

Table S1. Search strategies.

Search subject	Search mode	Search options			
		Age	Methodology	Publication Type	Field
n-back & WMC	(“n-back” OR “2-back” OR “3-back”) AND (“working memory span” OR “operation span” OR “reading span” OR “computation span” OR “counting span” OR “symmetry span” OR “rotation span”)	Adulthood (18yrs & older)	Empirical study	Peer-reviewed journal	All
RM & WMC	(“running memory” OR “letter memory” OR “consonant updating” OR “memory updating” OR “letter updating” OR “spatial updating” OR “running span” OR “running digit span”) AND (“working memory span” OR “operation span” OR “reading span” OR “computation span” OR “counting span” OR “symmetry span” OR “rotation span”)	Adulthood (18yrs & older)	Empirical study	Peer-reviewed journal	All
n-back & <i>Gf</i>	(“n-back” OR “2-back” OR “3-back”) AND (“fluid cognition” OR “intelligence” OR “raven” OR “WAIS” OR “cattell culture fair”)	Adulthood (18yrs & older)	Empirical study	Peer-reviewed journal	All
RM & <i>Gf</i>	(“running memory” OR “letter memory” OR “consonant updating” OR “memory updating” OR “letter updating” OR “spatial updating” OR “running span” OR “running digit span”) AND (“fluid cognition” OR “intelligence” OR “raven” OR “WAIS” OR “cattell culture fair”)	Adulthood (18yrs & older)	Empirical study	Peer-reviewed journal	All

Note. WMC = working memory capacity; RM = running memory; *Gf* = general fluid intelligence; WAIS = Wechsler Adult Intelligence Scale.

Table S2. Basic information for studies included in the meta-analysis (n-back and WMC).

Author and year	<i>n</i>	Load	Stimuli	Key	SOA	Effect size	
						<i>r</i>	95% CI for <i>r</i>
Berta et al. (2023)	93	2	letter	2	2500	0.50	[0.29, 0.71]
Burgess et al. (2011)	102	3	word & face	2	2360	0.38	[0.28, 0.48]
Colom et al. (2008) Exp. 2	261	2	spatial & letter	1	1500	0.18	[0.11, 0.25]
Colom et al. (2008) Exp. 3	289	2	spatial & letter	1	1500	0.24	[0.16, 0.32]
Hakun & Johnson (2017)	51	2	letter & face	2	2500	0.14	[-0.06, 0.34]
		3					
Himi et al. (2019)	202	2,3 ^c	figure	1	2000	0.32	[0.23, 0.41]
Jaeggi et al. (2010a) Exp. 1	116	2	spatial	1	3000	-0.07	[-0.17, 0.02]
		3	consonant				
Jaeggi et al. (2010a) Exp. 2	281	2	spatial	1	3000	0.12	[-0.00, 0.24]
		3	syllable				
Jaeggi et al. (2010b)	104	2,3,4 ^c	shape	1	3000	0.21	[0.01, 0.41]
Kane et al. (2007)	129	3	letter	2	2500	0.14	[-0.03, 0.31]
Kim et al. (2017)	20	0,1,2 ^c	letter	1	1250	0.37	[-0.10, 0.85]
Kulikowski & Orzechowski (2018)	383	2	letter	1	n. a.	0.24	[0.19, 0.29]
		3					
Loomes et al. (2023)	85	1,2,3 ^c	letter	2	2500	0.35	[0.13, 0.56]
Minear et al. (2016)	116	2,3,4 ^c	letter	1	n. a.	0.41	[0.34, 0.47]
			polygon				
Pahor et al. (2020)	172	1,2,3,4 ^c	animal & vehicle	n. a.	3000	0.03	[-0.12, 0.18]
Roberts et al. (2002)	26	2,3,4,5 ^c	word	1	3000	0.01	[-0.20, 0.21]
Robison et al. (2024)	974	3	letter, digit, spatial	2	2500	0.24	[0.20, 0.28]

Author and year	<i>n</i>	Load	Stimuli	Key	SOA	Effect size	
						<i>r</i>	95% CI for <i>r</i>
Rudner et al. (2015)	20	1,2 ^C 2	spatial	2	5000	-0.17	[-0.51, 0.17]
Scharinger et al. (2017)	20	1,2,3,4 ^C	digit (value, position, form)	2	2000	0.43	[-0.05, 0.91]
Schmiedek et al. (2009)	96	3	spatial	2	1500 2500	0.28	[0.14, 0.41]
Schmiedek et al. (2014)	204	3	digit spatial	n. a.	4000 2500	0.33	[0.25, 0.41]
Shamosh et al. (2008)	103	3	face & word	2	2000	0.55	[0.35, 0.75]
Shelton et al. (2010)	172	2,3 ^C	word	n. a.	1000	0.37	[0.26, 0.47]
Shou et al. (2015)	190	1,2,3 ^C 2,3 ^C	letter	1	3000	0.25	[0.10, 0.39]
Sprenger et al. (2013)	138	2,4,6 ^C	letter	2	2500	0.30	[0.13, 0.47]
Stawski et al. (2006)	106	2	digit	2	self paced	0.24	[0.05, 0.43]
Stenfors et al. (2016)	233	2	word	2	4500	0.20	[0.07, 0.33]
Unsworth (2010)	165	3	word	2	3300	0.08	[-0.01, 0.17]
Zhang et al. (2024)	1605	3 2	letter, spatial	2	3000	0.21	[0.15, 0.27]

K_{total} : 29, n_{total} = 6456

Note. WMC = working memory capacity; Digital sequence ^C indicates that the load combines these digits; *n* = sample size; SOA = stimulus onset asynchrony; CI = confidence interval; Exp = experiment; n. a. = not available.

Table S3. Basic information for studies included in the meta-analysis (RM and WMC).

Author and year	<i>n</i>	Load	Stimuli	SOA	Effect size	
					<i>r</i>	95% CI for <i>r</i>
Broadway & Engle (2010) Exp. 1	89	3-8	letter	2000 500	0.57	[0.48, 0.65]
Broadway & Engle (2010) Exp. 2	294	3-6	letter	2500	0.55	[0.49, 0.61]
Cinan & Doğan (2013)	118	3-6	letter	n. a.	0.38	[0.15, 0.61]
Colom et al. (2008) Exp. 3	289	4	letter	1000	0.27	[0.18, 0.35]
Durand-López (2024)	48	1-13	digit	1725	0.50	[0.21, 0.79]
Fisk & Sharp (2004)	95	6	consonant	1000	0.53	[0.39, 0.68]
Harrison et al. (2015)	208	n. a.	Letter	n. a.	0.47	[0.37, 0.57]
Himi et al. (2019)	202	4	letter	3000	0.21	[0.13, 0.29]
Jarosz et al. (2019)	80	3-6	letter	2500	0.41	[0.25, 0.57]
Löffler et al. (2024)	139	3-5	digit	1550	0.73	[0.56, 0.90]
Loh et al. (2023)	98	3-5	digit	1550	0.34	[0.14, 0.55]
Mishra et al. (2013)	20	4	letter	n. a.	0.60	[0.12, 1.08]
Miyake et al. (2000)	137	4	letter	2000	0.34	[0.17, 0.51]
Redick (2016)	65	4	letter	n. a.	0.42	[0.17, 0.67]
Ronnberg et al. (2014)	20	4	letter	n. a.	0.25	[-0.23, 0.73]
Rummel et al. (2019)	100	3-7	letter	500	0.46	[0.22, 0.71]
Salthouse et al. (2008)	236	4	spatial letter	1000	0.41	[0.36, 0.46]
Schmiedek et al. (2014)	204	4 2-4	digit spatial	2750 3000	0.41	[0.35, 0.47]
Shipstead et al. (2012)	170	3-7	Letter	500	0.37	[0.19, 0.56]
Shipstead et al. (2014)	215	3-7	Letter	500	0.47	[0.37, 0.57]
Shulley & Shake (2016)	104	3	letter	2500	0.46	[0.27, 0.66]

Author and year	n	Load	Stimuli	SOA	Effect size	
					r	95% CI for r
Zekveld et al. (2018)	26	4	letter	n. a.	0.07	[-0.34, 0.48]
Zuber et al. (2019)	282	3	letter	1500	0.35	[0.23, 0.47]

K_{total} : 23, n_{total} = 3239

Note. RM = running memory; WMC = working memory capacity; n = sample size; SOA = stimulus onset asynchrony; CI = confidence interval; Exp = experiment; n. a. = not available.

Table S4. Basic information for studies included in the meta-analysis (n-back and Gf).

Author and year	<i>n</i>	Load	Stimuli	Key	SOA	Effect size	
						<i>r</i>	95% CI for <i>r</i>
Barch et al. (2008)	37	2	letter	2	n. a.	0.60	[0.36, 0.83]
Benedek et al. (2014)	230	2	figure	1	1500	0.28	[0.23, 0.33]
Burgess et al. (2011)	102	3	word & face	2	2360	0.35	[0.21, 0.49]
Byrne et al. (2024)	703	1-12 ^c	letter, digit, spatial	1	2760	0.38	[0.34, 0.42]
Chuderski & Necka (2012) Exp. 1	101	2	two-digit	1	1000	0.29	[0.15, 0.43]
		3					
Chuderski & Necka (2012) Exp. 2	102	2	two-digit	1	2000	0.40	[0.26, 0.54]
		3					
Chuderski & Necka (2012) Exp. 3	136	2	two-digit	1	2800	0.24	[0.16, 0.33]
		3					
Chuderski & Necka (2012) Exp. 4	135	2	two-digit	1	2800	0.27	[0.19, 0.36]
		3					
Chuderski & Necka (2012) Exp. 5	273	2	figure	1	1800	0.34	[0.25, 0.42]
		3					
Chuderski & Necka (2012) Exp. 6	75	2	figure	1	1800	0.47	[0.24, 0.70]
		3					
Chuderski (2014)	176	1,2 ^c	figure	1	2000	0.37	[0.27, 0.48]
Cochrane et al. (2019)	68	1,2,3,4,5,6,7 ^c	cartoon animal	2	2000	0.38	[0.14, 0.63]
Colom et al. (2008) Exp. 2	261	2	spatial & letter	1	1500	0.29	[0.20, 0.37]
Colom et al. (2008) Exp. 3	289	2	spatial & letter	1	1500	0.34	[0.27, 0.40]
Friedman et al. (2008)	582	2	spatial	2	2000	0.31	[0.23, 0.39]
Gevins & Smith (2000)	48	0,2 ^c	spatial	2	4500	0.19	[-0.10, 0.48]
Gray et al. (2003)	48	3	word & face	2	2360	0.36	[0.07, 0.65]

Author and year	<i>n</i>	Load	Stimuli	Key	SOA	Effect size	
						<i>r</i>	95% CI for <i>r</i>
Hockey & Geffen (2004)	69	2	spatial	2	1500	0.28	[0.11, 0.45]
Jaeggi et al. (2010a) Exp. 3	50	3					
		2	spatial	1	3000	0.26	[0.12, 0.40]
Jaeggi et al. (2010b)	104	3	consonant				
		2,3,4 ^c	shape	1	3000	0.44	[0.24, 0.64]
Kane et al. (2007)	129	3	letter	2	2500	0.39	[0.22, 0.56]
Karamaouna et al. (2024)	247	0,1,2,3 ^c	letter	1	1000	0.21	[0.08, 0.33]
		1,2,3 ^c	image		2000		
Krumm et al. (2009)	184	2,3 ^c	figural	1	n. a.	0.41	[0.26, 0.55]
Kulikowski & Orzechowski (2018)	383	2	letter	1	n. a.	0.36	[0.32, 0.40]
		3					
Minear et al. (2016)	116	2,3,4 ^c	letter	1	n. a.	0.34	[0.24, 0.43]
			polygon				
Nęcka et al. (2018)	296	2	figure	1	1800	0.31	[0.23, 0.39]
Okada & Slevc (2018)	150	2,3 ^c	spatial	2	2000	0.48	[0.32, 0.64]
Ren et al. (2017)	205	2,3 ^c	digit	2	3000	0.24	[0.14, 0.33]
Robison et al. (2024)	974	3	letter, digit, spatial	2	2500	0.36	[0.32, 0.40]
Schmiedek et al. (2009)	96	3	spatial	2	1500	0.36	[0.26, 0.46]
					2500		
Shamosh et al. (2008)	103	3	face & word	2	2000	0.52	[0.42, 0.61]
Shelton et al. (2010)	172	2,3 ^c	word	n. a.	1000	0.35	[0.26, 0.43]
Sprenger et al. (2013)	138	2,4,6 ^c	letter	2	2500	0.52	[0.35, 0.69]
Studer-Luethi et al. (2012)	112	2,3,4 ^c	shape	1	3000	0.43	[0.24, 0.62]
Timarova et al. (2014)	28	2	letter	n. a.	3000	0.31	[-0.08, 0.70]
Unsworth (2010)	165	3	word	2	3300	0.19	[0.10, 0.28]

Author and year	<i>n</i>	Load	Stimuli	Key	SOA	Effect size	
						<i>r</i>	95% CI for <i>r</i>
Waiter et al. (2009)	37	0,2 ^C	letter	2	3000	0.39	[0.05, 0.72]
Wongupparaj et al. (2015)	110	2	letter	1	1500	0.41	[0.32, 0.51]
		3					
Wongupparaj et al. (2018)	115	3	letter	1	1500	0.53	[0.40, 0.65]
Zhu et al. (2010)	557	2	Chinese characters & Tibetan letters	2	3000	0.25	[0.19, 0.30]

K_{total} : 40, n_{total} = 7906

Note. *Gf* = general fluid intelligence; Digital sequence ^C indicates that the load combines these digits; *n* = sample size; SOA = stimulus onset asynchrony; CI = confidence interval; Exp = experiment; n. a. = not available.

Table S5. Basic information for studies included in the meta-analysis (RM and Gf).

Author and year	<i>n</i>	Load	Stimuli	SOA	Effect size	
					<i>r</i>	95% CI for <i>r</i>
Broadway & Engle (2010) Exp. 1	89	3-8	letter	2000 500	0.55	[0.45, 0.66]
Broadway & Engle (2010) Exp. 2	294	3-6	letter	2500	0.50	[0.45, 0.54]
Chen et al. (2002)	31	3	digit	1750 750	0.48	[0.35, 0.61]
Chen & Li (2007)	142	3	digit	1750	0.42	[0.30, 0.54]
Colom et al. (2008) Exp. 3	289	4	letter	1000	0.22	[0.16, 0.29]
Friedman et al. (2008)	582	3	letter	2500	0.40	[0.32, 0.48]
Gustavson et al. (2022)	1238	4	letter	3000	0.55	[0.50, 0.60]
Harrison et al. (2015)	208	n. a.	Letter	n. a.	0.43	[0.33, 0.53]
Jarosz et al. (2019)	80	3-6	letter	2500	0.45	[0.34, 0.56]
Li et al. (2021)	226	4	digit	1250	0.11	[-0.08, 0.30]
Löffler et al. (2024)	139	3-5	digit	1550	0.35	[0.18, 0.52]
Loh et al. (2023)	98	3-5	digit	1550	0.28	[0.08, 0.48]
Lv et al. (2022)	241	4-7	spatial	1500	0.34	[0.25, 0.43]
Ma et al. (2020)	58	3	digit	1750	0.07	[-0.12, 0.25]
Ma et al. (2023)	248	4-7	spatial	1250	0.35	[0.23, 0.47]
Okada & Slevc (2018)	150	4	letter	2300	0.41	[0.25, 0.57]
Rummel et al. (2019)	100	3-7	letter	500	0.19	[-0.01, 0.39]
Salthouse et al. (2008)	236	4	spatial letter	1000	0.56	[0.46, 0.65]
Shipstead et al. (2012)	170	3-7	Letter	500	0.42	[0.33, 0.50]
Shipstead et al. (2014)	215	3-7	Letter	500	0.51	[0.43, 0.58]
Van Biesen et al. (2023)	30	1-5	word	1500	0.52	[0.15, 0.90]

Author and year	n	Load	Stimuli	SOA	Effect size	
					r	95% CI for r
Zhao et al. (2017)	96	3	digit	750	0.53	[0.33, 0.73]

K_{total} : 22, $n_{\text{total}} = 4960$

Note. RM = running memory; Gf = general fluid intelligence; Digital sequence ^c indicates that the load combines these digits; n = sample size; SOA = stimulus onset asynchrony; CI = confidence interval; Exp = experiment; n. a. = not available.

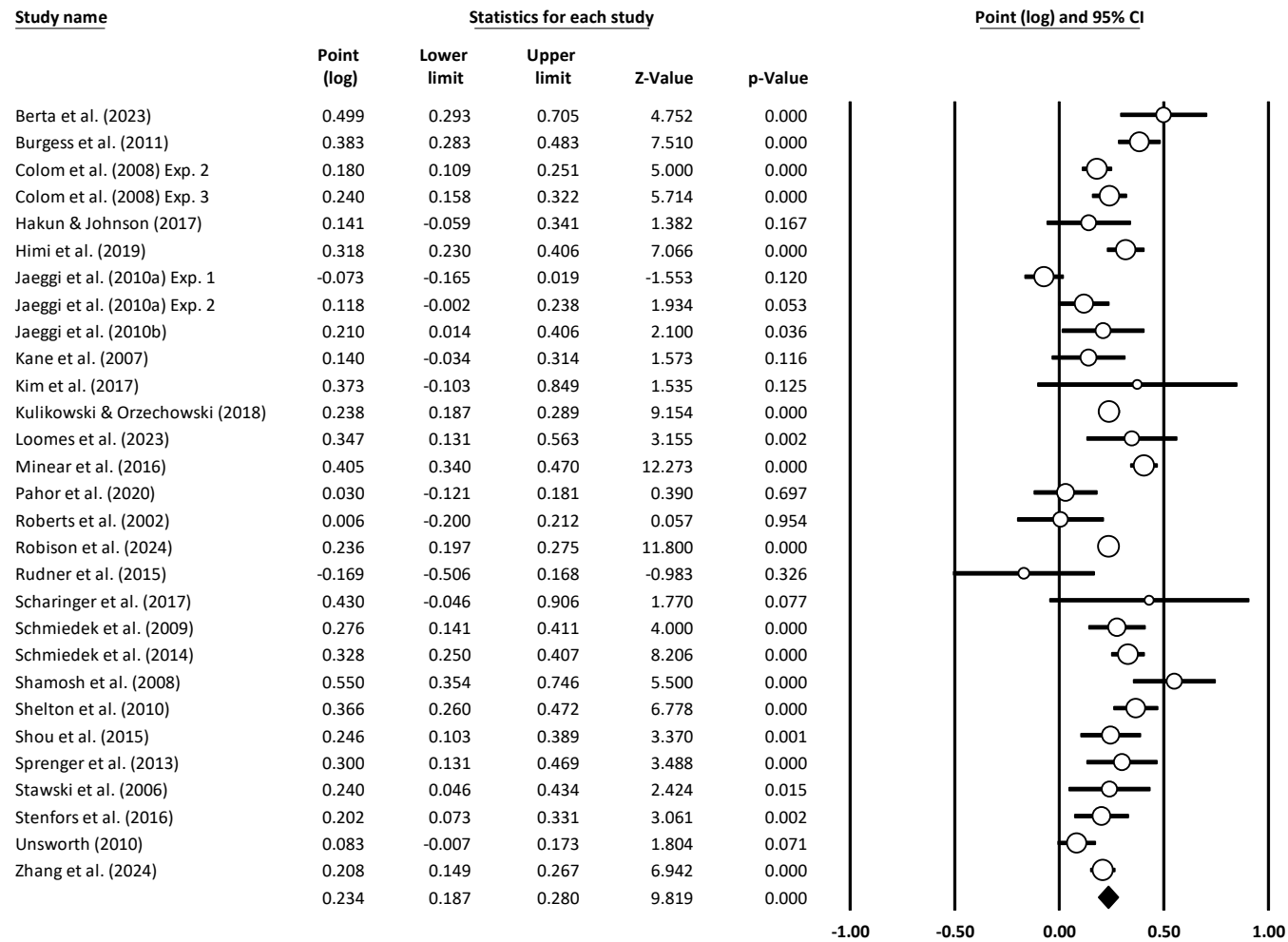


Figure S1. Forest plot of correlation of n-back and WMC

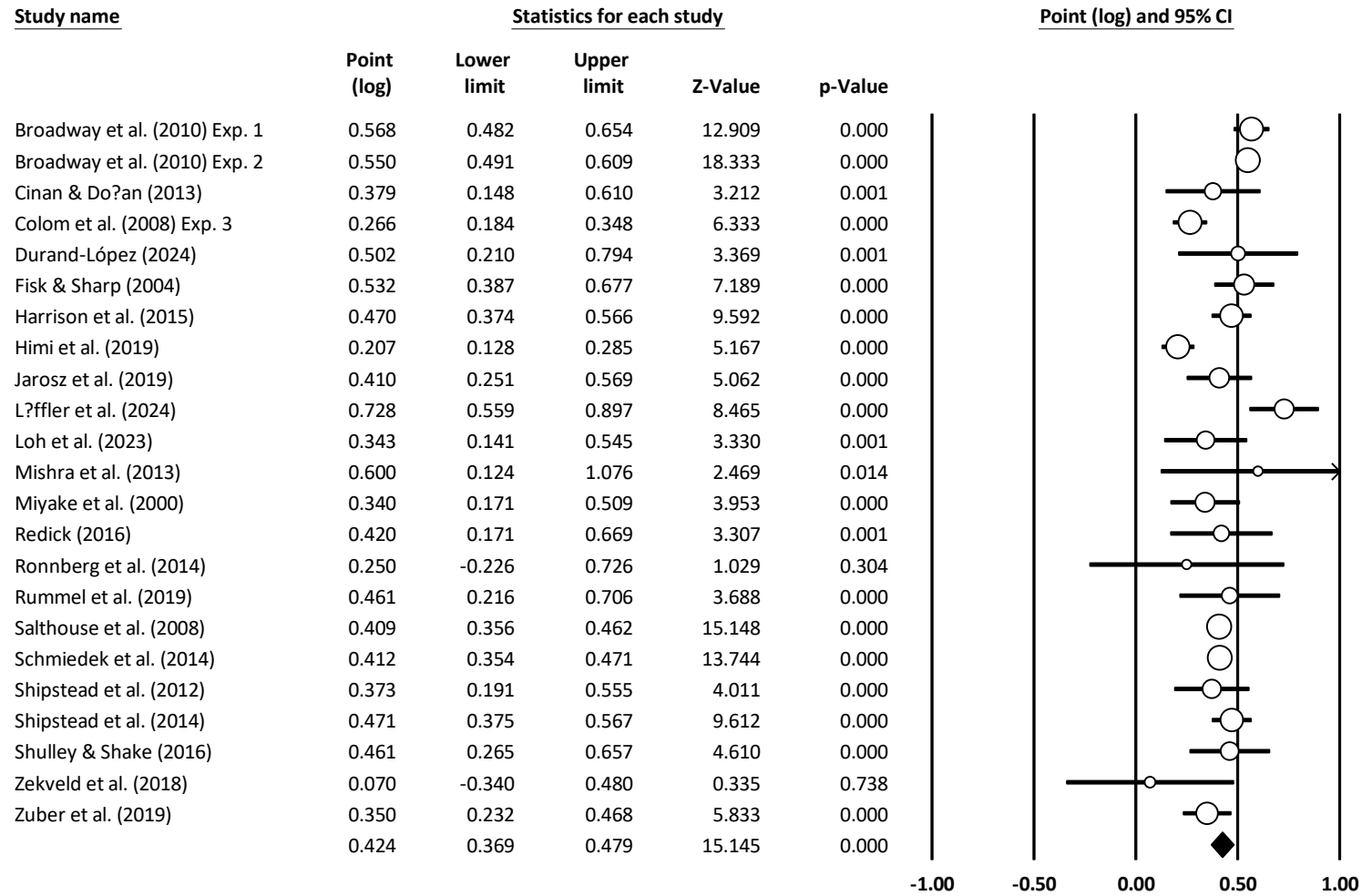


Figure S2. Forest plot of correlation of RM and WMC

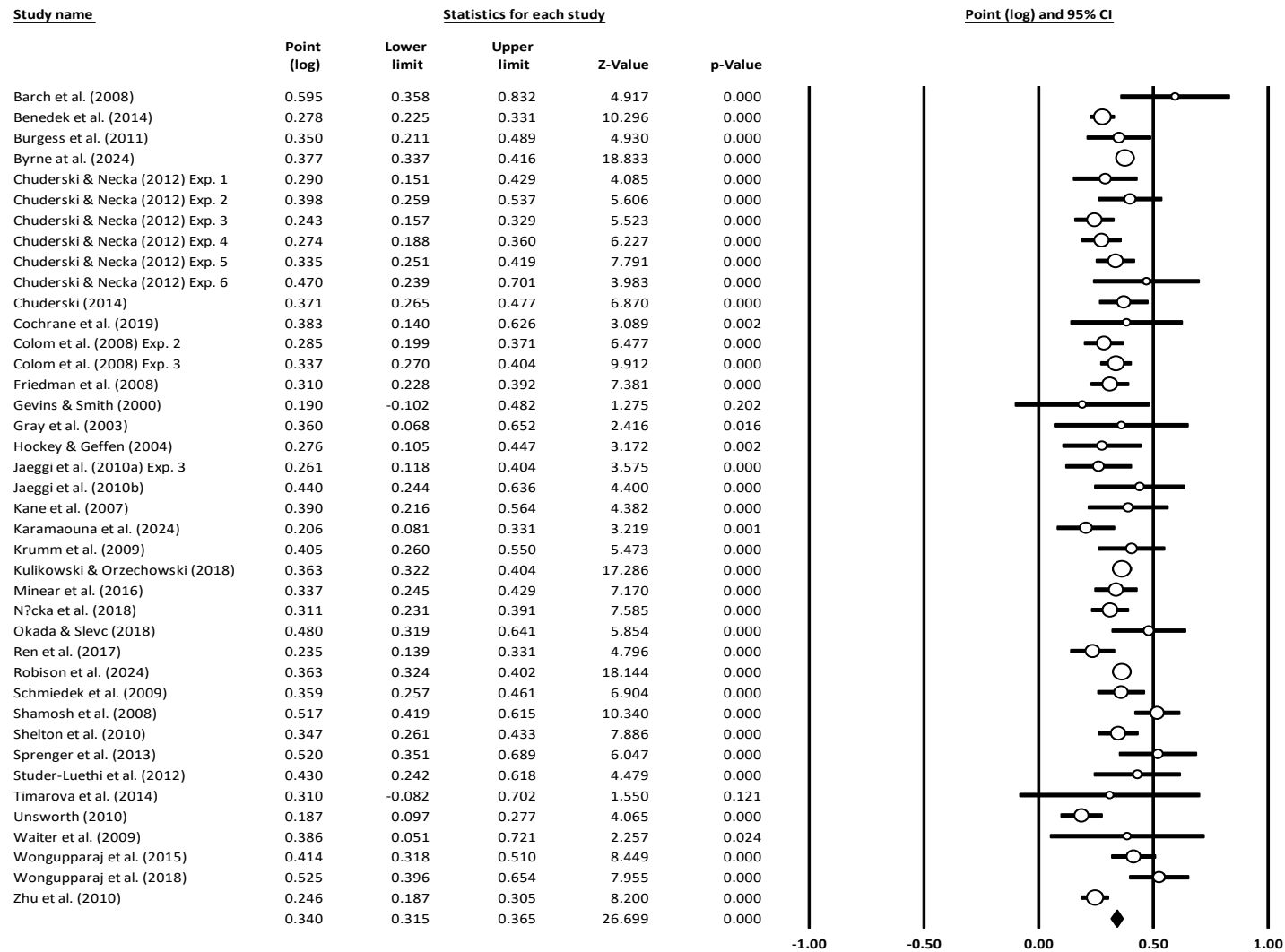


Figure S3. Forest plot of correlation of n-back and Gf

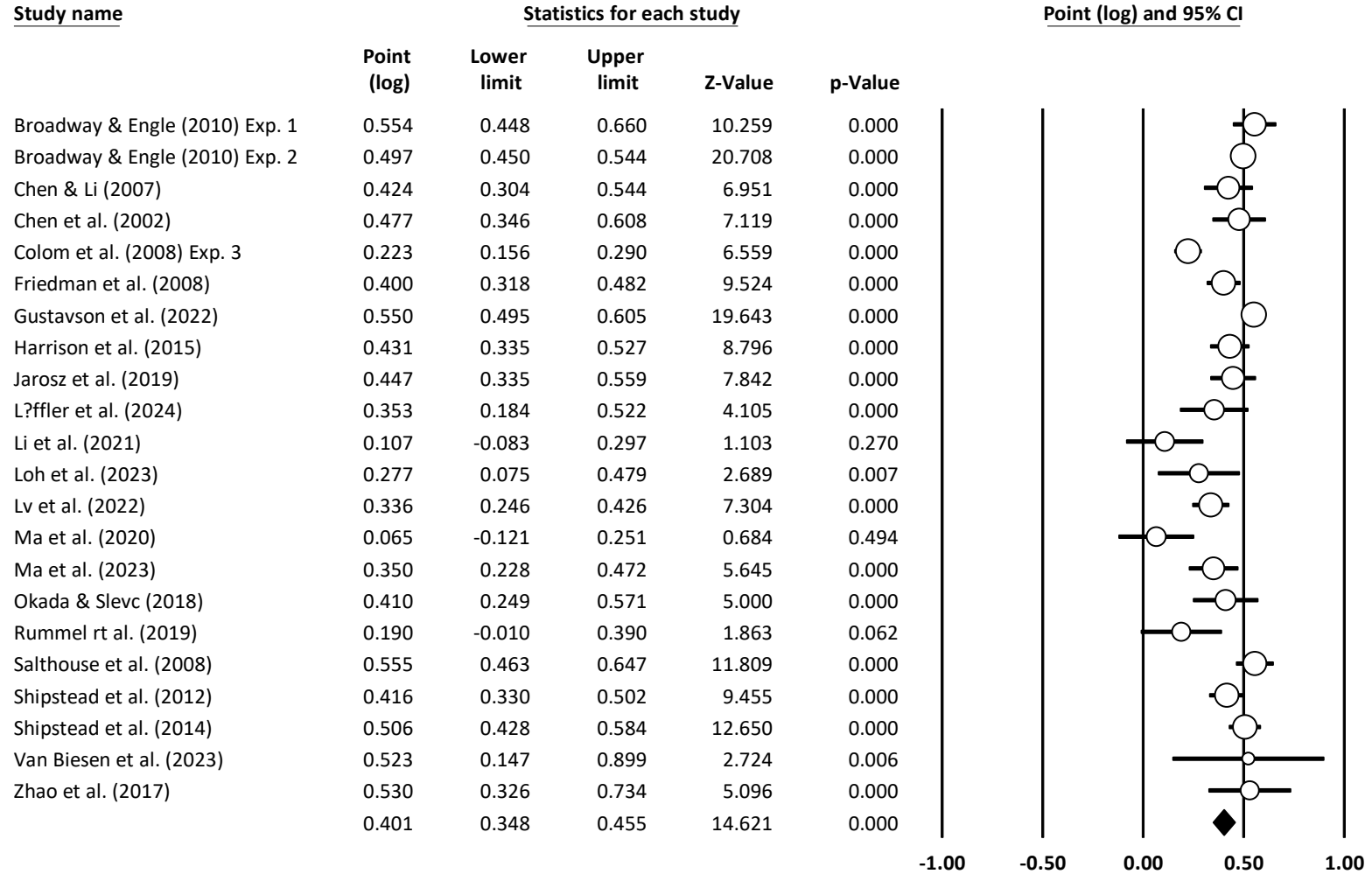


Figure S4. Forest plot of correlation of RM and Gf

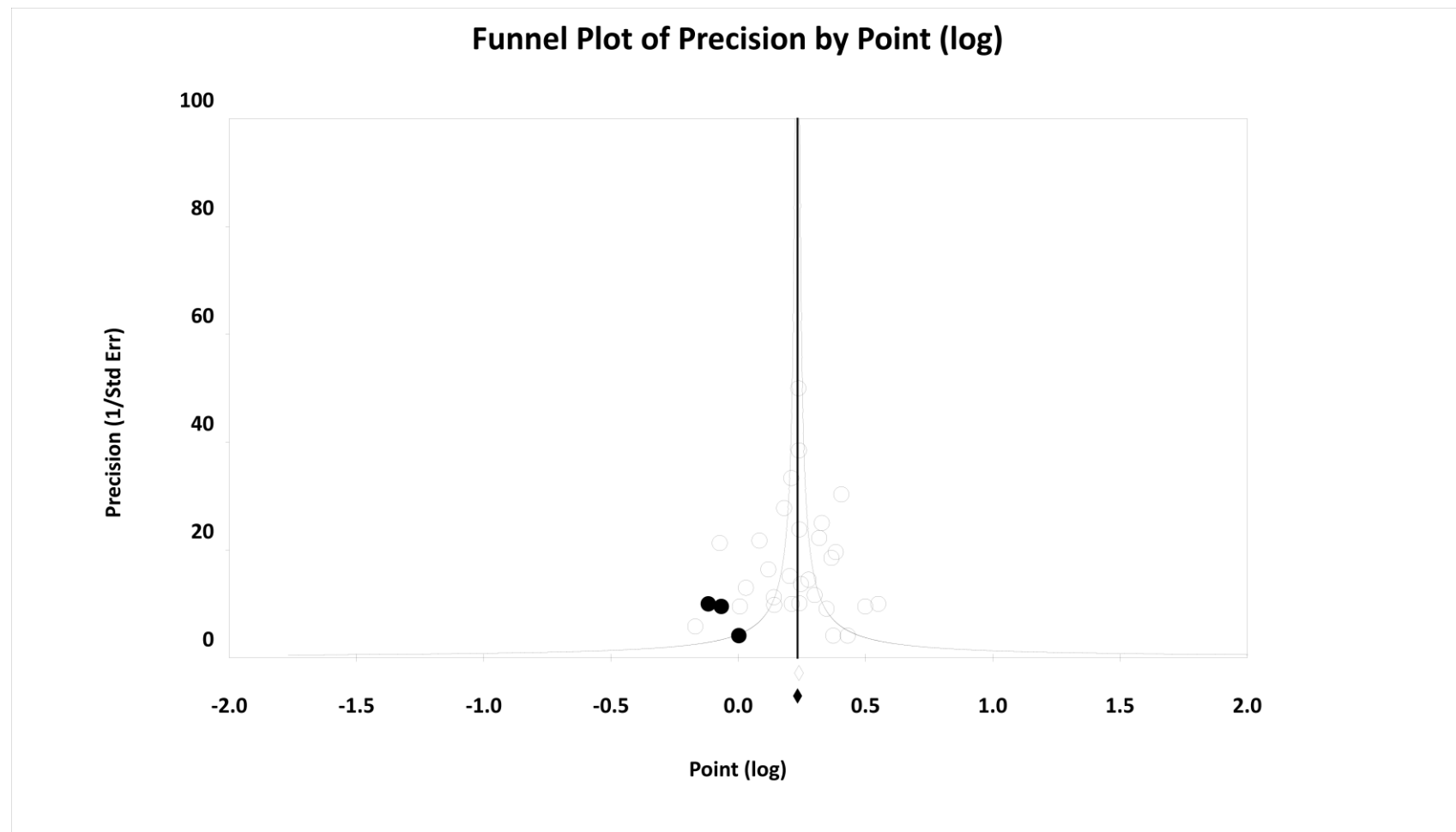


Figure S5. Funnel Plot of n-back and WMC

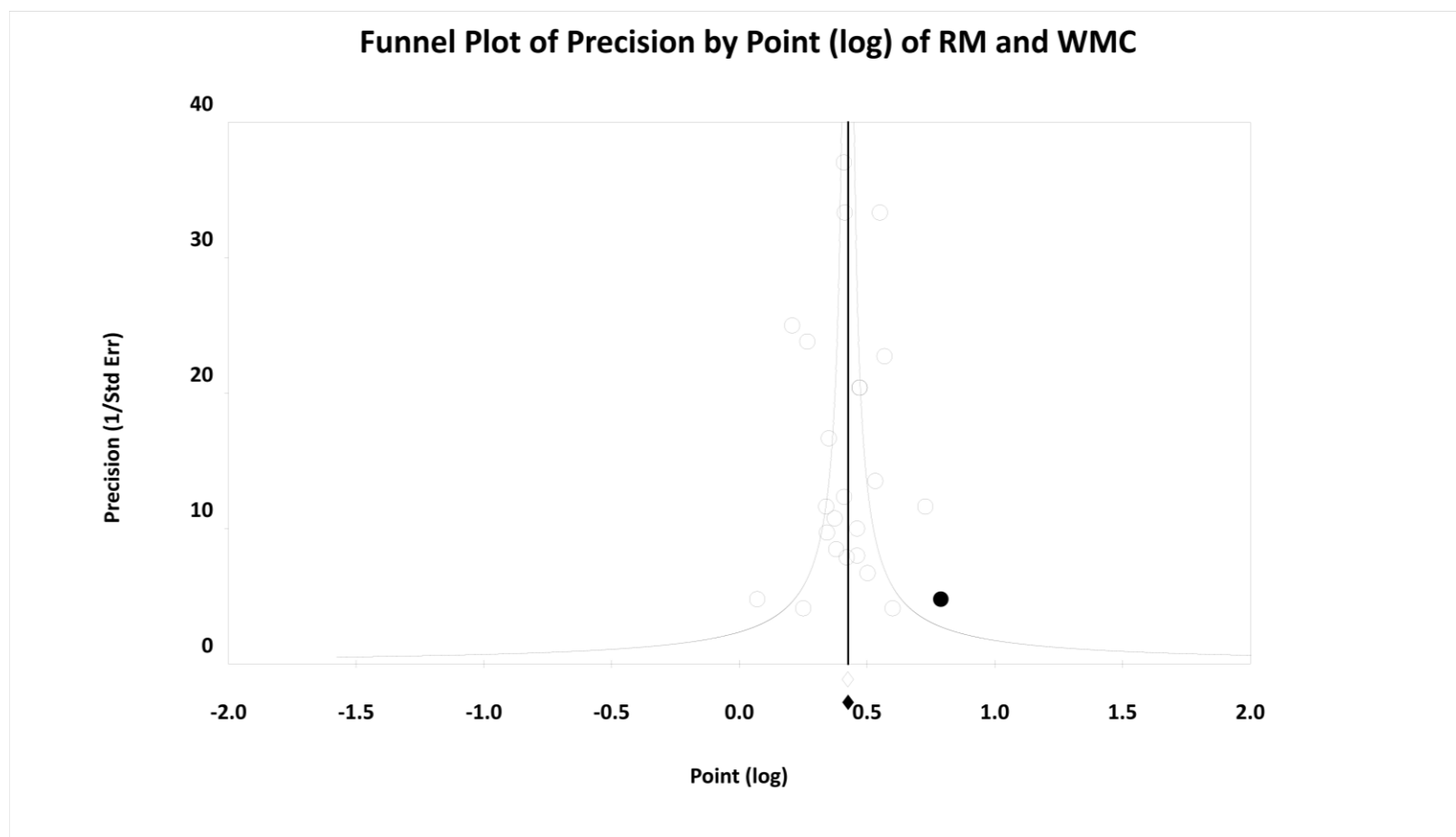


Figure S6. Funnel Plot of RM and WMC

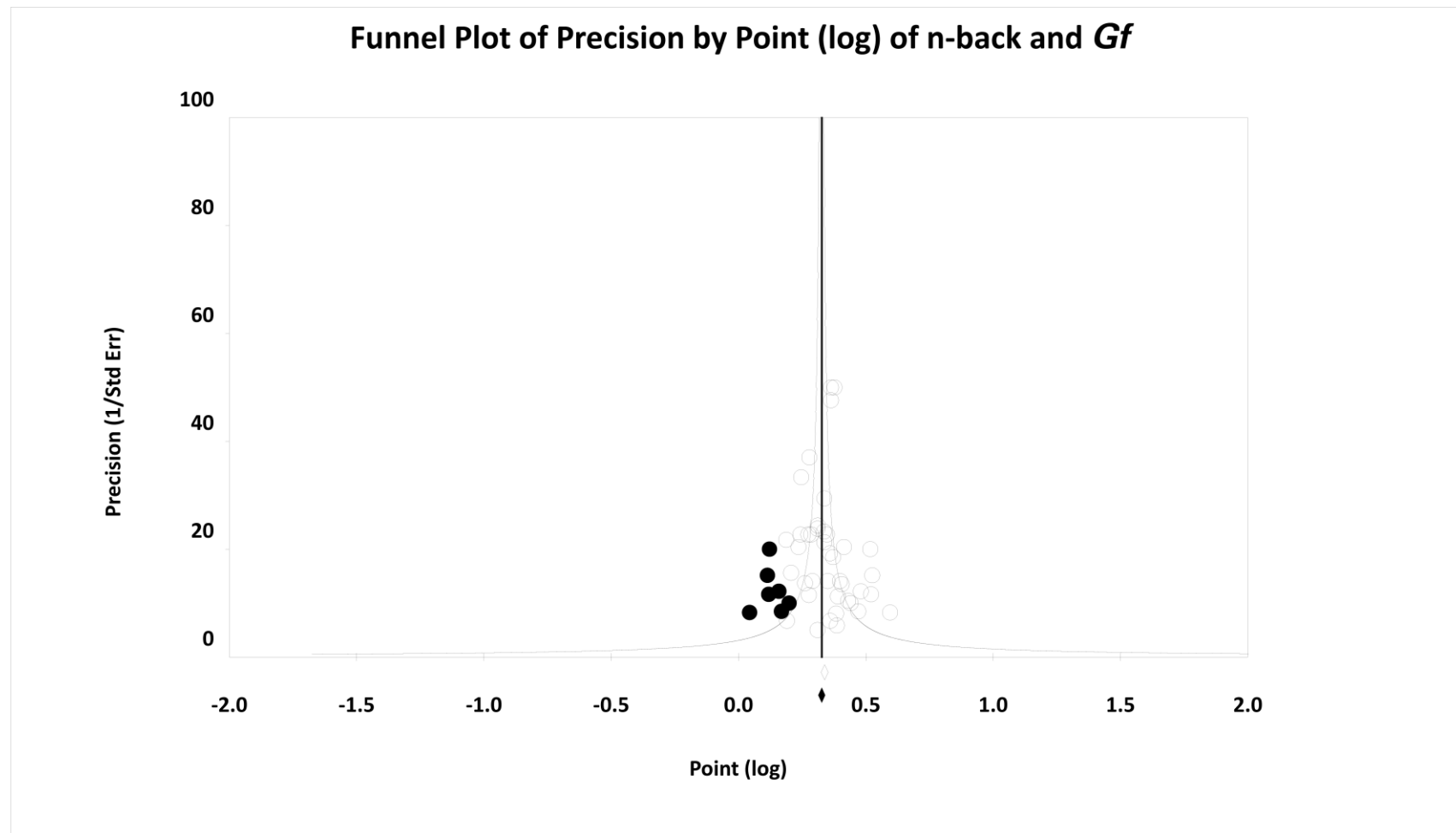


Figure S7. Funnel Plot of n-back and Gf

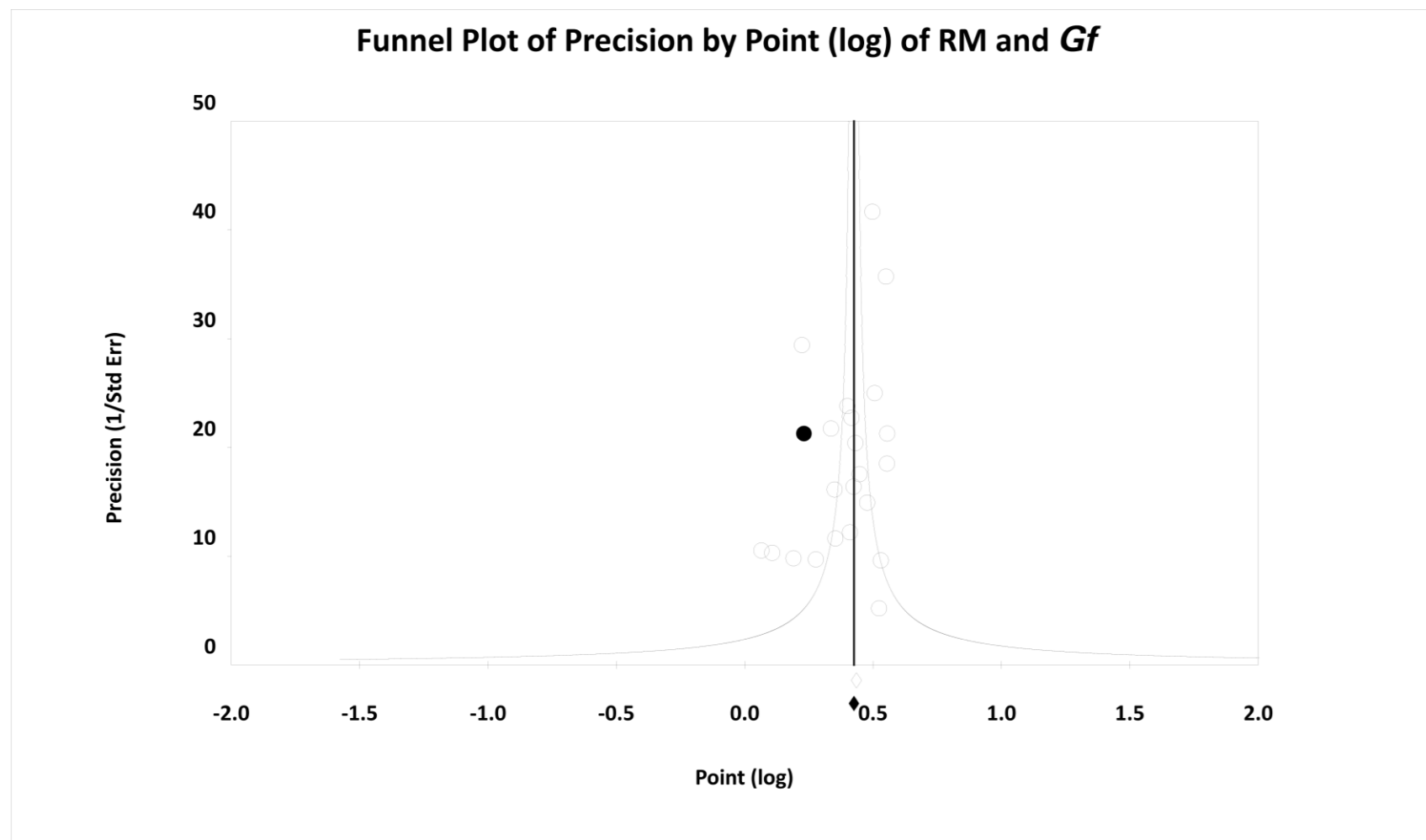


Figure S8. Funnel Plot of RM and Gf