

Table A3-1. User involvement as moderator in game effectiveness (games published <2010).

Outcome	n	k	Hedges' g (95% CI)	<i>P_g</i>	Q	<i>P_Q</i>	<i>I</i>² Index
BEHAVIOR							
TOTAL¹	6121	9	0.102 [-0.005; 0.199]	.04	310.05	<.001	97%
User involvement (between categories)	5989	8			1.15	.28	
Within categories							
No involvement	3036	2	0.728 [-0.460; 1.915]	.23	230.53	<.001	99%
Involvement only as tester	132	1	0.349 [0.007; 0.692]	.046	NA		
Involvement as informant or co-designer	2953	6	0.076 [-0.026; 0.177]	.15	8.87	.16	36%
BEHAVIORAL DETERMINANTS							
TOTAL¹	6797	21	0.289 [0.197; 0.381]	<.001	52.17	<.001	62%
User involvement (between categories)	6797	21			1.41	.49	
Within categories							
No involvement	3718	7	0.278 [0.083; 0.473]	.01	29.96	<.001	80%
Involvement only as tester	558	5	0.443 [0.171; 0.715]	.001	9.05	.06	56%
Involvement as informant or co-designer	2521	9	0.266 [0.153; 0.379]	<.001	11.21	.19	29%
SELF-EFFICACY							
TOTAL¹	2932	10	0.322 [0.236; 0.407]	<.001	18.28	.03	51%
User involvement (between categories)	2793	9			2.63	.11	
Within categories							
No involvement	1324	4	0.401 [0.292; 0.509]	<.001	1.46	.69	0%
Involvement only as tester	139	1	-0.052 [-0.382; 0.279]	.76	NA		
Involvement as informant or co-designer	1419	5	0.245 [0.093; 0.398]	.002	7.97	.09	50%
CLINICAL OUTCOMES							
TOTAL¹	894	6	-0.060 [-0.163; 0.168]	.97	5.17	.40	3%
User involvement (between categories)	835	5			6.34	.43	
Within categories							
No involvement	59	1	-0.115 [-0.620; 0.389]	.65	NA		
Involvement only as tester	269	2	0.083 [-0.156; 0.322]	.50	0.05	.82	0%

Involvement as informant or co-designer	566	3	-0.060 [-0.317; 0.198]	.65	4.34	.11	54%
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Table A3-2. User involvement as moderator in game effectiveness (games published 2010-2014).

Outcome	n	k	Hedges' g (95% CI)	<i>P_g</i>	Q	<i>P_Q</i>	<i>I</i>² Index
BEHAVIOR							
TOTAL¹	5563	13	0.092 [0.019; 0.164]	.01	37.85	<.001	68%
User involvement (between categories)	5361	11			3.87	.049	
Within categories							
No involvement	202	2	0.292 [0.012; 0.572]	.04	1.03	.31	3%
Involvement only as tester	298	3	0.577 [0.074; 1.081]	.03	8.31	.02	76%
Involvement as informant or co-designer	5063	8	0.066 [-0.010; 0.142]	.09	6.68	.46	0%
BEHAVIORAL DETERMINANTS							
TOTAL¹	6203	23	0.332 [0.247; 0.416]	<.001	55.75	<.001	61%
User involvement (between categories)	6203	23			1.95	.38	
Within categories							
No involvement	931	9	0.322 [0.173; 0.472]	<.001	8.99	.34	11%
Involvement only as tester	777	3	0.410 [0.264; 0.556]	<.001	0.91	.64	0%
Involvement as informant or co-designer	4495	11	0.264 [0.120; 0.409]	<.001	37.01	<.001	73%
SELF-EFFICACY							
TOTAL¹	3466	10	0.131 [0.064; 0.199]	<.001	21.14	.01	57%
User involvement (between categories)	3466	10			8.17	.02	
Within categories							
No involvement	221	4	0.281 [0.009; 0.553]	.04	0.63	.89	0%
Involvement only as tester	295	2	0.483 [0.253; 0.714]	<.001	0.04	.85	0%
Involvement as informant or co-designer	2950	4	0.098 [-0.041; 0.237]	.17	8.83	.03	66%
CLINICAL OUTCOMES							
TOTAL¹	309	3	0.060 [-0.175; 0.501]	.62	1.20	.55	0%
User involvement (between categories)	309	3			NA		
Within categories							

No involvement	60	1	0.052 [-0.479; 0.582]	.85	NA		
Involvement only as tester	115	1	-0.090 [-0.467; 0.288]	.64	NA		
Involvement as informant or co-designer	134	1	0.204 [-0.161; 0.568]	.27	NA		

Table A3-3. User involvement as moderator in game effectiveness (average age of participants <18 years).

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P_g</i>	<i>Q</i>	<i>P_Q</i>	<i>I²</i> Index
BEHAVIOR							
TOTAL¹	10200	16	0.108 [0.050; 0.166]	<.001	320.30	<.001	95%
User involvement (between categories)	10068	15			1.26	.26	
Within categories							
No involvement	3238	4	0.540 [-0.230; 1.311]	.17	234.29	<.001	99%
Involvement only as tester	132	1	0.349 [0.007; 0.692]	.046	NA		
Involvement as informant or co-designer	6830	11	0.098 [0.040; 0.157]	<.001	7.88	.64	0%
BEHAVIORAL DETERMINANTS							
TOTAL¹	9555	25	0.312 [0.220; 0.403]	<.001	73.01	<.001	67%
User involvement (between categories)	9555	25			0.23	.89	
Within categories							
No involvement	4210	10	0.313 [0.183; 0.442]	<.001	22.44	.01	60%
Involvement only as tester	322	3	0.425 [-0.057; 0.906]	.08	7.37	.03	73%
Involvement as informant or co-designer	5023	12	0.302 [0.168; 0.437]	<.001	37.07	<.001	70%
SELF-EFFICACY							
TOTAL¹	5388	12	0.240 [0.164; 0.317]	<.001	35.91	<.001	69%
User involvement (between categories)	5199	11			9.66	.002	
Within categories							
No involvement	1321	4	0.377 [0.268; 0.486]	<.001	1.10	.78	0%
Involvement only as tester	139	1	-0.052 [-0.382; 0.279]	.76	NA		
Involvement as informant or co-designer	3878	7	0.127 [0.014; 0.241]	.03	15.54	.02	61%
CLINICAL OUTCOMES							
TOTAL¹	818	5	0.013 [-0.172; 0.199]	.89	5.67	.23	29%
User involvement (between categories)	835	5			NA		

Within categories							
No involvement	0	0	NA		NA		
Involvement only as tester	118	1	0.052 [-0.308; 0.411]	.78	NA		
Involvement as informant or co-designer	700	4	-0.001 [-0.217; 0.216]	.99	5.63	.13	47%

Table A3-4. User involvement as moderator in game effectiveness (average age of participants ≥ 18 years)

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P_g</i>	<i>Q</i>	<i>P_Q</i>	<i>I²</i> Index
BEHAVIOR							
TOTAL¹	1484	6	0.067 [-0.094; 0.229]	0.41	35.78	<.001	86%
User involvement (between categories)	1484	6			4.39	.04	
Within categories							
No involvement	0	0	NA		NA		
Involvement only as tester	298	3	0.577 [0.074; 1.081]	.03	8.31	.02	76%
Involvement as informant or co-designer	1186	3	0.009 [-0.161; 0.179]	0.92	4.09	.13	51%
BEHAVIORAL DETERMINANTS							
TOTAL¹	3248	16	0.328 [0.231; 0.424]	<.001	32.86	.01	54%
User involvement (between categories)	3248	16			3.15	.21	
Within categories							
No involvement	380	5	0.279 [-0.154; 0.712]	.21	15.17	.004	74%
Involvement only as tester	935	4	0.410 [0.277; 0.542]	<.001	0.91	.82	0%
Involvement as informant or co-designer	1933	7	0.231 [0.082; 0.379]	.002	11.55	.07	48%
SELF-EFFICACY							
TOTAL¹	1001	7	0.407 [0.281; 0.532]	<.001	2.50	.87	0%
User involvement (between categories)	1001	7			0.92	.63	
Within categories							
No involvement	165	3	0.453 [0.140; 0.765]	.004	1.41	.49	0%
Involvement only as tester	295	2	0.483 [0.253; 0.714]	<.001	0.04	.85	0%
Involvement as informant or co-designer	541	2	0.351 [0.181; 0.521]	<.001	0.14	.71	0%
CLINICAL OUTCOMES							
TOTAL¹	175	2	-0.042 [-0.350; 0.265]	.79	0.18	.67	0%
User involvement (between categories)	175	2			NA		
Within categories							

No involvement	60	1	0.052 [-0.479; 0.582]	.85	NA		
Involvement only as tester	118	1	-0.090 [-0.467; 0.288]	.64	NA		
Involvement as informant or co-designer	0	0	NA		NA		

Table A3-5. Meta-regression results of user involvement as informant or co-designer on game study effectiveness in behavior and behavioral determinants

	K	N	INFORMANT			CO-DESIGNER		
			β	95% CI	P	β	95% CI	P
BEHAVIOR								
All areas	14	8016	-0.002	-0.032; 0.029	.92	-0.007	-0.041; 0.027	.69
Aesthetics	14	8016	-0.001	-0.038; 0.035	.94	-0.024	-0.065; 0.017	.27
Dynamics	14	8016	0.074	-0.040; 0.187	.20		NA	
Mechanics	14	8016	-0.064	-0.161; 0.033	.20	0.063	-0.064; 0.190	.33
BEHAVIORAL DETERMINANTS								
All areas	16	6155	0.034	-0.039; 0.108	.36	0.036	-0.015; 0.089	.16
Aesthetics	16	6155	0.025	-0.058; 0.108	.56	0.046	-0.027; 0.120	.22
Dynamics	16	6155	0.235	0.079; 0.329	.003	0.157	-0.115; 0.428	.26
Mechanics	16	6155	-0.078	-0.343; 0.188	.57		NA	

n=combined participant sample size; *k*=number of studies; β : meta-regression weight; CI= confidence Interval; NA: not available, due to insufficient observations or variation

Table A3-6. Moderator analysis for the role of PD in educational content on the game study effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as informant (between categories)	8016	14			0.06	.81	
Within categories							
No	1164	4	0.104 [-0.072; 0.280]	.25	5.95	.11	50%
Yes	6352	10	0.081 [0.022; 0.140]	.007	8.60	.48	0%
Involvement as co-designer (between categories)	8016	14			1.04	.31	
Within categories							
No	7341	13	0.068 [0.008; 0.128]	.03	13.64	.32	12%
Yes	675	1	0.194 [-0.041; 0.429]	.11	NA		
BEHAVIORAL DETERMINANTS							
Involvement as informant (between categories)	6155	16			2.92	.09	
Within categories							
No	1948	7	0.410 [0.160; 0.660]	.001	23.76	.001	75%
Yes	4207	9	0.182 [0.106; 0.258]	<.001	10.36	.24	23%
Within categories							
No	6093	14	0.241 [0.143; 0.340]	<.001	35.75	.001	64%
Yes	62	2	0.561 [-0.072; 1.194]	.08	1.61	.21	38%

n=combined participants sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not available

Table A3-7. Moderator analysis for the role of user involvement in creating **narratives** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	4113	8			0.05	.82	
No	2357	4	0.049 [-0.070; 0.169]	.42	4.91	.18	39%
Yes	1757	4	0.072 [-0.083; 0.226]	.36	5.30	.15	43%
Involvement as informant	4113	8			0.05	.82	
No	2357	4	0.049 [-0.070; 0.169]	.42	4.91	.18	39%
Yes	1757	4	0.072 [-0.083; 0.226]	.36	5.30	.15	43%
Involvement as co-designer	4113	8			0.03	.87	
No	2815	6	0.068 [-0.024; 0.159]	.15	6.14	.29	19%
Yes	1299	2	0.045 [-0.217; 0.307]	.74	3.49	.06	71%
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	2808	10			0.43	.51	
No	1233	5	0.352 [0.071; 0.633]	.01	21.99	<.001	82%
Yes	1575	5	0.244 [0.083; 0.405]	.003	5.67	.23	29%
Involvement as informant	2808	10			1.35	.24	
No	1382	8	0.385 [0.141; 0.630]	.002	24.45	.001	71%
Yes	1426	2	0.209 [0.039; 0.378]	.02	2.42	.12	59%
Involvement as co-designer	2808	10			0.00	.99	
No	1738	6	0.304 [0.076; 0.532]	.009	25.75	<.001	80%
Yes	1070	4	0.303 [0.177; 0.428]	<.00	2.66	.45	0%

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n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-8. Moderator analysis for the role of user involvement in design of the **challenge** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			1.07	.30	
No	5394	10	0.052 [-0.027; 0.132]	.20	11.89	.22	24%
Yes	2622	4	0.113 [0.029; 0.198]	.008	1.54	.67	0%
Involvement as informant	8016	14			1.07	.30	
No	5394	10	0.052 [-0.027; 0.132]	.20	11.89	.22	24%
Yes	2622	4	0.113 [0.029; 0.198]	.008	1.54	.67	0%
Involvement as co-designer	8016	14			1.04	.31	
No	7341	13	0.068 [0.008; 0.128]	<.05	13.64	.32	12%
Yes	675	1	0.194 [-0.041; 0.429]	.11	NA		
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			2.93	.09	
No	5777	11	0.194 [0.126; 0.262]	<.00 1	14.28	.16	30%
Yes	377	5	0.579 [0.144; 1.013]	.009	9.49	.05	59%
Involvement as informant	6155	16			NA		
No	5926	14	0.202 [0.133; 0.271]	<.00 1	18.00	.16	28%
Yes	229	2	0.575 [-0.246; 1.396]	.17	7.50	.006	87%
Involvement as co-designer	6155	16			11.23	.001	
No	5837	12	0.192 [0.128; 0.257]	<.00 1	14.32	.22	23%
Yes	318	4	0.791 [0.447; 1.135]	<.00 1	3.65	.30	18%

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-9. Moderator analysis for the role of user involvement in designing **character looks** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			0.36	.55	
No	3382	4	0.050 [-0.050; 0.150]	.33	1.84	.61	0%
Yes	4634	10	0.089 [0.010; 0.167]	.03	12.47	.19	28%
Involvement as informant	8016	14			1.80	.18	
No	4012	6	0.030 [-0.055; 0.115]	.49	3.15	.68	0%
Yes	4004	8	0.113 [0.026; 0.199]	.01	9.72	.21	5%
Involvement as co-designer	8016	14			4.38	.04	
No	6531	10	0.107 [0.047; 0.168]	<.001	7.49	.59	0%
Yes	1485	4	-0.022 [-0.128; 0.083]	.68	2.81	.42	0%
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			1.17	.28	
No	3251	8	0.197 [0.080; 0.314]	.001	13.15	.07	47%
Yes	2904	8	0.308 [0.145; 0.470]	<.001	22.36	.002	69%
Involvement as informant	6155	16			1.27	.26	
No	3571	9	0.200 [0.098; 0.302]	<.001	13.59	.09	41%
Yes	2584	7	0.326 [0.132; 0.519]	.001	22.31	.001	73%
Involvement as co-designer	6155	16			0.21	.65	
No	4178	12	0.272 [0.135; 0.408]	<.001	35.79	<.001	69%
Yes	1977	4	0.233 [0.138; 0.327]	<.001	3.04	.39	1%

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-10. Moderator analysis for the role of user involvement in designing **game world looks** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			0.25	.62	
No	4668	9	0.093 [0.017; 0.168]	.02	6.42	.60	0%
Yes	3348	5	0.058[-0.055; 0.171]	.31	7.89	.096	49%
Involvement as informant	8016	14			0.25	.62	
No	4668	9	0.093 [0.017; 0.168]	.02	6.42	.60	0%
Yes	3348	5	0.058[-0.055; 0.171]	0.31	7.89	.096	49%
Involvement as co-designer	8016	14			3.99	.046	
No	7392	13	0.095 [0.039; 0.150]	.001	10.69	.56	0%
Yes	624	1	-0.075 [-0.232; 0.082]	.35	NA		
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			0.32	0.57	
No	4765	11	0.241 [0.118; 0.363]	<.001	33.74	<.001	70%
Yes	1390	5	0.288 [0.179; 0.397]	<.001	2.88	0.58	0%
Involvement as informant	6155	16			0.05	0.83	
No	4827	13	0.257 [0.135; 0.378]	<.001	37.8	<.001	68%
Yes	1328	3	0.275 [0.163; 0.386]	<.001	0.144	0.93	0%
Involvement as co-designer	6155	16			0.59	0.44	
No	5172	13	0.239 [0.129; 0.349]	<.001	34.05	<.01	65%
Yes	983	3	0.354 [0.082; 0.626]	.01	2.63	.27	24%

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-11. Moderator analysis for the role of user involvement in creating the **language in the game**, on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			0.79	.37	
No	4921	10	0.100 [0.028; 0.172]	.007	8.11	.52	0%
Yes	3095	4	0.038 [-0.077; 0.154]	.52	5.66	.13	47%
Involvement as informant	8016	14			0.79	.37	
No	4921	10	0.100 [0.028; 0.172]	.007	8.11	.52	0%
Yes	3095	4	0.038 [-0.077; 0.154]	.52	5.66	.13	47%
Involvement as co-designer	8016	14			0.10	.75	
No	6717	12	0.089 [0.032; 0.146]	.002	9.95	.54	0%
Yes	1299	2	0.045 [-0.217; 0.307]	.74	3.49	.06	71%
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			0.01	.93	
No	4865	12	0.259 [0.141; 0.377]	<.001	32.28	.001	66%
Yes	1290	4	0.247 [0.020; 0.475]	.03	6.40	.094	53%
Involvement as informant	6155	16			0.46	.50	
No	4927	14	0.273 [0.156; 0.390]	<.001	35.87	.001	64%
Yes	1228	2	0.185 [-0.045; 0.414]	.12	3.22	.07	69%
Involvement as co-designer	6155	16			0.59	.44	
No	5172	13	0.239 [0.129; 0.349]	<.001	34.05	.001	65%
Yes	983	3	0.354 [0.082; 0.626]	.01	2.63	.27	24%

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-12. Moderator analysis for the role of user involvement in design of **rewards** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			0.85	.36	
No	5606	10	0.056 [-0.023; 0.134]	.17	11.07	.27	19%
Yes	2410	4	0.109 [0.028; 0.190]	.008	2.51	.47	0%
Involvement as informant	8016	14			0.85	.36	
No	5606	10	0.056 [-0.023; 0.134]	.17	11.07	.27	19%
Yes	2410	4	0.109 [0.028; 0.190]	.008	2.51	.47	0%
Involvement as co-designer	8016	14			NA		
No	8016	14	0.075 [0.017; 0.133]	.01	14.67	.33	11%
Yes	0	0					
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			2.07	.15	
No	5253	11	0.194 [0.120; 0.267]	<.001	13.95	.18	28%
Yes	902	5	0.464 [0.103; 0.824]	.01	20.00	<.001	80%
Involvement as informant	6155	16			0.20	.66	
No	5315	13	0.204 [0.126; 0.282]	<.001	17.62	.13	32%
Yes	840	3	0.428 [-0.023; 0.880]	.06	17.75	<.001	89%
Involvement as co-designer	6155	16			NA		
No	6093	14	0.241 [0.143; 0.340]	<.001	35.75	.001	64%
Yes	62	2	0.561 [-0.072; 1.194]	.08	1.61	.21	38%

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-13. Moderator analysis for the role of user involvement in design of **levels** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			NA		
No	7882	13	0.070 [0.012; 0.128]	.02	13.52	.33	11%
Yes	134	1	0.274 [-0.092; 0.639]	.14	NA		
Involvement as informant	8016	14			NA		
No	7882	13	0.070 [0.012; 0.128]	.02	13.52	.33	11%
Yes	134	1	0.274 [-0.092; 0.639]	.14	NA		
Involvement as co-designer	8016	14			NA		
No	8016	14	0.075 [0.017; 0.133]	.01	14.67	.33	11%
Yes	0	0					
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			7.02	.008	
No	5294	13	0.191 [0.130; 0.253]	<.001	14.40	.28	17%
Yes	231	3	0.771 [0.347; 1.196]	<.001	3.51	.17	43%
Involvement as informant	6155	16			7.02	.008	
No	5294	13	0.191 [0.130; 0.253]	<.001	14.40	.28	17%
Yes	231	3	0.771 [0.347; 1.196]	<.001	3.51	.17	43%
Involvement as co-designer	6155	16			NA		
No	6093	14	0.241 [0.143; 0.340]	<.001	35.75	.001	64%
Yes	62	2	0.561 [-0.072; 1.194]	.08	1.61	.21	38%

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-14. Moderator analysis for the role of user involvement in design of **controls** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			0.37	.54	
No	7017	12	0.069 [0.003; 0.134]	.04	13.62	.26	19%
Yes	999	2	0.124 [-0.043; 0.290]	.15	0.692	.41	0%
Involvement as informant	8016	14			0.37	.54	
No	7017	12	0.069 [0.003; 0.134]	.04	13.62	.26	19%
Yes	999	2	0.124 [-0.043; 0.290]	.15	0.692	.41	0%
Involvement as co-designer	8016	14			NA		
No	7341	13	0.068 [0.008; 0.128]	.03	13.64	.32	12%
Yes	675	1	0.194 [-0.041; 0.429]	.11	NA		
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			NA		
No	6068	15	0.253 [0.153; 0.353]	<.001	39.12	<.001	64%
Yes	87	1	0.463 [-1.473; 2.399]	.64	NA		
Involvement as informant	6155	16			NA		
No	6068	15	0.253 [0.153; 0.353]	<.001	39.12	<.001	64%
Yes	87	1	0.463 [-1.473; 2.399]	.64	NA		
Involvement as co-designer	6155	16			NA		
No	6155	16	0.253 [0.154; 0.351]	<.001	39.19	.001	62%
Yes	0	0			NA		

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable

Table A3-15. Moderator analysis for the role of user involvement in design of **action and interactivity** on the game effectiveness outcomes on behavior and behavioral determinants.

Outcome	<i>n</i>	<i>k</i>	Hedges' <i>g</i> (95% CI)	<i>P</i>	<i>Q</i>	<i>P</i>	<i>I</i> ² Index
BEHAVIOR							
Involvement as either informant or co-designer	8016	14			0.11	.74	
No	5634	9	0.087 [0.023; 0.152]	.008	6.03	.64	0%
Yes	2382	5	0.063 [-0.069; 0.194]	.35	8.29	.08	52%
Involvement as informant	8016	14			0.54	.47	
No	6309	10	0.095 [0.032; 0.157]	.003	6.76	.66	0%
Yes	1707	4	0.035 [-0.112; 0.182]	.64	6.70	.08	55%
Involvement as co-designer	8016	14			NA		
No	7341	13	0.068 [0.008; 0.128]	.03	13.64	.32	12%
Yes	675	1	0.194 [-0.041; 0.429]	.11	NA		
BEHAVIORAL DETERMINANTS							
Involvement as either informant or co-designer	6155	16			0.48	.49	
No	4388	12	0.283 [0.150; 0.461]	<.001	35.70	<.001	69%
Yes	1767	4	0.223 [0.119; 0.328]	<.001	3.29	.35	9%
Involvement as informant	6155	16			0.48	0.49	
No	4388	12	0.283 [0.150; 0.461]	<.001	35.70	<.001	69%
Yes	1767	4	0.223 [0.119; 0.328]	<.001	3.29	0.35	9%
Involvement as co-designer	6155	16			NA		
No	6155	16	0.253 [0.154; 0.351]	<.001	39.19	.001	62%
Yes	0	0			NA		

n=combined sample size; *k*=number of studies; Hedges' *g* (random effects); CI= confidence Interval; *Q*= homogeneity statistic (mixed effects); *I*²=Inconsistency, a second measure of heterogeneity; NA: not applicable