	0.3334
251	FSIQ	IR	100	10.65±8.43	0.124	0.0003
	PIQ			11.12±9.03	0.095	0.0056
	VIQ			11.23±9.01	0.107	0.0018
252	FSIQ	IR	130	10.65±8.40	0.100	0.0034
	PIQ			11.07±9.03	0.070	0.0427
	VIQ			11.23±9.01	0.103	0.0027

Table 7: Residual IQ prediction performance by 2D-VGG8 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
253	PIQ	I	5	11.01±9.04	0.097	0.0048
254			10	11.04±9.00	0.101	0.0031
255			20	11.09±9.03	0.060	0.0805
256			40	11.09±9.02	0.067	0.0498
257			70	11.10±9.02	0.057	0.0942
258			100	11.09±9.03	0.046	0.1795
259			130	11.10±9.03	0.040	0.2490
260	PIQ	R	5	11.04±9.04	0.089	0.0092
261			10	11.06±9.01	0.087	0.0108
262			20	11.05±8.92	0.125	0.0002
263			40	11.00±9.03	0.111	0.0011
264			70	10.93±8.92	0.175	0.0001
265			100	10.98±9.00	0.133	0.0001
266			130	10.98±9.03	0.117	0.0006
267	PIQ	IR	5	11.06±9.05	0.064	0.0627
268			10	11.07±9.06	0.055	0.1091
269			20	11.09±9.08	0.017	0.6174
270			40	11.07±9.04	0.060	0.0810
271			70	10.95±9.07	0.134	0.0001
272			100	10.99±9.03	0.115	0.0008
273			130	10.99±9.04	0.120	0.0005
274	VIQ	I	5	11.24±9.00	0.119	0.0005
275			10	11.25±9.04	0.073	0.0322
276			20	11.24±9.05	0.080	0.0203
277			40	11.24±8.98	0.137	0.0001
278			70	11.21±9.05	0.101	0.0033
279			100	11.26±9.02	0.103	0.0025
280			130	11.26±9.04	0.085	0.0131
281	VIQ	R	5	11.25±9.06	0.063	0.0644
282			10	11.25±9.13	0.032	0.3495
283			20	11.23±8.99	0.107	0.0018
284			40	11.21±9.00	0.117	0.0006
285			70	11.22±9.05	0.093	0.0066
286			100	11.27±9.04	0.064	0.0628
287			130	11.20±9.02	0.120	0.0005
288	VIQ	IR	5	11.27±9.04	0.059	0.0878
289			10	11.25±9.05	0.069	0.0453
290			20	11.27±9.02	0.095	0.0054
291			40	11.22±9.08	0.081	0.0179
292			70	11.17±9.08	0.109	0.0015
293			100	11.23±9.10	0.071	0.0395
294			130	11.24±9.06	0.072	0.0357
295	FSIQ	I	5	10.67±8.42	0.090	0.0088
296			10	10.65±8.40	0.115	0.0008
297			20	10.66±8.38	0.122	0.0004
298			40	10.67±8.40	0.129	0.0002
299			70	10.64±8.41	0.108	0.0017
300			100	10.64±8.41	0.127	0.0002

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Table 7 – continued from previous page

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
301			130	10.64±8.42	0.102	0.0028
302	FSIQ	R	5	10.66±8.54	0.043	0.2117
303			10	10.64±8.44	0.100	0.0036
304			20	10.64±8.54	0.083	0.0153
305			40	10.60±8.55	0.085	0.0136
306			70	10.55±8.55	0.130	0.0002
307			100	10.54±8.52	0.130	0.0001
308			130	10.52±8.54	0.123	0.0003
309	FSIQ	IR	5	10.70±8.50	0.023	0.5090
310			10	10.64±8.47	0.073	0.0325
311			20	10.63±8.57	0.043	0.2136
312			40	10.58±8.43	0.131	0.0001
313			70	10.59±8.45	0.124	0.0003
314			100	10.66±8.47	0.088	0.0102
315			130	10.64±8.49	0.092	0.0070

Table 8: Residual IQ prediction performance by 2D-VGG8 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
316	FSIQ	I	5	10.69±8.44	0.064	0.0637
	PIQ			11.11±9.01	0.040	0.2386
	VIQ			11.28±9.04	0.058	0.0937
317	FSIQ	I	10	10.68±8.39	0.108	0.0015
	PIQ			11.08±9.02	0.058	0.0891
	VIQ			11.27±9.00	0.101	0.0033
318	FSIQ	I	20	10.71±8.43	0.061	0.0753
	PIQ			11.10±9.02	0.032	0.3573
	VIQ			11.26±9.05	0.083	0.0160
319	FSIQ	I	40	10.70±8.42	0.059	0.0845
	PIQ			11.11±9.02	0.034	0.3160
	VIQ			11.25±9.03	0.087	0.0111
320	FSIQ	I	70	10.68±8.39	0.102	0.0030
	PIQ			11.11±9.02	0.031	0.3663
	VIQ			11.27±9.01	0.100	0.0036
321	FSIQ	I	100	10.66±8.42	0.110	0.0014
	PIQ			11.10±9.01	0.059	0.0845
	VIQ			11.26±9.06	0.051	0.1404
322	FSIQ	I	130	10.67±8.39	0.101	0.0033
	PIQ			11.10±9.01	0.051	0.1347
	VIQ			11.24±9.02	0.097	0.0044
323	FSIQ	R	5	10.67±8.51	0.051	0.1397
	PIQ			11.05±9.02	0.088	0.0104
	VIQ			11.32±8.99	0.061	0.0747
324	FSIQ	R	10	10.64±8.49	0.093	0.0067
	PIQ			11.07±8.97	0.097	0.0045
	VIQ			11.31±9.00	0.047	0.1695

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Table 8 – continued from previous page

Exp.	IQ	Data	# of Slices	Mean MAE	r	p -value
325	FSIQ	R	20	10.54±8.45	0.106	0.0163
	PIQ			10.74±8.86	0.149	0.0007
	VIQ			11.53±9.37	-0.013	0.7744
326	FSIQ	R	40	10.17±8.50	0.128	0.0182
	PIQ			10.84±9.30	0.187	0.0005
	VIQ			11.28±8.75	0.073	0.1794
327	FSIQ	R	70	09.94±8.65	0.135	0.0787
	PIQ			10.57±9.43	0.232	0.0023
	VIQ			11.32±9.19	0.033	0.6688
328	FSIQ	R	100	09.90±8.55	0.119	0.1224
	PIQ			10.69±9.48	0.127	0.0991
	VIQ			11.32±9.18	0.081	0.2932
329	FSIQ	R	130	10.65±8.53	0.073	0.0337
	PIQ			11.02±9.09	0.082	0.0169
	VIQ			11.27±9.03	0.061	0.0739
330	FSIQ	IR	5	10.68±8.52	0.022	0.5213
	PIQ			11.07±9.05	0.048	0.1633
	VIQ			11.30±9.04	0.034	0.3264
331	FSIQ	IR	10	10.69±8.45	0.076	0.0272
	PIQ			11.06±9.04	0.069	0.0429
	VIQ			11.28±9.05	0.042	0.2263
332	FSIQ	IR	20	10.64±8.44	0.108	0.0016
	PIQ			11.03±9.06	0.086	0.0126
	VIQ			11.26±9.04	0.067	0.0498
333	FSIQ	IR	40	10.63±8.40	0.122	0.0004
	PIQ			11.00±9.05	0.102	0.0030
	VIQ			11.20±9.02	0.111	0.0012
334	FSIQ	IR	70	10.65±8.59	0.089	0.0098
	PIQ			11.07±9.12	0.073	0.0340
	VIQ			11.27±9.05	0.070	0.0418
335	FSIQ	IR	100	10.58±8.54	0.109	0.0014
	PIQ			10.99±9.16	0.090	0.0088
	VIQ			11.28±8.97	0.093	0.0065
336	FSIQ	IR	130	10.58±8.44	0.127	0.0002
	PIQ			10.96±9.13	0.102	0.0029
	VIQ			11.26±9.02	0.085	0.0131

Absolute and Residual IQ Prediction by 3D CNNs

Table 9: Absolute IQ prediction performance by 3D-ResNet18 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
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Table 9 – continued from previous page

Exp.	IQ	Data	Mean MAE	r	p -value
337	PIQ	I	11.96±9.60	0.118	0.0006
338		R	11.79±9.95	0.191	0.0001
339		IR	11.92±9.74	0.091	0.0082
340	VIQ	I	12.35±9.65	0.168	0.0001
341		R	12.35±9.77	0.138	0.0001
342		IR	12.43±9.76	0.111	0.0012
343	FSIQ	I	11.72±9.01	0.141	0.0001
344		R	11.73±9.04	0.191	0.0001
345		IR	11.67±9.12	0.150	0.0001

Table 10: Absolute IQ prediction performance by 3D-ResNet18 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
346	FSIQ	I	11.76±8.97	0.136	0.0001
	PIQ		12.05±9.69	0.068	0.0463
	VIQ		12.38±9.63	0.166	0.0001
347	FSIQ	R	11.67±9.16	0.192	0.0001
	PIQ		11.89±9.65	0.168	0.0001
	VIQ		12.50±9.90	0.144	0.0001
348	FSIQ	IR	11.73±9.06	0.118	0.0006
	PIQ		11.88±9.66	0.120	0.0005
	VIQ		12.52±9.75	0.088	0.0099

Table 11: Absolute IQ prediction performance by 3D-ResNet50 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
349	PIQ	I	11.98±9.67	0.092	0.0076
350		R	11.93±9.59	0.122	0.0004
351		IR	11.93±9.56	0.142	0.0001
352	VIQ	I	12.38±9.68	0.151	0.0001
353		R	12.45±9.77	0.093	0.0065
354		IR	12.42±9.90	0.069	0.0443
355	FSIQ	I	11.66±9.11	0.134	0.0001
356		R	11.69±9.11	0.119	0.0005
357		IR	11.77±9.20	0.064	0.0632

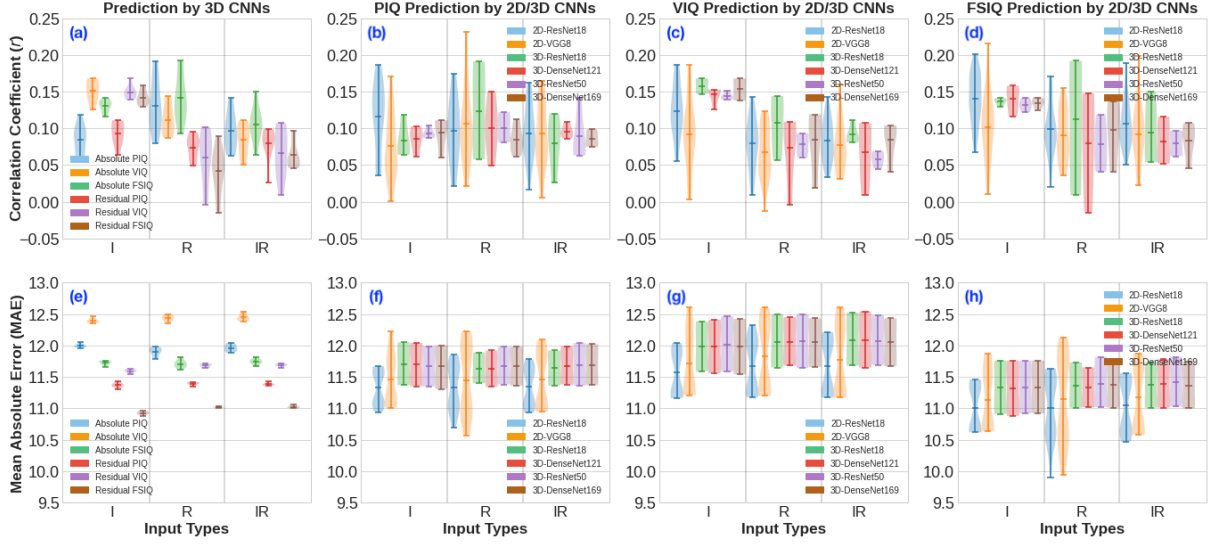


Figure 2: Violin plots showing absolute and residual IQ prediction performance in terms of Pearson correlation coefficient (r) and mean absolute error by 2D and 3D CNNs in settings 1 and 2. (a) Correlation and (e) mean absolute error between the ground truth and absolute/residual PIQ, VIQ, and FSIQ scores *vs.* input types by 3D-ResNet18, 3D-ResNet50, 3D-DenseNet121, and 3D-DenseNet169. (b-d) Correlation and (e-g) mean absolute error between the ground truth and actual/residual PIQ, VIQ, and FSIQ scores *vs.* input types, respectively, by different 2D and 3D CNNs.

Table 12: Absolute IQ prediction performance by 3D-ResNet50 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
358	FSIQ	I	11.76 ± 9.04	0.122	0.0003
	PIQ		11.99 ± 9.66	0.090	0.0084
	VIQ		12.46 ± 9.65	0.142	0.0001
359	FSIQ	R	11.82 ± 9.01	0.093	0.0065
	PIQ		11.98 ± 9.62	0.115	0.0008
	VIQ		12.50 ± 9.71	0.093	0.0068
360	FSIQ	IR	11.82 ± 9.07	0.095	0.0054
	PIQ		12.04 ± 9.60	0.063	0.0672
	VIQ		12.48 ± 9.85	0.064	0.0602

Table 13: Absolute IQ prediction performance by 3D-DenseNet121 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
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Table 13 – continued from previous page

Exp.	IQ	Data	Mean MAE	r	p -value
361	PIQ	I	11.99±9.60	0.092	0.0073
362		R	11.82±9.65	0.150	0.0001
363		IR	11.92±9.68	0.095	0.0055
364	VIQ	I	12.38±9.66	0.153	0.0001
365		R	12.45±9.79	0.087	0.0116
366		IR	12.41±9.80	0.104	0.0023
367	FSIQ	I	11.72±9.08	0.116	0.0007
368		R	11.61±9.15	0.148	0.0001
369		IR	11.74±9.15	0.103	0.0027

Table 14: Absolute IQ prediction performance by 3D-DenseNet121 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
370	FSIQ	I	11.76±9.03	0.133	0.0001
	PIQ		12.04±9.66	0.062	0.0704
	VIQ		12.41±9.75	0.126	0.0002
371	FSIQ	R	11.65±9.16	0.132	0.0001
	PIQ		11.92±9.67	0.108	0.0016
	VIQ		12.40±9.86	0.109	0.0014
372	FSIQ	IR	11.78±9.06	0.116	0.0007
	PIQ		11.99±9.60	0.109	0.0015
	VIQ		12.54±9.76	0.051	0.1369

Table 15: Absolute IQ prediction performance by 3D-DenseNet169 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
373	PIQ	I	11.99±9.69	0.060	0.0827
374		R	11.92±9.79	0.080	0.0198
375		IR	11.98±9.66	0.076	0.0267
376	VIQ	I	12.37±9.65	0.165	0.0001
377		R	12.42±9.76	0.111	0.0012
378		IR	12.38±9.90	0.097	0.0048
379	FSIQ	I	11.70±9.06	0.135	0.0001
380		R	11.72±9.07	0.137	0.0001
381		IR	11.71±9.17	0.092	0.0072

Table 16: Absolute IQ prediction performance by 3D-DenseNet169 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
382	FSIQ	I	11.76 $\pm$ 9.04	0.125	0.0003
	PIQ		12.00 $\pm$ 9.59	0.098	0.0041
	VIQ		12.42 $\pm$ 9.67	0.138	0.0001
383	FSIQ	R	11.75 $\pm$ 9.04	0.123	0.0003
	PIQ		11.98 $\pm$ 9.61	0.113	0.0010
	VIQ		12.43 $\pm$ 9.75	0.119	0.0005
384	FSIQ	IR	11.74 $\pm$ 9.08	0.107	0.0018
	PIQ		12.02 $\pm$ 9.63	0.075	0.0279
	VIQ		12.43 $\pm$ 9.83	0.094	0.0060

Table 17: Residual IQ prediction performance by 3D-ResNet18 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
385	PIQ	I	11.37 $\pm$ 9.58	0.084	0.0140
386		R	11.40 $\pm$ 9.53	0.077	0.0248
387		IR	11.36 $\pm$ 9.57	0.084	0.0145
388	VIQ	I	11.59 $\pm$ 9.54	0.150	0.0001
389		R	11.65 $\pm$ 9.60	0.090	0.0085
390		IR	11.68 $\pm$ 9.58	0.081	0.0184
391	FSIQ	I	10.91 $\pm$ 8.97	0.140	0.0001
392		R	11.02 $\pm$ 9.13	0.009	0.7829
393		IR	11.01 $\pm$ 9.04	0.055	0.1074

Table 18: Residual IQ prediction performance by 3D-ResNet18 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
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Exp.	IQ	Data	Mean MAE	r	p -value
394	FSIQ	I	10.95±8.95	0.130	0.0002
	PIQ		11.43±9.52	0.064	0.0619
	VIQ		11.62±9.55	0.147	0.0001
395	FSIQ	R	11.01±8.99	0.058	0.0913
	PIQ		11.41±9.55	0.058	0.0903
	VIQ		11.70±9.60	0.057	0.0982
396	FSIQ	IR	11.06±8.93	0.054	0.1178
	PIQ		11.43±9.56	0.026	0.4518
	VIQ		11.69±9.56	0.087	0.0110

Table 19: Residual IQ prediction performance by 3D-ResNet50 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
397	PIQ	I	11.37±9.55	0.087	0.0114
398		R	11.38±9.54	0.081	0.0189
399		IR	11.36±9.57	0.080	0.0199
400	VIQ	I	11.59±9.55	0.143	0.0001
401		R	11.64±9.71	0.070	0.0413
402		IR	11.69±9.62	0.055	0.1092
403	FSIQ	I	10.92±8.95	0.130	0.0001
404		R	11.02±8.98	0.041	0.2360
405		IR	11.03±8.94	0.097	0.0046

Table 20: Residual IQ prediction performance by 3D-ResNet50 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
406	FSIQ	I	10.96±8.86	0.142	0.0001
	PIQ		11.35±9.53	0.104	0.0024
	VIQ		11.61±9.52	0.139	0.0001
407	FSIQ	R	11.02±8.98	0.060	0.0823
	PIQ		11.41±9.55	0.083	0.0149
	VIQ		11.71±9.59	0.060	0.0787
408	FSIQ	IR	11.05±8.94	0.062	0.0730
	PIQ		11.42±9.55	0.072	0.0349
	VIQ		11.70±9.61	0.045	0.1945

Table 21: Residual IQ prediction performance by 3D-DenseNet121 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
409	PIQ	I	11.35 $\pm$ 9.60	0.085	0.0130
410		R	11.34 $\pm$ 9.57	0.095	0.0055
411		IR	11.38 $\pm$ 9.53	0.094	0.0059
412	VIQ	I	11.56 $\pm$ 9.55	0.152	0.0001
413		R	11.68 $\pm$ 9.58	0.102	0.0030
414		IR	11.65 $\pm$ 9.56	0.107	0.0017
415	FSIQ	I	10.88 $\pm$ 8.95	0.155	0.0001
416		R	11.02 $\pm$ 9.02	0.053	0.1203
417		IR	11.01 $\pm$ 9.02	0.052	0.1281

Table 22: Residual IQ prediction performance by 3D-DenseNet121 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
418	FSIQ	I	10.92 $\pm$ 8.89	0.158	0.0001
	PIQ		11.42 $\pm$ 9.47	0.103	0.0027
	VIQ		11.60 $\pm$ 9.49	0.153	0.0001
419	FSIQ	R	11.04 $\pm$ 9.01	-0.015	0.6635
	PIQ		11.42 $\pm$ 9.55	0.049	0.1518
	VIQ		11.70 $\pm$ 9.65	-0.004	0.9002
420	FSIQ	IR	11.03 $\pm$ 8.96	0.056	0.1039
	PIQ		11.39 $\pm$ 9.55	0.086	0.0125
	VIQ		11.71 $\pm$ 9.63	0.009	0.7853

Table 23: Residual IQ prediction performance by 3D-DenseNet169 in setting 1. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
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Exp.	IQ	Data	Mean MAE	r	p -value
421	PIQ	I	11.31±9.57	0.111	0.0012
422		R	11.36±9.56	0.085	0.0131
423		IR	11.37±9.53	0.099	0.0040
424	VIQ	I	11.54±9.50	0.168	0.0001
425		R	11.66±9.59	0.088	0.0099
426		IR	11.67±9.54	0.104	0.0023
427	FSIQ	I	10.92±8.99	0.136	0.0001
428		R	11.01±8.96	0.089	0.0098
429		IR	11.00±9.01	0.046	0.1783

Table 24: Residual IQ prediction performance by 3D-DenseNet169 in setting 2. MAE and correlation coefficient (r) are combined over 5-folds. For p -values equal to or smaller than 0.0001 are shown as 0.0001. Acronyms are used as, Exp: experiment number, I: intensity map as input, R: RAVENS map as input, and IR: combined intensity and RAVENS maps as input.

Exp.	IQ	Data	Mean MAE	r	p -value
430	FSIQ	I	10.96±8.88	0.142	0.0001
	PIQ		11.38±9.50	0.110	0.0013
	VIQ		11.63±9.50	0.142	0.0001
431	FSIQ	R	11.02±8.99	0.041	0.2278
	PIQ		11.40±9.56	0.062	0.0701
	VIQ		11.71±9.67	0.019	0.5716
432	FSIQ	IR	11.00±8.95	0.088	0.0103
	PIQ		11.38±9.54	0.092	0.0074
	VIQ		11.72±9.61	0.041	0.2316