

Supplementary Table 1. Comparison of efficacy of DoBrain and general educational apps in children with developmental disabilities

Variable	DoBrain (N=32)			JNKK (N=30)			Group difference in Δ	
	Before	After	Δ^\dagger	Before	After	Δ^\dagger	p-value	Adjusted p-value [†]
PEP-R DQ	53.7±31.9	60.2±26.9	6.5±18.9	50.2±25.7	50.1±28.9	-0.1±15.7	0.024	0.194
Imitation	50.2±35.0	52.5±28.8	2.3±26.8	46.4±26.1	45.4±29.3	-1.0±19.0	0.593	>0.999
Perception	62.3±34.8	62.7±28.5	0.4±24.9	61.9±31.8	52.3±31.7	-9.7±27.4*	0.058	0.460
Fine motor	59.3±26.3	63.1±21.8	3.9±22.6	62.7±30.5	61.2±27.0	-1.5±19.3	0.330	>0.999
Gross motor	78.8±29.5	79.7±21.6	0.9±23.1	73.2±29.8	69.7±30.1	-3.5±28.0	0.914	>0.999
Eye-hand coordination	69.1±24.6	76.4±21.2	7.3±17.6	68.9±26.8	66.4±22.8	-2.5±15.9	0.026	0.205
Cognitive performance	58.1±36.5	66.4±28.3	8.3±24.8	52.3±27.0	52.5±31.8	0.2±18.9	0.063	0.508
Cognitive verbal	56.7±28.4	59.7±27.2	3.0±16.5	48.4±21.7	50.6±26.1	2.3±14.2	0.778	>0.999
VABS ABCS	61.5±13.9	63.6±14.8	2.1±7.4	59.4±14.4	59.4±15.5	0.1±6.4	0.253	>0.999
Communication	62.8±15.2	66.0±19.4	3.3±10.5	60.7±17.8	60.9±17.2	0.2±11.4	0.480	>0.999
Daily living skills	74.8±13.2	74.5±17.4	-0.4±12.8	75.1±15.9	71.3±16.7	-3.8±6.7*	0.026	0.131
Socialization	60.6±16.4	60.1±17.3	-0.6±9.9	60.8±15.5	59.2±17.6	-1.7±8.5	0.413	>0.999
Motor skills	75.1±14.3	75.8±15.4	0.7±11.8	72.0±12.6	73.6±12.6	1.6±8.4	0.826	>0.999
K-CARS	30.7±7.3	29.6±7.1	-1.1±3.5	28.2±8.4	29.6±8.1	1.4±3.2*	0.005	0.005
SRS total score	66.1±15.1	61.5±12.2	-4.6±8.6*	64.6±14.3	61.5±12.5	-3.1±7.4*	0.352	0.352
CBCL								
Emotionally reactive	54.8±6.2	54.2±4.6	-0.6±5.0	53.9±5.3	53.3±4.6	-0.6±4.5	0.749	>0.999
Anxious/depressed	53.8±4.9	53.0±5.2	-0.8±4.1	52.8±5.1	53.2±5.0	0.4±6.4	0.048	0.339
Somatic complaints	54.8±5.9	54.3±5.6	-0.5±5.0	52.9±4.7	53.4±5.3	0.5±4.3	0.575	>0.999
Withdrawn	64.3±6.6	61.8±7.2	-2.5±6.3	65.4±11.0	63.2±11.3	-2.2±7.1	0.782	>0.999
Sleep problems	56.3±6.4	53.7±6.0	-2.6±5.7	54.6±6.6	55.0±7.9	0.4±6.9	0.050	0.352
Attention problems	62.4±8.0	60.3±9.1	-2.1±6.8	60.1±8.0	60.0±8.3	-0.1±6.8	0.238	>0.999
Aggressive behavior	57.1±7.9	54.6±6.2	-2.4±6.3	55.7±6.5	53.7±6.4	-2.1±6.7	0.738	>0.999
ABC								
Irritability	7.3±6.6	4.3±5.0	-3.0±4.5*	6.5±6.8	5.0±6.5	-1.6±3.8	0.130	0.651
Lethargy/social withdrawal	8.8±6.1	6.2±5.1	-2.7±4.7*	8.4±7.2	7.5±7.9	-1.0±4.2	0.060	0.302
Stereotypic behavior	3.2±4.0	2.1±3.0	-1.1±2.7	2.2±3.6	2.2±3.4	0.0±1.3	0.071	0.354
Hyperactivity/noncompliance	8.1±5.4	5.7±4.3	-2.4±4.3*	6.1±4.8	5.2±5.2	-0.9±4.2	0.152	0.761
Inappropriate speech	2.6±2.2	1.9±2.0	-0.6±2.1	1.7±1.8	1.8±1.9	0.0±1.9	0.270	>0.999
PSI								
Child characteristics	59.8±7.5	58.3±7.9	-1.6±5.2	59.8±11.3	58.3±12.3	-1.5±6.4	0.979	>0.999
Parent characteristics	54.1±9.2	54.1±7.8	0.1±5.3	56.5±9.5	55.3±11.9	-1.2±6.1	0.411	>0.999
Caregiver CESD-R	11.0±12.6	10.1±11.1	-0.9±9.9	14.7±13.5	10.5±14.0	-4.1±11.6*	0.074	0.074
SOS								
Self-control failure	6.7±2.4	7.1±2.7	0.4±2.0	6.6±1.9	7.1±2.3	0.4±2.0	0.908	>0.999
Saliency	7.4±2.9	7.8±2.5	0.4±2.4*	6.9±3.0	8.1±2.8	1.2±2.4*	0.177	0.530
Problematic consequences	5.2±2.7	5.6±2.2	0.4±2.1	5.5±2.5	6.0±2.3	0.5±1.9	0.885	>0.999

Values are presented as mean±standard deviation. *adjusted p<0.05, significant difference observed between before and after values; †subscales were adjusted for multiple comparison using Bonferroni's method. PEP-R DQ, Psychoeducational Profile-Revised Developmental Quotient; VABS ABCS, Vineland Adaptive Behavior Scale Adaptive Behavior Composite Score; K-CARS, Korean version of the Childhood Autism Rating Scale; SRS, Social Responsiveness Scale; CBCL, Child Behavior Checklist; ABC, Aberrant Behavior Checklist; PSI, Parenting Stress Index; CESD-R, Center for Epidemiologic Studies Depression Scale-Revised; SOS, Smartphone Overuse Scale; JNKK, Junior Naver and Kakao Kids