

Supplementary Table S1 *P*-values for interactions between baseline frequency of moderate PA or 12-month change in frequency of moderate PA and age, sex, county, educational level, living situation and intervention on the frailty scores

Items	Overall frailty	Physical frailty	Psychological frailty	Social frailty
	<i>P</i> -value	<i>P</i> -value	<i>P</i> -value	<i>P</i> -value
Interactions in models on associations between baseline frequency of moderate PA and frailty				
Baseline frequency of moderate PA*Age	0.452	0.193	0.838	0.350
Baseline frequency of moderate PA*Sex	0.692	0.754	0.878	0.877
Baseline frequency of moderate PA*Country	0.409	0.142	0.346	0.705
Baseline frequency of moderate PA*Educational level	0.923	0.885	0.658	0.056
Baseline frequency of moderate PA* Live situation	0.926	0.966	0.497	0.924
Baseline frequency of moderate PA*Intervention	0.142	0.269	0.303	0.479
Interactions in models on associations between 12-month change in moderate PA and frailty				
Change in moderate PA*Age	0.443	0.216	0.838	0.546
Change in moderate PA*Sex	0.766	0.928	0.682	0.943
Change in moderate PA*Country	0.136	0.189	<0.001	0.856
Change in moderate PA*Educational level	0.719	0.542	0.117	0.148
Change in moderate PA*Live situation	0.682	0.272	0.089	0.022
Change in moderate PA*Intervention	0.399	0.743	0.714	0.329

Significant *P*-values in bold

After applying Bonferroni correction for multiple testing ($P=0.05/48=0.001$), except interaction between country and change in physical activity on follow-up psychological frailty score, no statistically significant interaction was found.

Abbreviations: PA = physical activity

Supplementary Table S2 Multivariate linear regression models (frequency of moderate physical activity at baseline and follow-up scores of frailty)

Items	12-month follow-up overall frailty		12-month follow-up physical frailty		12-month follow-up psychological frailty		12-month follow-up social frailty	
	Crude Model	Adjusted Model	Crude Model	Adjusted Model	Crude Model	Adjusted Model	Crude Model	Adjusted Model
	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)
Baseline frequency of moderate physical activity								
Regular frequency	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Low frequency	0.39^b(0.13,0.66)	0.28^a(0.01,0.55)	0.27^b(0.08,0.45)	0.18(-0.01,0.37)	0.21^c(0.10,0.31)	0.16^b(0.05,0.27)	0.05(-0.02,0.13)	0.06(-0.02,0.13)
Baseline overall frailty	0.69^c(0.65,0.73)	0.65^c(0.61,0.69)						
Baseline physical frailty			0.66^c(0.62,0.70)	0.62^c(0.58,0.67)				
Baseline psychological frailty					0.56^c(0.51,0.60)	0.54^c(0.50,0.59)		
Baseline social frailty							0.62^c(0.59,0.66)	0.39^c(0.34,0.44)
Age		0.04^c(0.02,0.07)		0.03^b(0.01,0.04)		0.01^a(0.00,0.02)		0.01(-0.00,0.01)
Sex								
<i>Male</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
<i>Female</i>		0.24(-0.01,0.48)		0.11(-0.06,0.29)		0.12^a(0.02,0.22)		0.04(-0.03,0.11)
Country								
<i>Spain</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
<i>Greece</i>	-0.05(-0.46,0.36)	-0.20(-0.21,0.62)	-0.21(-0.50,0.07)	-0.08(-0.37,0.21)	0.18^a(0.02,0.35)	0.25^b(0.08,0.42)	0.08(-0.04,0.20)	0.21^b(0.09,0.33)
<i>Croatia</i>	0.83^c(0.50,1.17)	0.96^c(0.57,1.36)	0.44^c(0.20,0.67)	0.54^c(0.26,0.81)	0.32^c(0.19,0.45)	0.35^c(0.19,0.51)	0.17^b(0.07,0.27)	0.22^b(0.10,0.33)
<i>The Netherlands</i>	-0.19(-0.55,0.18)	-0.08(-0.49,0.32)	-0.11(-0.37,0.14)	0.01(-0.28,0.29)	-0.16^a(-0.30,-0.01)	-0.11(-0.27,0.05)	0.05(-0.06,0.16)	-0.01(-0.11,0.12)
<i>The United Kingdom</i>	-0.45^b(-0.76,-0.14)	-0.45^a(-0.84,-0.07)	-0.45^c(-0.67,-0.23)	-0.43^b(-0.70,-0.16)	-0.15^a(-0.28,-0.03)	-0.10(-0.26,0.05)	0.12^a(0.02,0.21)	0.04(-0.07,0.15)
Educational level								
<i>Tertiary or higher</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
<i>Secondary or equivalent</i>		0.12(-0.26,0.51)		0.13(-0.14,0.40)		0.04(-0.12,0.19)		-0.00(-0.11,0.11)
<i>Primary or less versus</i>		0.55^a(0.11,0.98)		0.40^a(0.10,0.71)		0.17(-0.01,0.34)		0.07(-0.06,0.19)
Living situation								
<i>Living with others</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
<i>Living alone</i>		0.06(-0.19,0.31)		-0.12(-0.29,0.06)		-0.13^b(-0.23,-0.03)		0.61^c(0.52,0.70)
Smoking								
<i>No</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>

Yes	0.02(-0.39,0.43)		-0.15(-0.44,0.14)		0.11(-0.06,0.27)		0.07(-0.05,0.18)	
Alcohol risk								
No	Reference		Reference		Reference		Reference	
Yes	-0.23(-0.48,0.02)		-0.08(-0.26,0.10)		-0.12^a(-0.22,-0.01)		-0.06(-0.13,0.02)	
Multi-morbidity								
No	Reference		Reference		Reference		Reference	
Yes	0.59^b(0.20,0.97)		0.50^c(0.22,0.77)		0.10(-0.06,0.25)		0.07(-0.04,0.18)	
Intervention condition								
Control group	Reference		Reference		Reference		Reference	
Intervention group	-0.50^c(-0.72,-0.28)		-0.42^c(-0.58,-0.27)		-0.05(-0.14,0.04)		-0.02(-0.08,0.05)	
Adjusted R square, %	53.7	55.2	49.0	50.8	36.7	37.5	41.4	48.2

^a $p < .05$, ^b $p < .01$, ^c $p < .001$, significant effect estimates in bold

Supplementary Table S3 Multivariate linear regression models (12-month change in physical activity and follow-up scores of frailty)

Items	12-month follow-up overall frailty		12-month follow-up physical frailty		12-month follow-up psychological frailty		12-month follow-up social frailty	
	Crude Model	Adjusted Model	Crude Model	Adjusted Model	Crude Model	Adjusted Model	Crude Model	Adjusted Model
	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)	B(95%CI)
12-month change in moderate physical activity								
Continued regular frequency	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Decreased frequency	1.34^c(1.02,1.66)	1.31^c(0.99,1.63)	0.83^c(0.60,1.06)	0.80^c(0.58,1.03)	0.45^c(0.32,0.58)	0.43^c(0.30,0.56)	0.13^a(0.03,0.23)	0.14^b(0.04,0.23)
Continued low frequency	1.31^c(1.00,1.63)	1.16^c(0.84,1.49)	0.86^c(0.63,1.09)	0.73^c(0.51,0.96)	0.47^c(0.35,0.60)	0.42^c(0.29,0.55)	0.14^b(0.05,0.24)	0.13^b(0.04,0.23)
Increased frequency	-0.25(-0.64,0.13)	-0.25(-0.63,0.14)	-0.15(-0.42,0.12)	-0.15(-0.42,0.11)	0.02(-0.13,0.18)	0.01(-0.15,0.16)	-0.03(-0.15,0.09)	0.02(-0.09,0.13)
Baseline overall frailty	0.66^c(0.62,0.70)	0.62^c(0.58,0.66)						
Baseline physical frailty			0.62^c(0.58,0.66)	0.60^c(0.55,0.64)				
Baseline psychological frailty					0.54^c(0.50,0.59)	0.53^c(0.48,0.57)		
Baseline social frailty							0.62^c(0.59,0.66)	0.39^c(0.34,0.44)
Age		0.03^a(0.00,0.05)		0.02^a(0.00,0.03)		0.01(-0.00,0.02)		0.00(-0.00,0.01)
Sex								
<i>Male</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
<i>Female</i>		0.20(-0.05,0.44)		0.09(-0.08,0.26)		0.10^a(0.00,0.20)		0.04(-0.03,0.11)
Country								
<i>Spain</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
<i>Greece</i>	-0.34(-0.74,0.06)	-0.10(-0.51,0.30)	-0.41^b(-0.70,-0.13)	-0.29(-0.57,0.00)	0.09(-0.07,0.26)	0.15(-0.02,0.32)	0.05(-0.08,0.17)	0.17^b(0.05,0.29)
<i>Croatia</i>	0.56^b(0.23,0.88)	0.74^c(0.36,1.13)	0.26^a(0.03,0.49)	0.40^b(0.13,0.67)	0.22^b(0.09,0.36)	0.27^b(0.12,0.43)	0.14^b(0.04,0.24)	0.19^b(0.08,0.30)
<i>The Netherlands</i>	-0.33(-0.68,0.02)	-0.19(-0.58,0.21)	-0.21(-0.46,0.04)	-0.06(-0.34,0.22)	-0.20^b(-0.35,-0.06)	-0.14(-0.30,0.02)	0.04(-0.07,0.15)	-0.00(-0.12,0.11)
<i>The United Kingdom</i>	-0.61^c(-0.91,-0.30)	-0.55^b(-0.92,-0.17)	-0.55^c(-0.77,-0.34)	-0.49^c(-0.75,-0.22)	-0.20^b(-0.32,-0.08)	-0.13(-0.28,0.02)	0.10^a(0.01,0.19)	0.03(-0.08,0.14)
Educational level								
<i>Tertiary or higher</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
<i>Secondary or equivalent</i>		0.22(-0.15,0.60)		0.19(-0.08,0.45)		0.07(-0.09,0.22)		0.01(-0.10,0.12)
<i>Primary or less versus</i>		0.63^b(0.20,1.05)		0.46^b(0.16,0.75)		0.19^a(0.01,0.36)		0.08(-0.05,0.20)
Living situation								
<i>Living with others</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>

<i>Living alone</i>	0.15(-0.10,0.39)	-0.08(-0.25,0.09)	-0.11^a(-0.21,-0.02)	0.62^c(0.53,0.70)
Smoking				
<i>No</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
<i>Yes</i>	-0.02(-0.41,0.38)	-0.17(-0.45,0.12)	0.09(-0.07,0.26)	0.06(-0.06,0.18)
Alcohol risk				
<i>No</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
<i>Yes</i>	-0.21(-0.45,0.04)	-0.07(-0.24,0.10)	-0.11^a(-0.21,-0.01)	-0.05(-0.12,0.02)
Multi-morbidity				
<i>No</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
<i>Yes</i>	0.50^a(0.12,0.87)	0.45^b(0.18,0.71)	0.06(-0.10,0.21)	0.05(-0.06,0.16)
Intervention condition				
<i>Control group</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
<i>Intervention group</i>	-0.46^c(-0.68,-0.25)	-0.39^c(-0.55,-0.24)	-0.04(-0.13,0.05)	-0.01(-0.08,0.05)
Adjusted R square, %	56.6	51.6	39.2	41.8
	57.8	53.0	39.7	48.5

^a $p < .05$, ^b $p < .01$, ^c $p < .001$, significant effect estimates in bold

Supplementary Table S4 Multiple linear regression models (12-month change in moderate physical activity and psychological frailty) stratified by country

Items	Spain 12-month follow-up Psychological frailty		Greece 12-month follow-up Psychological frailty		Croatia 12-month follow-up Psychological frailty		The Netherlands 12-month follow-up Psychological frailty		The United Kingdom 12-month follow-up Psychological frailty	
	Crude Model B(95%CI)	Adjusted Model B(95%CI)	Crude Model B(95%CI)	Adjusted Model B(95%CI)	Crude Model B(95%CI)	Adjusted Model B(95%CI)	Crude Model B(95%CI)	Adjusted Model B(95%CI)	Crude Model B(95%CI)	Adjusted Model B(95%CI)
12-month change in moderate physical activity										
Continued regular frequency	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>
Decreased frequency	0.55^c(0.25,0.85)	0.57^b(0.26,0.87)	0.67^c(0.30,1.04)	0.69^b(0.30,1.08)	0.50^b(0.21,0.79)	0.48^b(0.19,0.77)	0.09(-0.19,0.37)	0.06(-0.23,0.35)	0.50^c(0.25,0.74)	0.46^c(0.22,0.71)
Continued low frequency	0.80^c(0.43,1.16)	0.79^c(0.42,1.16)	0.93^c(0.54,1.32)	0.83^c(0.40,1.26)	0.52^c(0.28,0.76)	0.45^b(0.19,0.70)	0.10(-0.22,0.42)	-0.01(-0.34,0.33)	0.30^c(0.08,0.51)	0.23^a(0.01,0.46)
Increased frequency	-0.21(-0.50,0.08)	-0.19(-0.48,0.10)	0.03(-0.51,0.57)	-0.03(-0.60,0.53)	0.05(-0.33,0.44)	-0.02(-0.41,0.37)	0.47^b(0.15,0.79)	0.43^a(0.10,0.75)	-0.10(-0.39,0.19)	-0.08(-0.37,0.22)
Baseline psychological frailty	0.58^c(0.49,0.67)	0.55^c(0.46,0.64)	0.59^c(0.47,0.72)	0.56^c(0.42,0.70)	0.46^c(0.36,0.56)	0.44^c(0.34,0.54)	0.57^c(0.46,0.67)	0.58^c(0.48,0.69)	0.54^c(0.46,0.63)	0.54^c(0.45,0.63)
Age		0.01(-0.01,0.02)		-0.00(-0.03,0.03)		0.01(-0.02,0.03)		0.02(-0.01,0.04)		0.01(-0.00,0.03)
Sex										
Male		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
Female		0.04(-0.15,0.24)		0.05(-0.30,0.39)		0.27^a(0.03,0.52)		-0.02(-0.26,0.23)		0.10(-0.07,0.26)
Educational level										
Tertiary or higher		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
Secondary or equivalent		0.11(-0.20,0.42)		-0.19(-0.65,0.28)		0.14(-0.24,0.51)		0.14(-0.23,0.51)		-0.05(-0.33,0.23)
Primary or less versus		0.31^a(0.02,0.60)		0.02(-0.43,0.46)		-0.07(-0.67,0.52)		0.17(-0.27,0.61)		-0.28(-0.89,0.32)
Living situation										
Living with others		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
Living alone		-0.08(-0.29,0.12)		0.01(-0.37,0.40)		-0.22(-0.44,0.00)		-0.15(-0.39,0.09)		-0.09(-0.26,0.07)
Smoking										
No		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>		<i>Reference</i>
Yes		0.17(-0.21,0.54)		0.01(-0.41,0.43)		0.41^a(0.01,0.81)		0.08(-0.28,0.43)		-0.08(-0.39,0.24)
Alcohol risk										

No	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	
Yes	-0.04(-0.23,0.16)	-0.31(-0.64,0.02)	-0.29(-0.58,0.00)	-0.02(-0.20,0.23)	0.00(-0.17,0.18)					
Multi-morbidity										
No	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	
Yes <i>versus</i> no	0.02(-0.26,0.31)	0.29(-0.24,0.83)	-0.18(-0.53,0.18)	0.10(-0.21,0.41)	0.14(-0.22,0.49)					
Intervention condition										
Control group	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	<i>Reference</i>	
Intervention group	0.13(-0.05,0.31)	-0.12(-0.43,0.19)	-0.19(-0.40,0.01)	-0.23(-0.45,0.00)	-0.04(-0.20,0.12)					
Adjusted R square, %	35.7	36.4	44.5	44.4	25.6	27.7	33.2	33.2	30.9	30.4

^a $p < 0.05$, ^b $p < 0.01$, ^c $p < 0.001$, significant effect estimates in bold

Supplementary Figure S1 Frequency of moderate physical activity of participants (three categories of frequency of physical activity; ‘More than once a week’= (a) more than once a week; ‘One a week or less’= (b) once a week and (c) one to three times a month; ‘Never’= (d) hardly ever, or never)

