

# Effect of Physical Activity on Cognitive Functioning and Quality of Life in Older Adulthood

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# Introduction



Adding life to years, not just more years to life.

-Gerontology Society of America

# Canadian Demographics

	Age 0-14	Age 15-64	Age 65+
Canada	16.1	68.6	15.3
Newfoundland and Labrador	14.5	68.4	17.1
Prince Edward Island	15.8	66.9	17.3
Nova Scotia	14.3	68.0	17.7
New Brunswick	14.7	67.7	17.6
Quebec	15.4	68.0	16.6
Ontario	16.2	68.6	15.2
Manitoba	18.7	66.9	14.4
Saskatchewan	18.8	67.7	14.4
Alberta	18.2	70.6	11.2
British Columbia	14.8	68.8	16.4
Yukon	16.7	73.4	9.9
Northwest Territories	21.1	72.8	6.1
Nunavut	30.8	65.7	3.5

(Statistics Canada, 2013)

# Cognitive Function

- Cognitive functioning declines with age, eventually resulting in dementia  
(Lautenschlager, Cox & Kurz, 2010)
- 26.6 million people living with dementia globally (2006 estimate)
- Study conducted using young (age 15-39) and old (40-71) cohorts
  - Younger cohort had better response times, better accuracy and higher WAIS-III scores
  - Individuals that were more active had better response times (regardless of age)  
(Hillman et al., 2006)
- Meta-analysis looking at effects of aerobic training on cognitive functioning
  - Selective benefits based on fitness training, including executive control
  - Effectiveness based on type of intervention, duration, and gender  
(Colcombe & Kramer, 2003)

# Physical Activity

- Canadian Society for Exercise Physiology (CSEP)
  - Guidelines for physical activity for each age group
- Older adults should attain 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week in bouts of 10 minutes or more  
(Tremblay et al., 2011)
- Benefits of physical activity:
  - Reduce risk of chronic disease and premature death
  - Maintain functional independence and mobility
  - Improve fitness and improve/maintain body weight
  - Maintain bone health and feel better

# Physical Activity

- Study on 349 adults over age 55
  - Used a treadmill protocol and examined peak oxygen consumption and oxygen uptake
  - Measured cognitive function, attention, executive control, and memory
  - Individuals with poorer cardiorespiratory fitness had greater cognitive decline over six years

(Barnes, Yaffle, Satariano & Tager, 2003)
- Meta-analysis looked at effects of physical activity in adults with dementia
  - Studies used cardio fit, strength training, flexibility training, and boot camp
  - Short term and long term interventions both produced significant results
  - Overall, greater physical activity was positive for individuals with cognitive impairment

(Heyn, Abreu & Ottenbacher, 2004)

# Quality of Life

- One's physical, mental, and emotional well being  
(Wilson & Cleary, 1995)
- Conscious cognitive judgment of the level of satisfaction one has with life  
(Rejeski & Mihalko, 2001)
- Related to health, mobility, and functional independence  
(Ozturk et al., 2011)

# Health Related Quality of Life (HRQoL)

- How well-being is impacted by disease, disability, and disorders
- Includes:
  - Cognitive function
  - Productivity
  - Symptoms of illness
  - Energy and vitality
  - Pain
  - Self-esteem
  - Body image
  - Sleep and rest



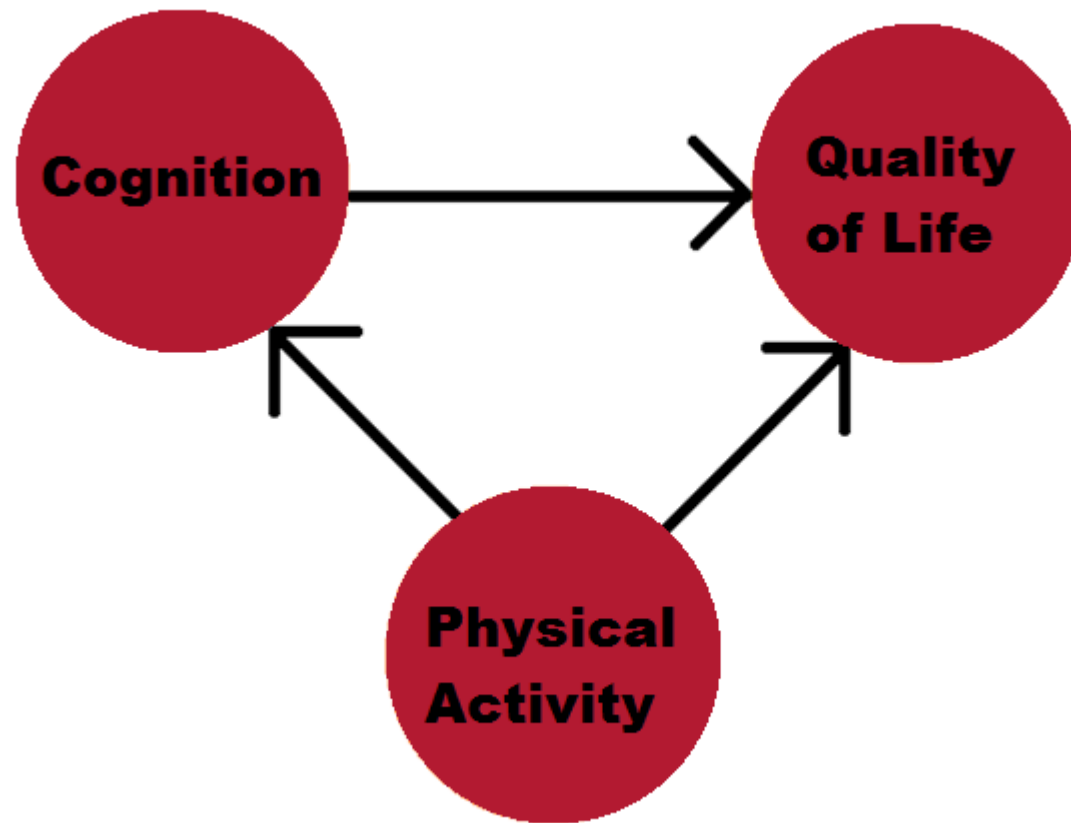
(Rejeski & Mihalko, 2001)



# Quality of Life

- Quality of life can be increased through physical activity
  - Positive relationship between physical activity and life satisfaction  
(Rejeski & Mihalko, 2001)
- Link between physical activity and quality of life moderated by mental and health status
  - Study on 249 older women supports social cognitive model relating physical activity and quality of life  
(McAuley et al., 2006)
- 6-month aerobic exercise intervention for seniors with Alzheimer's disease
  - Trend towards improving cognitive function and quality of life, and reducing depression  
(Yu et al., 2013)

# Study Rationale



# PROCEDURES

# Participants

- Eligibility
  - Self reported memory problems
  - Community-dwelling
  - Able to walk 200 meters unassisted by another person
  - Have a family member/friend willing to provide information
- Participants = 18 older adults
  - 12 Female and 6 Male
  - Age 65 to 79 years ( $M = 70.11$ ,  $SD = 4.16$ )
  - 72% born in Canada
  - 80% educated beyond high school



# Cognitive Ability

- Psychogeriatric Assessment Scale
  - Designed to assess dementia, stroke, and depression based on ‘subject’ and ‘informant’ information scales
    - Subject - Cognitive Impairment Scale (PAS-CI)
    - Informant - Cognitive Decline Scale (PAS-CD)

(Jorm & Mackinnon, 1995)

- Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE)
  - Designed to screen for dementia in subjects unable to undergo cognitive testing

(Jorm & Jacomb, 1989)

- Montreal Cognitive Assessment (MoCA)
  - Designed to screen for dementia in subjects unable to undergo cognitive testing

(Jorm & Jacomb, 1989)

# Quality of Life

- Assessment of Quality of Life (AQoL-8D)

- Evaluate quality of life for participants on 8 dimensions
  - Independent living
  - Relationships
  - Self-Worth
  - Mental health
  - Happiness
  - Coping
  - Pain
  - Senses

(Richardson et al., 2011)

- Qualidem

- Measures caregivers rating of resident's quality of life in residential settings
- 9 subscales including:
  - Care relationship
  - Positive affect
  - Negative affect
  - Social Relations
  - Positive-self image
  - Restless behavior
  - Social isolation
  - Feeling at home
  - Having something to do

(Ettema, 2007)

# Methods

- Baseline questionnaires
  - IQCODE, MoCA, PAS-CI, PAS-CD
  - AQoL-8D, Qualidem
- Follow up at two months, four months, and six months
- Assigned to walk at least 150 minutes per week (CSEP guidelines)
  - Provided with an activity log to record activities for six months
  - Provided with a vivofit activity tracker to use during weeks 1, 14, and 26

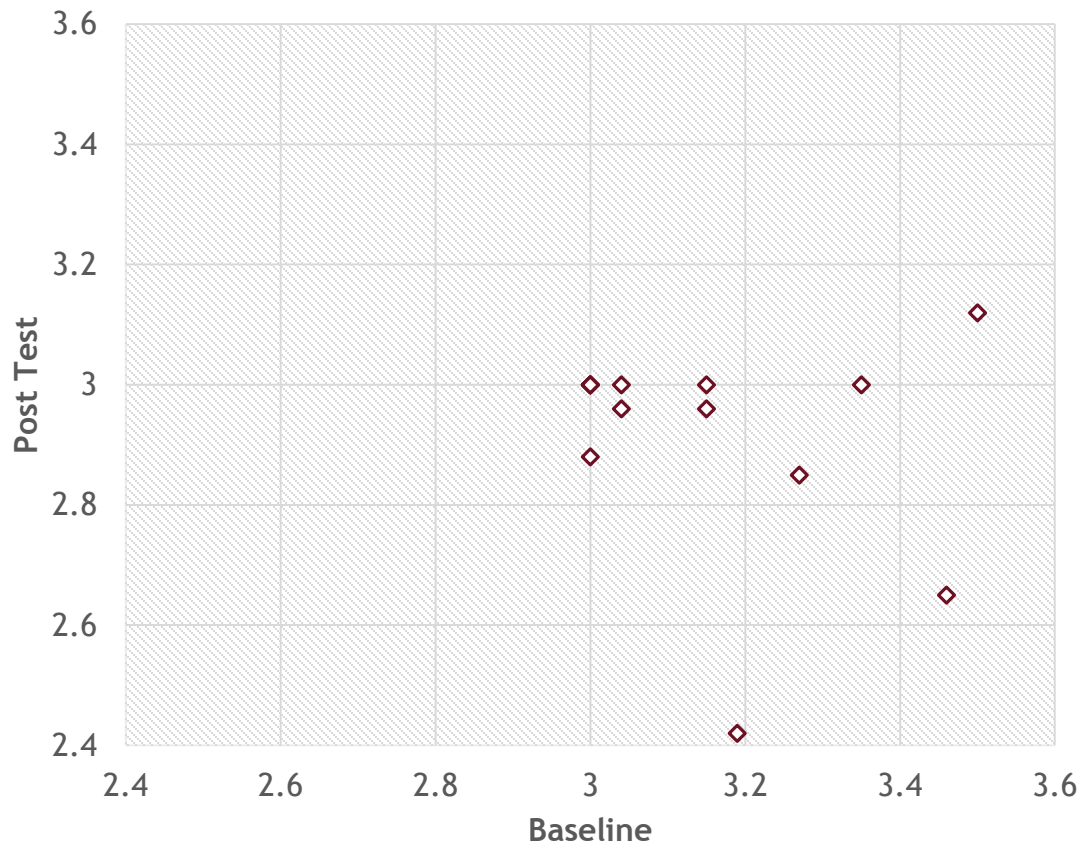


# RESULTS



# Cognition - IQCODE

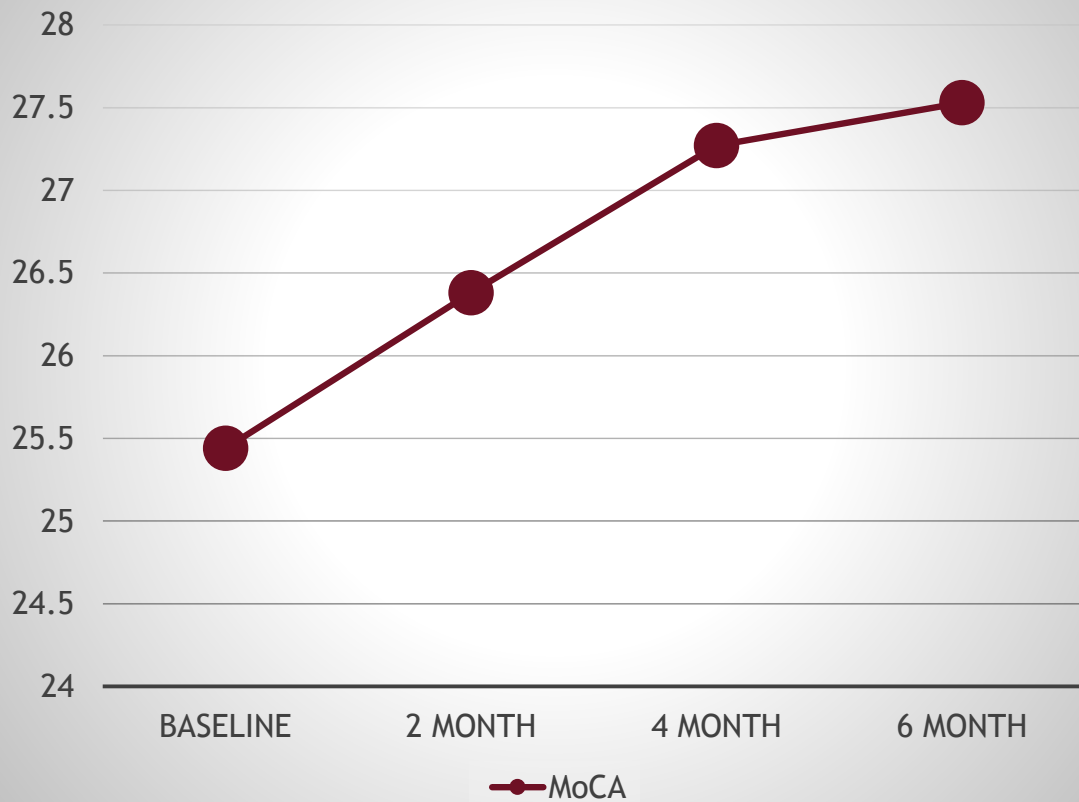
IQCODE Scores



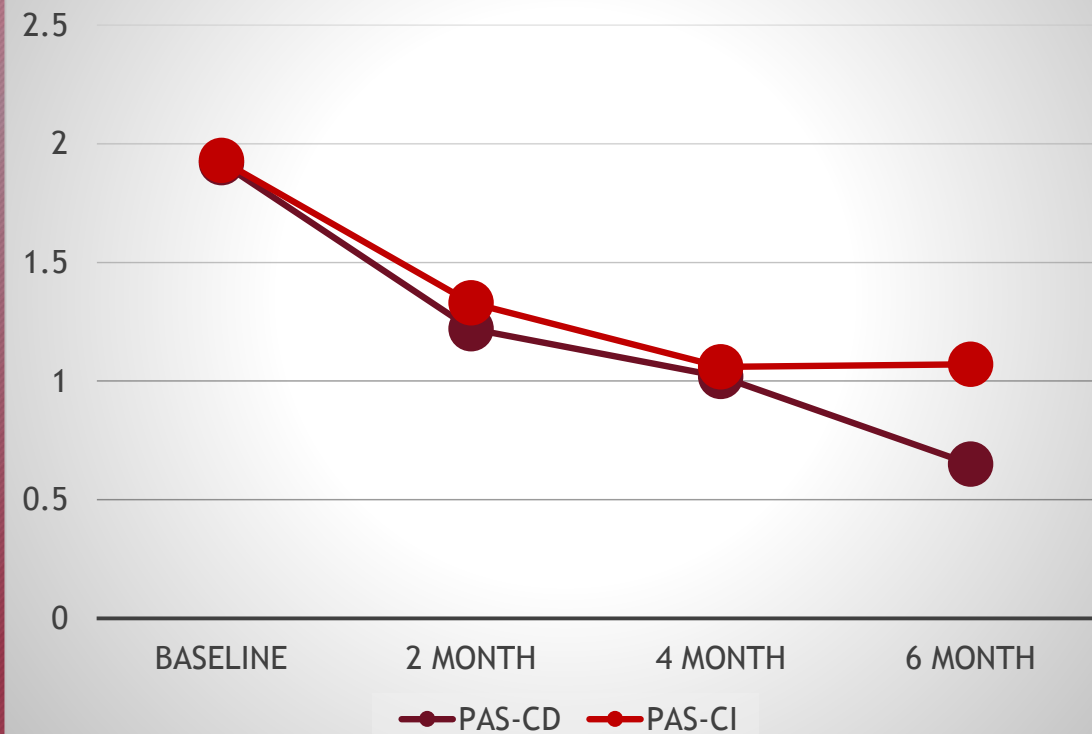
- 1 - Much Improved
- 2 - Somewhat Improved
- 3 - Not Much Change
- 4 - Somewhat Worse
- 5 - Much Worse

# Cognition

## MoCA

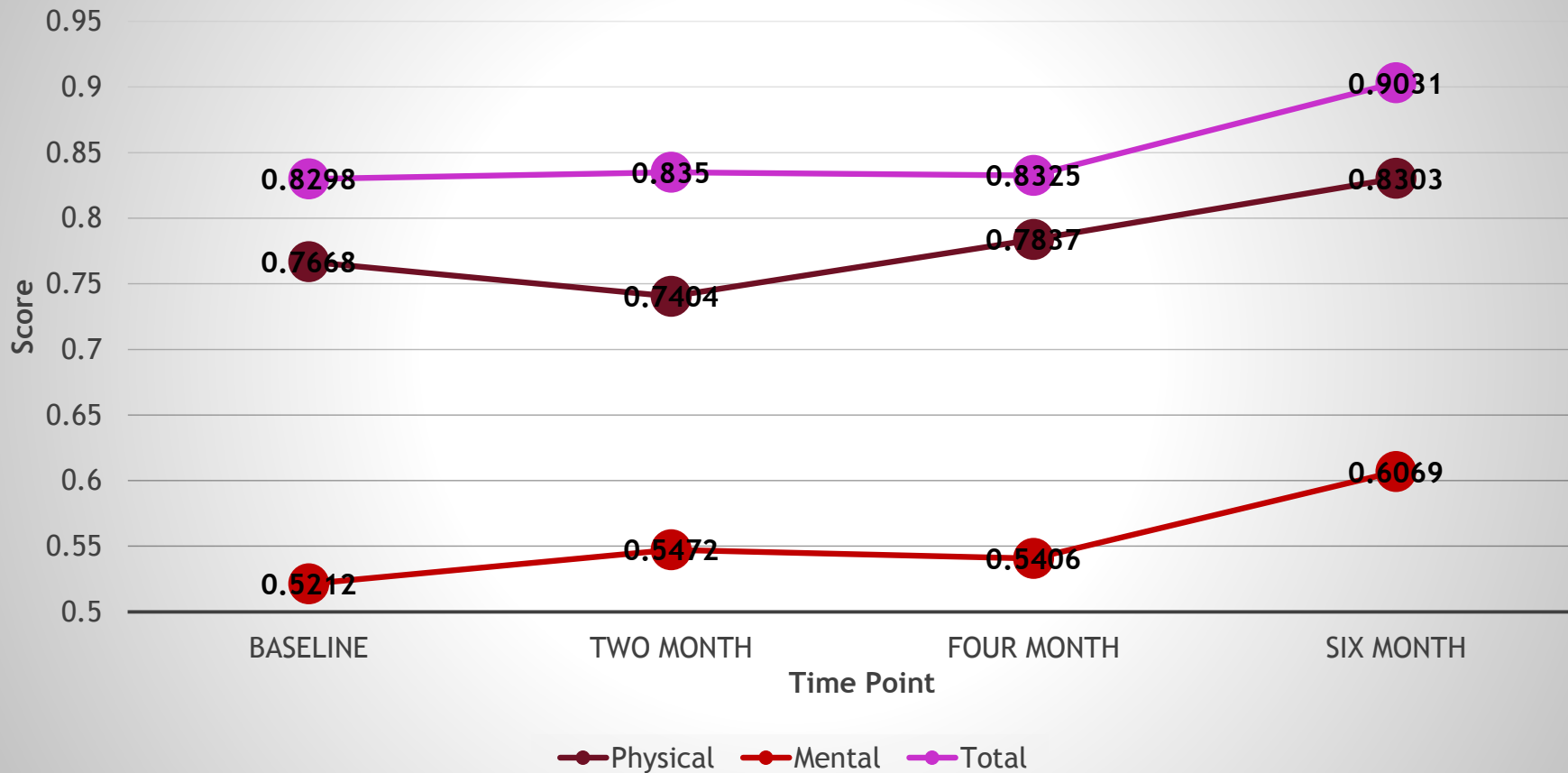


## Psychogeriatric Assessment Scales



# Quality of Life - AQoL-8D

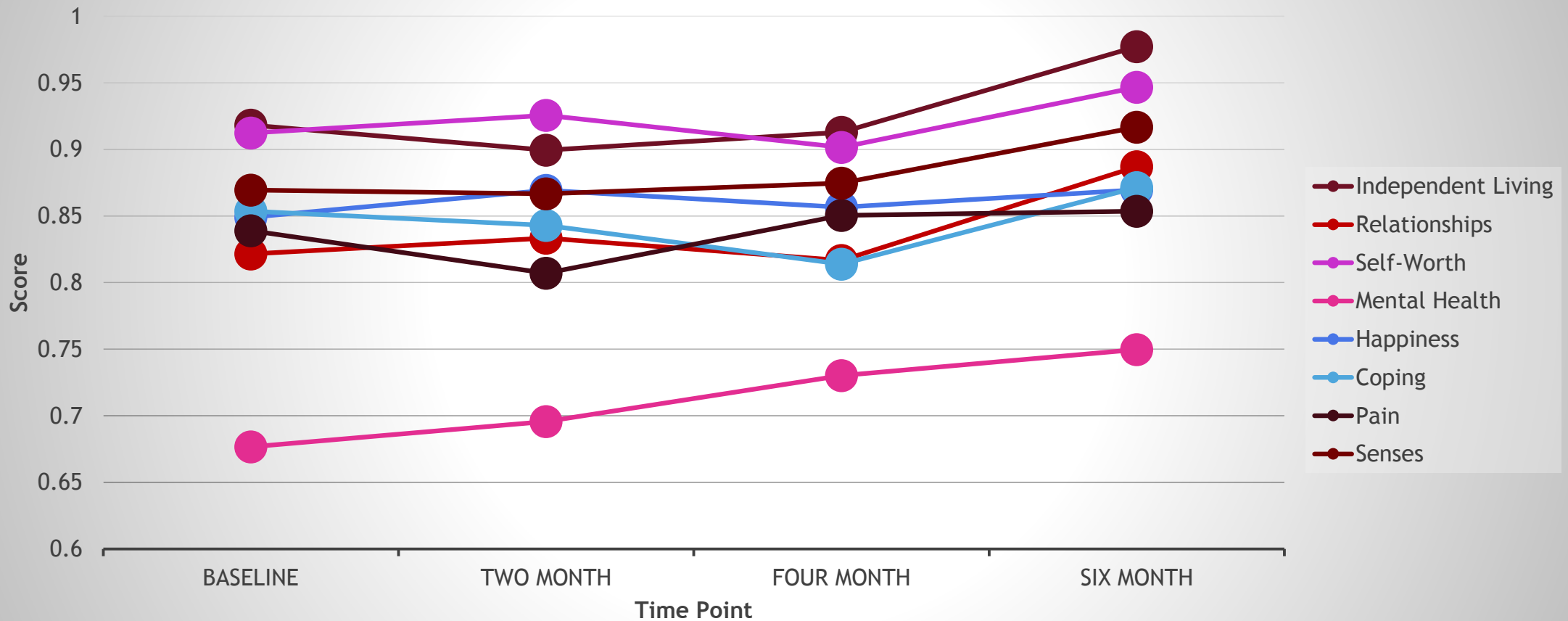
## Assessment of Quality of Life - 8 Dimension



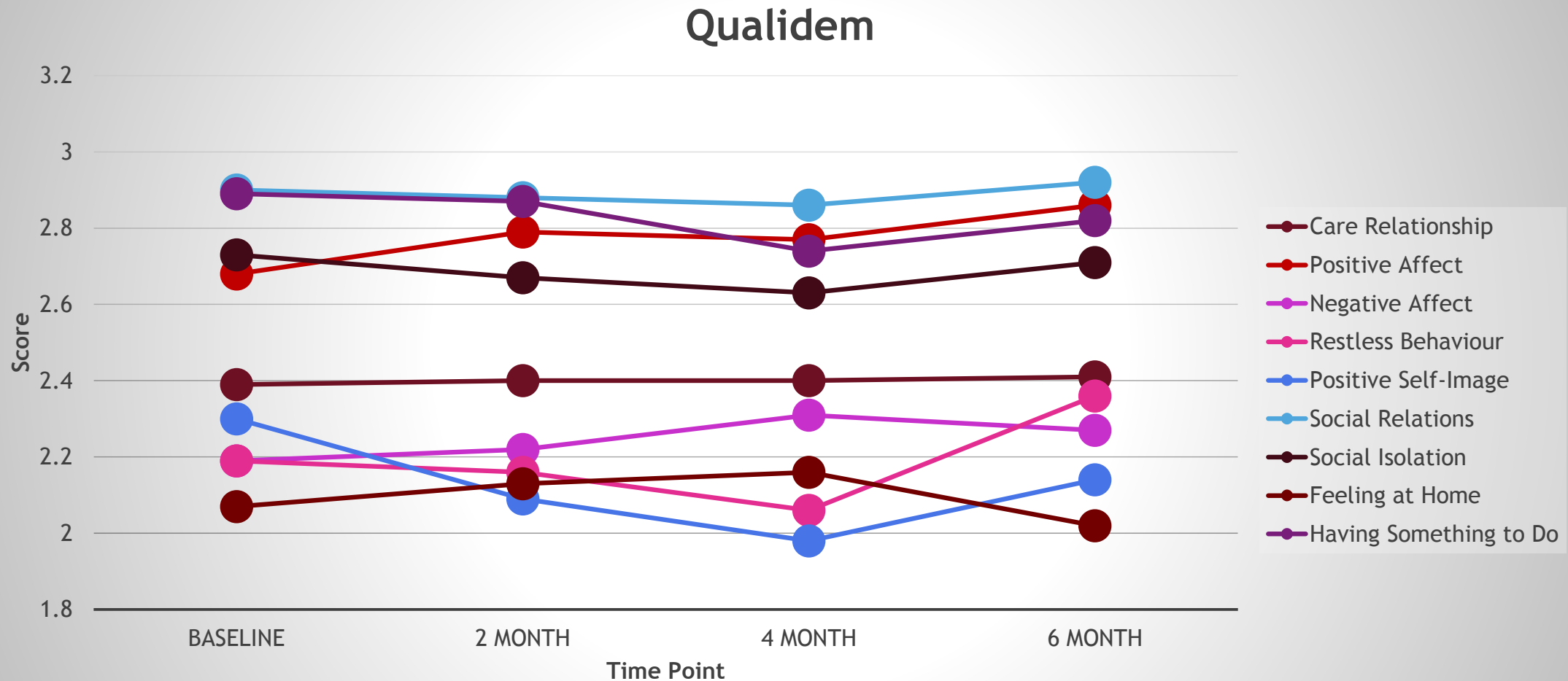
- Overall  
 $F(3,21) = 5.544, p = .006, \eta = .442$
- Physical  
 $F(3,21) = 1.625, p = .214$
- Mental  
 $F(3,21) = 4.588, p = .013, \eta = .396$

# Quality of Life - AQoL-8D

## Assessment of Quality of Life - 8 Dimension



# Quality of Life -Qualidem



# Discussion

- Greater levels of physical activity help improve circulation, blood flow, and oxygenation
- This benefits the brain as much as any other muscle in the body
- Maintaining cognitive abilities can allow individuals to remain independent in older adulthood
- Good physical and mental health can lead to an overall positive quality of life

Thank you for listening!

Questions? Comments?

