

SUPPLEMENTARY MATERIAL

Table S1. Baseline demographics of study participants (n=110)

	Completers	Withdrawals	All	<i>p</i> -value ^a
<i>n</i>	94	16	110	
Gender (M/F)	33/61	3/13	36/74	0.365
Age (years)	69.9 (SD 6.4)	68.0 (SD 5.1)	69.2 (SD 6.1)	0.324
BMI (kg/m ²)	26.9 (SD 4.3)	28.0 (SD 3.5)	27.1 (SD 4.2)	0.318
Hypertension ^b	34	6	40	0.427
Diabetes	4	1	5 (4.5%)	0.684
Education				0.348
Secondary	13	3	16	
TAFE/post-school/diploma/vocational skills training	28	5	33	
University degree	29	3	32	
Post-graduate degree	26	3	29	
SPB (mm Hg)	130.7 (SD 17.3)	132.9 (SD 15.8)	131.6 (SD 18.1)	0.637
DPB (mm Hg)	74.7 (SD 9.2)	77.8 (SD 10.0)	75.2 (SD 11.02)	0.298
METs ^c	1144.2 (SD 754.1)	1125.7 (SD 1298.8)	1230 (SD 1468)	0.937
T-MoCA ^d	18.1 (SD 1.8)	18.1 (SD 1.9)	18.1 (SD 1.8)	0.946
MIS ^e	11.4 (SD 2.4)	10.7 (SD 3.2)	11.3 (SD 2.5)	0.343
Spot-the-word 2	52.3 (SD 3.7)	50.7 (SD 6.6)	52.1 (SD 4.3)	0.169
MAC-Q ^f	26.5 (SD 3.9)	26.8 (SD 3.4)	26.5 (SD 3.9)	0.736
GDS ^g	2.3 (SD 2.7)	2.4 (SD 1.9)	2.3 (SD 2.6)	0.845

Data are presented in mean and standard deviation (SD); BMI, body mass index; SPB, systolic blood pressure; DPB, diastolic blood pressure. ^a*p*-value for independent t-test or chi-square test among the two groups; ^b Participants with controlled hypertension taking anti-hypertensive drugs; ^c Metabolic equivalent of task (minutes per week); ^d Telephone Montreal Cognitive Assessment; ^e Memory Index Score (T-MoCA component); ^f Memory Assessment Clinic-Q; ^g Geriatric Depression Scale – short form.

Table S2 – Usual dietary intake of participants, assessed using three 24h-recalls prior allocation to treatment.

	Diet	Active powder	Control	All	P-value ^a
n	38	37	34	109	
Energy (kJ)	6438.7 SD 1682.4	7416.7 SD 1975.7	7011.1 SD 1967.1	6949.2 SD 1902.8	0.088
Protein (g)	65.6 SD 16.0	81.4 SD 31.0	73.0 SD 23.6	73.3 SD 23.6	0.014
Fat - total (g)	66.7 SD 25.0	75.2 SD 24.0	72.4 SD 27.6	71.3 SD 25.5	0.367
Saturated fat (g)	22.9 SD 8.8	25.6 SD 6.9	23.6 SD 8.0	24.00 SD 8.0	0.340
Carbohydrates (g)	160.1 SD 61.3	170.2 SD 58.7	164.7 SD 62.9	165.0 SD 60.5	0.778
Dietary fibre (g)	21.1 SD 7.2	21.7 SD 10.2	22.4 SD 10.0	21.7 SD 9.1	0.833
Sodium (mg)	1785.5 SD 743.4	2132.1 SD 735.4	2084.1 SD 706.9	1996.3 SD 739.4	0.035
Vitamin C (mg)	59.8 IQR 83.9	60.8 IQR 56.0	80.6 IQR 84.1	67.3 IQR 70.6	0.584
Vitamin E (mg)	9.1 IQR 6.80	10.5 IQR 9.68	11.1 IQR 4.91	10.8 IQR 7.9	0.301
Vitamin A ^b (mg)	614.7 IQR 389.9	674.9 IQR 451.2	700.0 IQR 436.4	671.6 IQR 382.1	0.152
Anthocyanins (mg)	15.8 IQR 49.4	18.6 IQR 51.0	23.4 IQR 42.3	17.6 IQR 46.3	0.522
Total flavonoids (mg)	477.7 IQR 454.1	223. 2 IQR 398.87	229.6 IQR 344.5	308.9 IQR 418.4	0.001

Values are mean and standard deviation or median and interquartile range; ^a*p*-value for one-way ANOVA or Kruskal-Wallis among the three treatments; ^b Total Vitamin A equivalents. Values obtained from the AUSNUT 2011-13 - Australian Food Composition Database (42). Anthocyanins and total flavonoids content values obtained from the ‘PhenolExplorer’ polyphenol food composition database (43).

Figure S1. CONSORT 2010 Flow Diagram

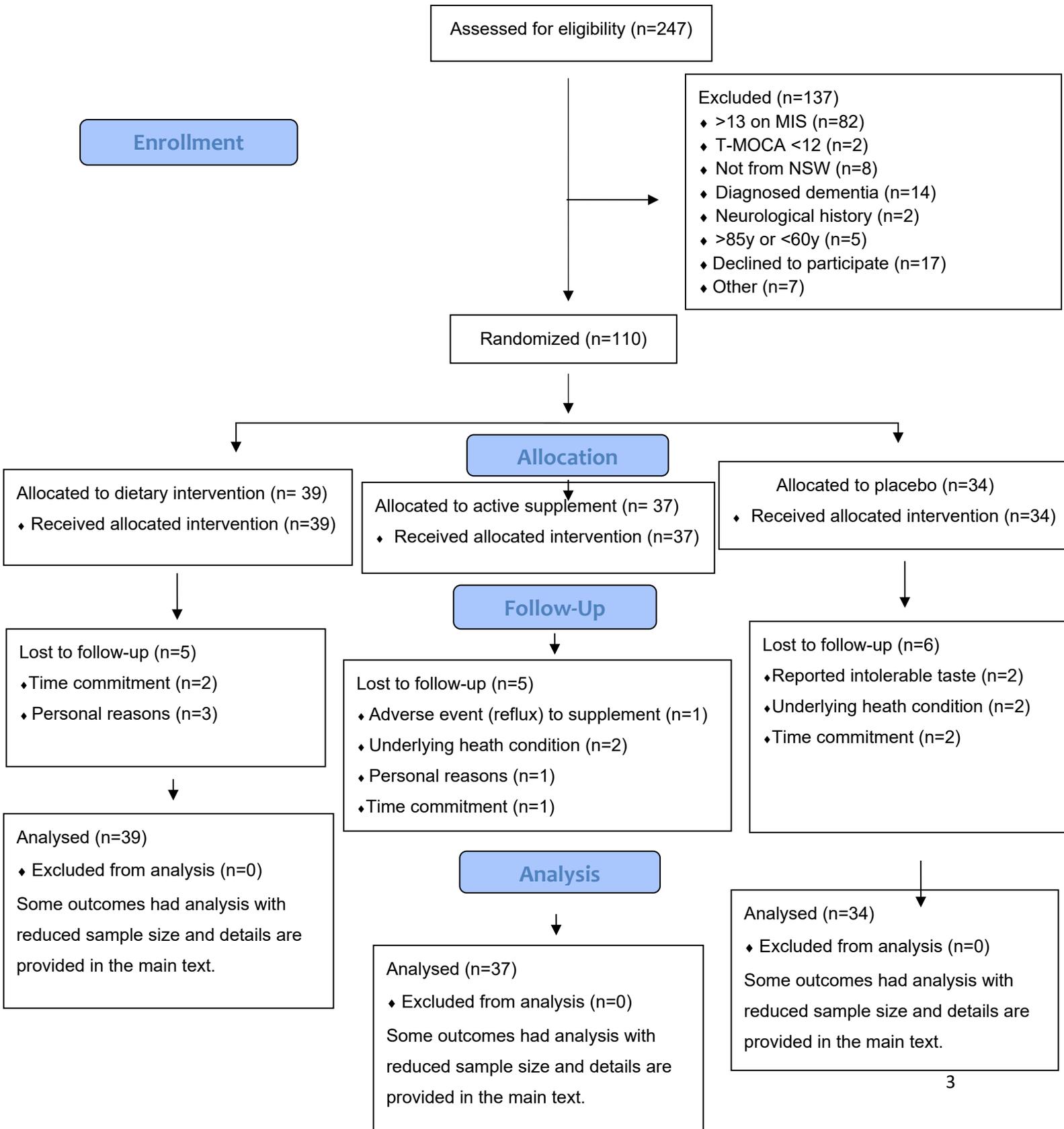


Table S3. Secondary analysis of cognitive tests, cognitive and mood questionnaires scores at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (**n=81**).

Outcome	Treatment (n)	Time	Treatment	Treatment *time	Adjusted for Sex
FCSRT +IR Free recall	Diet (n=22)	<0.001	0.833	0.154	0.166
	Active powder (n=31)				
	Control group (n=28)				
FCSRT +IR Delayed recall	Diet (n=22)	0.001	0.910	0.330	0.344
	Active powder (n=31)				
	Control group (n=28)				
Trail Making A	Diet (n=22)	<0.001	0.634	0.703	0.712
	Active powder (n=31)				
	Control group (n=28)				
Trail Making B	Diet (n=22)	<0.001	0.582	0.318	0.318
	Active powder (n=31)				
	Control group (n=28)				
Symbol Digit	Diet (n=22)	<0.001	0.582	0.318	0.318
	Active powder (n=31)				
	Control group (n=28)				
Spot-the- word 2	Diet (n=22)	<0.001	0.864	0.427	0.437
	Active powder (n=31)				
	Control group (n=28)				

Table S3 (continuation). Secondary analysis of cognitive tests, cognitive and mood questionnaires scores at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (**n=81**).

Outcome	Treatment (n)	Time	Treatment	Treatment *time	Adjusted for Sex
Verbal Fluency (F)	Diet (n=22)	0.122	0.787	0.115	0.113
	Active powder (n=31)				
	Control group (n=28)				
Verbal Fluency (A)	Diet (n=22)	0.309	0.545	0.768	0.775
	Active powder (n=31)				
	Control group (n=28)				
Verbal Fluency (S)	Diet (n=22)	0.303	0.181	0.820	0.817
	Active powder (n=31)				
	Control group (n=28)				
List Sorting (Raw)	Diet (n=22)	<0.001	0.818	0.937	0.937
	Active powder (n=31)				
	Control group (n=28)				
List Sorting (USS)	Diet (n=22)	<0.001	0.820	0.872	0.872
	Active powder (n=31)				
	Control group (n=28)				
List Sorting (ACSS)	Diet (n=22)	<0.001	0.856	0.816	0.815
	Active powder (n=31)				
	Control group (n=28)				

Table S3 (continuation). Secondary analysis of cognitive tests, cognitive and mood questionnaires scores at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (n=81).

Outcome	Treatment (n)	Time	Treatment	Treatment *time	Adjusted for Sex
GDS	Diet (n=22)	0.410	0.360	0.533	0.525
	Active powder (n=31)				
	Control group (n=28)				
MAC-Q	Diet (n=22)	<0.001	0.866	0.257	0.259
	Active powder (n=31)				
	Control group (n=28)				

Secondary Analysis: Excluding participants in group 1 with <75mg/day of anthocyanins at follow-up, and excluding participants from treatment 2 and 3 that did not comply with the intervention (consumed <80% of the study product, or stopped the intervention for more than 14 days).

FCSRT+IR, Free and Cued Selective Reminding Test-Immediate Recall; USS, uncorrected standard score; ACSS, age-corrected standard score; GDS, geriatric depressive scale – short form; MAC-Q, Memory Assessment Clinic-Q Time, treatment, and time*treatment effects from linear mixed model analysis.

Table S4. Secondary analysis of serum concentrations of inflammatory biomarkers and lipids at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (**n=69**).

Outcome	Treatment (n)	Time	Treatment	Treatment *time	Adjusted for Sex
IL-1b	Diet (n=20)	0.366	0.323	0.511	0.513
	Active powder (n=27)				
	Control group (n=22)				
IL-6	Diet (n=20)	0.192	0.696	0.314	0.322
	Active powder (n=27)				
	Control group (n=22)				
IL-8	Diet (n=20)	0.190	0.898	0.423	0.421
	Active powder (n=27)				
	Control group (n=22)				
MIP-1a	Diet (n=20)	0.002	0.131	0.429	0.419
	Active powder (n=27)				
	Control group (n=22)				
TNF-a	Diet (n=20)	0.201	0.134	0.645	0.647
	Active powder (n=27)				
	Control group (n=22)				

Secondary Analysis: Excluding participants in group 1 with <75mg/day of anthocyanins at follow-up and excluding participants from treatment 2 and 3 that did not comply with the intervention consumed <80% of the study product, or stopped the intervention for more than 14 days). IL, Interleukin; MIP-1a, Macrophage Inflammatory Protein-1Alpha. TNF-a, Tumour Necrosis Factor alpha. Time, treatment, and time*treatment effects from linear mixed model analysis.

Table S5. Anthropometry measurements and blood pressure at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (n=110).

Outcome	Treatment (n)	Baseline	12w	24w	Time	Treatment	Treatment *time
Weight (Kg)	Diet (n=39)	73.6 ± 13.3	73.3 ± 12.9 (n=33)	72.9 ± 12.7 (n=34)	0.251	0.111	0.764
	Active powder (n=37)	77.4 ± 14.1	77.6 ± 14.8 (n=30)	78.0 ± 14.8 (n=31)			
	Control group (n=34)	70.6 ±	70.9 ± 12.1 (n=32)	71.3 ± 13.2 (n=30)			
BMI (Kg/m ²)	Diet (n=39)	27.6 ± 4.8	27.6 ± 4.9 (n=33)	27.5 ± 5.0 (n=34)	0.278	0.100	0.746
	Active powder (n=37)	27.9 ± 4.2	27.7 ± 4.5 (n=30)	28.0 ± 4.6 (n=31)			
	Control group (n=34)	25.7 ± 3.2	25.7 ± 3.1 (n=32)	25.9 ± 4.0 (n=30)			
Waist circumference (cm)	Diet (n=38)	92.3 ± 16.3	92.5 ± 10.3 (n=31)	92.7 ± 10.3 (n=32)	0.702	0.073	0.570
	Active powder (n=35)	97.0 ± 11.8	97.7 ± 12.0 (n=29)	97.7 ± 12.5 (n=27)			
	Control group (n=33)	92.3 ± 11.6	92.4 ± 11.3 (n=30)	90.6 ± 14.6 (n=29)			
Hip circumference (cm)	Diet (n=38)	103.1 ± 16.4	104.1 ± 9.4 (n=31)	103.3 ± 9.3 (n=32)	0.755	0.380	0.389
	Active powder (n=35)	104.4 ± 9.9	105.8 ± 9.9 (n=29)	105.3 ± 8.6 (n=27)			
	Control group (n=33)	103.0 ± 6.9	101.4 ± 9.6 (n=30)	102.1 ± 6.5 (n=29)			
Waist-to-hip ratio	Diet (n=38)	0.89 ± 0.07	0.89 ± 0.06 (n=31)	0.90 ± 0.07 (n=31)	0.333	0.170	0.445
	Active powder (n=35)	0.93 ± 0.10	0.93 ± 0.06 (n=29)	0.92 ± 0.06 (n=29)			
	Control group (n=33)	0.89 ± 0.08	0.91 ± 0.10 (n=30)	0.88 ± 0.12 (n=30)			

Table S5 (continuation). Anthropometry measurements and blood pressure at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (n=110).

Outcome	Treatment (n)	Baseline	12w	24w	Time	Treatment	Treatment *time
SBP	Diet (n=39)	130.1 ± 15.9	125.9 ± 13.9 (n=33)	127.1 ± 14.7 (n=34)	0.395	0.230	0.686
	Active powder (n=37)	134.3 ± 19.0	131.0 ± 13.5 (n=30)	133.3 ± 20.9 (n=31)			
	Control group (n=32)	127.7 ± 15.9	128.9 ± 17.2 (n=30)	127.5 ± 17.5 (n=29)			
DBP	Diet (n=39)	74.0 ± 9.2	71.0 ± 10.5 (n=33)	70.8 ± 10.1 (n=34)	0.032	0.220	0.332
	Active powder (n=37)	78.4 ± 12.7	73.8 ± 12.1 (n=30)	74.6 ± 10.8 (n=31)			
	Control group (n=32)	72.9 ± 11.0	73.9 ± 10.3 (n=30)	73.4 ± 13.2 (n=29)			

Values are mean and standard deviation. BMI, body mass index. SBP, systolic blood pressure; DBP, diastolic blood pressure. Time, treatment, and time*treatment effects from linear mixed model analysis.

Table S6. Secondary analysis of vascular and microvascular reactivity tests scores at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (n=49).

Outcome	Treatment (n)	Time	Treatment	Treatment *time	Adjusted for Sex
PORH	Diet (n=14)	0.379	0.232	0.592	0.582
	Active powder (n=17)				
	Control group (n=18)				
PORH _{cvc}	Diet (n=14)	0.365	0.175	0.712	0.708
	Active powder (n=17)				
	Control group (n=18)				
FMD	Diet (n=14)	0.168	0.620	0.521	0.520
	Active powder (n=18)				
	Control group (n=16)				
Peak shear rate	Diet (n=14)	0.360	0.499	0.418	0.430
	Active powder (n=18)				
	Control group (n=16)				

Secondary Analysis: Excluding participants in group 1 with <75mg/day of anthocyanins at follow-up and excluding participants from treatment 2 and 3 that did not comply with the intervention consumed <80% of the study product, or stopped the intervention for more than 14 days). PORH, post-occlusive reactive hyperaemia maximum perfusion; cvc, cutaneous vascular conductance in PU/mmHg; FMD, flow-mediated dilatation. Time, treatment, and time*treatment effects from linear mixed model analysis.

Table S7. Secondary analysis of cognitive tests, cognitive and mood questionnaires scores at baseline, and 12 weeks and 24 weeks after treatment in control and intervention groups (**n=94, diet n=34, active powder n=32, control group n=28**)

Outcome	Baseline	12w	24w	Time	Treatment	Treatment *time	Adjusted for Sex
FCSRT	28.7 ± 4.3	30.8 ± 3.7	31.8 ± 5.0	<0.001	0.662	0.192	0.202
+IR	29.3 ± 5.1	28.9 ± 4.8	30.3 ± 5.0				
Free recall	28.3 ± 4.6	29.1 ± 6.3	31.5 ± 6.1				
FCSRT	10.7 ± 2.3	11.1 ± 1.7	11.8 ± 2.1	<0.001	0.657	0.282	0.300
+IR	11.3 ± 2.2	11.1 ± 2.4	12.2 ± 2.0				
Delayed recall	10.8 ± 2.1	11.8 ± 1.8	11.8 ± 2.3				
Trail Making A				<0.001	0.258	0.565	0.586
Trail Making B				0.002	0.295	0.352	0.351
Symbol Digit				<0.001	0.820	0.384	0.392
Spot-the-word 2				0.727	0.630	0.495	0.500
Verbal Fluency (F)				0.034	0.702	0.233	0.234
Verbal Fluency (A)				0.151	0.514	0.526	0.531
Verbal Fluency (S)				0.222	0.162	0.819	0.818

List Sorting (Raw)	0.002	0.947	0.813	0.814
List Sorting (USS)	0.002	0.938	0.718	0.719
List Sorting (ACSS)	<0.001	0.804	0.666	0.667
GDS	0.299	0.559	0.885	0.881
MAC-Q	<0.001	0.932	0.361	0.364

Secondary Analysis: Excluding dropouts (only completers, n=94)

FCSRT+IR, Free and Cued Selective Reminding Test-Immediate Recall; USS, uncorrected standard score; ACSS, age-corrected standard score; GDS, geriatric depressive scale – short form; MAC-Q, Memory Assessment Clinic-Q Time, treatment, and time*treatment effects from linear mixed model analysis.