ARTERY
Association for Research into Arterial Structure and Physiology

MEDIATOR EFFECT OF CARDIORESPIRATORY FITNESS ON THE RELATIONSHIP BETWEEN ARTERIAL STIFFNESS AND COGNITIVE FUNCTION

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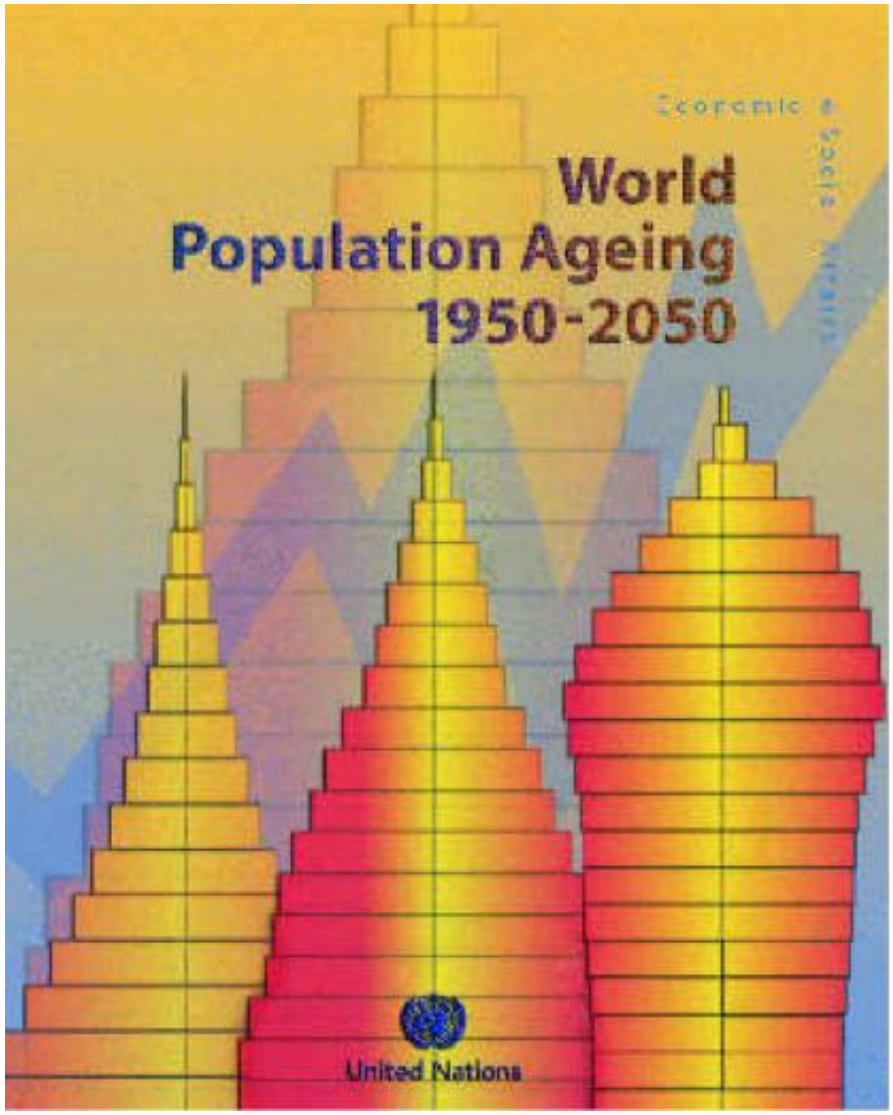
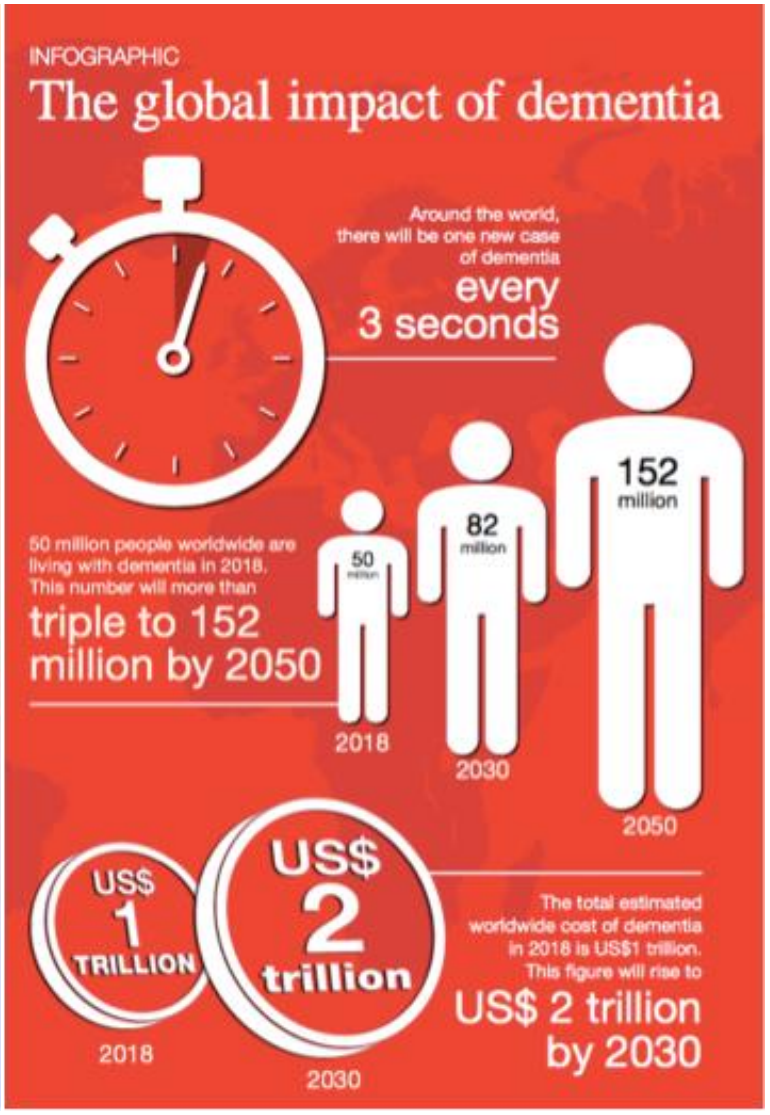
Guimarães | 2018

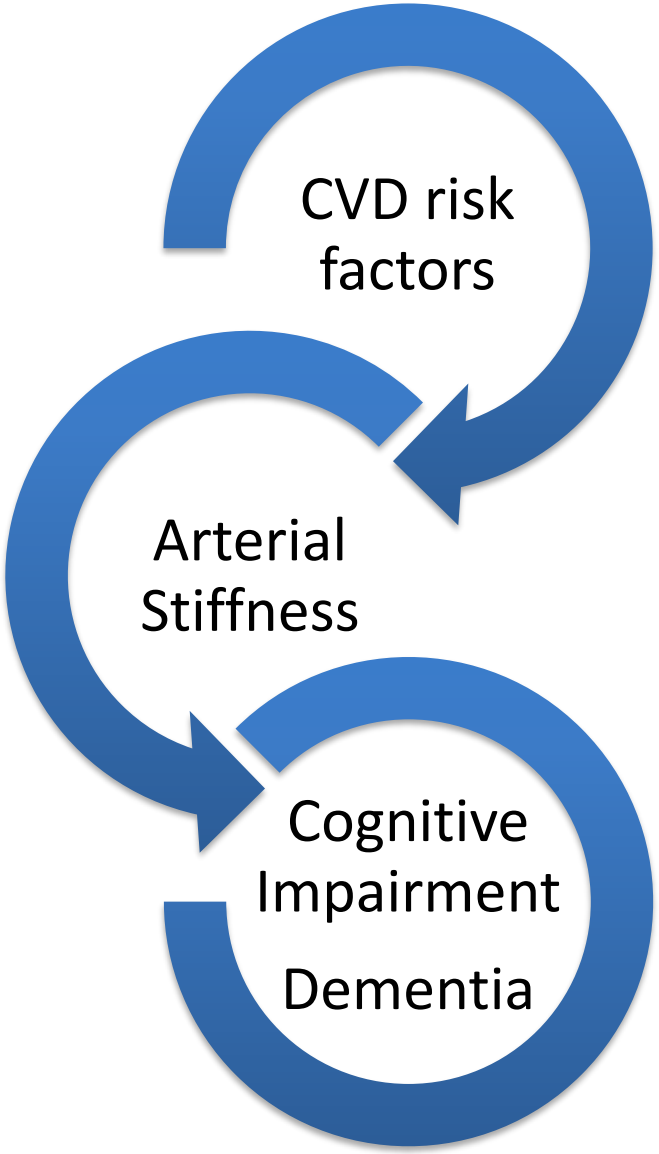
BACKGROUND





World Alzheimer Report 2018

BACKGROUND



Hypertension 2008,52:1120
Brain 2011,134:3398
J Hypertens 2011,29:1469

BACKGROUND

CARDIORESPIRATORY FITNESS: is the ability of the circulatory and respiratory systems to supply oxygen to skeletal muscles during sustained physical exercise

Public Health Rep 1985, 100: 126

Independent predictor for all cause mortality and cardiovascular events

Jama 2009, 301: 202

Negative association between arterial stiffness and cardiorespiratory fitness

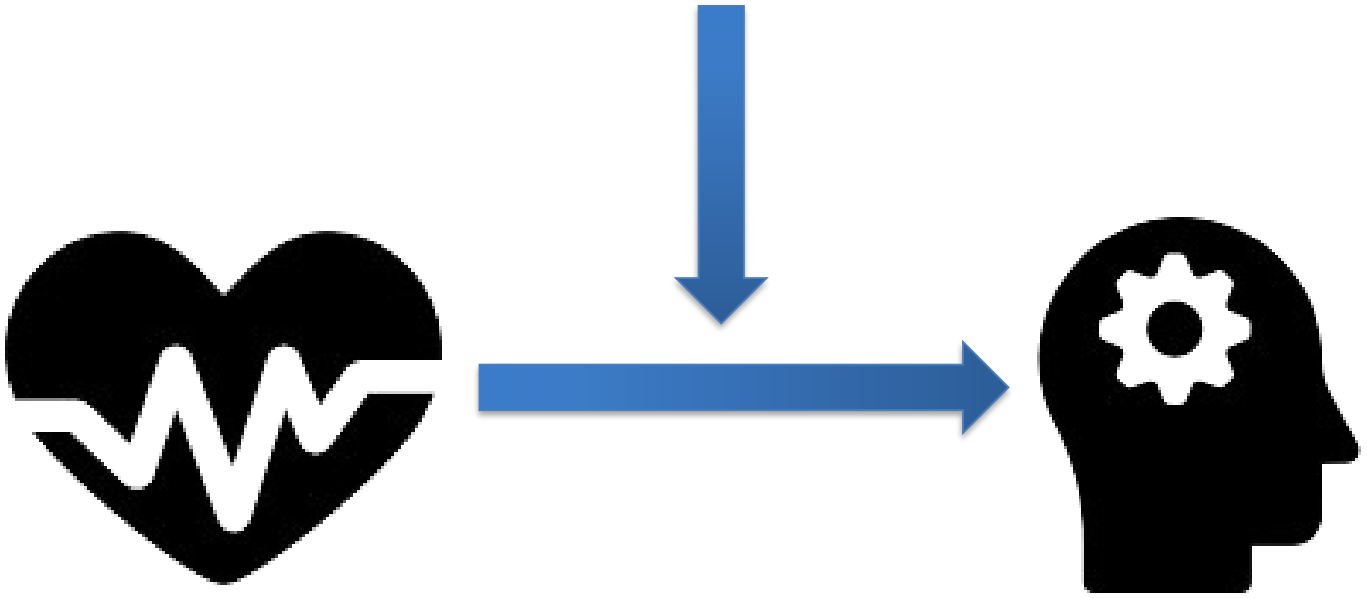
J Human Hyper2010, 24: 197; JCH 2016, 18:292

Positive association between cognitive function and cardiorespiratory fitness

J Am Geriatr Soc 2003, 51:459; Front Public Health 2017, 5:1

BACKGROUND

CARDIORESPIRATORY FITNESS



PURPOSE

To investigate the role of cardiorespiratory fitness as a mediator of the relationship between arterial stiffness and cognitive function in apparently healthy seniors

METHODS

Study Design

- Cross-sectional

- 155 participants (75.5 ± 6.5 yrs)

- Daily-care institutions and senior physical activity programs from Porto – Portugal

METHODS

Inclusion Criteria	Exclusion Criteria
Age ≥ 65 years old	Established diagnosis of cardiovascular disease or cognitive disorders, orthopaedic impairments, arrhythmias, severe hypertension, acute coronary syndrome, pulmonary and renal comorbidities, and peripheral arterial disease

Ethics

Ethics Committee of Faculty of Sports, University of Porto (02.2018)

Procedures according to Helsinki declaration

MEASUREMENTS

Cardiorespiratory Fitness

- 6 minute-walk test: submaximal exercise test

The Gerontologist 2012, 53: 255

Arterial Stiffness

- Carotid-femoral pulse wave velocity (c-f PWV)
- Applanation tonometry (SphygmoCor, AtCor Medical, Australia)
- Direct distance, 2 measurements (mean), c-f PWV x 0.8

Eur Heart J 2010, 31:2338

MEASUREMENTS

Cognitive Function

- Portuguese validated version of the Montreal Cognitive Assessment (MoCA)

- Cognitive domains: Executive functions, language, visuospatial skills, short term memory, attention, concentration and working memory, spatial and temporal orientation

- Maximum score: 30 points

- 1 additional point for subjects with 12 or less years of education

Avaliação Psicológica 2010, 9: 345
J Am Geriatr Soc 2005, 53: 695

MEASUREMENTS

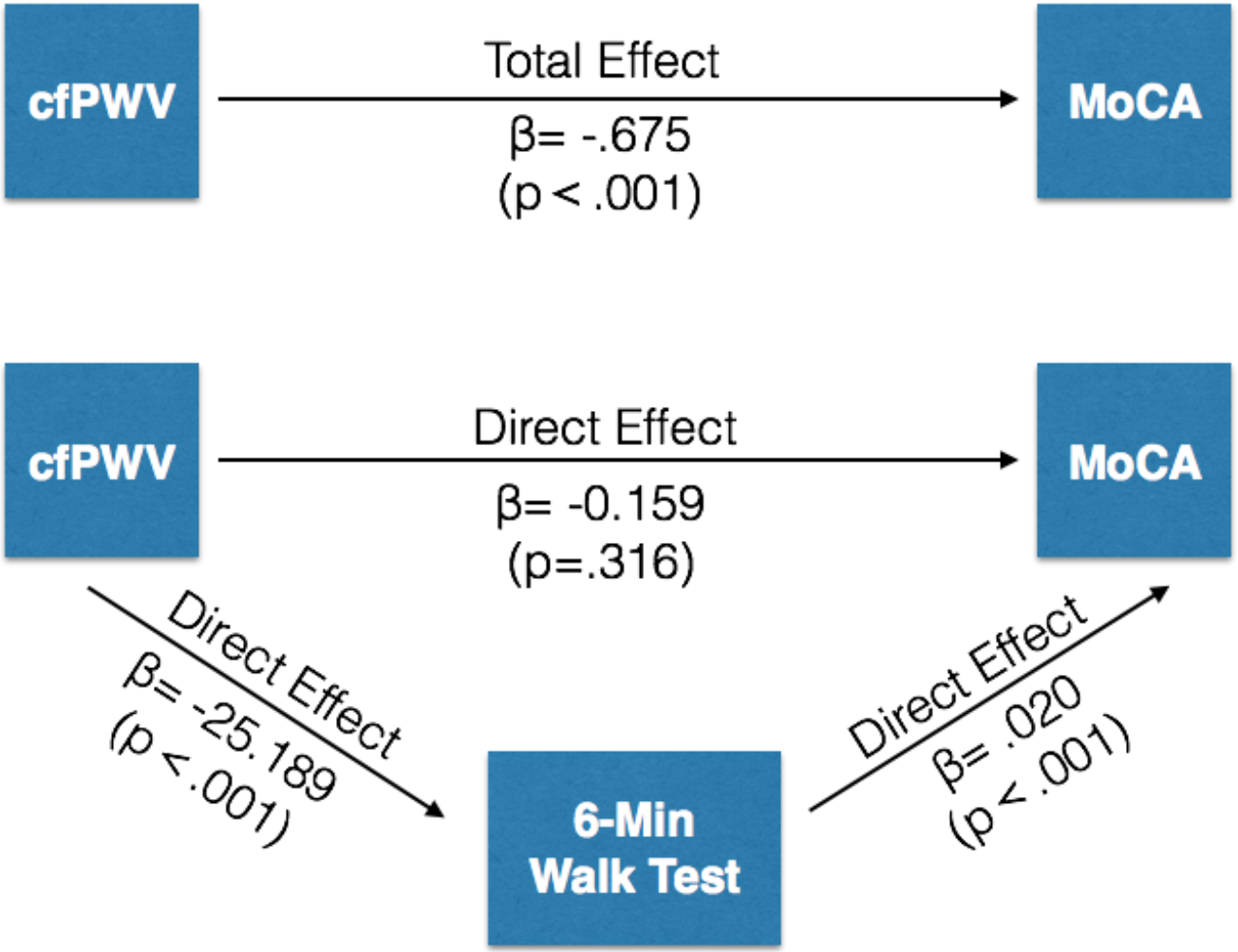
Statistical Procedures

- Descriptive statistics (mean ± sd; frequencies)
- Between genders comparisons (t-test, chi-square test, Mann-Whitney)
- Bivariate correlation (cfPWV, MoCA and 6 min-walk test)
- Simple mediation analysis:
  - 1 dependent, 1 independent and 1 potential mediator
  - Bootstrapping procedures (direct, indirect and total effect)
  - Hayes's PROCESS macro for SPSS

RESULTS- Sample Characteristics

	Total (N=155)	Female (N=108)	Male (N=47)	p
Physical Characteristics, mean ± sd				
Age (years)	75.5 ± 6.5	75.8 ± 6.6	74.8 ± 6.5	.384
Body mass index (kg/m^2)	27.6 ± 4.4	27.5 ± 4.6	27.7 ± 4.0	.873
Waist circumference (cm)	94.6 ± 13.8	91.2 ± 11.9	102.3 ± 14.8	**<.001**
Hip circumference (cm)	103.2 ±14.8	101.9 ± 10.2	106.3 ± 21.8	.781
Education, %(N)				**.014**
Primary and elementary education	69 (107)	74 (80)	57.4 (27)	
Secondary school	18.7 (29)	13 (14)	31.8 (15)	
Higher education	12.3 (19)	13 (14)	10.6 (5)	
Hemodynamics, mean ± sd				
SBP (mmHg)	128.1 ± 17.1	127.4 ± 19.0	129.7 ± 11.9	.367
DBP (mmHg)	67.7 ± 9.0	66.3 ± 9.8	70.8 ± 6.1	**.001**
Mean Arterial Pressure (mmHg)	88.9 ± 11.7	88.2 ± 13.2	90.6 ± 7.5	.143
Resting Heart Rate (bpm)	63.5 ± 9.9	65.4 ± 9.5	59.3 ± 9.3	**<.001**
c-f PWV (m/s)	11.5 ± 3.1	11.7 ± 3.3	11.0 ± 2.6	.199
Cardiorespiratory fitness, mean ± sd				
6 min-walk test (m)	471.3 ± 161.7	438.2 ± 159.5	545.2 ± 142.2	**<.001**
Cognitive Function, mean ± sd				
MoCA (score)	20.0 ± 6.3	19.2 ± 6.7	22.0 ± 4.7	**.004**

RESULTS- Mediation Analysis

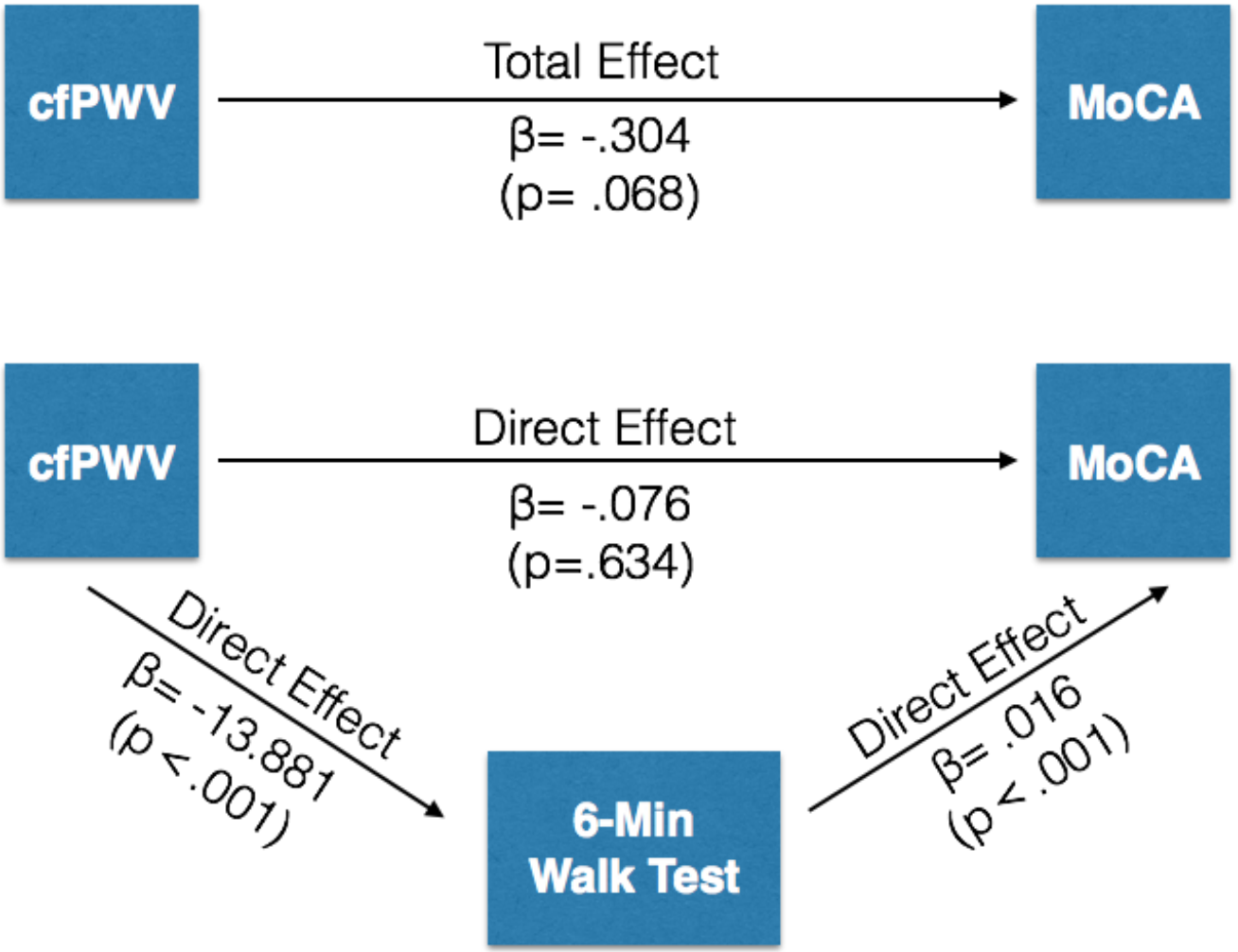


INDIRECT EFFECT= -.516 (95%CI: -.773; -.305)

Unadjusted mediation model

Unpublished data

RESULTS- Mediation Analysis



INDIRECT EFFECT= -.229 (95%CI: -.449; -.048)

Adjustments for gender and age

Unpublished data

CONCLUSION

Cardiorespiratory fitness, independently of gender and age, has a mediator capacity in the association between arterial stiffness and cognitive function

Exercise programs aiming to improve cardiorespiratory fitness might positively affect the association between arterial stiffness an and cognition function

STUDY LIMMITATIONS

Non-randomized cross sectional study

Small sample size

Physical activity was not controlled

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THANK YOU

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