

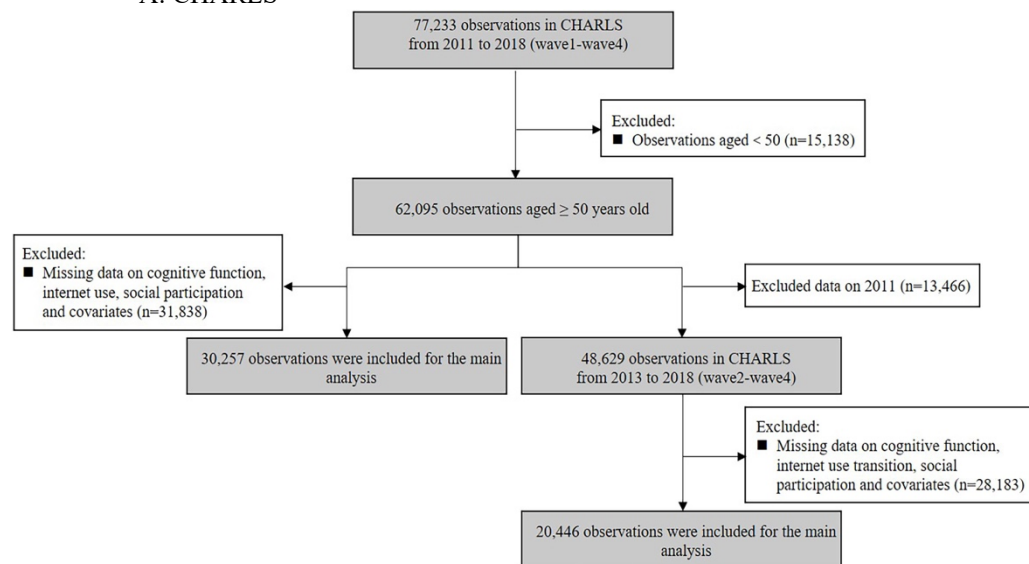
Supplementary Information

Content

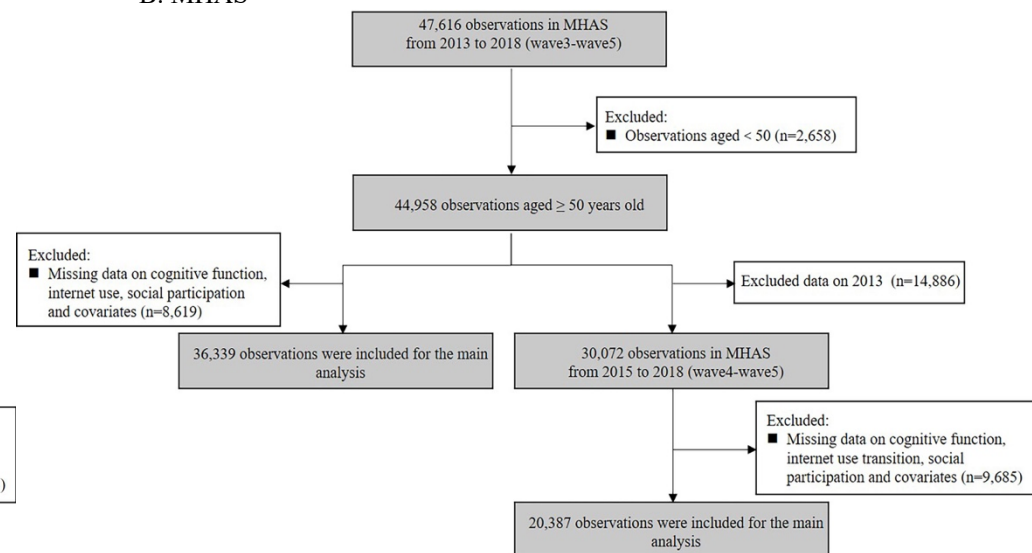
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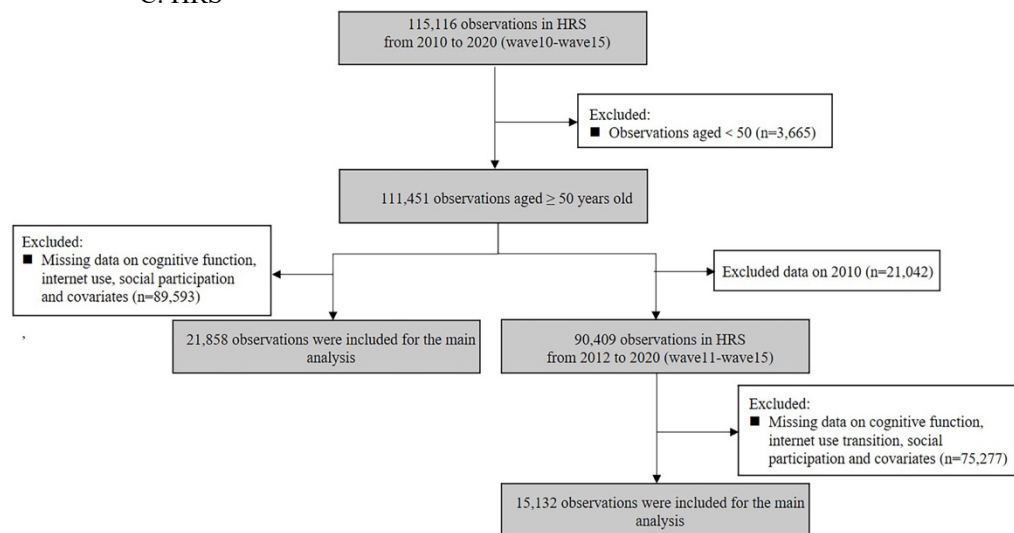
A: CHARLS



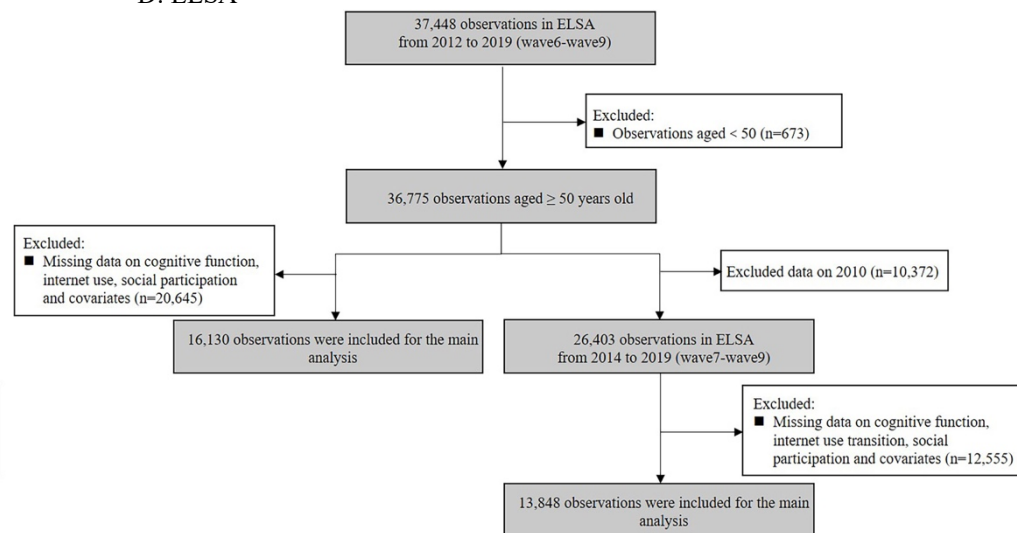
B: MHAS

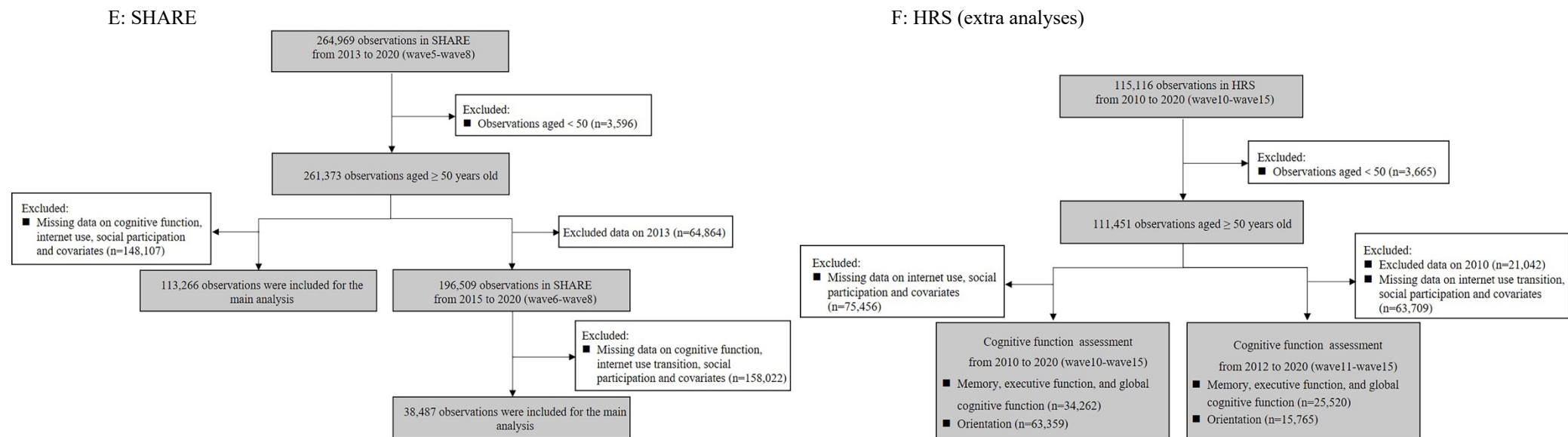


C: HRS



D: ELSA





Supplementary Figure 1 The flowcharts of participant selection in CHARLS, MHAS, HRS, ELSA, and SHARE

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.

Supplementary Table 1 Measurements of internet use, social participation and cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Variables	Questions and values
Internet use	
CHARLS	0 = no, 1 = yes [Have you used the internet in the last month?]
MHAS	0 = no, 1 = yes [In the house do you have internet?]
HRS	0 = no, 1 = yes [Whether the respondent uses the World Wide Web, or Internet, for sending and receiving email or for any other purpose, such as making purchases, searching for information, or making travel reservations?]
ELSA	0 = never, 1 = yes (less than every 3 months, at least once every 3 months, at least once a month (but not every week), at least once a week (but not every day), or every day, or almost every day) [On average, how often do you use the Internet or email?]
SHARE	0 = never, 1 = yes [During the past 7 days, have you used the Internet, for e-mailing, searching for information, making purchases, or for any other purpose at least once?]
Social Participation	
CHARLS	0 = no, 1 = yes [Have you done any of these activities in the last month? (Including 'Interacted with friends', 'Played Ma-jong, played chess, played cards, or went to community club', 'Went to a sport, social, or other kind of club', 'Took part in a community-related organization', 'Done voluntary or charity work' and 'Attended an educational or training course')]
MHAS	0 = no, 1 = yes [If you did some of these activities during the past year? (Including 'Caring for a sick or disabled adult', 'Caring for children under 12 years old', 'Work(ing) as a volunteer or help with a non-profit organization without pay or compensation', 'Attend(ing) a lecture, seminar or class', and 'Attend(ing) a sport or social club')]
HRS	0 = no, 1 = yes [Whether the respondent participates in any social activities on a monthly basis? (Including 'Caring for a sick or disabled adult', Doing activities with grandchildren, nieces/nephews, or neighborhood children, 'Doing volunteer work with children or young people', 'Doing any other volunteer or charity work', 'Attending an education or training course', 'Going to a sport, social, or other club', or 'Attending meetings of nonreligious organizations, such as political, community, or other interest groups'. Starting in Wave 12, 'Participating in a local community arts groups such as a choir, dance, photography, theatre, or music groups' is added to the list of activities)]
ELSA	0 = no, 1 = yes [Whether the respondent is a member of an organization, club or society and attends at least one committee meeting in a year? (Including 'Political party, trade union or environmental groups', 'Tenants group, resident groups neighbourhood watch', 'Church or other religious groups', 'Charitable associations', 'Education, arts or music groups or evening classes', 'Social clubs', 'Sports clubs, gyms, exercise classes', or 'Any other organizations, clubs or societies')]
SHARE	0 = no, 1 = yes [Have you done any of these activities in the last month? (Including 'Done voluntary or charity work', 'Attended an educational or training course', 'Gone to a sport, social or other kind of club', 'Taken part in a political or community-related organization', 'Read books, magazines or newspapers', 'Did word or number games such as crossword puzzles or Sudoku', or 'Played cards or games such as chess')]
Cognitive function	

CHARLS	Immediate word recall (0-10), Delayed word recall (0-10); Orientation (0-4); the Serial Sevens test (0-5), Copy the overlapping pentagons (0-1)
MHAS	Verbal learning (0-8), Delayed Verbal recall (0-8); Orientation (0-3); Constructional praxis (0-6), Constructional praxis recall (0-6), Visual Scanning (0-60), Verbal fluency (0-60)
HRS	Immediate word recall (0-10), Delayed word recall (0-10); Orientation (0-4); Counting-backward test (0-2), the Serial Sevens test (0-5)
ELSA	Immediate word recall (0-10), Delayed word recall (0-10); Cognition orient (0-4); Verbal fluency (0-100)
SHARE	Immediate word recall (0-10), Delayed word recall (0-10); Cognition orient (0-4); Verbal fluency (0-100)

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.

Supplementary Table 2 Measurements of covariates in CHARLS, MHAS, HRS, ELSA, and SHARE

Variables	Definitions and values				
	CHARLS	MHAS	HRS	ELSA	SHARE
Demographic characteristics					
Gender	0 = female, 1 = male				
Age	0 = group 1 (50-59) , 1 = group 2 (60-69), 2 = group 3 (70-79), 3 = group 4 (≥ 80)				
Marital status	0 = no [Separated, divorced, widowed or never married]				
	1 = yes [Married or partnered]				
Educational level	0 = Less than upper secondary		0 = Less than High-school	0 = Less than upper secondary	
	1 = Upper secondary and vocational training		1 = GED, or high-school graduate	1 = Upper secondary and vocational training	
	2 = Tertiary		2 = Some college, or college and above	2 = Tertiary	
Residence status	0 = Rural, 1 = Urban			Not applicable	0 = Rural, 1 = Urban
Employment status	0 = no [Unemployed, retired, or never worked per their labor force status]	0 = no [Unemployed, retired, disabled, not in the labor force]	0 = no [Not in the labor force (including retired, disabled, or a homemaker)]	0 = no [Retired, disabled, or looking after home or family]	0 = no [Retired, unemployment Permanently sick or disabled or homemaker]
	1 = yes [Agricultural work, non-agricultural employed work, non-agricultural self-employed work, or	1 = yes [Working]	1 = yes [In the labor force (including working for pay, or not working for pay, but	1 = yes [Employed, self-employed, unemployed or partly retired]	1 = yes [Employed or self-employed]

	non-agricultural unpaid family business work]		reports actively looking for a job in the last four weeks]		
Per capita household consumption	0 = group 1: lowest consumption (0-P25) , 1 = group 2 (P25-P50), 2 = group 3 (P50-P75), 3 = group 4: highest consumption (P75-P100)		Not applicable	Consistent with CHARLS	Not applicable
Total household capital income (CNY)	Not applicable	Not applicable	0 = group 1: most deprived (0-P25) , 1 = group 2 (P25-P50), 2 = group 3(P50-P75), 3 = group 3: most affluent (P75-P100)	Not applicable	Consistent with SHARE
Health-related behaviors					
Current smokers	0 = no, 1 = yes [Smoke now]	0 = no, 1 = yes [Smoked cigarettes in the last 2 years]	0 = no, 1 = yes [Smoke now]	0 = no, 1 = yes [Smoke now]	0 = no, 1 = yes [Smoke at the present time]
Current drinkers	0 = no, 1 = yes [Ever drinks any alcohol last year]	0 = no, 1 = yes [currently drinks alcohol]	0 = no, 1 = yes [Ever drinks alcoholic beverages in the last 3 months]	0 = no, 1 = yes [Alcoholic drink during the last 12 months]	0 = no, 1 = yes [Alcoholic drink in the last three months]
Health status					
Self-reported health	Continuous variable:1-5 [Excellent - poor]				
Chronic disease	0 = no, 1 = yes [Whether they had been diagnosed by a physician with the following diseases: high blood pressure, diabetes, cancer, lung disease, heart problems, stroke, and arthritis]				

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.

Supplementary Table 3 The characteristics of the sample used to analyze the effects of internet use on cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

	CHARLS	MHAS	HRS	ELSA	SHARE
Variables	(N=30,257)	(N=36,339)	(N=21,858)	(N=16,130)	(N=113,266)
	n(%)	n(%)	n(%)	n(%)	n(%)
Demographic characteristics					
Age(years), M(SD)	61.26(7.95)	63.66(9.43)	72.91(9.40)	67.54(8.96)	68.33(9.93)
50-59	14,096(46.59)	12,591(34.65)	2,234(10.22)	3,097(19.20)	26,005(22.96)
60-69	11,244(37.16)	12,725(35.02)	5,124(23.44)	6,679(41.41)	39,481(34.86)
70-79	4,268(14.11)	83,54(22.99)	9,198(42.08)	4,582(28.41)	31,898(28.16)
≥80	649(2.14)	2,669(7.34)	5,302(24.26)	1,772(10.99)	15,882(14.02)
Gender					
Female	14,454(47.77)	20,828(57.32)	12,727(58.23)	8,711(54.00)	66,508(58.72)
Male	15,803(52.23)	15,511(42.68)	9,131(41.77)	7,419(46.00)	46,758(41.28)
Marital status					
Separated, divorced, widowed or never married	3,433(11.35)	11,146(30.67)	9,222(42.19)	5,038(31.23)	31,953(28.21)
Married or partnered	26,824(88.65)	25,193(69.33)	12,636(57.81)	11,092(68.77)	81,313(71.79)
Educational level					
Less than upper secondary	25,705(84.96)	30,386(83.62)	3,330(15.23)	3,389(21.01)	23,055(20.35)
Upper secondary and vocational training	3,896(12.88)	1,298(3.57)	13,127(60.06)	9,006(55.83)	63,792(56.32)
Tertiary	656(2.17)	4,655(12.81)	5,401(24.71)	3,735(23.16)	26,419(23.32)
Residence status					
Rural	17,378(57.43)	10,484(28.85)	6,409(29.32)	-	37,525(33.13)
Urban	12,879(42.57)	25,855(71.15)	15,449(70.68)	-	75,741(66.87)
Employment status					
No	11,004(36.37)	21,524(59.23)	16,161(73.94)	11,126(68.98)	86,057(75.98)
Yes	19,253(63.63)	14,815(40.77)	5,697(26.06)	5,004(31.02)	27,209(24.02)
Per capita household consumption/					

Total household capital income (CNY)					
Group 1	7,571(25.02)	9,441(25.98)	8,729(39.94)	4,033(25.00)	26,794(23.66)
Group 2	7,562(24.99)	9,357(25.75)	2,262(10.35)	4,033(25.00)	27,930(24.66)
Group 3	7,565(25.00)	9,064(24.94)	5,438(24.88)	4,032(25.00)	28,845(25.47)
Group 4	7,559(24.98)	8,477(23.33)	5,429(24.84)	4,032(25.00)	29,697(26.22)
Health-related behaviors					
Current smokers					
No	21,415(70.78)	31,931(87.87)	19,807(90.62)	14,633(90.72)	98,783(87.21)
Yes	8,842(29.22)	4,408(12.13)	2,051(9.38)	1,497(9.28)	14,483(12.79)
Current drinkers					
No	19,248(63.62)	26,931(74.11)	13,799(63.13)	2,021(12.53)	80,527(71.10)
Yes	11,009(36.38)	9,408(25.89)	8,059(36.87)	14,109(87.47)	32,739(28.90)
Health status					
Self-reported health, M(SD)	2.94(0.95)	3.66(0.83)	2.85(1.02)	2.72(1.08)	3.14(1.05)
Chronic disease					
No	9,645(31.88)	10,545(29.02)	1,971(9.02)	4,402(27.29)	46,773(41.29)
Yes	20,612(68.12)	25,794(70.98)	19,887(90.98)	11,728(72.71)	66,493(58.71)
Social participation					
No	14,744(48.73)	19,963(54.94)	5,230(23.93)	10,804(66.98)	19,789(17.47)
Yes	15,513(51.27)	16,376(45.06)	16,628(76.07)	5,326(33.02)	93,477(82.53)
Internet use					
No	27,916(92.26)	21,875(60.20)	10,463(47.87)	2,738(16.97)	52,581(46.42)
Yes	2,341(7.74)	14,464(39.80)	11,395(52.13)	13,392(83.03)	60,685(53.58)

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; M: mean; SD: standard deviation.

Supplementary Table 4 The characteristics of the sample used to analyze the effects of internet use transition on cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

	CHARLS	MHAS	HRS	ELSA	SHARE
Variables	(N=20,446)	(N=20,387)	(N=15,132)	(N=13,848)	(N=38,487)
	n(%)	n(%)	n(%)	n(%)	n(%)
Demographic characteristics					
Age(years), M(SD)	61.34(8.04)	66.77(8.99)	75.35(7.08)	68.37(8.43)	70.95(9.28)
50-59	9,294(45.46)	5,078(24.91)	4(0.03)	2,024(14.62)	4,855(12.61)
60-69	7,726(37.79)	7,689(37.72)	3,802(25.13)	6,034(43.57)	13,587(35.30)
70-79	2,976(14.56)	5,760(28.25)	7,069(46.72)	4,211(30.41)	13,069(33.96)
≥80	450(2.20)	1,860(9.12)	4,257(28.13)	1,579(11.40)	6,976(18.13)
Gender					
Female	9,941(48.62)	1,1873(58.24)	8,892(58.76)	7,456(53.84)	24,763(64.34)
Male	10,505(51.38)	8,514(41.76)	6,240(41.24)	6,392(46.16)	13,724(35.66)
Marital status					
Separated, divorced, widowed or never married	2,242(10.97)	6,645(32.59)	6,382(42.18)	4,175(30.15)	11,808(30.68)
Married or partnered	18,204(89.03)	13,742(67.41)	8,750(57.82)	9,673(69.85)	26,679(69.32)
Educational level					
Less than upper secondary	17,340(84.81)	17,380(85.25)	2,274(15.03)	2,873(20.75)	9,706(25.22)
Upper secondary and vocational training	2,713(13.27)	781(3.83)	9,078(59.99)	7,724(55.78)	20,086(52.19)
Tertiary	393(1.92)	2,226(10.92)	3,780(24.98)	3,251(23.48)	8,695(22.59)
Residence status					
Rural	11,988(58.63)	5,963(29.25)	4,485(29.64)	-	13,011(33.81)
Urban	8,458(41.37)	14,424(70.75)	10,647(70.36)	-	25,476(66.19)
Labor force					
No	7,075(34.60)	12,646(62.03)	12,198(80.61)	10,038(72.49)	32,106(83.42)
Yes	13,371(65.40)	7,741(37.97)	2,934(19.39)	3,810(27.51)	6,381(16.58)
Per capita household consumption/					
Total household capital income (CNY)					

Group 1	4,749(23.23)	5,375(26.36)	6,075(40.15)	3,461(24.99)	8,052(20.92)
Group 2	5,160(25.24)	5,403(26.50)	1,535(10.14)	3,464(25.01)	9,922(25.78)
Group 3	5,283(25.84)	5,133(25.18)	3,749(24.78)	3,462(25.00)	10,350(26.89)
Group 4	5,254(25.70)	4,476(21.96)	3,773(24.93)	3,461(24.99)	10,163(26.41)
Health-related behaviors					
Current smokers					
No	14,824(72.50)	18,062(88.60)	14,008(92.57)	1,2677(91.54)	36,268(94.23)
Yes	5,622(27.50)	2,325(11.40)	1,124(7.43)	1,171(8.46)	2,219(5.77)
Current drinkers					
No	12,920(63.19)	15,304(75.07)	9,690(64.04)	1,710(12.35)	31,900(82.89)
Yes	7,526(36.81)	5,083(24.93)	5,442(35.96)	12,138(87.65)	6,587(17.11)
Health status					
Self-reported health, M(SD)	2.92(0.97)	3.69(0.82)	2.86(1.00)	2.72(1.07)	3.16(1.02)
Chronic disease					
No	5,937(29.04)	4,779(23.44)	929(6.14)	3,550(25.64)	15,333(39.84)
Yes	14,509(70.96)	15,608(76.56)	14,203(93.86)	10,298(74.36)	23,154(60.16)
Social participation					
No	9,907(48.45)	11,179(54.83)	3,811(25.19)	9,071(65.50)	5,872(15.26)
Yes	10,539(51.55)	9,208(45.17)	11,321(74.81)	4,777(34.50)	32,615(84.74)
Internet use transition					
No → no	18,227(89.15)	10,658(52.28)	6,441(42.57)	2,158(15.58)	17,952(46.64)
No → yes	1,129(5.52)	2,643(12.96)	792(5.23)	401(2.90)	2,181(5.67)
Yes → no	351(1.72)	1,096(5.38)	782(5.17)	201(1.45)	1,545(4.01)
Yes → yes	739(3.61)	5,990(29.38)	7,117(47.03)	11,088(80.07)	16,809(43.67)

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; M: mean; SD: standard deviation

Supplementary Table 5 Association of internet use and social participation with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Panel A: Internet use; B(95%CI); <i>p</i> value							Panel B: Social participation; B(95%CI); <i>p</i> value					
	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Memory												
Model 1	0.607 (0.564 to 0.650) ***	0.340 (0.319 to 0.362) ***	0.692 (0.665 to 0.719) ***	0.763 (0.718 to 0.808) ***	0.773 (0.762 to 0.785) ***	0.635 (0.446 to 0.824) ***	0.190 (0.168 to 0.212) ***	0.227 (0.209 to 0.246) ***	0.271 (0.242 to −0.301) ***	0.150 (0.117 to 0.183) ***	0.577 (0.563 to 0.592) ***	0.283 (0.098 to 0.469) **
Model 2	0.297 (0.254 to 0.340) ***	0.173 (0.151 to 0.195) ***	0.383 (0.354 to 0.412) ***	0.388 (0.341 to 0.434) ***	0.394 (0.381 to 0.406) ***	0.327 (0.227 to 0.427) ***	0.141 (0.120 to 0.162) ***	0.122 (0.103 to 0.140) ***	0.126 (0.099 to 0.154) ***	0.099 (0.068 to 0.131) ***	0.352 (0.338 to 0.366) ***	0.168 (0.053 to 0.283) **
Model 3	0.294 (0.251 to 0.337) ***	0.172 (0.150 to 0.193) ***	0.371 (0.342 to 0.400) ***	0.370 (0.323 to 0.417) ***	0.391 (0.379 to 0.404) ***	0.319 (0.221 to 0.418) ***	0.141 (0.120 to 0.162) ***	0.120 (0.102 to 0.139) ***	0.121 (0.094 to 0.149) ***	0.093 (0.062 to 0.125) ***	0.350 (0.336 to 0.363) ***	0.166 (0.051 to 0.281) **
Model 4	0.285 (0.243 to 0.328) ***	0.166 (0.144 to 0.188) ***	0.356 (0.327 to 0.385) ***	0.349 (0.302 to 0.396) ***	0.359 (0.347 to 0.372) ***	0.304 (0.222 to 0.387) ***	0.136 (0.115 to 0.157) ***	0.120 (0.102 to 0.138) ***	0.108 (0.081 to 0.136) ***	0.084 (0.053 to 0.115) ***	0.329 (0.315 to 0.342) ***	0.156 (0.048 to 0.263) **
Model 5	0.268 (0.225 to 0.311) ***	0.162 (0.141 to 0.184) ***	0.352 (0.323 to 0.381) ***	0.343 (0.296 to 0.389) ***	0.320 (0.308 to 0.333) ***	0.288 (0.212 to 0.365) ***	0.127 (0.106 to 0.149) ***	0.117 (0.099 to 0.135) ***	0.095 (0.068 to 0.123) ***	0.071 (0.040 to 0.102) ***	0.275 (0.261 to 0.289) ***	0.137 (0.053 to 0.222) **
Orientation												
Model 1	0.436 (0.393 to 0.480) ***	0.259 (0.237 to 0.282) ***	0.302 (0.274 to 0.330) ***	0.377 (0.332 to 0.421) ***	0.314 (0.302 to 0.325) ***	0.334 (0.289 to 0.378) ***	0.124 (0.102 to 0.147) ***	0.125 (0.105 to 0.145) ***	0.177 (0.145 to 0.208) ***	0.097 (0.062 to 0.132) ***	0.350 (0.335 to 0.366) ***	0.175 (0.063 to 0.287) **
Model 2	0.167 (0.123 to 0.212) ***	0.114 (0.090 to 0.138) ***	0.180 (0.148 to 0.212) ***	0.262 (0.211 to 0.312) ***	0.142 (0.128 to 0.156) ***	0.168 (0.132 to 0.204) ***	0.072 (0.050 to 0.094) ***	0.056 (0.036 to 0.076) ***	0.103 (0.071 to 0.135) ***	0.070 (0.034 to 0.106) ***	0.264 (0.248 to 0.280) ***	0.113 (0.017 to 0.210) *
Model 3	0.168 (0.124 to 0.212) ***	0.114 (0.090 to 0.137) ***	0.175 (0.143 to 0.207) ***	0.251 (0.200 to 0.301) ***	0.140 (0.126 to 0.154) ***	0.164 (0.130 to 0.198) ***	0.074 (0.052 to 0.096) ***	0.056 (0.036 to 0.076) ***	0.100 (0.068 to 0.132) ***	0.065 (0.029 to 0.100) ***	0.263 (0.247 to 0.279) ***	0.112 (0.016 to 0.208) *
Model 4	0.156 (0.112 to 0.201) ***	0.111 (0.087 to 0.134) ***	0.166 (0.133 to 0.198) ***	0.238 (0.187 to 0.289) ***	0.115 (0.101 to 0.129) ***	0.152 (0.117 to 0.187) ***	0.069 (0.047 to 0.090) ***	0.056 (0.036 to 0.076) ***	0.092 (0.060 to 0.124) ***	0.058 (0.022 to 0.093) **	0.247 (0.231 to 0.263) ***	0.104 (0.014 to 0.195) *
Model 5	0.148 (0.103 to 0.192) ***	0.109 (0.085 to 0.133) ***	0.162 (0.130 to 0.195) ***	0.233 (0.182 to 0.284) ***	0.079 (0.065 to 0.093) ***	0.142 (0.096 to 0.188) ***	0.064 (0.042 to 0.085) ***	0.053 (0.033 to 0.073) ***	0.085 (0.053 to 0.117) ***	0.045 (0.009 to 0.081) *	0.232 (0.216 to 0.249) ***	0.096 (0.011 to 0.181) *

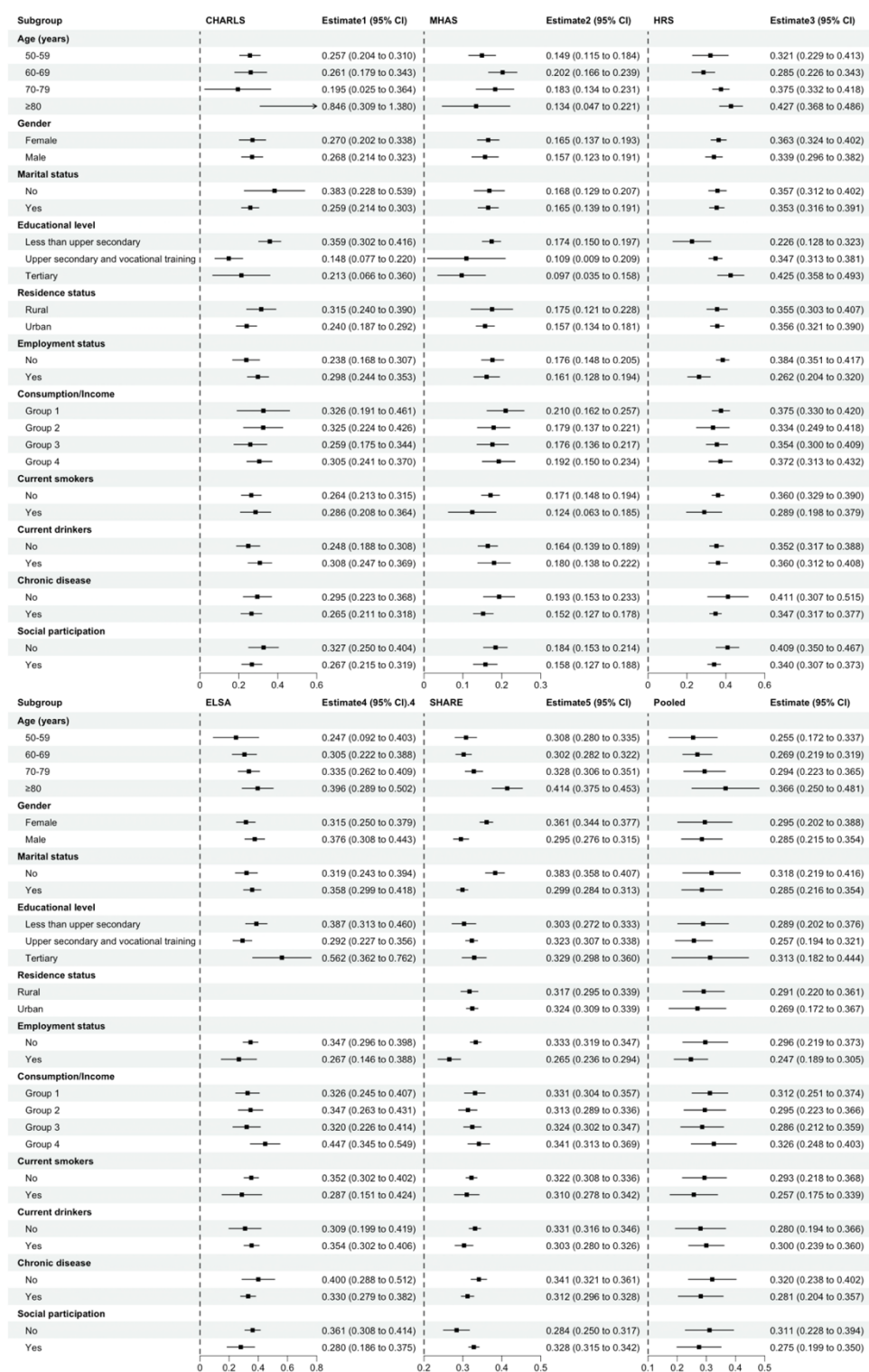
**Executive
function**

Model 1	0.452 (0.410 to 0.494) ***	0.363 (0.344 to 0.382) ***	0.537 (0.510 to 0.564) ***	0.610 (0.565 to 0.655) ***	0.728 (0.716 to 0.739) ***	0.538 (0.363 to 0.713) ***	0.144 (0.123 to 0.165) ***	0.156 (0.141 to 0.172) ***	0.170 (0.142 to 0.198) ***	0.175 (0.142 to 0.208) ***	0.658 (0.644 to 0.673) ***	0.261 (0.013 to 0.508) *
Model 2	0.220 (0.178 to 0.263) ***	0.210 (0.192 to 0.228) ***	0.280 (0.251 to 0.309) ***	0.290 (0.241 to 0.339) ***	0.403 (0.391 to 0.416) ***	0.281 (0.183 to 0.379) ***	0.112 (0.091 to 0.132) ***	0.118 (0.103 to 0.133) ***	0.070 (0.043 to 0.097) ***	0.116 (0.084 to 0.148) ***	0.448 (0.434 to 0.462) ***	0.173 (0.006 to 0.340) *
Model 3	0.217 (0.175 to 0.260) ***	0.209 (0.191 to 0.227) ***	0.271 (0.242 to 0.300) ***	0.277 (0.228 to 0.326) ***	0.400 (0.387 to 0.413) ***	0.275 (0.178 to 0.373) ***	0.112 (0.091 to 0.133) ***	0.116 (0.101 to 0.131) ***	0.067 (0.040 to 0.094) ***	0.113 (0.081 to 0.145) ***	0.445 (0.431 to 0.459) ***	0.171 (0.004 to 0.337) *
Model 4	0.211 (0.169 to 0.254) ***	0.204 (0.186 to 0.223) ***	0.258 (0.229 to 0.287) ***	0.257 (0.208 to 0.306) ***	0.377 (0.364 to 0.390) ***	0.262 (0.173 to 0.351) ***	0.109 (0.088 to 0.130) ***	0.117 (0.102 to 0.132) ***	0.056 (0.029 to 0.083) ***	0.104 (0.071 to 0.136) ***	0.429 (0.415 to 0.443) ***	0.163 (0.003 to 0.324) *
Model 5	0.198 (0.155 to 0.240) ***	0.203 (0.185 to 0.221) ***	0.256 (0.227 to 0.285) ***	0.248 (0.199 to 0.297) ***	0.325 (0.313 to 0.338) ***	0.247 (0.184 to 0.309) ***	0.103 (0.082 to 0.123) ***	0.116 (0.101 to 0.130) ***	0.047 (0.020 to 0.074) **	0.094 (0.062 to 0.127) ***	0.377 (0.363 to 0.391) ***	0.148 (0.010 to 0.285) *

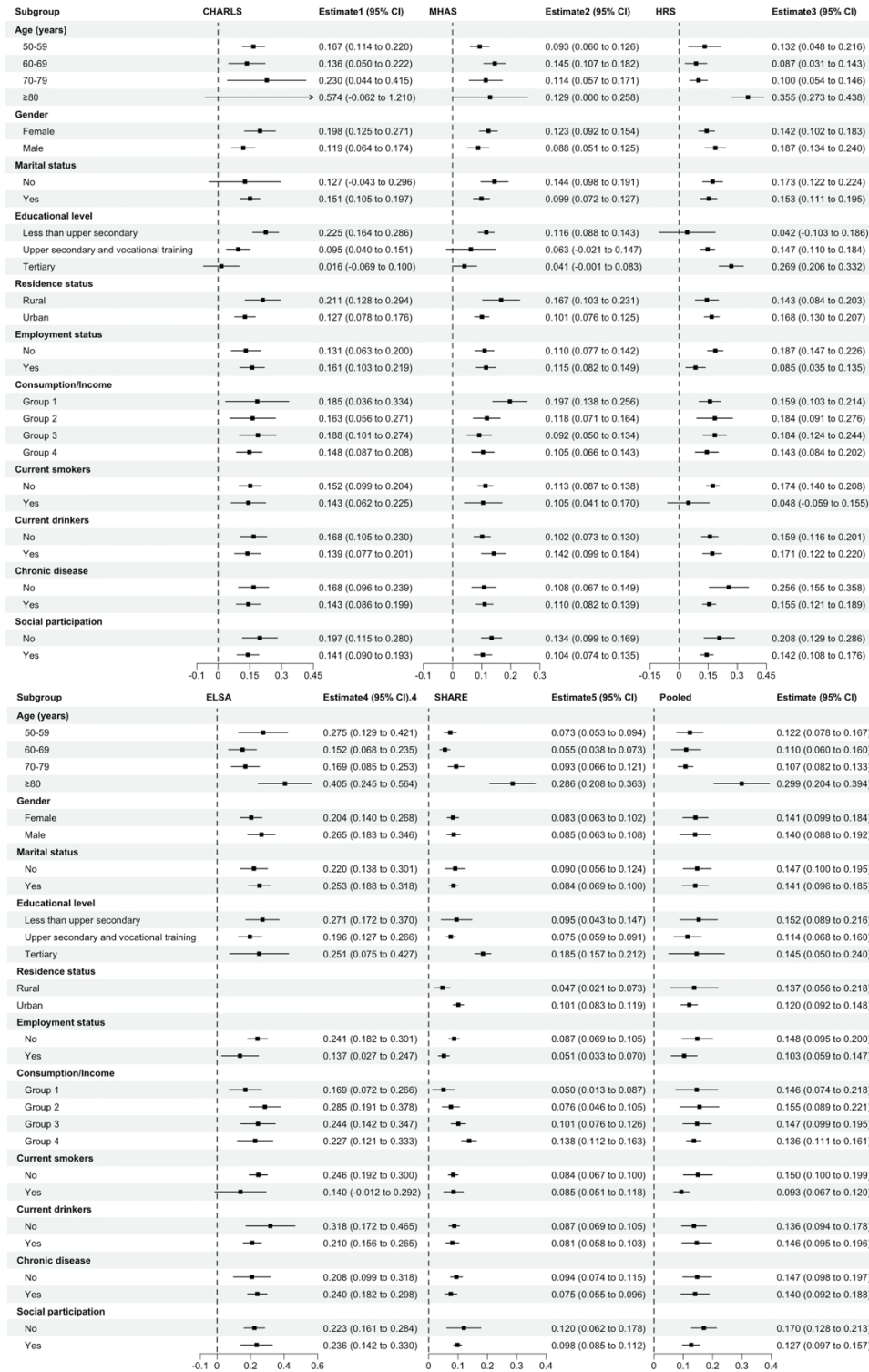
**Global
cognition**

Model 1	0.422 (0.392 to 0.452) ***	0.270 (0.255 to 0.286) ***	0.509 (0.490 to 0.528) ***	0.573 (0.541 to 0.605) ***	0.591 (0.582 to 0.599) ***	0.473 (0.330 to 0.616) ***	0.125 (0.111 to 0.140) ***	0.132 (0.119 to 0.144) ***	0.197 (0.176 to 0.217) ***	0.127 (0.104 to 0.150) ***	0.502 (0.491 to 0.512) ***	0.217 (0.037 to 0.396) *
Model 2	0.206 (0.177 to 0.236) ***	0.153 (0.138 to 0.167) ***	0.282 (0.262 to 0.303) ***	0.312 (0.278 to 0.345) ***	0.311 (0.301 to 0.320) ***	0.253 (0.179 to 0.327) ***	0.096 (0.082 to 0.110) ***	0.089 (0.077 to 0.101) ***	0.100 (0.081 to 0.120) ***	0.089 (0.067 to 0.112) ***	0.346 (0.336 to 0.357) ***	0.144 (0.019 to 0.269) *
Model 3	0.205 (0.176 to 0.235) ***	0.152 (0.137 to 0.166) ***	0.274 (0.253 to 0.294) ***	0.299 (0.265 to 0.332) ***	0.308 (0.299 to 0.318) ***	0.247 (0.175 to 0.320) ***	0.097 (0.083 to 0.111) ***	0.088 (0.076 to 0.100) ***	0.097 (0.077 to 0.116) ***	0.085 (0.063 to 0.108) ***	0.345 (0.335 to 0.355) ***	0.142 (0.018 to 0.268) *
Model 4	0.198 (0.169 to 0.228) ***	0.148 (0.133 to 0.162) ***	0.262 (0.241 to 0.282) ***	0.282 (0.249 to 0.316) ***	0.283 (0.274 to 0.292) ***	0.234 (0.172 to 0.297) ***	0.093 (0.079 to 0.108) ***	0.088 (0.076 to 0.100) ***	0.087 (0.068 to 0.106) ***	0.078 (0.056 to 0.100) ***	0.328 (0.318 to 0.339) ***	0.135 (0.016 to 0.254) *
Model 5	0.187 (0.158 to 0.217) ***	0.146 (0.132 to 0.161) ***	0.258 (0.238 to 0.279) ***	0.276 (0.243 to 0.310) ***	0.244 (0.234 to 0.253) ***	0.222 (0.172 to 0.271) ***	0.088 (0.074 to 0.102) ***	0.086 (0.074 to 0.098) ***	0.078 (0.058 to 0.097) ***	0.068 (0.046 to 0.090) ***	0.289 (0.279 to 0.299) ***	0.122 (0.020 to 0.224) *

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; Model 1 was crude model; Model 2 was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income); Model 3 was additionally adjusted for health-related behaviors (current smokers and current drinkers) based on Model 2; Model 4 was further adjusted for health status (self-rated health and chronic disease) based on Model 3; Model 5 was fully adjusted to include social participation or internet use.

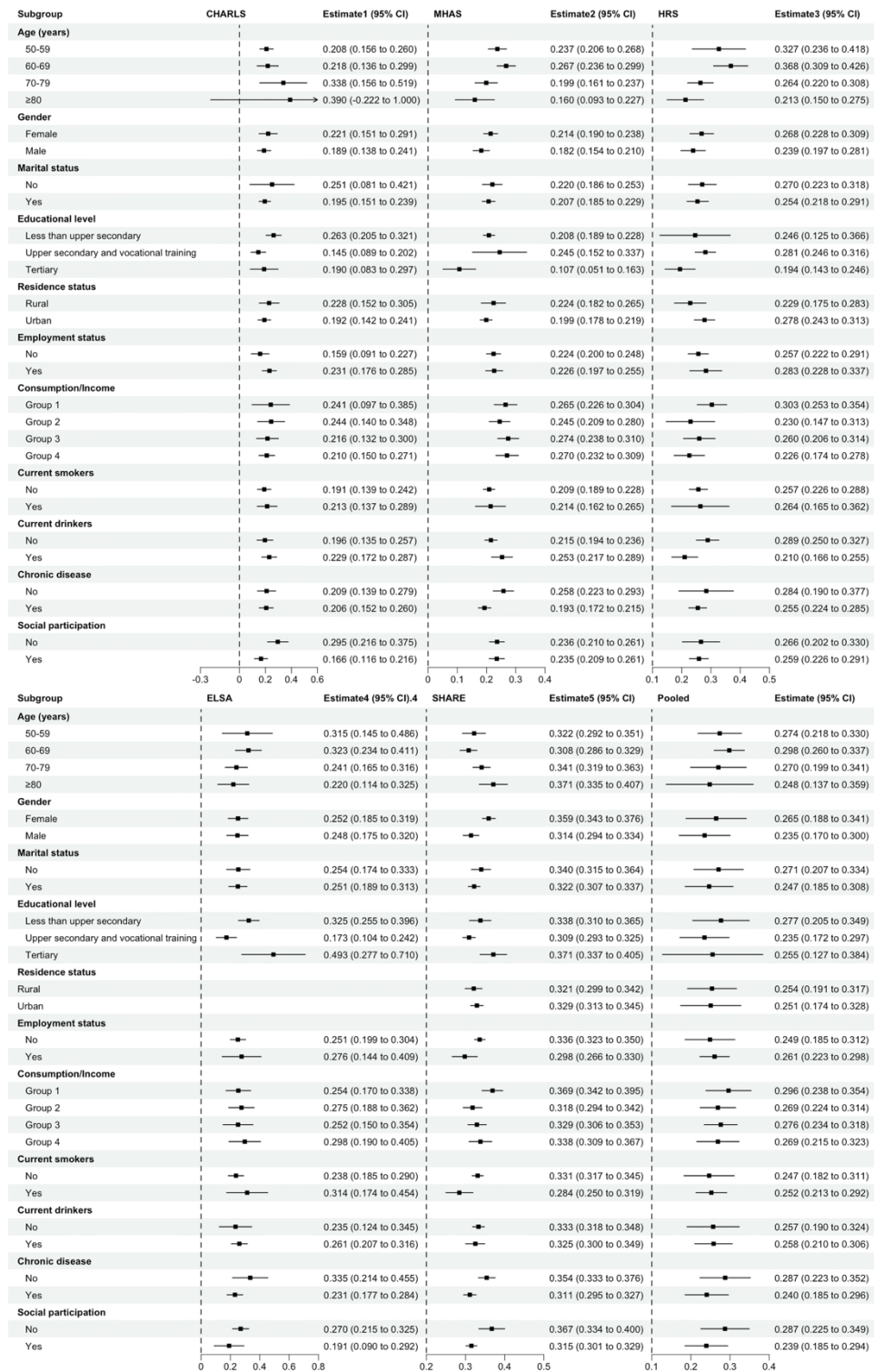


Supplementary Figure 2 Stratified associations between internet use and memory in CHARLS, MHAS, HRS, ELSA, and SHARE
Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.



Supplementary Figure 3 Stratified associations between internet use and orientation in CHARLS, MHAS, HRS, ELSA, and SHARE

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.



Supplementary Figure 4 Stratified associations between internet use and executive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.

Supplementary Table 6 The interactions of internet use, and social participation with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Multiplicative interaction; B(95%CI); <i>p</i> value							Multiplicative interaction; B(95%CI); <i>p</i> value						
	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Memory							Orientation						
Model 1	0.593 (0.544 to 0.642) ***	0.343 (0.318 to 0.367) ***	0.589 (0.563 to 0.616) ***	0.208 (0.174 to 0.241) ***	0.755 (0.744 to 0.767) ***	0.498 (0.279 to 0.716) ***	Model 1	0.410 (0.360 to 0.459) ***	0.219 (0.194 to 0.245) ***	0.271 (0.243 – 0.298) ***	0.135 (0.099 to 0.171) ***	0.287 (0.274 to 0.299) ***	0.263 (0.202 to 0.323) ***
Model 2	0.289 (0.241 to 0.337) ***	0.172 (0.148 to 0.195) ***	0.306 (0.279 to 0.334) ***	0.122 (0.090 to 0.154) ***	0.396 (0.384 to 0.409) ***	0.257 (0.141 to 0.373) ***	Model 2	0.142 (0.092 to 0.192) ***	0.084 (0.058 to 0.110) ***	0.152 (0.122 to 0.182) ***	0.092 (0.055 to 0.129) ***	0.129 (0.116 to 0.143) ***	0.119 (0.094 to 0.144) ***
Model 3	0.286 (0.238 to 0.335) ***	0.170 (0.146 to 0.194) ***	0.295 (0.268 to 0.323) ***	0.116 (0.083 to 0.148) ***	0.394 (0.382 to 0.406) ***	0.252 (0.136 to 0.369) ***	Model 3	0.143 (0.093 to 0.193) ***	0.084 (0.058 to 0.110) ***	0.147 (0.116 to 0.178) ***	0.087 (0.050 to 0.124) ***	0.127 (0.112 to 0.141) ***	0.117 (0.092 to 0.141) ***
Model 4	0.275 (0.227 to 0.324) ***	0.166 (0.142 to 0.190) ***	0.279 (0.252 to 0.306) ***	0.106 (0.073 to 0.138) ***	0.364 (0.351 to 0.376) ***	0.238 (0.132 to 0.344) ***	Model 4	0.129 (0.079 to 0.179) ***	0.081 (0.055 to 0.107) ***	0.137 (0.105 to 0.168) ***	0.079 (0.042 to 0.116) ****	0.104 (0.089 to 0.118) ***	0.104 (0.090 to 0.118) ***
Executive function							Global cognition						
Model 1	0.419 (0.371 to 0.466) ***	0.303 (0.283 to 0.324) ***	0.427 (0.401 to 0.454) ***	0.219 (0.185 to 0.253) ***	0.732 (0.720 to 0.743) ***	0.420 (0.190 to 0.651) ***	Model 1	0.388 (0.354 to 0.422) ***	0.233 (0.216 to 0.249) ***	0.422 (0.404 to 0.441) ***	0.172 (0.148 to 0.196) ***	0.577 (0.568 to 0.585) ***	0.358 (0.185 to 0.532) ***
Model 2	0.192 (0.144 to 0.240) ***	0.203 (0.183 to 0.222) ***	0.210 (0.183 to 0.237) ***	0.128 (0.094 to 0.161) ***	0.426 (0.413 to 0.438) ***	0.232 (0.101 to 0.363) ***	Model 2	0.183 (0.149 to 0.216) ***	0.140 (0.124 to 0.156) ***	0.221 (0.202 to 0.241) ***	0.110 (0.086 to 0.133) ***	0.314 (0.305 to 0.323) ***	0.194 (0.104 to 0.284) ***
Model 3	0.189 (0.141 to 0.236) ***	0.201 (0.182 to 0.221) ***	0.202 (0.175 to 0.229) ***	0.125 (0.091 to 0.158) ***	0.422 (0.410 to 0.435) ***	0.228 (0.907 to 0.359) ***	Model 3	0.182 (0.148 to 0.215) ***	0.139 (0.123 to 0.155) ***	0.214 (0.194 to 0.233) ***	0.106 (0.083 to 0.129) ***	0.311 (0.302 to 0.320) ***	0.191 (0.101 to 0.280) ***
Model 4	0.182 (0.134 to 0.229) ***	0.199 (0.179 to 0.218) ***	0.188 (0.160 to 0.215) ***	0.115 (0.081 to 0.148) ***	0.401 (0.388 to 0.413) ***	0.218 (0.094 to 0.341) ***	Model 4	0.182 (0.134 to 0.229) ***	0.137 (0.121 to 0.152) ***	0.201 (0.181 to 0.220) ***	0.098 (0.075 to 0.121) *	0.288 (0.279 to 0.297) ***	0.181 (0.099 to 0.264) ***

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; Model 1 was crude model; Model 2 was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income); Model 3 was additionally adjusted for health-related behaviors (current smokers and current drinkers) based on Model 2; Model 4 was further adjusted for health status (self-rated health and chronic disease) based on Model 3.

Supplementary Table 7 Association of internet use transition with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Models	Groups	Memory; B(95%CI)						Orientation; B(95%CI)					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Model 1	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.202 (0.084 to 0.319)	0.232 (0.175 to 0.288)	0.525 (0.461 to 0.589)	0.524 (0.414 to 0.634)	0.493 (0.450 to 0.536)	0.397 (0.261 to 0.534)	0.167 (0.046 to 0.288)	0.132 (0.072 to 0.192)	0.224 (0.151 to 0.296)	0.260 (0.260 to 0.070)	0.117 (0.068 to 0.167)	0.166 (0.114 to 0.217)
	No → no	-0.688 (- 0.786 to - 0.591)	-0.316 (- 0.370 to - 0.261)	-0.272 (- 0.336 to - 0.207)	-0.311 (- 0.426 to - 0.197)	-0.446 (- 0.489 to - 0.404)	-0.405 (- 0.523 to - 0.286)	-0.454 (- 0.554 to - 0.354)	-0.278 (- 0.336 to - 0.220)	-0.108 (- 0.181 to - 0.035)	-0.099 (- 0.099 to 0.072)	-0.223 (- 0.272 to - 0.173)	-0.235 (- 0.335 to - 0.135)
	No → yes	-0.111 (- 0.216 to - 0.006)	-0.046 (- 0.103 to 0.010)	0.198 (0.116 to 0.281)	0.162 (0.038 to 0.286)	0.100 (0.050 to 0.150)	0.059 (- 0.047 to 0.166)	-0.034 (- 0.142 to 0.075)	-0.069 (- 0.131 to - 0.007)	0.119 (0.023 to 0.215)	0.147 (0.147 to 0.083)	0.072 (0.013 to 0.132)	0.038 (- 0.045 to 0.122)
	No → no	-0.313 (- 0.408 to - 0.218)	-0.162 (- 0.214 to - 0.110)	-0.120 (- 0.183 to - 0.058)	-0.126 (- 0.238 to - 0.014)	-0.184 (- 0.226 to - 0.143)	-0.177 (- 0.229 to - 0.126)	-0.133 (- 0.232 to - 0.033)	-0.160 (- 0.218 to - 0.102)	-0.055 (- 0.129 to 0.018)	-0.061 (- 0.129 to 0.081)	-0.085 (- 0.136 to - 0.033)	-0.104 (- 0.146 to - 0.061)
Model 2	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.102 (- 0.010 to 0.215)	0.103 (0.049 to 0.156)	0.346 (0.284 to 0.408)	0.311 (0.203 to 0.419)	0.309 (0.268 to 0.350)	0.236 (0.128 to 0.344)	0.086 (- 0.032 to 0.205)	0.037 (- 0.023 to 0.096)	0.154 (0.081 to 0.227)	0.185 (0.047 to 0.322)	0.063 (0.012 to 0.114)	0.092 (0.041 to 0.143)
	No → no	-0.313 (- 0.408 to - 0.218)	-0.162 (- 0.214 to - 0.110)	-0.120 (- 0.183 to - 0.058)	-0.126 (- 0.238 to - 0.014)	-0.184 (- 0.226 to - 0.143)	-0.177 (- 0.229 to - 0.126)	-0.133 (- 0.232 to - 0.033)	-0.160 (- 0.218 to - 0.102)	-0.055 (- 0.129 to 0.018)	-0.061 (- 0.129 to 0.081)	-0.085 (- 0.136 to - 0.033)	-0.104 (- 0.146 to - 0.061)
	No → yes	-0.009 (- 0.111 to 0.093)	-0.023 (- 0.078 to 0.031)	0.164 (0.084 to 0.244)	0.139 (0.017 to 0.261)	0.093 (0.045 to 0.141)	0.070 (- 0.005 to 0.144)	0.075 (- 0.031 to 0.182)	-0.055 (- 0.116 to 0.006)	0.094 (- 0.001 to 0.189)	0.129 (- 0.033 to 0.290)	0.093 (0.029 to 0.156)	0.058 (- 0.018 to 0.134)
	No → no	-0.310 (- 0.405 to - 0.215)	-0.162 (- 0.215 to - 0.110)	-0.115 (- 0.177 to - 0.052)	-0.111 (- 0.223 to 0.001)	-0.182 (- 0.224 to - 0.141)	-0.174 (- 0.226 to - 0.121)	-0.128 (- 0.227 to - 0.028)	-0.160 (- 0.217 to - 0.102)	-0.053 (- 0.127 to 0.020)	-0.053 (- 0.053 to 0.130)	-0.097 (- 0.147 to - 0.047)	-0.106 (- 0.147 to - 0.065)
Model 3	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.100 (- 0.013 to 0.212)	0.100 (0.046 to 0.154)	0.335 (0.273 to 0.397)	0.306 (0.198 to 0.414)	0.308 (0.267 to 0.349)	0.232 (0.124 to 0.339)	0.086 (- 0.031 to 0.205)	0.036 (- 0.023 to 0.096)	0.149 (0.076 to 0.222)	0.180 (0.180 to 0.070)	0.062 (0.012 to 0.112)	0.089 (0.040 to 0.138)
	No → no	-0.310 (- 0.405 to - 0.215)	-0.162 (- 0.215 to - 0.110)	-0.115 (- 0.177 to - 0.052)	-0.111 (- 0.223 to 0.001)	-0.182 (- 0.224 to - 0.141)	-0.174 (- 0.226 to - 0.121)	-0.128 (- 0.227 to - 0.028)	-0.160 (- 0.217 to - 0.102)	-0.053 (- 0.127 to 0.020)	-0.053 (- 0.053 to 0.130)	-0.097 (- 0.147 to - 0.047)	-0.106 (- 0.147 to - 0.065)
	No → yes	-0.009 (- 0.110 to 0.093)	-0.024 (- 0.078 to 0.031)	0.166 (0.086 to 0.246)	0.143 (0.021 to 0.265)	0.094 (0.046 to 0.142)	0.071 (- 0.005 to 0.147)	0.078 (- 0.029 to 0.185)	-0.055 (- 0.116 to 0.006)	0.093 (- 0.002 to 0.188)	0.130 (0.130 to 0.082)	0.068 (0.009 to 0.126)	0.051 (- 0.019 to 0.121)
	No → no	-0.310 (- 0.405 to - 0.215)	-0.162 (- 0.215 to - 0.110)	-0.115 (- 0.177 to - 0.052)	-0.111 (- 0.223 to 0.001)	-0.182 (- 0.224 to - 0.141)	-0.174 (- 0.226 to - 0.121)	-0.128 (- 0.227 to - 0.028)	-0.160 (- 0.217 to - 0.102)	-0.053 (- 0.127 to 0.020)	-0.053 (- 0.053 to 0.130)	-0.097 (- 0.147 to - 0.047)	-0.106 (- 0.147 to - 0.065)
Model 4	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Model 5	Yes → yes	0.094 (- 0.018 to 0.206)	0.093 (0.039 to 0.147)	0.324 (0.262 to 0.386)	0.284 (0.176 to 0.392)	0.289 (0.248 to 0.330)	0.219 (0.116 to 0.321)	0.077 (- 0.041 to 0.195)	0.035 (- 0.025 to 0.094)	0.143 (0.070 to 0.216)	0.167 (0.030 to 0.304)	0.049 (- 0.001 to 0.099)	0.080 (0.032 to 0.129)
	No → no	-0.302 (- 0.397 to - 0.207)	-0.157 (- 0.209 to - 0.105)	-0.108 (- 0.170 to - 0.045)	-0.108 (- 0.220 to 0.004)	-0.160 (- 0.200 to - 0.119)	-0.163 (- 0.215 to - 0.112)	-0.118 (- 0.217 to - 0.018)	-0.158 (- 0.216 to - 0.100)	-0.049 (- 0.123 to 0.024)	-0.054 (- 0.196 to 0.087)	-0.080 (- 0.130 to - 0.030)	-0.097 (- 0.141 to - 0.054)
	No → yes	-0.010 (- 0.111 to 0.092)	-0.022 (- 0.076 to 0.032)	0.164 (0.084 to 0.243)	0.140 (0.019 to 0.262)	0.092 (0.044 to 0.140)	0.070 (- 0.004 to 0.144)	0.076 (- 0.030 to 0.183)	-0.055 (- 0.115 to 0.006)	0.092 (- 0.003 to 0.187)	0.127 (- 0.034 to 0.289)	0.067 (0.008 to 0.125)	0.050 (- 0.019 to 0.119)
	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.080 (- 0.032 to 0.192)	0.090 (0.037 to 0.144)	0.317 (0.255 to 0.379)	0.278 (0.170 to 0.386)	0.267 (0.227 to 0.308)	0.209 (0.111 to 0.306)	0.070 (- 0.048 to 0.188)	0.033 (- 0.026 to 0.093)	0.138 (0.065 to 0.211)	0.161 (0.023 to 0.298)	0.029 (- 0.020 to 0.079)	0.073 (0.022 to 0.124)
	No → no	-0.295 (- 0.390 to - 0.200)	-0.150 (- 0.202 to - 0.098)	-0.107 (- 0.170 to - 0.045)	-0.107 (- 0.219 to 0.004)	-0.142 (- 0.182 to - 0.101)	-0.155 (- 0.204 to - 0.105)	-0.114 (- 0.213 to - 0.015)	-0.155 (- 0.213 to - 0.097)	-0.049 (- 0.122 to 0.024)	-0.055 (- 0.197 to 0.087)	-0.064 (- 0.113 to - 0.014)	-0.091 (- 0.137 to - 0.045)
	No → yes	-0.018 (- 0.119 to 0.084)	-0.022 (- 0.076 to 0.033)	0.158 (0.078 to 0.237)	0.137 (0.016 to 0.259)	0.080 (0.033 to 0.128)	0.064 (- 0.008 to 0.135)	0.072 (- 0.034 to 0.179)	-0.054 (- 0.115 to 0.006)	0.088 (- 0.007 to 0.183)	0.124 (- 0.037 to 0.286)	0.056 (- 0.002 to 0.115)	0.044 (- 0.021 to 0.110)

Supplementary Table 7 Association of internet use transition with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE (continued)

Models	Groups	Executive function; B(95%CI)						Global cognition; B(95%CI)					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Model 1	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.211 (0.096 to 0.327)	0.341 (0.294 to 0.387)	0.285 (0.223 to 0.347)	0.373 (0.261 to 0.485)	0.494 (0.452 to 0.537)	0.346 (0.247 to 0.445)	0.194 (0.113 to 0.274)	0.225 (0.188 to 0.263)	0.337 (0.293 to 0.382)	0.372 (0.294 to 0.450)	0.368 (0.336 to 0.399)	0.301 (0.229 to 0.372)
	No → no	-0.496 (-0.592 to -0.400)	-0.431 (-0.476 to -0.386)	-0.368 (-0.431 to -0.306)	-0.304 (-0.420 to -0.187)	-0.390 (-0.433 to -0.347)	-0.402 (-0.446 to -0.358)	-0.506 (-0.572 to -0.439)	-0.322 (-0.359 to -0.286)	-0.256 (-0.301 to -0.211)	-0.251 (-0.332 to -0.170)	-0.348 (-0.379 to -0.317)	-0.336 (-0.404 to -0.268)
	No → yes	-0.056 (-0.158 to 0.047)	-0.056 (-0.101 to 0.010)	0.015 (-0.064 to 0.095)	-0.019 (-0.145 to 0.108)	0.078 (0.028 to 0.128)	-0.004 (-0.070 to 0.062)	-0.070 (-0.140 to 0.000)	-0.055 (-0.091 to 0.019)	0.101 (0.044 to 0.158)	0.070 (-0.017 to 0.158)	0.075 (0.039 to 0.111)	0.023 (-0.050 to 0.097)
Model 2	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.126 (0.014 to 0.239)	0.164 (0.120 to 0.208)	0.160 (0.099 to 0.221)	0.189 (0.078 to 0.301)	0.328 (0.286 to 0.370)	0.198 (0.110 to 0.286)	0.102 (0.025 to 0.179)	0.100 (0.065 to 0.136)	0.217 (0.173 to 0.260)	0.224 (0.147 to 0.300)	0.233 (0.202 to 0.263)	0.176 (0.111 to 0.241)
	No → no	-0.220 (-0.315 to -0.125)	-0.244 (-0.287 to -0.201)	-0.186 (-0.247 to -0.125)	-0.150 (-0.266 to -0.035)	-0.165 (-0.207 to -0.123)	-0.197 (-0.236 to -0.158)	-0.215 (-0.280 to -0.150)	-0.185 (-0.220 to -0.150)	-0.127 (-0.171 to -0.083)	-0.122 (-0.202 to -0.043)	-0.151 (-0.182 to -0.121)	-0.161 (-0.190 to -0.131)
	No → yes	0.032 (-0.068 to 0.132)	-0.041 (-0.084 to 0.002)	0.027 (-0.050 to 0.104)	-0.032 (-0.157 to 0.093)	0.081 (0.033 to 0.129)	0.016 (-0.043 to 0.075)	0.024 (-0.044 to 0.092)	-0.043 (-0.077 to 0.008)	0.089 (0.033 to 0.145)	0.059 (-0.027 to 0.145)	0.075 (0.040 to 0.110)	0.039 (-0.020 to 0.098)
Model 3	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.123 (0.011 to 0.236)	0.161 (0.117 to 0.205)	0.152 (0.091 to 0.213)	0.186 (0.075 to 0.298)	0.327 (0.285 to 0.368)	0.194 (0.104 to 0.284)	0.100 (0.023 to 0.177)	0.098 (0.063 to 0.134)	0.209 (0.165 to 0.253)	0.220 (0.144 to 0.297)	0.232 (0.202 to 0.262)	0.173 (0.109 to 0.237)
	No → no	-0.217 (-0.311 to -0.122)	-0.245 (-0.288 to -0.202)	-0.182 (-0.243 to -0.120)	-0.139 (-0.254 to -0.023)	-0.163 (-0.205 to -0.121)	-0.194 (-0.236 to -0.153)	-0.212 (-0.277 to -0.147)	-0.185 (-0.220 to -0.150)	-0.123 (-0.167 to -0.079)	-0.111 (-0.190 to -0.031)	-0.150 (-0.180 to -0.119)	-0.158 (-0.189 to -0.127)
	No → yes	0.032 (-0.068 to 0.133)	-0.042 (-0.085 to 0.002)	0.028 (-0.049 to 0.105)	-0.029 (-0.154 to 0.096)	0.082 (0.033 to 0.130)	0.017 (-0.043 to 0.076)	0.025 (-0.043 to 0.093)	-0.043 (-0.078 to 0.008)	0.090 (0.034 to 0.145)	0.062 (-0.024 to 0.148)	0.076 (0.041 to 0.111)	0.040 (-0.020 to 0.100)
Model 4	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Model 5	Yes → yes	0.119 (0.007 to 0.232)	0.155 (0.111 to 0.199)	0.143 (0.082 to 0.204)	0.167 (0.056 to 0.278)	0.310 (0.268 to 0.352)	0.183 (0.099 to 0.268)	0.094 (0.018 to 0.171)	0.094 (0.058 to 0.129)	0.201 (0.157 to 0.245)	0.204 (0.128 to 0.281)	0.216 (0.186 to 0.246)	0.163 (0.104 to 0.222)
	No → no	-0.212 (- 0.307 to - 0.117)	-0.239 (- 0.282 to - 0.196)	-0.177 (- 0.238 to - 0.116)	-0.134 (- 0.249 to - 0.019)	-0.143 (- 0.185 to - 0.101)	-0.188 (- 0.237 to - 0.140)	-0.205 (- 0.270 to - 0.140)	-0.181 (- 0.215 to - 0.146)	-0.118 (- 0.162 to - 0.074)	-0.107 (- 0.186 to - 0.028)	-0.130 (- 0.161 to - 0.100)	-0.149 (- 0.182 to - 0.115)
	No → yes	0.032 (- 0.069 to 0.132)	-0.040 (- 0.083 to 0.003)	0.026 (- 0.051 to 0.103)	-0.032 (- 0.156 to 0.093)	0.080 (0.032 to 0.128)	0.016 (- 0.042 to 0.074)	0.024 (- 0.044 to 0.092)	-0.042 (- 0.076 to - 0.007)	0.088 (0.033 to 0.144)	0.060 (- 0.025 to 0.146)	0.074 (0.039 to 0.109)	0.039 (- 0.019 to 0.098)
	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.106 (- 0.006 to 0.219)	0.153 (0.109 to 0.197)	0.140 (0.079 to 0.201)	0.158 (0.047 to 0.269)	0.283 (0.242 to 0.324)	0.174 (0.101 to 0.247)	0.084 (0.007 to 0.160)	0.092 (0.056 to 0.127)	0.195 (0.152 to 0.239)	0.198 (0.121 to 0.274)	0.193 (0.164 to 0.223)	0.154 (0.101 to 0.206)
	No → no	-0.207 (- 0.302 to - 0.112)	-0.234 (- 0.277 to - 0.191)	-0.177 (- 0.238 to - 0.116)	-0.133 (- 0.248 to - 0.018)	-0.121 (- 0.162 to - 0.079)	-0.176 (- 0.230 to - 0.123)	-0.201 (- 0.266 to - 0.137)	-0.176 (- 0.211 to - 0.142)	-0.118 (- 0.162 to - 0.074)	-0.106 (- 0.186 to - 0.027)	-0.112 (- 0.142 to - 0.082)	-0.142 (- 0.178 to - 0.106)
	No → yes	0.024 (- 0.076 to 0.124)	-0.039 (- 0.083 to 0.004)	0.023 (- 0.054 to 0.101)	-0.036 (- 0.161 to 0.088)	0.065 (0.017 to 0.113)	0.010 (- 0.041 to 0.061)	0.018 (- 0.050 to 0.085)	-0.041 (- 0.076 to - 0.006)	0.084 (0.028 to 0.139)	0.057 (- 0.029 to 0.143)	0.062 (0.028 to 0.097)	0.034 (- 0.020 to 0.088)

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELISA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; Model 1 was crude model; Model 2 was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income); Model 3 was additionally adjusted for health-related behaviors (current smokers and current drinkers) based on Model 2; Model 4 was further adjusted for health status (self-rated health and chronic disease) based on Model 3; Model 5 was fully adjusted to include social participation; The internet use transition from 'Yes' to 'no' as the reference group.

Supplementary Table 8 Association of internet use transition with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Models	Groups	Memory; B(95%CI)						Orientation; B(95%CI)					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Model 1	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.578 (0.522 to 0.633)	0.269 (0.232 to 0.306)	0.470 (0.406 to 0.534)	0.473 (0.473 to 0.044)	0.546 (0.510 to 0.582)	0.467 (0.334 to 0.599)	0.421 (0.363 to 0.478)	0.209 (0.169 to 0.249)	0.227 (0.155 to 0.300)	0.246 (0.141 to 0.351)	0.295 (0.253 to 0.337)	0.281 (0.202 to 0.306)
	Yes → no	0.688 (0.591 to 0.786)	0.316 (0.261 to 0.370)	0.272 (0.207 to 0.336)	0.311 (0.311 to 0.058)	0.446 (0.404 to 0.489)	0.405 (0.286 to 0.523)	0.454 (0.354 to 0.554)	0.278 (0.220 to 0.336)	0.108 (0.035 to 0.181)	0.099 (- 0.043 to 0.241)	0.223 (0.173 to 0.272)	0.235 (0.135 to 0.335)
	Yes → yes	0.890 (0.814 to 0.966)	0.547 (0.513 to 0.581)	0.797 (0.763 to 0.832)	0.836 (0.836 to 0.027)	0.940 (0.919 to 0.960)	0.801 (0.644 to 0.959)	0.621 (0.544 to 0.698)	0.410 (0.375 to 0.445)	0.332 (0.296 to 0.368)	0.359 (0.309 to 0.409)	0.340 (0.317 to 0.363)	0.405 (0.339 to 0.470)
Model 2	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.304 (0.249 to 0.360)	0.139 (0.103 to 0.175)	0.284 (0.222 to 0.346)	0.265 (0.181 to 0.350)	0.277 (0.242 to 0.312)	0.252 (0.181 to 0.323)	0.208 (0.208 to 0.030)	0.105 (0.065 to 0.145)	0.149 (0.076 to 0.222)	0.189 (0.084 to 0.295)	0.165 (0.122 to 0.208)	0.158 (0.118 to 0.198)
	Yes → no	0.313 (0.218 to 0.408)	0.162 (0.110 to 0.214)	0.120 (0.058 to 0.183)	0.126 (0.014 to 0.238)	0.184 (0.143 to 0.226)	0.177 (0.126 to 0.229)	0.133 (0.133 to 0.051)	0.160 (0.102 to 0.218)	0.055 (- 0.018 to 0.129)	0.061 (- 0.081 to 0.202)	0.098 (0.048 to 0.147)	0.108 (0.068 to 0.148)
	Yes → yes	0.416 (0.340 to 0.491)	0.265 (0.230 to 0.300)	0.466 (0.428 to 0.503)	0.437 (0.382 to 0.492)	0.493 (0.470 to 0.517)	0.415 (0.321 to 0.510)	0.219 (0.219 to 0.041)	0.197 (0.158 to 0.235)	0.209 (0.167 to 0.251)	0.245 (0.188 to 0.303)	0.160 (0.132 to 0.188)	0.199 (0.168 to 0.230)
Model 3	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.301 (0.246 to 0.356)	0.139 (0.102 to 0.175)	0.281 (0.218 to 0.343)	0.254 (0.170 to 0.339)	0.276 (0.241 to 0.311)	0.249 (0.179 to 0.318)	0.206 (0.206 to 0.030)	0.105 (0.064 to 0.145)	0.147 (0.073 to 0.220)	0.183 (0.078 to 0.289)	0.164 (0.122 to 0.207)	0.156 (0.117 to 0.195)
	Yes → no	0.310 (0.215 to 0.405)	0.162 (0.110 to 0.215)	0.115 (0.052 to 0.177)	0.111 (- 0.001 to 0.223)	0.182 (0.141 to 0.224)	0.174 (0.121 to 0.226)	0.128 (0.128 to 0.051)	0.160 (0.102 to 0.217)	0.053 (- 0.020 to 0.127)	0.053 (- 0.089 to 0.195)	0.097 (0.047 to 0.147)	0.106 (0.065 to 0.147)
	Yes → yes	0.410 (0.334 to 0.486)	0.262 (0.227 to 0.297)	0.450 (0.412 to 0.488)	0.418 (0.362 to 0.473)	0.491 (0.467 to 0.514)	0.406 (0.312 to 0.500)	0.214 (0.214 to 0.041)	0.196 (0.157 to 0.234)	0.203 (0.161 to 0.245)	0.234 (0.176 to 0.291)	0.159 (0.131 to 0.187)	0.194 (0.166 to 0.222)
Model 4	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref

Model 5	No → yes	0.293 (0.237 to 0.348)	0.135 (0.099 to 0.171)	0.271 (0.271 to 0.032)	0.248 (0.164 to 0.333)	0.252 (0.217 to 0.287)	0.238 (0.173 to 0.302)	0.206 (0.206 to 0.030)	0.104 (0.064 to 0.144)	0.141 (0.068 to 0.214)	0.181 (0.076 to 0.287)	0.146 (0.104 to 0.189)	0.149 (0.112 to 0.187)
	Yes → no	0.302 (0.207 to 0.397)	0.157 (0.105 to 0.209)	0.108 (0.108 to 0.032)	0.108 (- 0.004 to 0.220)	0.160 (0.119 to 0.200)	163.000 (0.112 to 0.215)	0.128 (0.128 to 0.051)	0.158 (0.100 to 0.216)	0.049 (- 0.024 to 0.123)	0.054 (- 0.088 to 0.196)	0.080 (0.030 to 0.130)	0.099 (0.055 to 0.143)
	Yes → yes	0.396 (0.320 to 0.472)	0.250 (0.215 to 0.285)	0.432 (0.432 to 0.019)	0.392 (0.337 to 0.447)	0.449 (0.425 to 0.472)	0.384 (0.300 to 0.467)	0.214 (0.214 to 0.041)	0.193 (0.155 to 0.232)	0.192 (0.150 to 0.235)	0.221 (0.164 to 0.279)	0.129 (0.101 to 0.157)	0.184 (0.145 to 0.223)
	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.277 (0.222 to 0.332)	0.129 (0.093 to 0.165)	0.265 (0.203 to 0.327)	0.245 (0.160 to 0.329)	0.222 (0.187 to 0.257)	0.224 (0.164 to 0.285)	0.187 (0.129 to 0.244)	0.101 (0.061 to 0.141)	0.137 (0.064 to 0.210)	0.179 (0.074 to 0.284)	0.120 (0.077 to 0.163)	0.135 (0.102 to 0.168)
	Yes → no	0.295 (0.200 to 0.390)	0.150 (0.098 to 0.202)	0.107 (0.045 to 0.170)	0.107 (- 0.004 to 0.219)	0.142 (0.101 to 0.182)	0.155 (0.105 to 0.205)	0.114 (0.015 to 0.213)	0.155 (0.097 to 0.213)	0.049 (- 0.024 to 0.122)	0.055 (- 0.087 to 0.197)	0.064 (0.014 to 0.113)	0.091 (0.045 to 0.137)
	Yes → yes	0.375 (0.299 to 0.451)	0.241 (0.205 to 0.276)	0.425 (0.387 to 0.463)	0.385 (0.330 to 0.440)	0.409 (0.385 to 0.432)	0.367 (0.292 to 0.441)	0.184 (0.105 to 0.264)	0.189 (0.150 to 0.227)	0.187 (0.145 to 0.229)	0.215 (0.157 to 0.273)	0.093 (0.065 to 0.121)	0.171 (0.117 to 0.224)

Supplementary Table 8 Association of internet use transition with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE (continued)

Models	Groups	Executive function; B(95%CI)						Global cognition; B(95%CI)					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Model 1	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes		0.376	0.384	0.285	0.468	0.397	0.435	0.267	0.357	0.321	0.423	
		0.440 (0.385 to 0.495)	(0.344 to 0.407)	(0.321 to 0.446)	(0.197 to 0.373)	(0.432 to 0.504)	(0.343 to 0.450)	(0.397 to 0.474)	(0.242 to 0.293)	(0.312 to 0.402)	(0.260 to 0.382)	(0.396 to 0.449)	0.361 (0.286 to 0.436)
	Yes → no		0.431	0.368	0.304	0.390	0.402	0.506	0.322	0.256	0.251	0.348	
		0.496 (0.400 to 0.592)	(0.386 to 0.476)	(0.306 to 0.431)	(0.187 to 0.420)	(0.347 to 0.433)	(0.358 to 0.446)	(0.439 to 0.572)	(0.286 to 0.359)	(0.211 to 0.301)	(0.170 to 0.332)	(0.317 to 0.379)	0.336 (0.268 to 0.404)
	Yes → yes		0.772	0.653	0.676	0.884	0.402	0.699	0.548	0.593	0.623	0.716	
Model 2	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes		0.203	0.213	0.118	0.246	0.216	0.239	0.142	0.216	0.181	0.226	
		0.253 (0.197 to 0.308)	(0.173 to 0.234)	(0.152 to 0.274)	(0.031 to 0.205)	(0.210 to 0.282)	(0.182 to 0.250)	(0.239 to 0.019)	(0.118 to 0.167)	(0.172 to 0.260)	(0.121 to 0.241)	(0.201 to 0.252)	0.201 (0.157 to 0.244)
	Yes → no		0.244	0.186	0.150	0.165	0.197	0.215	0.185	0.127	0.122	0.151	
		0.220 (0.125 to 0.315)	(0.201 to 0.287)	(0.125 to 0.247)	(0.035 to 0.266)	(0.123 to 0.207)	(0.159 to 0.236)	(0.215 to 0.033)	(0.150 to 0.220)	(0.083 to 0.171)	(0.043 to 0.202)	(0.121 to 0.182)	0.173 (0.150 to 0.197)
	Yes → yes		0.408	0.346	0.339	0.493	0.390	0.317	0.285	0.344	0.346	0.384	
Model 3	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes		0.203	0.210	0.110	0.245	0.214	0.237	0.142	0.213	0.173	0.226	
		0.249 (0.194 to 0.304)	(0.173 to 0.233)	(0.149 to 0.271)	(0.023 to 0.197)	(0.209 to 0.280)	(0.179 to 0.248)	(0.199 to 0.275)	(0.118 to 0.166)	(0.169 to 0.257)	(0.113 to 0.233)	(0.200 to 0.251)	0.198 (0.156 to 0.241)
	Yes → no		0.245	0.182	0.139	0.163	0.194	0.212	0.185	0.123	0.111	0.150	
		0.217 (0.122 to 0.311)	(0.202 to 0.288)	(0.120 to 0.243)	(0.023 to 0.254)	(0.121 to 0.205)	(0.153 to 0.235)	(0.147 to 0.277)	(0.150 to 0.220)	(0.079 to 0.167)	(0.031 to 0.190)	(0.119 to 0.180)	0.158 (0.127 to 0.189)
	Yes → yes		0.406	0.334	0.325	0.489	0.382	0.312	0.283	0.332	0.331	0.382	
Model 4	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes		0.199	0.203	0.102	0.223	0.205	0.229	0.139	0.169	0.167	0.204	
		0.244 (0.189 to 0.299)	(0.169 to 0.229)	(0.142 to 0.264)	(0.015 to 0.189)	(0.187 to 0.258)	(0.173 to 0.236)	(0.192 to 0.267)	(0.115 to 0.163)	(0.163 to 0.250)	(0.108 to 0.227)	(0.179 to 0.230)	0.185 (0.142 to 0.228)

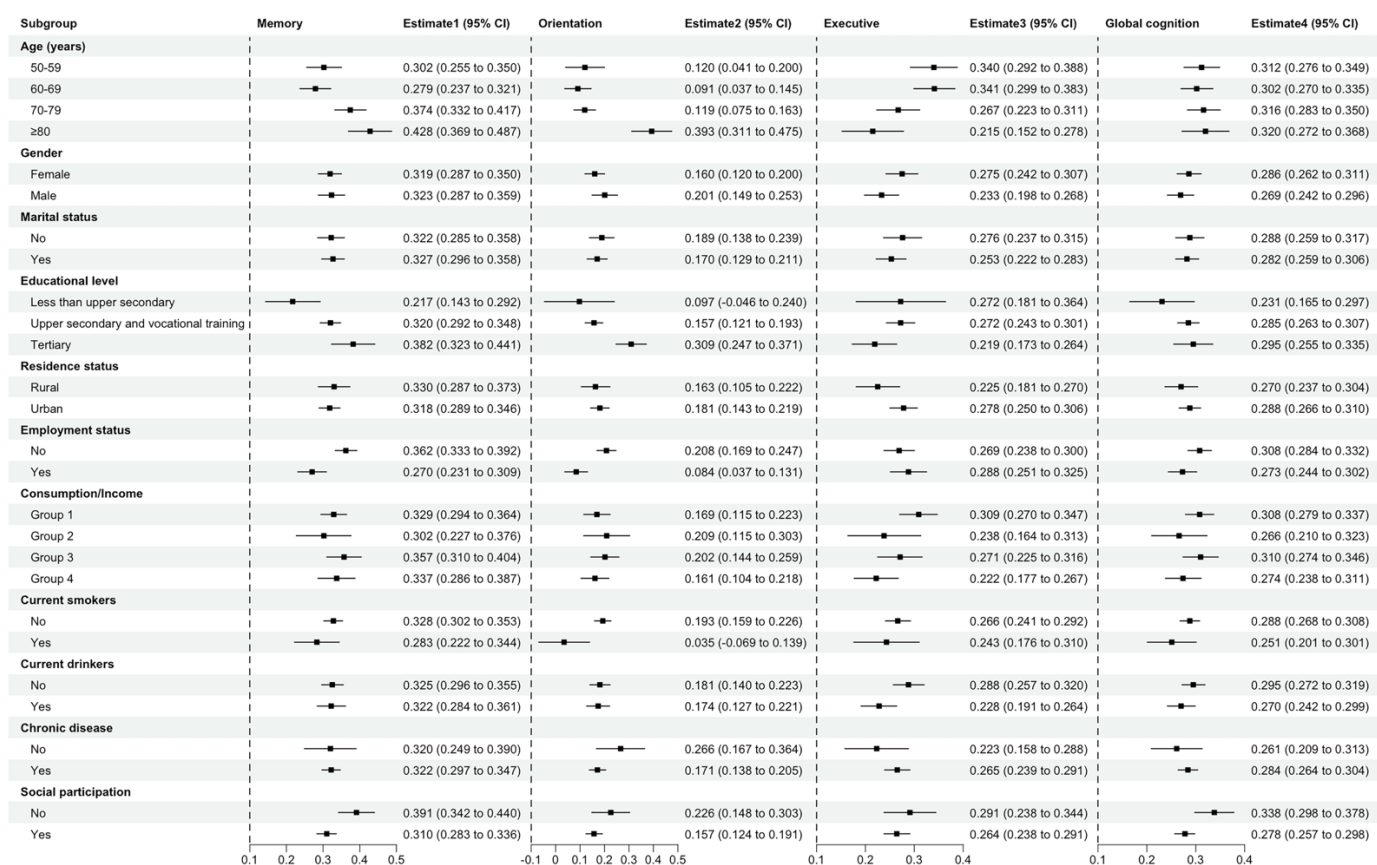
Model 5	Yes → no		0.239	0.177	0.134	0.143	0.184	0.205	0.181	0.079	0.107	0.130	
		0.212 (0.117 to 0.307)	(0.196 to 0.282)	(0.116 to 0.238)	(0.019 to 0.249)	(0.101 to 0.185)	(0.138 to 0.231)	(0.140 to 0.270)	(0.146 to 0.215)	(0.074 to 0.162)	(0.028 to 0.186)	(0.100 to 0.161)	0.156 (0.119 to 0.193)
	Yes → yes		0.394	0.320	0.301	0.453	0.364	0.300	0.274	0.305	0.311	0.346	
		0.332 (0.253 to 0.410)	(0.363 to 0.425)	(0.281 to 0.359)	(0.243 to 0.359)	(0.428 to 0.477)	(0.302 to 0.425)	(0.245 to 0.354)	(0.249 to 0.300)	(0.292 to 0.347)	(0.272 to 0.351)	(0.328 to 0.364)	0.309 (0.269 to 0.349)
	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes		0.194	0.200	0.097	0.186	0.191	0.219	0.135	0.163	0.164	0.175	
		0.231 (0.175 to 0.286)	(0.164 to 0.224)	(0.139 to 0.261)	(0.010 to 0.184)	(0.150 to 0.221)	(0.163 to 0.218)	(0.181 to 0.257)	(0.111 to 0.160)	(0.158 to 0.246)	(0.104 to 0.223)	(0.149 to 0.200)	0.172 (0.137 to 0.208)
	Yes → no		0.234	0.177	0.133	0.121	0.176	0.201	0.176	0.074	0.106	0.112	
		0.207 (0.112 to 0.302)	(0.191 to 0.277)	(0.116 to 0.238)	(0.018 to 0.248)	(0.079 to 0.162)	(0.123 to 0.230)	(0.137 to 0.266)	(0.142 to 0.211)	(0.074 to 0.162)	(0.027 to 0.186)	(0.082 to 0.142)	0.147 (0.104 to 0.191)
	Yes → yes		0.387	0.317	0.291	0.404	0.348	0.285	0.268	0.292	0.304	0.306	
		0.313 (0.235 to 0.392)	(0.356 to 0.418)	(0.278 to 0.356)	(0.233 to 0.349)	(0.379 to 0.428)	(0.304 to 0.393)	(0.230 to 0.340)	(0.243 to 0.293)	(0.286 to 0.341)	(0.264 to 0.343)	(0.288 to 0.324)	0.292 (0.272 to 0.312)

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELISA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; Model 1 was crude model; Model 2 was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income); Model 3 was additionally adjusted for health-related behaviors (current smokers and current drinkers) based on Model 2; Model 4 was further adjusted for health status (self-rated health and chronic disease) based on Model 3; Model 5 was fully adjusted to include social participation; The internet use transition from 'No' to 'no' as the reference group.

Supplementary Table 9 Association of internet use and social participation with cognitive function in HRS

Models	Panel A: Internet use; B(95%CI)				Panel B: Social participation; B(95%CI)			
	Memory	Orientation	Executive function	Global cognition	Memory	Orientation	Executive function	Global cognition
Model 1	0.607 (0.564 to 0.650)	0.340 (0.319 to 0.362)	0.692 (0.665 to 0.719)	0.763 (0.718 to 0.808)	0.190 (0.168 to 0.212)	0.227 (0.209 to 0.246)	0.271 (0.242 to 0.301)	0.150 (0.117 to 0.183)
Model 2	0.297 (0.254 to 0.340)	0.173 (0.151 to 0.195)	0.383 (0.354 to 0.412)	0.388 (0.341 to 0.434)	0.141 (0.120 to 0.162)	0.122 (0.103 to 0.140)	0.126 (0.099 to 0.154)	0.099 (0.068 to 0.131)
Model 3	0.294 (0.251 to 0.337)	0.172 (0.150 to 0.193)	0.371 (0.342 to 0.400)	0.370 (0.323 to 0.417)	0.141 (0.120 to 0.162)	0.120 (0.102 to 0.139)	0.121 (0.094 to 0.149)	0.093 (0.062 to 0.125)
Model 4	0.285 (0.243 to 0.328)	0.166 (0.144 to 0.188)	0.356 (0.327 to 0.385)	0.349 (0.302 to 0.396)	0.136 (0.115 to 0.157)	0.120 (0.102 to 0.138)	0.108 (0.081 to 0.136)	0.084 (0.053 to 0.115)
Model 5	0.268 (0.225 to 0.311)	0.162 (0.141 to 0.184)	0.352 (0.323 to 0.381)	0.343 (0.296 to 0.389)	0.127 (0.106 to 0.149)	0.117 (0.099 to 0.135)	0.095 (0.068 to 0.123)	0.071 (0.040 to 0.102)

Note: N=34,262 for memory, executive function and global cognition and N=63,359 for orientation; Model 1 was crude model; Model 2 was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income); Model 3 was additionally adjusted for health-related behaviors (current smokers and current drinkers) based on Model 2; Model 4 was further adjusted for health status (self-rated health and chronic disease) based on Model 3; Model 5 was fully adjusted to include internet use or social participation.



Supplementary Figure 5 Stratified association of internet use and cognitive function in HRS

Notes: N=34,262 for memory, executive function and global cognition and N=63,359 for orientation.

		Memory	Orientation	Executive function	Global cognition
Non-internet use	Non-social participation	Ref	Ref	Ref	Ref
	Social participation	0.088 (0.057 to 0.118)	0.140 (0.100 to 0.180)	0.062 (0.031 to 0.092)	0.073 (0.050 to 0.096)
Internet use	Non-social participation	0.360 (0.319 to 0.401)	0.256 (0.199 to 0.312)	0.287 (0.247 to 0.328)	0.314 (0.283 to 0.345)
	Social participation	0.395 (0.361 to 0.429)	0.295 (0.250 to 0.339)	0.309 (0.275 to 0.343)	0.340 (0.314 to 0.366)

Supplementary Figure 6 The joint association of internet use and social participation with cognitive function in HRS

Note: N=34,262 for memory, executive function and global cognition, and N=63,359 for orientation; HRS: Health and Retirement Study; The model was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income), health-related behaviors (current smokers and current drinkers), and health status (self-rated health and chronic disease); The joint impact between non-internet use and non-social participation served as the reference group.

Supplementary Table 10 Association of internet use transition with cognitive function in HRS

Models	Panel A: Internet use transition; B(95%CI)					Panel B: Internet use transition; B(95%CI)				
	Groups	Memory	Orientation	Executive function	Global cognition	Groups	Memory	Orientation	Executive function	Global cognition
Model 1	Yes → no	Ref	Ref	Ref	Ref	No → no	Ref	Ref	Ref	Ref
	Yes → yes	0.480 (0.431 to 0.529)	0.221 (0.150 to 0.292)	0.329 (0.282 to 0.377)	0.392 (0.355 to 0.429)	No → yes	0.473 (0.426 to 0.521)	0.266 (0.196 to 0.337)	0.373 (0.327 to 0.419)	0.418 (0.382 to 0.454)
	No → no	-0.347 (-0.398 to -0.297)	-0.144 (-0.215 to -0.073)	-0.333 (-0.381 to -0.284)	-0.339 (-0.376 to -0.301)	Yes → no	0.347 (0.297 to 0.398)	0.144 (0.073 to 0.215)	0.333 (0.284 to 0.381)	0.339 (0.301 to 0.376)
	No → yes	0.126 (0.064 to 0.188)	0.123 (0.029 to 0.216)	0.040 (-0.019 to 0.099)	0.079 (0.033 to 0.125)	Yes → yes	0.827 (0.800 to 0.854)	0.365 (0.330 to 0.401)	0.662 (0.634 to 0.690)	0.731 (0.709 to 0.752)
Model 2	Yes → no					No → no				
	Yes → yes	0.287 (0.240 to 0.335)	0.148 (0.077 to 0.219)	0.207 (0.160 to 0.253)	0.240 (0.204 to 0.276)	No → yes	0.246 (0.200 to 0.293)	0.176 (0.105 to 0.247)	0.208 (0.162 to 0.253)	0.228 (0.193 to 0.263)
	No → no	-0.157 (-0.206 to -0.108)	-0.082 (-0.153 to -0.010)	-0.158 (-0.206 to -0.110)	-0.160 (-0.197 to -0.123)	Yes → no	0.157 (0.108 to 0.206)	0.082 (0.010 to 0.153)	0.158 (0.110 to 0.206)	0.160 (0.123 to 0.197)
	No → yes	0.089 (0.030 to 0.149)	0.094 (0.002 to 0.187)	0.049 (-0.008 to 0.107)	0.068 (0.023 to 0.112)	Yes → yes	0.444 (0.414 to 0.474)	0.230 (0.189 to 0.271)	0.365 (0.334 to 0.396)	0.400 (0.376 to 0.424)
Model 3	Yes → no					No → no				
	Yes → yes	0.276 (0.229 to 0.324)	0.142 (0.071 to 0.214)	0.199 (0.153 to 0.246)	0.231 (0.195 to 0.267)	No → yes	0.243 (0.196 to 0.289)	0.173 (0.102 to 0.245)	0.205 (0.159 to 0.250)	0.225 (0.189 to 0.260)
	No → no	-0.153 (-0.202 to -0.104)	-0.079 (-0.151 to -0.008)	-0.155 (-0.203 to -0.107)	-0.157 (-0.193 to -0.120)	Yes → no	0.153 (0.104 to 0.202)	0.079 (0.008 to 0.151)	0.155 (0.107 to 0.203)	0.157 (0.120 to 0.193)
	No → yes	0.090 (0.030 to 0.150)	0.094 (0.002 to 0.187)	0.050 (-0.008 to 0.107)	0.068 (0.024 to 0.113)	Yes → yes	0.429 (0.399 to 0.459)	0.222 (0.180 to 0.263)	0.354 (0.323 to 0.385)	0.388 (0.364 to 0.412)
Model 4	Yes → no					No → no				
	Yes → yes	0.265 (0.217 to 0.312)	0.136 (0.065 to 0.207)	0.191 (0.144 to 0.237)	0.222 (0.186 to 0.258)	No → yes	0.235 (0.188 to 0.282)	0.168 (0.097 to 0.239)	0.200 (0.154 to 0.245)	0.219 (0.184 to 0.254)
	No → no	-0.145 (-0.194 to -0.096)	-0.075 (-0.147 to -0.004)	-0.150 (0.197 to -0.102)	-0.150 (-0.187 to -0.113)	Yes → no	0.145 (0.096 to 0.194)	0.075 (0.004 to 0.147)	0.150 (0.102 to 0.197)	0.150 (0.113 to 0.187)
	No → yes	0.090 (0.030 to 0.150)	0.092 (0.000 to 0.185)	0.050 (0.007 to 0.108)	0.069 (0.024 to 0.113)	Yes → yes	0.410 (0.380 to 0.440)	0.211 (0.170 to 0.253)	0.340 (0.309 to 0.372)	0.372 (0.348 to 0.396)
Model 5	Yes → no					No → no				
	Yes → yes	0.262 (0.214 to 0.310)	0.131 (0.060 to 0.202)	0.189 (0.142 to 0.235)	0.215 (0.180 to 0.250)	No → yes	0.230 (0.184 to 0.277)	0.163 (0.092 to 0.235)	0.197 (0.151 to 0.242)	0.215 (0.180 to 0.250)
	No → no	-0.144 (-0.192 to -0.095)	-0.074 (-0.146 to -0.003)	-0.149 (-0.196 to -0.101)	0.149 (0.112 to 0.186)	Yes → no	0.144 (0.095 to 0.192)	0.074 (0.003 to 0.146)	0.149 (0.101 to 0.196)	0.149 (0.112 to 0.186)
	No → yes	0.087 (0.027 to 0.147)	0.089 (-0.003 to 0.181)	0.048 (-0.010 to 0.105)	0.368 (0.344 to 0.392)	Yes → yes	0.405 (0.375 to 0.436)	0.205 (0.164 to 0.247)	0.337 (0.306 to 0.369)	0.368 (0.344 to 0.392)

Note: N=25,520 for memory, executive function and global cognition and N=15,765 for orientation; HRS: Health and Retirement Study; Model 1 was crude model; Model 2 was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income); Model 3 was additionally adjusted for health-related behaviors (current smokers and current drinkers) based on Model 2; Model 4 was further adjusted for health status (self-rated health and chronic disease) based on Model 3; Model 5 was fully adjusted to include social participation; The internet use transition from 'Yes' to 'no' as the reference group of panel A, and from 'No' to 'no' as the reference group of panel B.

Supplementary Table 11 Sensitivity analyses of the association between internet use, social participation and cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

Full adjusted model	Panel A: Internet use; B(95%CI); <i>p</i> value				Panel B: Social participation; B(95%CI); <i>p</i> value			
	Memory	Orientation	Executive function	Global cognition	Memory	Orientation	Executive function	Global cognition
Sensitivity analysis 1								
CHARLS	0.101 (0.044 to 0.158); 0.001	0.048 (-0.010 to 0.107); 0.107	0.135 (0.082 to 0.188); <0.001	0.077 (0.040 to 0.113); <0.001	0.074 (0.052 to 0.096); <0.001	0.021 (-0.002 to 0.044); 0.069	0.054 (0.033 to 0.074); <0.001	0.040 (0.026 to 0.054); <0.001
MHAS	0.074 (0.055 to 0.093); <0.001	0.054 (0.033 to 0.075); <0.001	0.077 (0.062 to 0.092); <0.001	0.054 (0.042 to 0.066); <0.001	0.075 (0.058 to 0.091); <0.001	0.024 (0.005 to 0.042); 0.011	0.068 (0.055 to 0.080); <0.001	0.047 (0.037 to 0.057); <0.001
HRS	0.109 (0.082 to 0.137); <0.001	0.085 (0.048 to 0.121); <0.001	0.066 (0.041 to 0.092); <0.001	0.077 (0.058 to 0.097); <0.001	0.035 (0.007 to 0.063); 0.014	0.048 (0.010 to 0.086); 0.014	0.016 (-0.010 to 0.042); 0.232	0.032 (0.012 to 0.052); 0.002
ELSA	0.066 (0.033 to 0.100); <0.001	0.147 (0.104 to 0.191); <0.001	0.049 (0.015 to 0.084); 0.005	0.075 (0.051 to 0.098); <0.001	0.026 (0.002 to 0.049); 0.033	0.017 (-0.014 to 0.048); 0.285	0.030 (0.006 to 0.055); 0.016	0.018 (0.001 to 0.034); 0.038
SHARE	0.091 (0.076 to 0.106); <0.001	0.050 (0.031 to 0.069); <0.001	0.074 (0.059 to 0.088); <0.001	0.063 (0.052 to 0.073); <0.001	0.091 (0.072 to 0.110); <0.001	0.071 (0.046 to 0.095); <0.001	0.109 (0.090 to 0.128); <0.001	0.077 (0.063 to 0.090); <0.001
Pooled	0.087 (0.073 to 0.101); <0.001	0.075 (0.044 to 0.105); <0.001	0.074 (0.060 to 0.089); <0.001	0.065 (0.056 to 0.073); <0.001	0.061 (0.038 to 0.084); <0.001	0.035 (0.015 to 0.056); <0.001	0.056 (0.027 to 0.086); <0.001	0.044 (0.026 to 0.062); <0.001
Sensitivity analysis 2								
CHARLS	0.112 (0.050 to 0.174); <0.001	0.057 (-0.007 to 0.121); 0.079	0.143 (0.085 to 0.202); <0.001	0.084 (0.044 to 0.124); <0.001	0.080 (0.055 to 0.105); <0.001	0.023 (-0.003 to 0.049); 0.078	0.060 (0.036 to 0.083); <0.001	0.044 (0.028 to 0.060); <0.001
MHAS	0.077 (0.058 to 0.097); <0.001	0.058 (0.036 to 0.080); <0.001	0.081 (0.065 to 0.097); <0.001	0.058 (0.046 to 0.071); <0.001	0.079 (0.061 to 0.096); <0.001	0.024 (0.005 to 0.043); 0.016	0.071 (0.057 to 0.084); <0.001	0.050 (0.039 to 0.060); <0.001
HRS	0.148 (0.112 to 0.185); <0.001	0.096 (0.050 to 0.142); <0.001	0.091 (0.057 to 0.125); <0.001	0.106 (0.080 to 0.131); <0.001	0.042 (0.004 to 0.080); 0.031	0.045 (-0.005 to 0.095); 0.076	0.018 (-0.018 to 0.054); 0.335	0.037 (0.010 to 0.064); 0.007
ELSA	0.073 (0.035 to 0.110); <0.001	0.149 (0.100 to 0.199); <0.001	0.047 (0.008 to 0.086); 0.020	0.085 (0.058 to 0.112); <0.001	0.028 (0.002 to 0.054); 0.032	0.021 (-0.013 to 0.055); 0.217	0.035 (0.008 to 0.062); 0.010	0.023 (0.005 to 0.042); 0.013
SHARE	0.125 (0.104 to 0.145); <0.001	0.073 (0.046 to 0.100); <0.001	0.098 (0.078 to 0.118); <0.001	0.094 (0.080 to 0.109); <0.001	0.138 (0.110 to 0.166); <0.001	0.093 (0.056 to 0.130); <0.001	0.158 (0.131 to 0.186); <0.001	0.121 (0.101 to 0.142); <0.001
Pooled	0.106 (0.076 to 0.136); <0.001	0.084 (0.055 to 0.113); <0.001	0.088 (0.068 to 0.107); <0.001	0.084 (0.064 to 0.105); <0.001	0.074 (0.040 to 0.108); <0.001	0.038 (0.014 to 0.062); 0.002	0.069 (0.030 to 0.108); <0.001	0.055 (0.025 to 0.085); <0.001

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; The Model was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income), health-related behaviors (current smokers and current drinkers), health status (self-rated health and chronic disease) and internet use or social participation.

Supplementary Table 12 Sensitivity analyses of the joint association of internet use and social participation with cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

		Sensitivity analysis 1; B(95%CI); <i>p</i> value						Sensitivity analysis 2; B(95%CI); <i>p</i> value					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Memory													
Non-internet use	Non-social participation	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Social participation	0.077 (0.055 to 0.100) ***	0.076 (0.056 to 0.097) ***	0.043 (0.008 to 0.078) *	0.035 (-0.030 to 0.101)	0.089 (0.066 to 0.112) ***	0.072 (0.057 to 0.088) ***	0.084 (0.059 to 0.109) ***	0.080 (0.058 to 0.102) ***	0.049 (0.001 to 0.097) *	0.044 (-0.031 to 0.119)	0.137 (0.104 to 0.170) ***	0.085 (0.057 to 0.113) ***
Internet use	Non-social participation	0.174 (0.070 to 0.278) **	0.076 (0.052 to 0.100) ***	0.126 (0.073 to 0.179) ***	0.069 (0.032 to 0.105) ***	0.086 (0.047 to 0.126) ***	0.089 (0.065 to 0.112) ***	0.190 (0.077 to 0.302) **	0.079 (0.053 to 0.104) ***	0.163 (0.093 to 0.234) ***	0.076 (0.035 to 0.118) ***	0.120 (0.064 to 0.177) ***	0.108 (0.072 to 0.143) ***
	Social participation	0.152 (0.086 to 0.218) ***	0.148 (0.123 to 0.173) ***	0.148 (0.109 to 0.188) ***	0.093 (0.053 to 0.133) ***	0.180 (0.156 to 0.205) ***	0.146 (0.117 to 0.175) ***	0.167 (0.095 to 0.239) ***	0.156 (0.129 to 0.182) ***	0.193 (0.141 to 0.246) ***	0.102 (0.057 to 0.147) ***	0.262 (0.227 to 0.297) ***	0.177 (0.121 to 0.233) ***
Orientation													
Non-internet use	Non-social participation	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Social participation	0.024 (0.001 to 0.047) *	0.037 (0.014 to 0.060) **	0.062 (0.014 to 0.110) *	-0.033 (-0.120 to 0.054)	0.100 (0.071 to 0.129) ***	0.046 (0.011 to 0.080) **	0.027 (0.001 to 0.053) *	0.039 (0.014 to 0.063) **	0.058 (-0.004 to 0.121)	-0.034 (-0.134 to 0.066)	0.130 (0.086 to 0.173) ***	0.051 (0.010 to 0.092) *
Internet use	Non-social participation	0.108 (0.001 to 0.215) *	0.070 (0.043 to 0.097) ***	0.113 (0.043 to 0.184) **	0.135 (0.087 to 0.183) ***	0.142 (0.091 to 0.192) ***	0.111 (0.074 to 0.147) ***	0.127 (0.012 to 0.243) *	0.075 (0.047 to 0.104) ***	0.124 (0.033 to 0.215) **	0.136 (0.082 to 0.191) ***	0.182 (0.108 to 0.257) ***	0.122 (0.077 to 0.167) ***
	Social participation	0.050 (-0.018 to 0.118)	0.072 (0.045 to 0.100) ***	0.139 (0.086 to 0.192) ***	0.159 (0.107 to 0.212) ***	0.140 (0.109 to 0.171) ***	0.113 (0.072 to 0.154) ***	0.057 (-0.017 to 0.131)	0.077 (0.048 to 0.106) ***	0.147 (0.079 to 0.215) ***	0.165 (0.106 to 0.223) ***	0.191 (0.146 to 0.236) ***	0.128 (0.073 to 0.183) ***
Executive function													
Non-internet use	Non-social participation	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Social participation	0.056 (0.035 to 0.076) ***	0.060 (0.044 to 0.076) ***	0.036 (0.002 to 0.069) *	0.070 (0.002 to 0.137) *	0.110 (0.087 to 0.132) ***	0.071 (0.050 to 0.091) ***	0.062 (0.038 to 0.086) ***	0.063 (0.046 to 0.080) ***	0.041 (-0.005 to 0.086)	0.076 (-0.001 to 0.153)	0.161 (0.129 to 0.193) ***	0.081 (0.041 to 0.122) ***
Internet use	Non-social participation	0.178 (0.082 to 0.274) ***	0.068 (0.049 to 0.087) ***	0.107 (0.058 to 0.156) ***	0.059 (0.021 to 0.097) **	0.076 (0.038 to 0.114) ***	0.080 (0.056 to 0.104) ***	0.190 (0.085 to 0.296) ***	0.072 (0.052 to 0.092) ***	0.139 (0.072 to 0.206) ***	0.057 (0.014 to 0.100) *	0.105 (0.050 to 0.160) ***	0.095 (0.061 to 0.129) ***
	Social participation	0.175 (0.113 to 0.236) ***	0.147 (0.127 to 0.167) ***	0.091 (0.054 to 0.128) ***	0.084 (0.042 to 0.125) ***	0.183 (0.159 to 0.207) ***	0.136 (0.099 to 0.174) ***	0.188 (0.120 to 0.256) ***	0.154 (0.133 to 0.175) ***	0.119 (0.069 to 0.169) ***	0.086 (0.040 to 0.133) ***	0.258 (0.224 to 0.292) ***	0.162 (0.103 to 0.221) ***
Global cognition													
Non-internet use	Non-social participation	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Social participation	0.042 (0.028 to 0.056) ***	0.048 (0.035 to 0.061) ***	0.045 (0.020 to 0.070) ***	0.005 (-0.041 to 0.052)	0.084 (0.068 to 0.100) ***	0.050 (0.030 to 0.070) ***	0.047 (0.031 to 0.064) ***	0.051 (0.037 to 0.064) ***	0.051 (0.018 to 0.085) **	0.009 (-0.044 to 0.063)	0.132 (0.108 to 0.156) ***	0.061 (0.028 to 0.094) ***
Internet use	Non-social participation	0.129 (0.063 to 0.195) ***	0.055 (0.040 to 0.071) ***	0.104 (0.067 to 0.141) ***	0.072 (0.046 to 0.098) ***	0.086 (0.058 to 0.113) ***	0.080 (0.059 to 0.102) ***	0.142 (0.070 to 0.213) ***	0.060 (0.043 to 0.076) ***	0.135 (0.086 to 0.184) ***	0.081 (0.052 to 0.111) ***	0.125 (0.085 to 0.165) ***	0.101 (0.068 to 0.135) ***
	Social participation	0.100 (0.057 to 0.142) ***	0.101 (0.085 to 0.117) ***	0.115 (0.087 to 0.143) ***	0.091 (0.062 to 0.120) ***	0.144 (0.127 to 0.162) ***	0.112 (0.090 to 0.134) ***	0.109 (0.063 to 0.156) ***	0.107 (0.090 to 0.124) ***	0.149 (0.112 to 0.186) ***	0.106 (0.074 to 0.139) ***	0.223 (0.198 to 0.248) ***	0.139 (0.089 to 0.190) ***

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; The Model was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income), health-related behaviors (current smokers and current drinkers), health status (self-rated health and chronic disease); *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

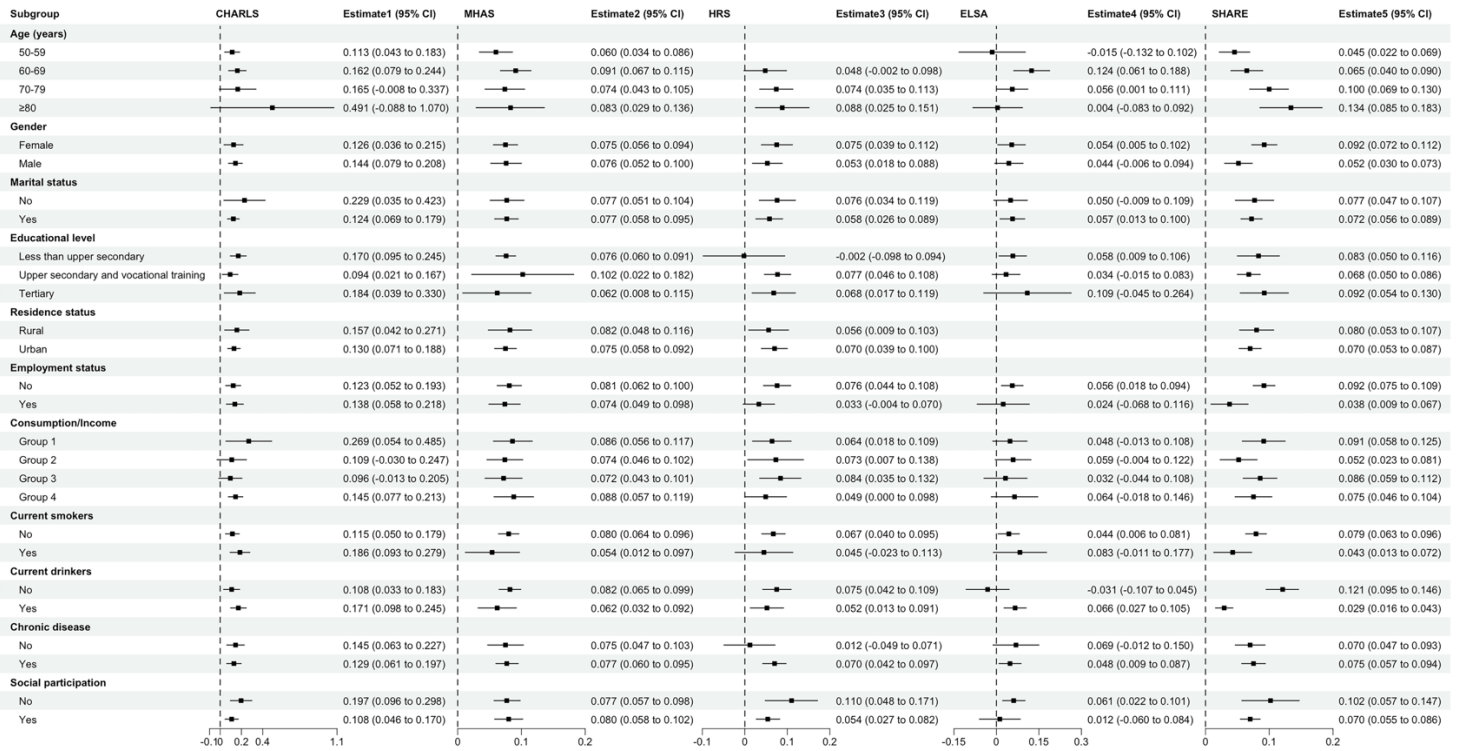
Supplementary Table 13 Sensitivity analysis 1 of the stratified association of internet use and cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

	Memory; B(95%CI); <i>p</i> value					Orientation; B(95%CI); <i>p</i> value					Executive function; B(95%CI); <i>p</i> value				
	CHARLS	MHAS	HRS	ELSA	SHARE	CHARLS	MHAS	HRS	ELSA	SHARE	CHARLS	MHAS	HRS	ELSA	SHARE
Age (years)															
50-59	0.057 (-0.019 to 0.133)	0.050 (0.019 to 0.081) **	—	0.063 (-0.046 to 0.171)	0.055 (0.031 to 0.080) ***	-0.005 (-0.084 to 0.074)	0.029 (-0.002 to 0.061)	—	0.041 (-0.080 to 0.161)	0.015 (-0.008 to 0.038)	0.113 (0.043 to 0.183) **	0.060 (0.034 to 0.086) ***	—	-0.015 (-0.132 to 0.102)	0.045 (0.022 to 0.069) ***
				0.019 (-0.050 to 0.067)	0.074 (0.049 to 0.100) ***	0.078 (-0.013 to 0.169)	0.072 (0.042 to 0.102) ***		0.110 (0.034 to 0.186) **	0.039 (0.014 to 0.065) **		0.091 (0.067 to 0.115) ***		0.048 (-0.098 to 0.074)	0.065 (0.040 to 0.090) ***
60-69	0.166 (0.078 to 0.254) ***	0.078 (0.049 to 0.108) ***	0.030 to 0.154	0.011 to 0.109	(0.049 to 0.100) ***	0.013 to 0.093 (-	(0.042 to 0.057	(0.007 to 0.050 (-	(0.034 to 0.113	(0.014 to 0.039 (-	0.162 (0.079 to 0.244) ***	0.067 to 0.115) ***	0.002 to 0.098	(0.061 to 0.188) ***	(0.040 to 0.090) ***
				(0.110 to 0.198) ***	0.109 (0.054 to 0.163) ***	0.117 (0.086 to 0.148) ***	0.093 (-0.008 to 0.285)	0.057 (0.002 to 0.105) *	0.113 (0.040 to 0.186) **	0.039 (-0.002 to 0.080)		0.074 (0.043 to 0.105) ***	0.074 (0.035 to 0.113) ***	0.056 (0.001 to 0.111) *	0.100 (0.069 to 0.130) ***
70-79	-0.102 (-0.286 to 0.083)	0.090 (0.049 to 0.132) ***	(0.110 to 0.198) ***	0.160	0.045 (-0.160 to 0.225) ***	0.158 (0.104 to 0.212) ***	0.331 (-0.274 to 0.936)	0.057 (-0.052 to 0.165)	0.214 (0.112 to 0.316) ***	0.273 (0.135 to 0.411) ***	0.244 (0.135 to 0.353) ***	0.165 (-0.008 to 0.337)	0.083 (0.043 to 0.105) ***	0.088 (0.035 to 0.113) ***	0.134 (0.085 to 0.183) ***
				0.095 to 0.225) ***	0.104 to 0.212) ***	0.104 to 0.212) ***	0.052 to 0.165)	(0.112 to 0.316) ***	(0.135 to 0.411) ***	(0.135 to 0.353) ***	(0.029 to 0.136) **		(0.025 to 0.151) **	0.083 to 0.092)	(0.085 to 0.183) ***
Gender															
Female	0.097 (0.004 to 0.190) *	0.071 (0.047 to 0.095) ***	0.122 (0.086 to 0.159) ***	0.051 (0.005 to 0.097) *	0.108 (0.087 to 0.129)	0.096 (-0.005 to 0.196)	0.061 (0.034 to 0.089)	0.089 (0.043 to 0.135) ***	0.149 (0.205 to NA)	0.059 (0.033 to 0.086) ***	0.126 (0.036 to 0.215) **	0.075 (0.056 to 0.094) ***	0.075 (0.039 to 0.112) ***	0.054 (0.005 to 0.102) *	0.092 (0.072 to 0.112) ***
				0.092 (0.050 to 0.134) ***	0.072 (0.034 to 0.133) **	0.072 (0.050 to 0.093) ***	0.020 (-0.051 to 0.090)	0.044 (0.011 to 0.077) **	0.144 (0.076 to 0.213) ***	0.039 (0.011 to 0.066) **		0.076 (0.052 to 0.100) ***	0.053 (0.018 to 0.088) **	0.044 (-0.006 to 0.094)	0.052 (0.030 to 0.073) ***
Male															
Marital status															
No	0.330 (0.132 to 0.527) **	0.073 (0.040 to 0.107) ***	0.132 (0.088 to 0.177) ***	0.018 (-0.037 to 0.073)	0.123 (0.091 to 0.155) ***	-0.031 (-0.231 to 0.169)	0.064 (0.025 to 0.104) **	0.070 (0.012 to 0.128) *	0.159 (0.089 to 0.230) ***	0.066 (0.019 to 0.112) **	0.229 (0.035 to 0.423) *	0.077 (0.051 to 0.104) ***	0.076 (0.034 to 0.119) ***	0.050 (-0.009 to 0.109)	0.077 (0.047 to 0.107) ***
				0.093 (0.058 to 0.128) ***	0.097 (0.054 to 0.139) ***	0.081 (0.064 to 0.098) ***	0.057 (-0.004 to 0.118)	0.050 (0.025 to 0.075) ***	0.093 (0.046 to 0.139) ***	0.146 (0.090 to 0.202) ***		0.046 (0.026 to 0.066) ***	0.077 (0.058 to 0.095) ***	0.058 (0.026 to 0.089) ***	0.057 (0.013 to 0.100) *
Yes	0.077 (0.017 to 0.136) *	0.075 (0.052 to 0.098) ***	(0.058 to 0.128) ***	0.054 to 0.139) ***	(0.064 to 0.098) ***	0.004 to 0.118)	(0.025 to 0.075) ***	(0.046 to 0.139) ***	(0.090 to 0.202) ***	(0.026 to 0.066) ***	0.124 (0.069 to 0.179.000) ***	(0.058 to 0.095) ***	(0.026 to 0.089) ***	(0.013 to 0.100) *	(0.056 to 0.089) ***
				Educational level											
Less than upper secondary	0.156 (0.077 to 0.235) **	0.078 (0.057 to 0.098) ***	0.049 (-0.041 to 0.138)	0.105 (0.053 to 0.156)	0.096 (0.063 to 0.130) ***	0.116 (0.032 to 0.199) **	0.056 (0.033 to 0.080) ***	-0.137 (-0.292 to 0.018)	0.178 (0.100 to 0.256) ***	0.046 (-0.010 to 0.102)	0.170 (0.095 to 0.245) ***	0.076 (0.060 to 0.091) ***	-0.002 (-0.098 to 0.094)	0.058 (0.009 to 0.106) *	0.083 (0.050 to 0.116) ***
				0.041 to 0.138)	0.063 to 0.130) ***	0.032 to 0.199) **	0.033 to 0.080) ***	0.292 to 0.018)	0.100 to 0.256) ***	0.010 to 0.102)		(0.060 to 0.091) ***	0.098 to 0.094)	0.009 to 0.106) *	(0.050 to 0.116) ***
Upper secondary and vocational training	0.014 (-0.081 to 0.109) *	0.082 (-0.005 to 0.169)	(0.089 to 0.155) ***	0.034 (-0.013 to 0.081) ***	0.091 (0.073 to 0.110) ***	-0.018 (-0.092 to 0.057)	0.002 (-0.079 to 0.082)	0.092 (0.050 to 0.134) ***	0.122 (0.062 to 0.182) ***	0.032 (0.010 to 0.055) **	0.094 (0.020 to 0.167) *	0.102 (0.022 to 0.182) *	0.077 (0.046 to 0.108) ***	0.034 (-0.015 to 0.083)	0.068 (0.050 to 0.086) ***
				0.013 to 0.081) ***	0.073 to 0.110) ***	0.092 to 0.057)	0.079 to 0.082)	0.050 to 0.134) ***	0.062 to 0.182) ***	0.010 to 0.055) **		(0.022 to 0.182) *	(0.046 to 0.108) ***	0.015 to 0.083)	(0.050 to 0.086) ***

Tertiary Residence status	0.134 (-0.040 to 0.307) ***	0.047 (-0.012 to 0.105)	0.087 (0.023 to 0.152) **	0.113 (- 0.028 to 0.254)	0.082 (0.045 to 0.120) ***	0.025 (- 0.081 to 0.131)	0.048 (0.003 to 0.094)	0.141 (0.065 to 0.216) ***	0.191 (0.026 to 0.355) *	0.146 (0.105 to 0.187) ***	0.184 (0.039 to 0.330) *	0.062 (0.008 to 0.115) *	0.068 (0.017 to 0.119) ***	0.109 (- 0.045 to 0.264)	0.092 (0.054 to 0.130) ***
Rural	0.149 (0.026 to 0.271) *	0.083 (0.034 to 0.131) **	0.148 (0.096 to 0.200) ***	—	0.077 (0.050 to 0.105) ***	0.074 (- 0.059 to 0.207)	0.075 (0.018 to 0.132) *	0.034 (- 0.034 to 0.103)	—	0.026 (- 0.010 to 0.062)	0.157 (0.042 to 0.271) **	0.082 (0.048 to 0.116) ***	0.056 (0.009 to 0.103) *		0.080 (0.053 to 0.107) ***
Urban Employment status	0.073 (0.008 to 0.138) *	0.071 (0.051 to 0.092) ***	0.089 (0.056 to 0.121) ***	—	0.097 (0.079 to 0.115)	0.040 (- 0.020 to 0.100)	0.051 (0.029 to 0.073) ***	0.100 (0.057 to 0.143) ***	—	0.059 (0.037 to 0.081) ***	0.130 (0.071 to 0.188) ***	0.075 (0.058 to 0.092) ***	0.070 (0.039 to 0.100) ***		0.070 (0.053 to 0.087) ***
No	0.100 (0.022 to 0.178) *	0.083 (0.059 to 0.107) ***	0.136 (0.101 to 0.170) ***	0.075 (0.038 to 0.113) ***	0.109 (0.091 to 0.127) ***	0.078 (0.005 to 0.151) *	0.052 (0.024 to 0.079) ***	0.107 (0.060 to 0.154) ***	0.151 (0.100 to 0.202) ***	0.054 (0.030 to 0.078) ***	0.123 (0.052 to 0.193) **	0.081 (0.062 to 0.100) ***	0.076 (0.044 to 0.108) ***	0.056 (0.018 to 0.094) **	0.092 (0.075 to 0.109) ***
Yes Consumption/Income	0.102 (0.017 to 0.186) *	0.058 (0.028 to 0.088) ***	0.048 (0.006 to 0.090) *	-0.004 (- 0.093 to 0.085)	0.040 (0.011 to 0.068)	0.011 (- 0.081 to 0.102)	0.059 (0.027 to 0.091) ***	0.018 (- 0.024 to 0.060)	0.123 (0.026 to 0.220) *	0.026 (0.002 to 0.050) *	0.138 (0.058 to 0.218) ***	0.074 (0.049 to 0.098) ***	0.033 (- 0.004 to 0.070)	0.024 (- 0.068 to 0.116)	0.038 (0.009 to 0.067) *
Group 1	0.112 (-0.111 to 0.335)	0.114 (0.072 to 0.155) ***	0.117 (0.071 to 0.164) ***	0.106 (0.047 to 0.165) ***	0.067 (0.032 to 0.102) ***	0.167 (- 0.075 to 0.408)	0.109 (0.058 to 0.161) ***	0.086 (0.020 to 0.151) *	0.090 (0.009 to 0.172) *	0.045 (- 0.007 to 0.098)	0.269 (0.054 to 0.485) *	0.086 (0.056 to 0.117) ***	0.064 (0.018 to 0.109) **	0.048 (- 0.013 to 0.108)	0.091 (0.058 to 0.125) ***
Group 2	0.143 (-0.007 to 0.293)	0.055 (0.019 to 0.091) **	0.090 (0.021 to 0.159) *	0.090 (0.026 to 0.154) **	0.080 (0.050 to 0.109) ***	0.068 (- 0.093 to 0.229)	0.038 (- 0.003 to 0.079)	0.048 (- 0.047 to 0.142)	0.153 (0.071 to 0.234) ***	0.074 (0.032 to 0.116) **	0.109 (-0.030 to 0.247)	0.074 (0.046 to 0.102) ***	0.073 (0.007 to 0.138) *	0.059 (- 0.122 to 0.122)	0.052 (0.023 to 0.081) ***
Group 3	0.138 (0.021 to 0.255) *	0.068 (0.031 to 0.105) ***	0.080 (0.028 to 0.133) **	-0.001 (- 0.073 to 0.071)	0.116 (0.089 to 0.142) ***	0.066 (- 0.050 to 0.181)	0.043 (0.004 to 0.081) *	0.105 (0.037 to 0.173) **	0.177 (0.082 to 0.271) ***	0.051 (0.017 to 0.085) **	0.096 (-0.013 to 0.205)	0.072 (0.043 to 0.101) ***	0.084 (0.035 to 0.132) **	0.032 (- 0.108 to 0.108)	0.086 (0.059 to 0.112) ***
Group 4 Current smokers	0.085 (0.007 to 0.163) *	0.072 (0.036 to 0.108) ***	0.150 (0.094 to 0.207) ***	0.051 (- 0.026 to 0.127)	0.086 (0.056 to 0.116) ***	0.027 (- 0.047 to 0.100)	0.043 (0.009 to 0.077) *	0.079 (0.008 to 0.150) *	0.207 (0.106 to 0.309) ***	0.041 (0.010 to 0.073) *	0.145 (0.077 to 0.213) ***	0.088 (0.057 to 0.119) ***	0.049 (0.000 to 0.098) *	0.064 (- 0.018 to 0.146)	0.075 (0.046 to 0.104) ***
No	0.082 (0.013 to 0.151) *	0.082 (0.062 to 0.102) ***	0.107 (0.078 to 0.137) ***	0.069 (0.033 to 0.105) ***	0.099 (0.082 to 0.115) ***	0.065 (- 0.005 to 0.136)	0.056 (0.033 to 0.078) ***	0.087 (0.048 to 0.126) ***	0.166 (0.119 to 0.212) ***	0.046 (0.025 to 0.067) ***	0.115 (0.050 to 0.179) ***	0.080 (0.064 to 0.096) ***	0.067 (0.040 to 0.095) ***	0.044 (0.006 to 0.081) *	0.079 (0.063 to 0.096) ***
Yes Current drinkers	0.146 (0.044 to 0.248) **	0.018 (-0.035 to 0.070)	0.139 (0.068 to 0.210) ***	0.046 (- 0.043 to 0.135)	0.044 (0.015 to 0.073) **	0.001 (- 0.104 to 0.106)	0.036 (- 0.022 to 0.094)	0.073 (- 0.022 to 0.167)	0.016 (- 0.112 to 0.143)	0.062 (0.024 to 0.099) **	0.186 (0.093 to 0.279) ***	0.054 (0.012 to 0.097) *	0.045 (- 0.023 to 0.113)	0.083 (- 0.011 to 0.177)	0.043 (0.013 to 0.072) **

Chronic disease	No	0.083 (0.003 to 0.163) *	0.068 (0.046 to 0.090) ***	0.113 (0.078 to 0.147) ***	0.045 (-0.037 to 0.128)	0.151 (0.125 to 0.177) ***	0.061 (-0.022 to 0.143)	0.053 (0.028 to 0.077) ***	0.084 (0.037 to 0.132) ***	0.196 (0.074 to 0.318) **	0.071 (0.036 to 0.105) ***	0.108 (0.033 to 0.183) **	0.082 (0.065 to 0.099) ***	0.075 (0.042 to 0.109) ***	-0.031 (-0.107 to 0.045)	0.121 (0.095 to 0.146) ***
	Yes	0.117 (0.035 to 0.199) **	0.088 (0.051 to 0.125) ***	0.103 (0.059 to 0.147) ***	0.071 (0.034 to 0.108) ***	0.029 (0.015 to 0.043) ***	0.040 (-0.043 to 0.122)	0.060 (0.021 to 0.099) **	0.084 (0.028 to 0.140) **	0.137 (0.090 to 0.184) ***	0.029 (0.013 to 0.044) ***	0.171 (0.098 to 0.245) ***	0.062 (0.032 to 0.092) ***	0.052 (0.013 to 0.091) **	0.066 (0.027 to 0.105) **	0.029 (0.016 to 0.043) ***
	No	0.147 (0.058 to 0.237) **	0.060 (0.026 to 0.095) **	0.091 (0.013 to 0.169) *	0.059 (-0.018 to 0.136)	0.101 (0.078 to 0.124) ***	0.023 (-0.067 to 0.114)	0.050 (0.014 to 0.086) **	0.075 (-0.018 to 0.168)	0.079 (-0.017 to 0.174)	0.044 (0.018 to 0.070) **	0.145 (0.063 to 0.227) **	0.075 (0.047 to 0.103) ***	0.012 (-0.049 to 0.071)	0.069 (-0.012 to 0.150)	0.070 (0.047 to 0.093) ***
	Yes	0.084 (0.011 to 0.156) *	0.077 (0.055 to 0.100) ***	0.112 (0.083 to 0.142) ***	0.068 (0.030 to 0.105) ***	0.084 (0.064 to 0.103) ***	0.057 (-0.018 to 0.132)	0.055 (0.029 to 0.080) ***	0.086 (0.047 to 0.125) ***	0.164 (0.115 to 0.214) ***	0.054 (0.027 to 0.080) ***	0.129 (0.061 to 0.197) ***	0.077 (0.060 to 0.095) ***	0.070 (0.042 to 0.097) ***	0.048 (0.009 to 0.087)	0.075 (0.057 to 0.094) ***
Social participation	No	0.194 (0.086 to 0.301) ***	0.072 (0.046 to 0.098) ***	0.158 (0.093 to 0.223) ***	0.066 (0.028 to 0.105) **	0.074 (0.028 to 0.121) **	0.101 (-0.011 to 0.212)	0.072 (0.042 to 0.101) ***	0.093 (-0.005 to 0.191)	0.116 (0.065 to 0.167) ***	0.067 (-0.012 to 0.146)	0.197 (0.096 to 0.298) ***	0.077 (0.057 to 0.098) ***	0.110 (0.048 to 0.171) **	0.061 (0.022 to 0.101) **	0.102 (0.057 to 0.147) ***
				0.097	0.058 (-	0.092	0.031 (-	0.037	0.081	0.236	0.056		0.080	0.054	0.012 (-	0.070
	Yes	0.067 (-0.001 to 0.135)	0.077 (0.050 to 0.104) ***	0.068 (0.068 to 0.127) ***	0.011 to 0.127)	(0.076 to 0.108) ***	0.037 to 0.100)	(0.009 to 0.065) *	(0.043 to 0.118) ***	(0.148 to 0.323) ***	(0.037 to 0.075) ***	0.108 (0.046 to 0.170) **	(0.058 to 0.102) ***	(0.027 to 0.082) ***	0.060 to 0.084)	(0.055 to 0.086) ***

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.



Supplementary Figure 7 Sensitivity analysis 1 of the stratified association of internet use and global cognition in CHARLS, MHAS, HRS, ELSA, and SHARE

CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe.

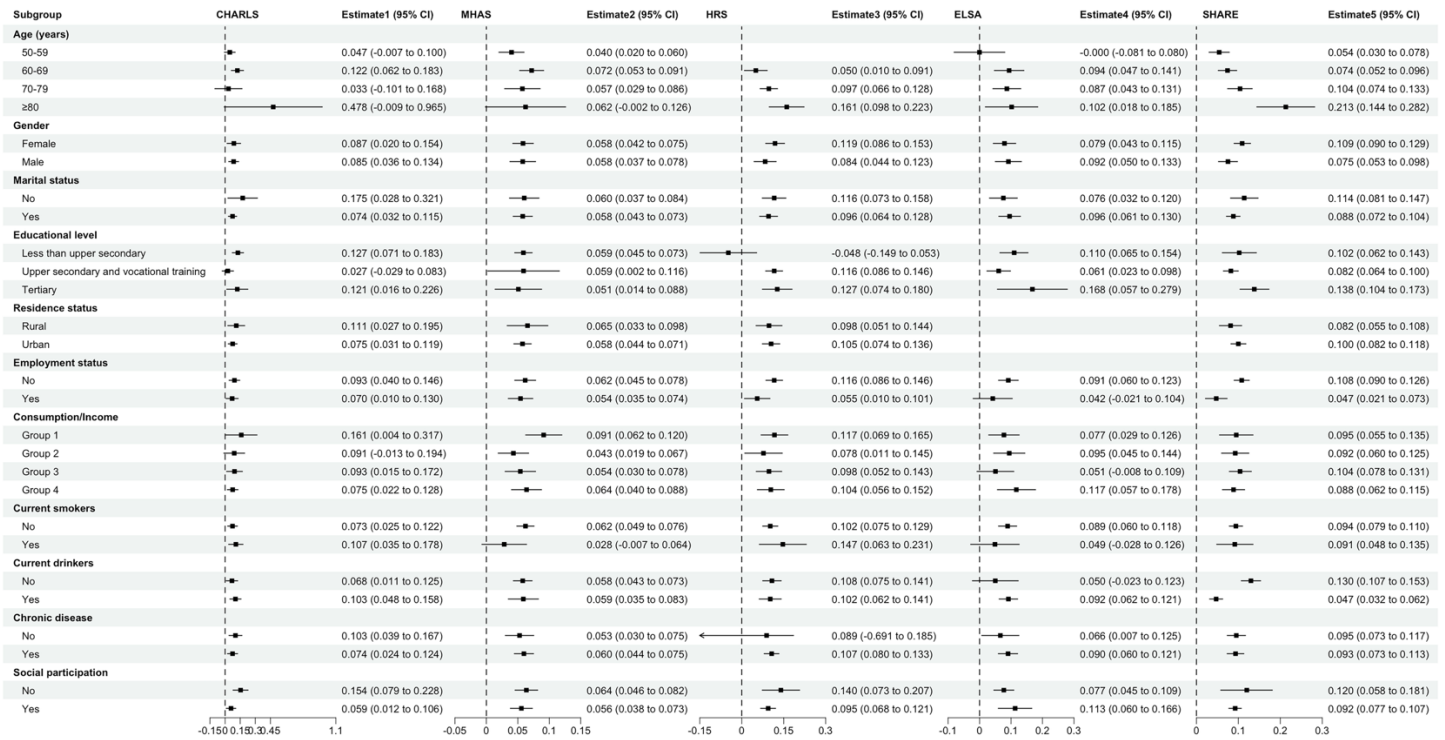
Supplementary Table 14 Sensitivity analysis 2 of the stratified association of internet use and cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

	Memory; B(95%CI); <i>p</i> value					Orientation; B(95%CI); <i>p</i> value					Executive function; B(95%CI); <i>p</i> value				
	CHARLS	MHAS	HRS	ELSA	SHARE	CHARLS	MHAS	HRS	ELSA	SHARE	CHARLS	MHAS	HRS	ELSA	SHARE
Age (years)															
50-59	0.061 (-0.023 to 0.146)	0.052 (0.019 to 0.084) **	—	0.077 (-0.055 to 0.209)	0.086 (0.048 to 0.124) ***	0.000 (-0.087 to 0.088)	0.031 (-0.003 to 0.064)	—	0.060 (-0.089 to 0.210)	0.012 (-0.026 to 0.050)	0.125 (0.046 to 0.205) **	0.064 (0.036 to 0.091) ***	—	-0.044 (-0.185 to 0.097)	0.072 (0.034 to 0.109) ***
60-69	0.177 (0.084 to 0.270) ***	0.083 (0.052 to 0.114) ***	0.039 to 0.081	0.049 (-0.118 to 0.116)	0.095 (0.060 to 0.129) ***	0.081 (-0.177 to 0.118)	0.075 (-0.043 to 0.107) ***	0.059 (-0.128 to 0.045)	0.083 (-0.109 to 0.109)	0.052 (0.016 to 0.089) **	0.169 (0.080 to 0.257) ***	0.095 (0.070 to 0.121) ***	0.059 (-0.121 to 0.083)	0.131 (0.060 to 0.202) ***	0.080 (0.046 to 0.113) ***
70-79	-0.086 (-0.291 to 0.118)	0.092 (0.048 to 0.136) ***	0.169 (0.119 to 0.219) ***	0.116 (0.055 to 0.178) ***	0.154 (0.115 to 0.193) ***	0.118 (-0.094 to 0.330)	0.055 (0.004 to 0.106) *	0.045 (-0.111 to 0.102)	0.109 (0.027 to 0.190) **	0.062 (0.009 to 0.116) *	0.166 (-0.029 to 0.361)	0.076 (0.043 to 0.109) ***	0.083 (0.038 to 0.129) ***	0.053 (-0.009 to 0.115)	0.128 (0.089 to 0.167) ***
≥80	0.574 (-0.173 to 1.320)	0.088 (0.000 to 0.175) *	0.202 (0.124 to 0.281) ***	0.058 (-0.039 to 0.156)	0.211 (0.139 to 0.282) ***	0.425 (-0.305 to 1.160)	0.077 (-0.046 to 0.201)	0.241 (0.126 to 0.356) ***	0.324 (0.164 to 0.485) ***	0.306 (0.159 to 0.453) ***	0.506 (0.204 to 1.220)	0.092 (0.031 to 0.152) **	0.116 (0.040 to 0.192) **	-0.001 (-0.105 to 0.102)	0.162 (0.097 to 0.226) ***
Gender															
Female	0.108 (0.006 to 0.209) *	0.074 (0.049 to 0.100) ***	0.164 (0.117 to 0.212) ***	0.052 (0.001 to 0.104) *	0.104 (0.113 to 0.168) ***	0.101 (-0.009 to 0.211)	0.066 (0.038 to 0.095) ***	0.105 (0.048 to 0.163) ***	0.143 (0.080 to 0.206) ***	0.080 (0.045 to 0.116) ***	0.125 (0.026 to 0.224) *	0.080 (0.059 to 0.100) ***	0.105 (0.057 to 0.153) ***	0.045 (-0.009 to 0.100)	0.116 (0.090 to 0.141) ***
Male	0.114 (0.036 to 0.192) **	0.083 (0.051 to 0.115) ***	0.125 (0.069 to 0.181) ***	0.094 (0.038 to 0.151) **	0.106 (0.075 to 0.137) ***	0.029 (-0.047 to 0.105)	0.048 (0.013 to 0.083) **	0.076 (-0.000 to 0.153)	0.154 (0.076 to 0.233) ***	0.064 (0.023 to 0.106) **	0.160 (0.089 to 0.232) ***	0.079 (0.053 to 0.105) ***	0.071 (0.022 to 0.119) **	0.048 (-0.009 to 0.104)	0.073 (0.042 to 0.105) ***
Marital status															
No	0.376 (0.151 to 0.601)	0.078 (0.043 to 0.114) ***	0.183 (0.124 to 0.242) ***	0.018 (-0.045 to 0.080)	0.158 (0.115 to 0.201) ***	-0.034 (0.260 to 0.193)	0.069 (0.027 to 0.110) **	0.082 (0.007 to 0.157) *	0.183 (0.103 to 0.263) ***	0.094 (0.031 to 0.158) **	0.262 (0.037 to 0.488) *	0.082 (0.053 to 0.110) ***	0.115 (0.057 to 0.174) ***	0.044 (-0.023 to 0.111)	0.096 (0.056 to 0.137) ***
Yes	0.086 (0.022 to 0.150) **	0.077 (0.053 to 0.102) ***	0.123 (0.078 to 0.169) ***	0.107 (0.059 to 0.155) ***	0.115 (0.091 to 0.138) ***	0.065 (0.001 to 0.131)	0.054 (0.028 to 0.080) ***	0.102 (0.043 to 0.161) **	0.134 (0.071 to 0.197) ***	0.066 (0.037 to 0.095) ***	0.132 (0.071 to 0.192) ***	0.080 (0.061 to 0.100) ***	0.072 (0.029 to 0.114) **	0.057 (0.008 to 0.106) *	0.098 (0.075 to 0.121) ***
Educational level															
Less than upper secondary	0.169 (0.085 to 0.254) ***	0.081 (0.060 to 0.103) ***	0.061 (-0.059 to 0.181)	0.105 (0.045 to 0.165) **	0.127 (0.079 to 0.175) ***	0.130 (0.040 to 0.220) **	0.060 (0.036 to 0.085) ***	-0.180 (-0.383 to 0.023)	0.175 (0.085 to 0.265) ***	0.070 (-0.013 to 0.153)	0.176 (0.094 to 0.257) *	0.079 (0.062 to 0.096) ***	0.005 (0.129 to 0.139)	0.053 (-0.003 to 0.110)	0.125 (0.078 to 0.172) ***
Upper secondary and vocational training	0.020 (-0.082 to 0.122)	0.084 (-0.008 to 0.176)	0.162 (0.118 to 0.205) ***	0.043 (-0.010 to 0.095)	0.127 (0.101 to 0.153) ***	-0.017 (-0.097 to 0.064)	0.005 (-0.080 to 0.090)	0.108 (0.054 to 0.161) ***	0.121 (0.053 to 0.189) ***	0.049 (0.017 to 0.080) **	0.109 (0.029 to 0.189) ***	0.112 (0.028 to 0.197) ***	0.103 (0.061 to 0.145) ***	0.035 (-0.020 to 0.089)	0.088 (0.064 to 0.113) ***

Tertiary Residence status	0.123 (-0.081 to 0.327)	0.044 (-0.019 to 0.106)	0.128 (0.045 to 0.211) **	0.152 (- 0.010 to 0.313)	0.116 (0.065 to 0.166) ***	0.026 (- 0.100 to 0.152)	0.049 (0.000 to 0.098) *	0.150 (0.057 to 0.242) **	0.263 (0.075 to 0.452) **	0.183 (0.125 to 0.240) ***	0.221 (0.050 to 0.392) ***	0.066 (0.008 to 0.123) *	0.092 (0.026 to 0.157) **	0.119 (- 0.058 to 0.295)	0.130 (0.079 to 0.182) ***
Rural	0.155 (0.026 to 0.284) *	0.087 (0.036 to 0.138) **	0.189 (0.123 to 0.256) ***	—	0.103 (0.066 to 0.139) ***	0.085 (- 0.056 to 0.225)	0.078 (0.018 to 0.138) *	0.054 (- 0.032 to 0.139)	—	0.042 (- 0.007 to 0.091)	0.160 (0.038 to 0.283) *	0.083 (0.048 to 0.119) ***	0.092 (0.031 to 0.154) **	—	0.108 (0.073 to 0.144) ***
Urban Employment status	0.089 (0.018 to 0.160) *	0.075 (0.053 to 0.096) ***	0.123 (0.079 to 0.167) ***	—	0.135 (0.110 to 0.160) ***	0.051 (- 0.015 to 0.116)	0.056 (0.033 to 0.079) ***	0.108 (0.053 to 0.164) ***	—	0.087 (0.055 to 0.119) ***	0.143 (0.078 to 0.208) ***	0.080 (0.062 to 0.098) ***	0.091 (0.049 to 0.133) ***	—	0.093 (0.068 to 0.117) ***
No	0.114 (0.028 to 0.200) *	0.086 (0.060 to 0.111) ***	0.165 (0.123 to 0.206) ***	0.084 (0.042 to 0.126) ***	0.145 (0.122 to 0.169) ***	0.087 (0.007 to 0.168) *	0.056 (0.027 to 0.085) ***	0.111 (0.057 to 0.165) ***	0.156 (0.099 to 0.213) ***	0.077 (0.043 to 0.111) ***	0.131 (0.052 to 0.210) **	0.085 (0.065 to 0.105) ***	0.096 (0.056 to 0.135) ***	0.053 (0.009 to 0.096) *	0.118 (0.095 to 0.141) ***
Yes Consumption/Income	0.107 (0.016 to 0.198) *	0.062 (0.031 to 0.094) ***	0.082 (0.006 to 0.157) *	-0.015 (- 0.118 to 0.087)	0.056 (0.013 to 0.099) *	0.020 (- 0.078 to 0.118)	0.061 (0.028 to 0.094) ***	0.018 (- 0.058 to 0.094)	0.105 (- 0.009 to 0.218)	0.036 (- 0.003 to 0.074)	0.149 (0.062 to 0.236) **	0.078 (0.052 to 0.103) ***	0.068 (- 0.001 to 0.136)	0.023 (- 0.082 to 0.129)	0.055 (0.012 to 0.098) *
Group 1	0.119 (-0.117 to 0.354)	0.116 (0.072 to 0.160) ***	0.160 (0.095 to 0.226) ***	0.122 (0.056 to 0.189) ***	0.088 (0.039 to 0.138) ***	0.176 (- 0.080 to 0.431)	0.117 (0.062 to 0.172) ***	0.100 (0.011 to 0.188) *	0.090 (- 0.002 to 0.181)	0.074 (- 0.003 to 0.152)	0.271 (0.040 to 0.503) *	0.086 (0.053 to 0.118) ***	0.099 (0.033 to 0.164) **	0.050 (- 0.018 to 0.117)	0.123 (0.075 to 0.171) ***
Group 2	0.159 (0.001 to 0.318) *	0.057 (0.019 to 0.096) **	0.116 (0.024 to 0.208) *	0.098 (0.025 to 0.171) **	0.116 (0.075 to 0.158) ***	0.072 (- 0.099 to 0.244)	0.041 (- 0.002 to 0.084)	0.026 (- 0.098 to 0.150)	0.164 (0.071 to 0.257) **	0.101 (0.040 to 0.163) **	0.115 (-0.035 to 0.264)	0.077 (0.048 to 0.107) ***	0.095 (0.007 to 0.184) *	0.056 (- 0.127 to 0.118) ***	0.077 (0.037 to 0.118) ***
Group 3	0.156 (0.031 to 0.282) *	0.070 (0.031 to 0.108) ***	0.100 (0.034 to 0.166) **	0.098 (0.086 to 0.076)	0.116 (0.120 to 0.192) ***	0.072 (- 0.048 to 0.202)	0.041 (- 0.004 to 0.085) *	0.026 (- 0.035 to 0.202) **	0.164 (0.040 to 0.253) **	0.101 (0.025 to 0.120) **	0.103 (-0.016 to 0.222)	0.077 (0.046 to 0.107) ***	0.095 (0.048 to 0.172) **	0.056 (- 0.105 to 0.105)	0.077 (0.076 to 0.148) ***
Group 4 Current smokers	0.090 (0.004 to 0.176) *	0.078 (0.039 to 0.117) ***	0.199 (0.126 to 0.271) ***	0.048 (- 0.038 to 0.135)	0.120 (0.079 to 0.161) ***	0.035 (- 0.046 to 0.117)	0.044 (0.007 to 0.080) *	0.090 (0.004 to 0.176) *	0.247 (0.131 to 0.364) ***	0.054 (0.009 to 0.098) *	0.160 (0.085 to 0.236) ***	0.097 (0.064 to 0.131) ***	0.056 (- 0.007 to 0.119)	0.062 (- 0.030 to 0.154)	0.099 (0.059 to 0.139) ***
No	0.095 (0.020 to 0.170) *	0.085 (0.064 to 0.106) ***	0.141 (0.103 to 0.179) ***	0.077 (0.036 to 0.117) ***	0.130 (0.108 to 0.151) ***	0.074 (- 0.002 to 0.151)	0.060 (0.036 to 0.084) ***	0.097 (0.049 to 0.146) ***	0.169 (0.116 to 0.221) ***	0.066 (0.038 to 0.094) ***	0.118 (0.047 to 0.189) **	0.085 (0.068 to 0.102) ***	0.089 (0.053 to 0.125) ***	0.039 (- 0.003 to 0.081)	0.100 (0.079 to 0.121) ***
Yes Current drinkers	0.152 (0.041 to 0.263) **	0.017 (-0.038 to 0.072)	0.247 (0.120 to 0.373) ***	0.043 (- 0.061 to 0.148)	0.082 (0.021 to 0.143) **	0.010 (0.104 to 0.125) ***	0.036 (- 0.025 to 0.098)	0.098 (- 0.071 to 0.267)	-0.005 (- 0.155 to 0.146)	0.127 (0.044 to 0.210) **	0.207 (0.105 to 0.310) ***	0.053 (0.008 to 0.099) *	0.084 (- 0.040 to 0.209)	0.094 (- 0.017 to 0.205)	0.077 (0.016 to 0.139) *

Chronic disease	No	0.093 (0.006 to 0.180) *	0.071 (0.048 to 0.094) ***	0.151 (0.106 to 0.197) ***	0.044 (-0.051 to 0.139)	0.182 (0.151 to 0.213) ***	0.069 (-0.021 to 0.159)	0.058 (0.032 to 0.084) ***	0.096 (0.037 to 0.156) **	0.208 (0.071 to 0.344) **	0.092 (0.052 to 0.132) ***	0.112 (0.028 to 0.195) **	0.087 (0.069 to 0.106) ***	0.100 (0.056 to 0.145) ***	-0.046 (-0.134 to 0.042)	0.139 (0.109 to 0.169) ***
	Yes	0.128 (0.041 to 0.216) **	0.091 (0.052 to 0.131) ***	0.143 (0.082 to 0.203) ***	0.079 (0.037 to 0.121) ***	0.047 (0.024 to 0.070) ***	0.049 (-0.040 to 0.138)	0.061 (0.021 to 0.102) **	0.098 (0.024 to 0.171) *	0.138 (0.085 to 0.192) ***	0.051 (0.022 to 0.079) ***	0.186 (0.106 to 0.266) ***	0.063 (0.032 to 0.094) ***	0.074 (0.020 to 0.127) **	0.066 (0.023 to 0.110) **	0.047 (0.024 to 0.070) ***
	No	0.168 (0.068 to 0.267) **	0.062 (0.026 to 0.099) **	0.137 (0.013 to 0.286)	0.066 (-0.020 to 0.151)	0.135 (0.103 to 0.167) ***	0.035 (-0.066 to 0.136)	0.056 (0.017 to 0.094) **	0.123 (-0.051 to 0.297)	0.068 (-0.040 to 0.176)	0.060 (0.023 to 0.096) **	0.160 (0.067 to 0.253) **	0.080 (0.050 to 0.111) ***	0.003 (-0.117 to 0.123)	0.075 (-0.015 to 0.164)	0.100 (0.068 to 0.131) ***
	Yes	0.091 (0.013 to 0.169) *	0.081 (0.057 to 0.104) ***	0.150 (0.112 to 0.187) ***	0.074 (0.031 to 0.116) **	0.118 (0.091 to 0.145) ***	0.066 (-0.015 to 0.146)	0.058 (0.031 to 0.084) ***	0.094 (0.046 to 0.142) ***	0.169 (0.113 to 0.226) ***	0.081 (0.042 to 0.119) ***	0.134 (0.060 to 0.208) ***	0.081 (0.062 to 0.100) ***	0.095 (0.059 to 0.131) ***	0.042 (-0.002 to 0.087)	0.097 (0.072 to 0.123) ***
	No	0.206 (0.090 to 0.322) **	0.075 (0.048 to 0.103) ***	0.210 (0.125 to 0.295) ***	0.076 (0.033 to 0.120) **	0.114 (0.043 to 0.185) **	0.119 (-0.002 to 0.240)	0.076 (0.044 to 0.109) ***	0.097 (-0.028 to 0.223)	0.057 (0.031 to 0.084) ***	0.097 (-0.027 to 0.221)	0.210 (0.098 to 0.321) ***	0.081 (0.060 to 0.103) ***	0.137 (0.054 to 0.219) **	0.059 (0.014 to 0.104) *	0.157 (0.090 to 0.224) ***
	Yes	0.076 (0.003 to 0.150) *	0.075 (0.048 to 0.103) ***	0.132 (0.093 to 0.172) ***	0.056 (-0.021 to 0.134)	0.126 (0.105 to 0.147) ***	0.037 (-0.037 to 0.112)	0.039 (0.010 to 0.069) **	0.094 (0.045 to 0.143) ***	0.230 (0.131 to 0.328) ***	0.076 (0.050 to 0.103) ***	0.115 (0.047 to 0.183) **	0.085 (0.062 to 0.107) ***	0.076 (0.039 to 0.113) ***	0.012 (-0.068 to 0.092)	0.092 (0.071 to 0.113) ***

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.



Supplementary Figure 8 Sensitivity analysis 2 of the stratified association of internet use and global cognition in CHARLS, MHAS, HRS, ELSA, and SHARE

Supplementary Table 15 Sensitivity analyses of the association between internet use transition and cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

		Sensitivity analysis 1; B(95%CI); <i>p</i> value						Sensitivity analysis 2; B(95%CI); <i>p</i> value					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Memory	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.080 (-0.075 to 0.235)	0.025 (-0.013 to 0.063)	0.137 (0.068 to 0.205) ***	0.096 (0.002 to 0.189) *	0.069 (0.045 to 0.092) ***	0.072 (0.034 to 0.109) ***	0.094 (-0.078 to 0.265)	0.035 (-0.011 to 0.081)	0.155 (0.068 to 0.243)) ***	0.116 (0.009 to 0.224) *	0.180 (0.119 to 0.241) ***	0.116 (0.044 to 0.188) **
	No → no	-0.077 (-0.209 to 0.055)	-0.009 (-0.046 to 0.028)	0.022 (-0.046 to 0.090)	0.054 to 0.138)	0.018 (-0.006 to 0.042)	0.011 (-0.008 to 0.029)	-0.068 (-0.215 to 0.080)	-0.014 (-0.059 to 0.031)	0.024 (-0.064 to 0.111)	0.058 (-0.053 to 0.169)	0.031 (-0.030 to 0.093)	0.006 (-0.025 to 0.037)
Orientation	No → yes	0.050 (-0.098 to 0.190)	0.005 (-0.036 to 0.046)	0.136 (0.048 to 0.225) **	0.056 to 0.166)	0.046 (0.017 to 0.075) **	0.047 (0.008 to 0.086) **	0.072 (-0.093 to 0.237)	0.004 (-0.046 to 0.054)	0.172 (0.059 to 0.284) **	0.058 (-0.070 to 0.186)	0.097 (0.024 to 0.170) **	0.073 (0.009 to 0.137) *
	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.002 (-0.160 to 0.164)	-0.016 (-0.055 to 0.023)	0.123 (0.039 to 0.207) **	0.146 (0.017 to 0.274) *	0.020 (-0.011 to 0.051)	0.042 (-0.011 to 0.094)	0.005 (-0.177 to 0.186)	-0.010 (-0.063 to 0.043)	0.121 (0.012 to 0.231) *	0.175 (0.028 to 0.322) *	0.057 (-0.025 to 0.138)	0.059 (-0.009 to 0.127)
Executive function	No → no	-0.052 (-0.189 to 0.087)	-0.062 (-0.100 to -0.024) **	0.031 (-0.053 to 0.115)	0.113 to 0.151)	-0.005 (-0.036 to 0.027)	0.059 to 0.018)	-0.059 (-0.215 to 0.097)	-0.089 (-0.141 to -0.037) **	0.017 (-0.093 to 0.128)	0.050 (-0.102 to 0.202)	0.002 (-0.079 to 0.084)	-0.029 (-0.087 to 0.028)
	No → yes	0.045 (-0.110 to 0.199)	-0.028 (-0.070 to 0.014)	0.089 (-0.020 to 0.198)	0.158 (0.004 to 0.312)	0.029 (-0.010 to 0.067)	0.033 (-0.020 to 0.085)	0.052 (-0.122 to 0.227)	-0.039 (-0.097 to 0.018)	0.108 (-0.033 to 0.250)	0.198 (0.021 to 0.376) *	0.084 (-0.014 to 0.182)	0.063 (-0.024 to 0.151)
	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Global cognition	Yes → yes	0.026 (-0.120 to 0.171)	0.019 (-0.010 to 0.047)	0.034 (-0.031 to 0.098)	0.024 (-0.072 to 0.120)	0.040 (0.017 to 0.064) **	0.032 (0.014 to 0.049) ***	0.033 (-0.131 to 0.196)	0.024 (-0.011 to 0.059)	0.037 (-0.047 to 0.120)	0.020 (-0.090 to 0.130)	0.094 (0.033 to 0.155) **	0.040 (0.012 to 0.067) **
	No → no	-0.123 (-0.247 to 0.000)	-0.042 (-0.070 to -0.015) **	0.094 to 0.035)	-0.032 (-0.131 to 0.068)	0.004 (-0.019 to 0.028)	0.061 to 0.005)	-0.125 (-0.266 to 0.016)	-0.055 (-0.090 to -0.021)) **	-0.044 (-0.128 to 0.040)	0.150 to 0.077)	-0.007 (-0.068 to 0.054)	-0.046 (-0.073 to -0.019) **
	No → yes	0.027 (-0.110 to 0.164)	-0.011 (-0.042 to 0.020)	0.088 to 0.078)	-0.005 (-0.103 to 0.217 to 0.010)	0.034 (0.005 to 0.063) *	0.001 (-0.036 to 0.037)	0.041 (-0.116 to 0.197)	-0.016 (-0.054 to 0.022)	-0.004 (-0.111 to 0.103)	0.274 to -0.013) *	0.063 (-0.009 to 0.136)	-0.005 (-0.061 to 0.051)
	Yes → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	Yes → yes	0.027 (-0.072 to 0.126)	0.006 (-0.016 to 0.028)	0.087 (0.041 to 0.133) ***	0.076 (0.010 to 0.142) *	0.040 (0.023 to 0.056) ***	0.043 (0.013 to 0.073) **	0.034 (-0.077 to 0.144)	0.011 (-0.017 to 0.040)	0.103 (0.044 to 0.163) **	0.091 (0.015 to 0.167) *	0.103 (0.059 to 0.147) ***	0.069 (0.018 to 0.119) **
	No → no	-0.070 (-0.154 to 0.014)	-0.031 (-0.052 to -0.010) **	0.010 (-0.035 to 0.056)	0.010 (-0.058 to 0.077)	0.009 (-0.008 to 0.026)	0.036 to 0.017)	-0.070 (-0.165 to 0.025)	-0.045 (-0.073 to -0.017) **	0.003 (-0.057 to 0.062)	0.015 (-0.064 to 0.094)	0.013 (-0.031 to 0.057)	-0.017 (-0.050 to 0.016)
	No → yes	0.039 (-0.053 to 0.132)	-0.011 (-0.034 to 0.013)	0.068 (0.009 to 0.127) *	0.055 to 0.101)	0.035 (0.014 to 0.055) **	0.025 (-0.006 to 0.056)	0.052 (-0.053 to 0.156)	-0.016 (-0.047 to 0.014)	0.089 (0.013 to 0.166) *	0.019 (-0.071 to 0.109)	0.077 (0.025 to 0.128) **	0.040 (-0.011 to 0.092)

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; The Model was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income), health-related behaviors (current smokers and current drinkers), and health status (self-rated health and chronic disease); The internet use transition from 'Yes' to 'no' as the reference group; *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Supplementary Table 16 Sensitivity analyses of the association between internet use transition and cognitive function in CHARLS, MHAS, HRS, ELSA, and SHARE

		Sensitivity analysis 1; B(95%CI); <i>p</i> value						Sensitivity analysis 2; B(95%CI); <i>p</i> value					
		CHARLS	MHAS	HRS	ELSA	SHARE	Pooled	CHARLS	MHAS	HRS	ELSA	SHARE	Pooled
Memory	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.127 (0.049 to 0.205) **	0.014 (-0.011 to 0.039)	0.114 (0.049 to 0.180) **	0.013 (-0.058 to 0.084)	0.028 (0.008 to 0.049) **	0.047 (0.012 to 0.083) **	0.139 (0.053 to 0.226) **	0.018 (-0.014 to 0.049)	0.148 (0.065 to 0.231) ***	0.000 (-0.082 to 0.082)	0.066 (0.016 to 0.115) *	0.068 (0.015 to 0.121) *
	Yes → no			-0.022 (-0.046 to 0.002)	-0.042 (-0.066 to -0.018)					-0.024 (-0.048 to -0.001)			
	Yes → yes	0.077 (-0.055 to 0.209)	0.009 (-0.028 to 0.046)	0.090 (0.046 to 0.134)	0.138 (0.054 to 0.222)	-0.018 (-0.042 to 0.006)	-0.011 (-0.029 to 0.008)	0.068 (-0.080 to 0.215)	0.014 (-0.031 to 0.059)	0.111 (0.064 to 0.158)	-0.058 (-0.169 to 0.053)	-0.031 (-0.093 to 0.030)	-0.006 (-0.037 to 0.025)
Orientation	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.157 (0.065 to 0.249) **	0.034 (0.012 to 0.056) **	0.115 (0.078 to 0.151) ***	0.054 (0.017 to 0.091) **	0.051 (0.038 to 0.064) ***	0.067 (0.039 to 0.095) ***	0.161 (0.060 to 0.262) **	0.049 (0.022 to 0.075) ***	0.132 (0.087 to 0.177) ***	0.058 (0.015 to 0.101) **	0.149 (0.118 to 0.179) ***	0.105 (0.055 to 0.154) ***
	Yes → no			-0.031 (-0.055 to -0.007)	-0.019 (-0.043 to 0.005)					-0.017 (-0.041 to 0.007)			
	Yes → yes	0.052 (-0.087 to 0.189)	0.062 (0.024 to 0.100) **	0.115 (0.053 to 0.177)	0.151 (0.113 to 0.189)	0.005 (-0.027 to 0.036)	0.020 (-0.018 to 0.059)	0.059 (-0.097 to 0.215)	0.089 (0.037 to 0.141) **	0.128 (0.093 to 0.163)	-0.050 (-0.202 to 0.102)	-0.002 (-0.084 to 0.079)	0.029 (-0.028 to 0.087) ***
Executive function	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.053 (-0.044 to 0.150)	0.046 (0.024 to 0.068) ***	0.092 (0.048 to 0.136) ***	0.127 (0.078 to 0.175) ***	0.025 (0.008 to 0.041) **	0.065 (0.030 to 0.099) ***	0.064 (-0.043 to 0.170)	0.079 (0.049 to 0.109) ***	0.104 (0.048 to 0.161) ***	0.125 (0.069 to 0.181) ***	0.054 (0.016 to 0.092) **	0.083 (0.059 to 0.106) ***
	Yes → no			-0.031 (-0.055 to -0.007)	-0.019 (-0.043 to 0.005)					-0.017 (-0.041 to 0.007)			
	Yes → yes	0.052 (-0.087 to 0.189)	0.062 (0.024 to 0.100) **	0.115 (0.053 to 0.177)	0.151 (0.113 to 0.189)	0.005 (-0.027 to 0.036)	0.020 (-0.018 to 0.059)	0.059 (-0.097 to 0.215)	0.089 (0.037 to 0.141) **	0.128 (0.093 to 0.163)	-0.050 (-0.202 to 0.102)	-0.002 (-0.084 to 0.079)	0.029 (-0.028 to 0.087) ***
Global cognition	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.151 (0.078 to 0.224) ***	0.031 (0.012 to 0.050) **	0.025 (-0.037 to 0.087)	0.145 (0.001 to 0.289)	0.030 (0.010 to 0.050) **	0.032 (-0.004 to 0.068)	0.166 (0.084 to 0.248) ***	0.039 (0.016 to 0.063) **	0.040 (-0.040 to 0.119)	-0.107 (-0.191 to -0.022) *	0.071 (0.021 to 0.120) **	0.043 (-0.016 to 0.103)
	Yes → no	0.123 (0.000 to 0.247)	0.042 (0.015 to 0.070) **	0.030 (-0.035 to 0.094)	0.032 (-0.068 to 0.131)	-0.004 (-0.028 to 0.019)	0.028 (-0.005 to 0.061)	0.125 (-0.016 to 0.266)	0.055 (0.021 to 0.090) **	0.044 (-0.040 to 0.128)	0.037 (-0.077 to 0.150)	0.007 (-0.054 to 0.068)	0.046 (0.019 to 0.073) **
	Yes → yes	0.149 (0.061 to 0.237) **	0.061 (0.044 to 0.077) ***	0.064 (0.029 to 0.099) ***	0.056 (0.017 to 0.095) **	0.036 (0.024 to 0.048) ***	0.057 (0.036 to 0.077) ***	0.158 (0.060 to 0.255) **	0.079 (0.059 to 0.100) ***	0.081 (0.036 to 0.125) ***	0.057 (0.012 to 0.101) *	0.101 (0.071 to 0.131) ***	0.085 (0.067 to 0.103) ***
Global cognition	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.109 (0.060 to 0.159) ***	0.020 (0.006 to 0.035) **	0.058 (0.014 to 0.102) *	0.013 (-0.037 to 0.063)	0.026 (0.012 to 0.040) ***	0.038 (0.016 to 0.061) ***	0.122 (0.066 to 0.177) ***	0.029 (0.009 to 0.048) **	0.087 (0.030 to 0.143) **	0.004 (-0.055 to 0.062)	0.063 (0.028 to 0.099) ***	0.059 (0.023 to 0.094) **
	Yes → no			-0.010 (-0.034 to 0.014)	-0.010 (-0.034 to 0.014)					-0.003 (-0.027 to 0.021)			
	Yes → yes	0.070 (-0.014 to 0.154)	0.031 (0.010 to 0.052) **	0.056 (0.035 to 0.077)	0.077 (0.058 to 0.096)	-0.009 (-0.026 to 0.008)	0.009 (-0.017 to 0.036)	0.070 (-0.025 to 0.165)	0.045 (0.017 to 0.073) **	0.062 (0.057 to 0.067)	-0.015 (-0.094 to 0.064)	-0.013 (-0.057 to 0.031)	0.017 (-0.016 to 0.050)
Global cognition	No → no	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
	No → yes	0.097 (0.036 to 0.158) **	0.037 (0.024 to 0.050) ***	0.077 (0.052 to 0.102) ***	0.066 (0.040 to 0.093) ***	0.031 (0.022 to 0.040) ***	0.053 (0.034 to 0.073) ***	0.104 (0.037 to 0.171) **	0.056 (0.040 to 0.073) ***	0.101 (0.069 to 0.132) ***	0.075 (0.045 to 0.106) ***	0.090 (0.068 to 0.112) ***	0.080 (0.060 to 0.101) ***

Note: CHARLS: China Health and Retirement Longitudinal Study; MHAS: Mexican Health and Ageing Study; HRS: Health and Retirement Study; ELSA: English Longitudinal Study of Ageing; SHARE: Survey of Health, Ageing and Retirement in Europe; The Model was adjusted for demographic characteristics (age, gender, marital status, educational level, employment status, and consumption/ income), health-related behaviors (current smokers and current drinkers), and health status (self-rated health and chronic disease); The internet use transition from 'No' to 'no' as the reference group; ****p*<0.001, ***p*<0.01, **p*<0.05.