

Supplementary Table 1

Lower Diagonal Correlation Matrix of the Relationship Between Activity Variety and Frequency Variables at Wave 2

		Variety at Wave 2				Frequency at Wave 2			
		Overall	Cognitive	Physical	Social	Overall	Cognitive	Physical	Social
	Overall	1.00							
Variety	Cognitive	.74***	1.00						
at Wave 2	Physical	.67***	.22***	1.00					
	Social	.73***	.35***	.20***	1.00				
	Overall	.65***	.57***	.50***	.31***	1.00			
Frequency	Cognitive	.61***	.82***	.19***	.29***	.68***	1.00		
at Wave 2	Physical	.56***	.24***	.74***	.22***	.67***	.24***	1.00	
	Social	.07***	.04*	.03	.08***	.57***	.05**	.04**	1.00

Notes: $N = 3337$. The scores of each overall, cognitive, physical, and social activity variety and frequency were standardized.

* $p < .05$, ** $p < .01$, *** $p < .0001$.

Supplementary Table 2

Correlation Matrix Between Activity Variety and Activity Frequency at Wave 2 with the same Activity Variety and Activity Frequency at Wave 3

		Variety at Wave 3				Frequency at Wave 3			
		Overall	Cognitive	Physical	Social	Overall	Cognitive	Physical	Social
Variety at Wave 2	Overall	.61***	.52***	.32***	.47***	.42***	.46***	.33***	-.01
	Cognitive	.49***	.58***	.15***	.32***	.38***	.53***	.17***	.02
	Physical	.33***	.20***	.35***	.16***	.27***	.17***	.34***	-.01
	Social	.45***	.30***	.16***	.50***	.22***	.25***	.20***	-.04
Frequency at Wave 2	Overall	.43***	.42***	.25***	.26***	.50***	.47***	.34***	.13***
	Cognitive	.41***	.52***	.10***	.25***	.41***	.61***	.14***	.03
	Physical	.35***	.23***	.34***	.19***	.38***	.24***	.48***	-.01
	Social	.06**	.04***	.04***	.05*	.16***	.04	.02	.24***

Notes: $N = 2049$. The scores of each overall, cognitive, physical, and social activity variety and frequency were standardized.

* $p < .05$, ** $p < .01$, *** $p < .0001$.

Supplementary Table 3

Cross-Sectional Associations of Activity Variety at Wave 2 With Executive Functioning and Episodic Memory at Wave 2

	Model 1				Model 2			
	Executive functioning		Episodic memory		Executive functioning		Episodic memory	
	<i>B(SE)</i>	95% CI	<i>B(SE)</i>	95% CI	<i>B(SE)</i>	95% CI	<i>B(SE)</i>	95% CI
Intercept	.09(.03)**	[.03, .15]	-.11(.05)*	[-.21, -.02]	.11(.03)**	[.05, .17]	-.11(.05)*	[-.20, -.01]
Age	-.02(.00)***	[-.02, -.01]	-.02(.00)***	[-.02, -.02]	-.02(.00)***	[-.02, -.02]	-.02(.00)***	[-.02, -.02]
Men (vs. Women)	-.08(.02)***	[-.12, -.05]	.45(.03)***	[.38, .51]	-.10(.02)***	[-.14, -.06]	.43(.03)***	[.37, .50]
White (vs. Non-white)	-.25(.04)***	[-.32, -.18]	-.24(.06)***	[-.35, -.13]	-.24(.03)***	[-.31, -.17]	-.24(.06)***	[-.35, -.13]
Education	.07(.00)***	[.06, .07]	.04(.01)***	[.02, .05]	.06(.00)***	[.05, .07]	.03(.01)***	[.02, .05]
Currently working (vs. not working)	-.05(.02)*	[-.09, -.01]	.01(.03)	[-.05, .07]	-.05(.02)*	[-.09, -.00]	.02(.03)	[-.05, .08]
Married (vs. not married/partnered)	-.03(.02)	[-.07, .02]	.02(.03)	[-.04, .09]	-.04(.02)	[-.08, .00]	.02(.03)	[-.04, .08]
Number of chronic conditions	-.01(.00)*	[-.02, -.00]	-.02(.01)*	[-.03, -.00]	-.01(.00)*	[-.02, -.00]	-.02(.01)*	[-.03, -.00]
Instrumental activities of daily living	-.04(.01)**	[-.06, -.01]	-.03(.02)	[-.07, .01]	-.04(.01)**	[-.06, -.01]	-.03(.02)	[-.07, .01]
History of depression/anxiety (vs. no)	.04(.03)	[-.01, .10]	-.11(.04)*	[-.20, -.03]	.03(.03)	[-.02, .09]	-.12(.04)**	[-.20, -.03]
Personality-extraversion	-.06(.02)**	[-.10, -.02]	.01(.03)	[-.06, .07]	-.05(.02)**	[-.09, -.01]	.01(.03)	[-.05, .08]
Personality-openness	.02(.02)	[-.02, .06]	.04(.03)	[-.02, .11]	-.00(.02)	[-.05, .04]	.03(.03)	[-.04, .10]
Personality-neuroticism	-.01(.02)	[-.04, .02]	-.06(.03)*	[-.11, -.00]	-.01(.02)	[-.04, .02]	-.06(.03)*	[-.11, -.01]

Personality-agreeableness	-.00(.02)	[-.05, .04]	.00(.04)	[-.07, .07]	.00(.02)	[-.03, .05]	.00(.04)	[-.07, .07]
Personality-conscientiousness	.03(.02)	[-.01, .08]	.05(.03)	[-.01, .12]	.03(.02)	[-.01, .07]	.06(.03)	[-.01, .13]
Activity frequency across domains at W2	.09(.02) ^{***}	[.05, .13]	.10(.03) ^{**}	[.04, .16]	-	-	-	-
Activity variety across domains at W2	.13(.02)^{***}	[.10, .17]	.17(.03)^{***}	[.11, .22]	-	-	-	-
Cognitive activity frequency at W2	-	-	-	-	.14(.02) ^{***}	[.01, .17]	.05(.03)	[-.00, .10]
Physical activity frequency at W2	-	-	-	-	.04(.01) [*]	[.01, .06]	.02(.02)	[-.03, .06]
Social activity frequency at W2	-	-	-	-	-.02(.01) [*]	[-.04, -.00]	.02(.01)	[-.01, .05]
Cognitive activity variety at W2	-	-	-	-	-.00(.02)	[-.04, .03]	.09(.03) ^{**}	[.04, .14]
Physical activity variety at W2	-	-	-	-	.02(.01)	[-.00, .05]	.06(.02) ^{**}	[.02, .10]
Social activity variety at W2	-	-	-	-	.03(.01) ^{**}	[.01, .05]	.02(.02)	[-.01, .05]

Notes: $N = 3337$. Scores of activity frequency, activity variety, and cognitive variables (executive functioning, episodic memory) were standardized. The main variables of interest are highlighted. CI = confidence interval.

* $p < .05$, ** $p < .01$, *** $p < .0001$.

Supplementary Table 4

Interaction Effect of Age in the Associations of Overall Activity Variety at W2 and Activity Frequency With Cognitive Functioning at W3

	Overall cognitive functioning		Executive functioning		Episodic memory	
	<i>B (SE)</i>	95% CI	<i>B (SE)</i>	95% CI	<i>B (SE)</i>	95% CI
Interaction effect of age in the association of activity variety with cognitive outcomes						
Intercept	-.01(.03)	[-.06, .05]	.10(.03)**	[.04, .16]	-.27(.06)***	[-.38, -.16]
Age	-.01(.00)***	[-.01, -.01]	-.01(.00)***	[-.01, -.01]	-.02(.00)***	[-.02, -.01]
Men (vs. Women)	.05(.02)*	[.01, .08]	-.13(.02)***	[-.17, -.09]	.49(.04)***	[.41, .56]
White (vs. Non-white)	-.08(.04)*	[-.15, -.01]	-.10(.04)*	[-.18, -.02]	-.03(.07)	[-.17, .11]
Education	.01(.00)**	[.00, .02]	.02(.00)***	[.01, .03]	-.01(.01)	[-.02, .01]
Currently working (vs. not working)	-.07(.02)**	[-.11, -.03]	-.08(.02)***	[-.13, -.04]	-.04(.04)	[-.11, .04]
Married (vs. not married/partnered)	-.02(.02)	[-.06, .02]	-.04(.02)	[-.08, .01]	.02(.04)	[-.06, .10]
Number of chronic conditions	-.00(.00)	[-.01, .01]	-.01(.01)	[-.02, .00]	.01(.01)	[-.01, .03]
Instrumental activities of daily living	-.01(.01)	[-.04, .01]	.00(.01)	[-.02, .03]	-.05(.03)*	[-.17, -.00]
History of depression/anxiety (vs. no)	.03(.03)	[-.03, .08]	.03(.03)	[-.03, .09]	.03(.05)	[-.08, .13]
Personality-extraversion	-.02(.02)	[-.06, .02]	-.03(.02)	[-.08, .01]	.01(.04)	[-.07, .08]
Personality-openness	.01(.02)	[-.03, .05]	.02(.02)	[-.03, .06]	-.01(.04)	[-.09, .07]
Personality-neuroticism	-.01(.02)	[-.04, .02]	.00(.02)	[-.03, .04]	-.04(.03)	[-.11, .02]

Personality-agreeableness	-.03(.02)	[-.07, .01]	-.04(.02)	[-.09, .00]	-.00(.04)	[-.08, .08]
Personality-conscientiousness	-.02(.02)	[-.02, .06]	.01(.02)	[-.03, .06]	.03(.04)	[-.05, .12]
Cognitive functioning at W2	.60(.02)***	[.57, .63]	.62(.02)***	[.58, .66]	.55(.03)***	[.48, .62]
Change in activity variety	.08(.02)***	[.05, .12]	.06(.02)**	[.02, .10]	.14(.04)**	[.07, .21]
Change in activity frequency	.03(.02)	[-.01, .07]	.04(.02)	[-.00, .09]	.01(.04)	[-.07, .09]
Activity frequency at W2	.02(.02)	[-.02, .06]	.04(.02)	[-.01, .09]	-.02(.04)	[-.11, .06]
Activity variety at W2	.10(.02)***	[.06, .14]	.07(.02)**	[.02, .11]	.18(.04)***	[.10, .26]
Age*activity variety at W2	-.00(.00)	[-.00, .00]	-.00(.00)*	[-.01, -.00]	.00(.00)	[-.00, .01]

Interaction effect of age in the association of activity frequency with cognitive outcomes

Intercept	-.01(.03)	[-.06, .05]	.10(.03)**	[.04, .16]	-.27(.06)***	[-.39, -.16]
Age	-.01(.00)***	[-.01, -.01]	-.01(.00)***	[-.01, -.01]	-.02(.00)***	[-.02, -.01]
Men (vs. Women)	.05(.02)*	[.01, .09]	-.13(.02)***	[-.17, -.09]	.48(.04)***	[.41, .56]
White (vs. Non-white)	-.08(.04)*	[-.15, -.01]	-.10(.04)*	[-.18, -.02]	-.02(.07)	[-.17, .11]
Education	.01(.00)*	[.00, .02]	.02(.00)***	[.01, .03]	-.01(.01)	[-.02, .01]
Currently working (vs. not working)	-.07(.02)**	[-.11, -.03]	-.09(.02)***	[-.13, -.04]	-.04(.04)	[-.11, .04]
Married (vs. not married/partnered)	-.02(.02)	[-.06, .02]	-.04(.02)	[-.08, .00]	.02(.04)	[-.06, .10]
Number of chronic conditions	-.00(.00)	[-.01, .01]	-.01(.01)	[-.02, .00]	.01(.01)	[-.01, .03]
Instrumental activities of daily living	-.01(.01)	[-.04, .01]	.00(.01)	[-.02, .03]	-.05(.03)*	[-.11, -.00]
History of depression/anxiety (vs. no)	.03(.03)	[-.03, .08]	.03(.03)	[-.03, .09]	.03(.05)	[-.08, .13]

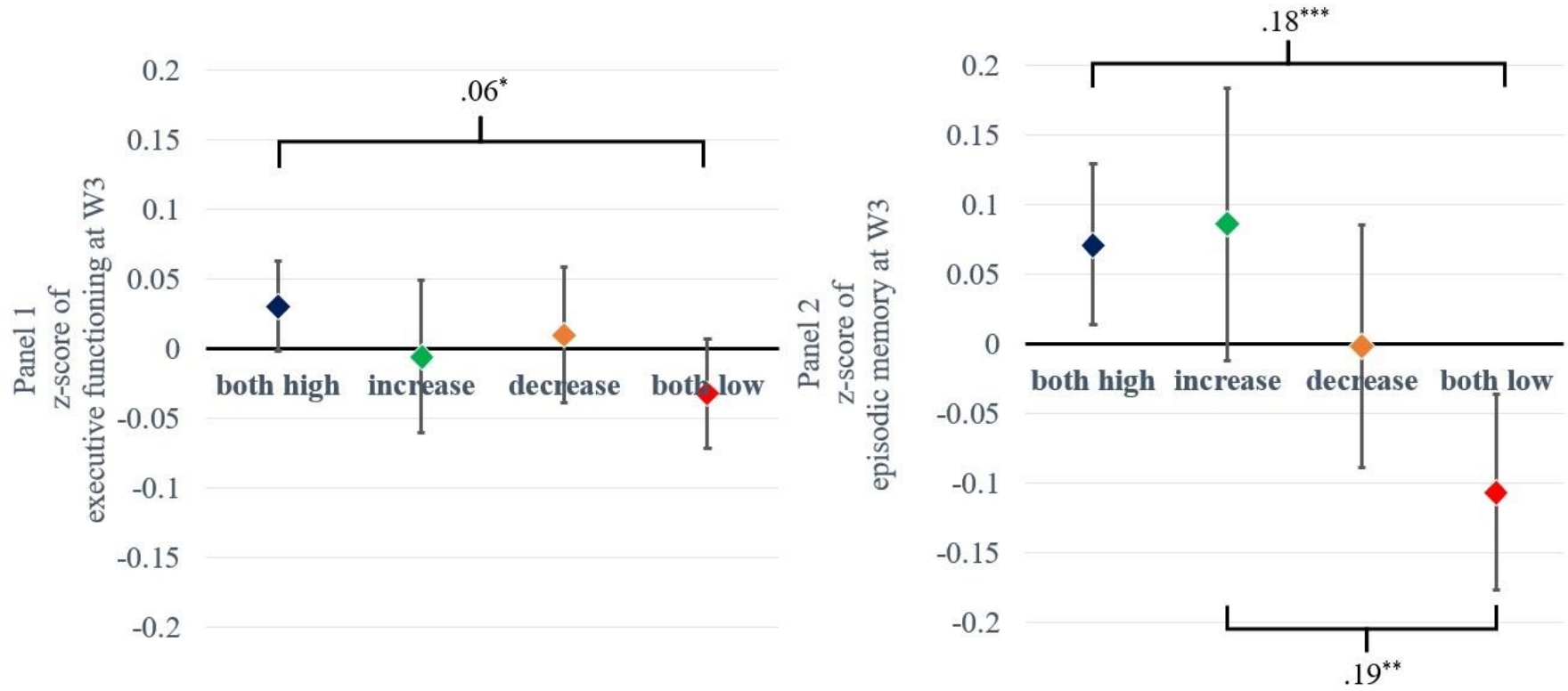
Personality-extraversion	-.02(.02)	[-.06, .02]	-.03(.02)	[-.08, .01]	.01(.04)	[-.07, .08]
Personality-openness	.01(.02)	[-.03, .05]	.02(.02)	[-.02, .06]	-.01(.04)	[-.09, .07]
Personality-neuroticism	-.01(.02)	[-.04, .02]	.00(.02)	[-.03, .04]	-.04(.03)	[-.10, .02]
Personality-agreeableness	-.03(.02)	[-.07, .01]	-.04(.02)	[-.09, .00]	-.00(.04)	[-.08, .08]
Personality-conscientiousness	.02(.02)	[-.02, .06]	.01(.02)	[-.03, .06]	.03(.04)	[-.05, .12]
Cognitive functioning at W2	.60(.02)***	[.57, .63]	.62(.02)***	[.59, .66]	.55(.03)***	[.48, .61]
Change in activity variety	.08(.02)***	[.05, .12]	.06(.02)**	[.02, .10]	.14(.04)**	[.07, .22]
Change in activity frequency	.03(.02)	[-.01, .07]	.04(.02)	[-.00, .09]	.01(.04)	[-.07, .08]
Activity frequency at W2	.02(.02)	[-.03, .06]	.03(.02)	[-.02, .08]	-.02(.04)	[-.11, .07]
Activity variety at W2	.10(.02)***	[.06, .14]	.06(.02)**	[.02, .11]	.18(.04)***	[.10, .26]
Age*activity frequency at W2	-.00(.00)	[-.00, .00]	-.00(.00)	[-.00, .00]	.00(.00)	[-.00, .01]

Notes: $N = 2049$. Scores of activity frequency, activity variety, and three cognitive variables (overall cognitive functioning, executive functioning, episodic memory) were standardized. The main variables of interest are highlighted. CI = confidence interval.

^a Further analyses were conducted for the relationship between overall activity variety at W2 and executive functioning (EF) at W3. In the older adults whose age is 1 standard deviation above the mean, overall activity variety at W2 significantly and positively predicted EF at W3 [$B = 0.10$, $SE = 0.03$, $p < 0.001$]. In the average-aged adults, overall activity variety at W2 also positively predicted EF at W3 [$B = 0.10$, $SE = 0.03$, $p < 0.01$]. Yet, in the younger adults whose age is 1 standard deviation below the mean, overall activity variety at W2 did not predict EF at W3 [$B = 0.3$, $SE = 0.02$, $p = 0.17$].

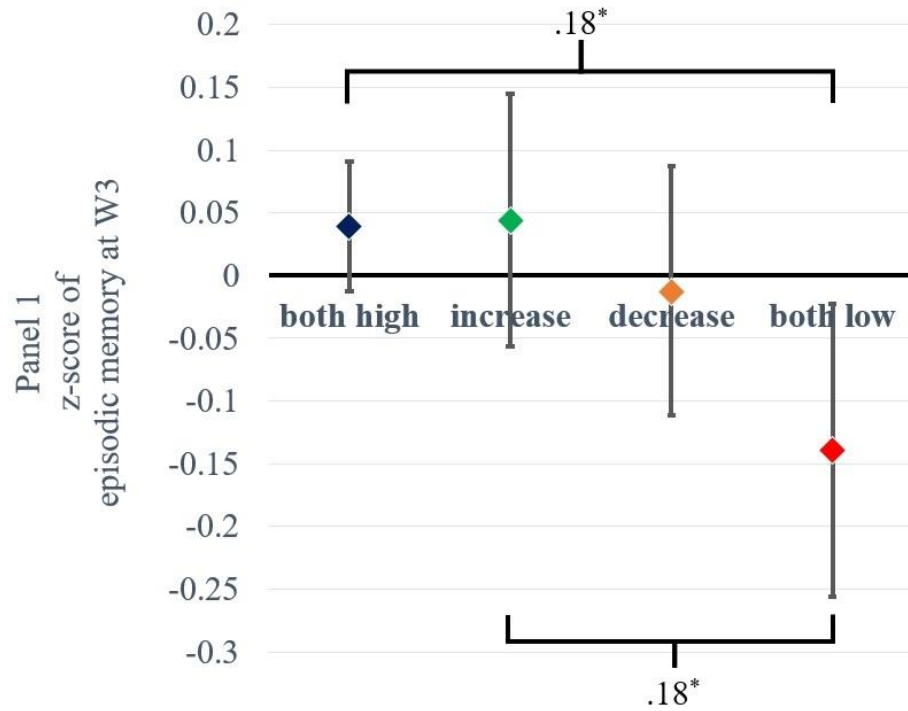
* $p < .05$, ** $p < .01$, *** $p < .0001$.

Supplementary Figure 1



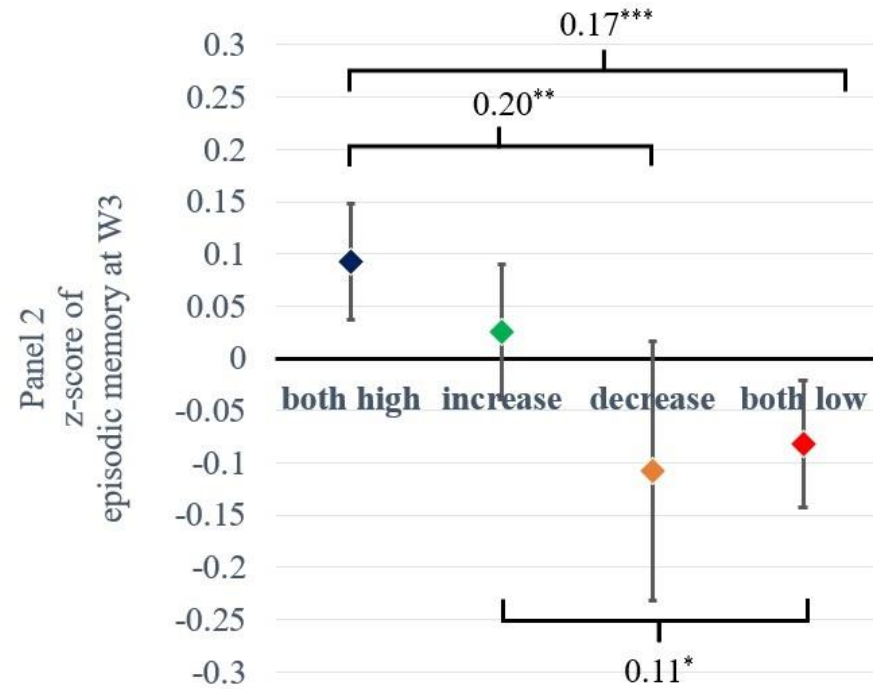
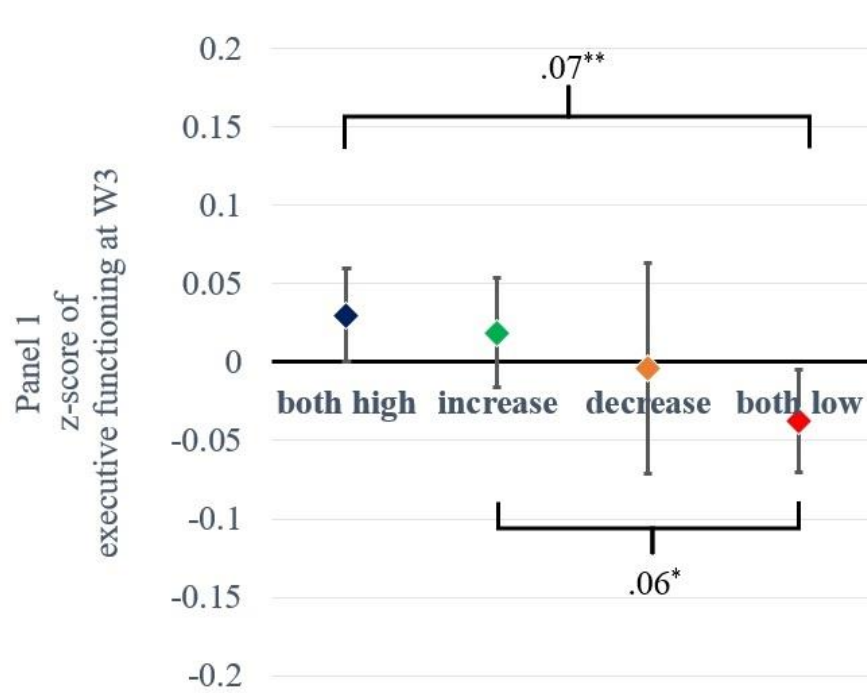
both high: relatively high overall activity variety (OAV) at W2 and W3
increase: relatively low OAV at W2 and relatively high OAV at W3
decrease: relatively high OAV at W2 and relatively low OAV at W3
both low: relatively low OAV at W2 and W3

Supplementary Figure 2



both high: relatively high physical activity variety (PAV) at W2 and W3
increase: relatively low PAV at W2 and relatively high PAV at W3
decrease: relatively high PAV at W2 and relatively low PAV at W3
both low: relatively low PAV at W2 and W3

Supplementary Figure 3



both high: relatively high social activity variety (SAV) at W2 and W3
increase: relatively low SAV at W2 and relatively high SAV at W3
decrease: relatively high SAV at W2 and relatively low SAV at W3
both low: relatively low SAV at W2 and W3