



**PHYSICAL ACTIVITY AND QUALITY OF LIFE IN
MULTIPLE SCLEROSIS: RESULTS FROM A
LONGITUDINAL STUDY OF POSSIBLE
INTERMEDIARY VARIABLES**

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EPIDEMIOLOGY OF MS

MOST COMMON NEUROLOGICAL DISEASE

PREVALENCE: 400,000 ADULTS IN U.S.

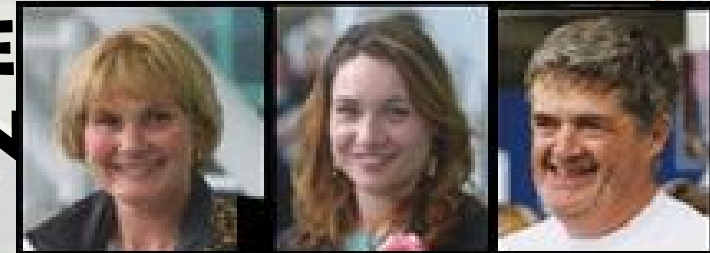
INCIDENCE: 200 NEW CASES PER WEEK

WHO IS MOST AT RISK FOR MS?

ADULT (20-50 YEARS) WOMEN WHO

LIVE IN TEMPERATE CLIMATE

WHO ARE OF EUROPEAN



(National MS Society, 2005)



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THE DISEASE ITSELF

CLINICAL COURSE

REVERSIBLE PERIODS OF
NEUROLOGICAL DISABILITY

IRREVERSIBLE NEUROLOGICAL
DISABILITY

PATHOGENESIS

FOCAL INFLAMMATORY
DEMYELINATION AND TRANSECTION
OF AXONS

LOSS OF AXONS AND NEURONS

(Hemmer, Nessler, Zhou, et al., 2006)



QUALITY OF LIFE IN MS

**OUR PERCEPTION OF HOW
WELL WE LIVE
PROFOUNDLY
COMPROMISED IN
PERSONS WITH MS
BEHAVIORAL,
PSYCHOLOGICAL, AND
SOCIAL CORRELATES OF
QOL IN MS**

**(Benito-Leon et al., 2003;
Mitchell et al., 2005)**

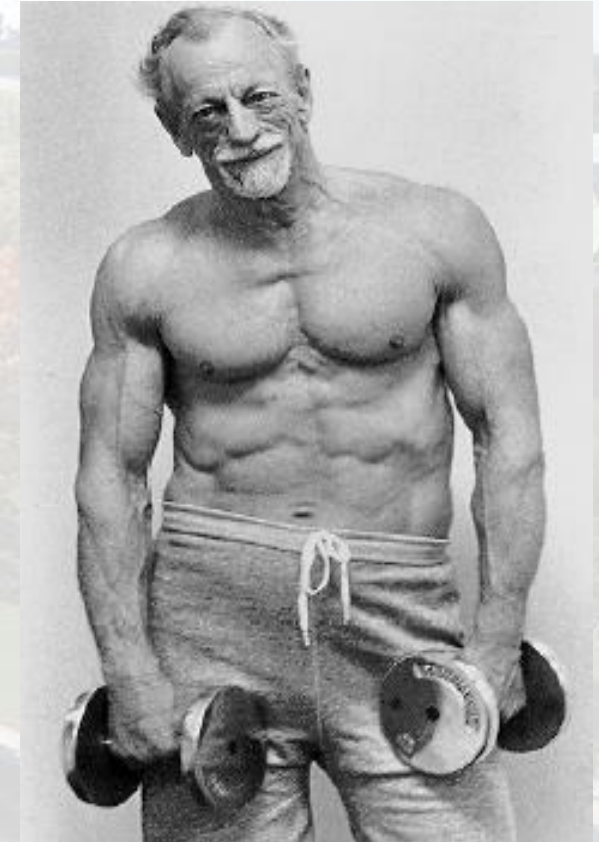


DOES PHYSICAL ACTIVITY IMPROVE QOL?

META-ANALYSIS OF THE OVERALL EFFECT OF EXERCISE TRAINING ON QOL IN MS RESULTS?

**109 EFFECTS FROM 13
STUDIES WITH 448 MS
PARTICIPANTS**

**WEIGHTED MEANES OF 0.23
(95% CI 0.15, 0.31)**



(Motl & Gosney, 2008)



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WHY? Possible Mediators

PHYSICAL ACTIVITY WAS ASSOCIATED WITH BETTER QOL

THE PATHWAY WAS INDIRECT VIA DEPRESSION, FATIGUE, PAIN, SOCIAL SUPPORT, AND EFFICACY FOR MS

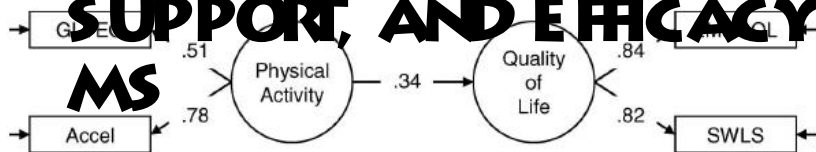


Figure 1. Model that was tested for understanding the association between physical activity and quality of life in a sample of 292 individuals with multiple sclerosis. *Note:* The factor loadings and path coefficient are standardised estimates and statistically significant. GLTEQ, Godin Leisure-Time Exercise Questionnaire; Accel, accelerometer counts; LMSQOL, Leeds Multiple Sclerosis Quality of Life Scale; SLWS, Satisfaction With Life Scale.

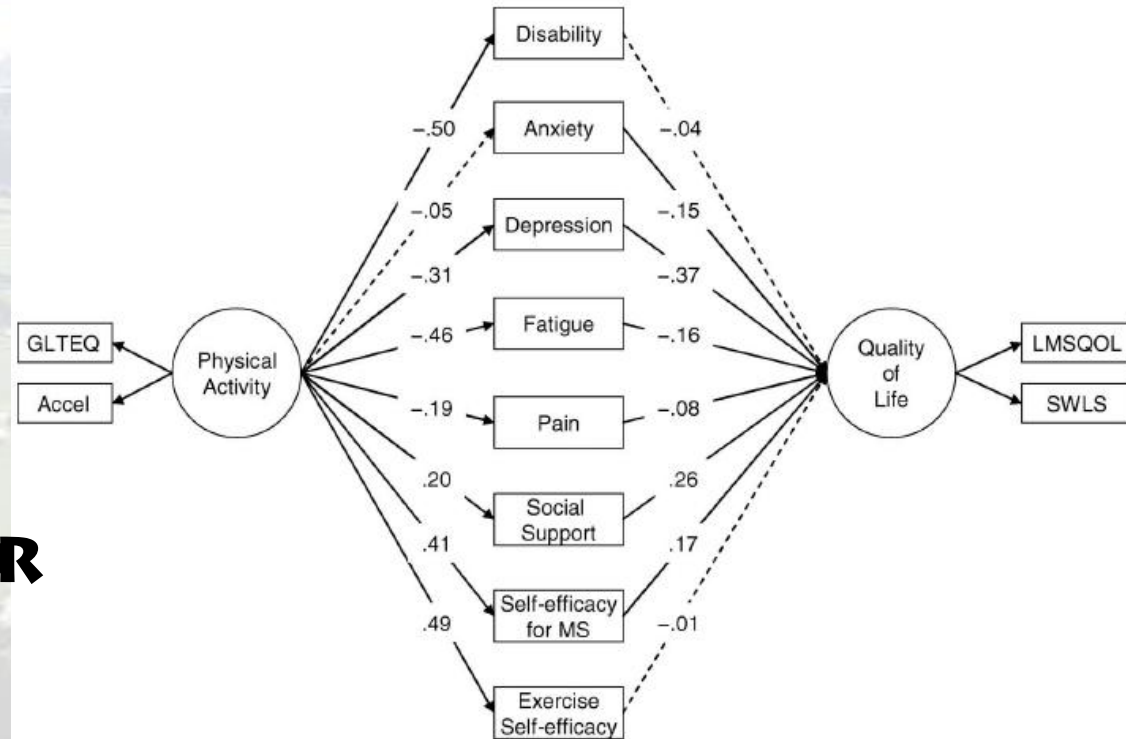


Figure 2. Model that was tested for understanding the associations among physical activity, disability, fatigue, mood, pain, self-efficacy, social support, and quality of life in a sample of 292 individuals with multiple sclerosis. *Note:* All coefficients are standardised estimates. Solid lines represent statistically significant paths, and dashed lines represent non-significant paths. GLTEQ, Godin Leisure-Time Exercise Questionnaire; Accel, accelerometer counts; Disability, Patient Determined Disease Steps Scale; Anxiety, Anxiety subscale of Hospital Anxiety and Depression Scale; Depression, Depression subscale of Hospital Anxiety and Depression Scale; Fatigue, Fatigue Severity Scale; Pain, Short-form of McGill Pain Questionnaire; Social Support, Social Provisions Scale; Self-efficacy for MS, Multiple Sclerosis Self-Efficacy Scale; Exercise Self-efficacy, Exercise Self-Efficacy Scale; LMSQOL, Leeds Multiple Sclerosis Quality of Life Scale; SLWS, Satisfaction With Life Scale.

(Motl, McAuley, Snook, et al., 2009)

PURPOSE OF PRESENT STUDY

IS CHANGE IN PHYSICAL ACTIVITY ASSOCIATED WITH CHANGE IN QOL ACROSS A 6-MONTH PERIOD OF TIME IN PERSONS WITH MS?

IS THE RELATIONSHIP ACCOUNTED FOR BY CHANGES IN INTERMEDIATE VARIABLES OF DEPRESSION, FATIGUE, PAIN, SOCIAL SUPPORT, AND SELF-EFFICACY FOR MANAGING MS?



PARTICIPANTS

**292 PERSONS PROVIDED BASELINE DATA
AND 276 PROVIDED FOLLOW-UP DATA 6-
MONTHS LATER**

SAMPLE CHARACTERISTICS

245 FEMALES, 47 MALES

M AGE 48-10 YRS

246 RRMS, 12 PPMS, 34 SPMS

M TIME SINCE DIAGNOSIS 10-8 YRS

***Mdn* PDDS SCORE 3.0**



MEASURES

PHYSICAL ACTIVITY

ACTIGRAPH ACCELEROMETER AND GL

QUALITY OF LIFE

SWLS AND LMS QOL

INTERMEDIATE VARIABLES

FSS, HADS, SF-MPQ, MSSE, AND SPS



PROCEDURES

**UIUC IRB APPROVAL AND SIGNED ICD
MATERIALS SENT THROUGH U.S. POSTAL SERVICE
WORE ACCELEROMETER FOR 7 DAYS AND
COMPLETED GLTEQ AND MEASURES OF
INTERMEDIATES AND QOL ON 8TH DAY
BASELINE AND 6-MONTHS LATER AT FOLLOW-UP
\$40 PRORATED REMUNERATION**



DATA ANALYSIS

**PANEL ANALYSIS AND COVARIANCE
MODELING IN *Mplus* 3.0**

**FIML ESTIMATOR FOR MISSING DATA
WITHIN/ACROSS TIME POINTS**

**χ^2 , SRMR, AND CFI AS SUGGESTED BY
BOWEN (1989) AND HU AND BENTLER
(1999)**



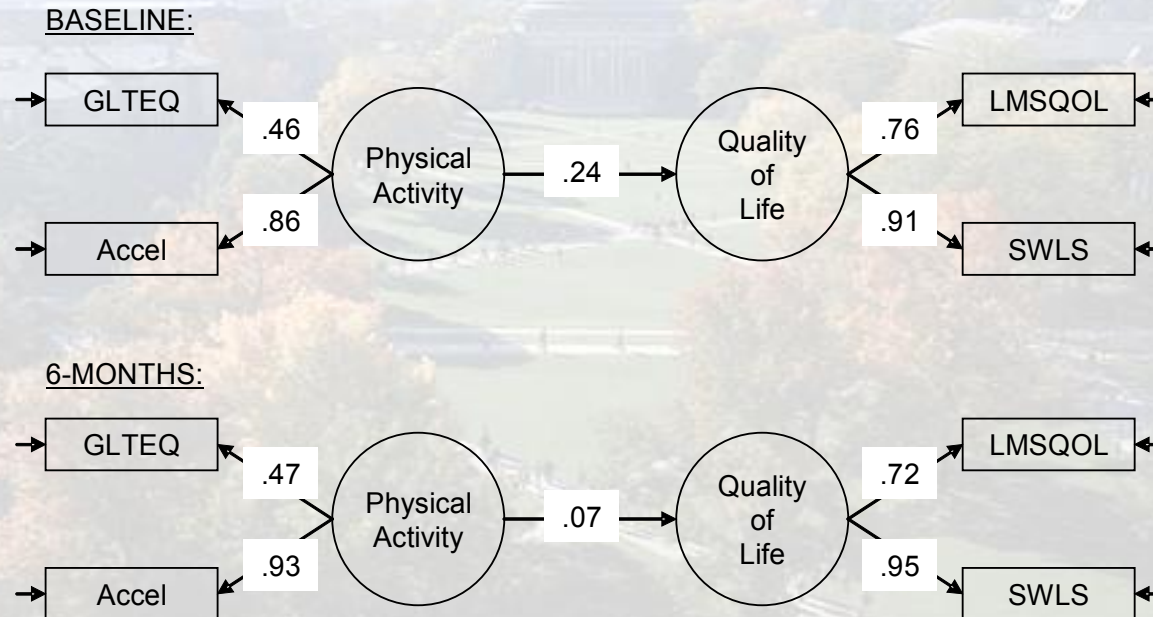
RESULTS: DESCRIPTIVE STATISTICS

Descriptive Statistics and Changes across Time for the Measures in the Covariance Modeling

Measure	Baseline	6-month follow-up	<i>t</i>	<i>P</i>
GLTEQ	26.5 (22.4)	25.7 (23.7)	0.72	0.47
Accelerometer	220,006 (121,252)	206,834 (104,781)	3.56	0.0001
LM SQOL	19.3 (4.8)	19.1 (4.9)	1.51	0.13
SWLS	21.8 (8.0)	22.0 (8.2)	-1.03	0.31
HADS_D	6.0 (4.2)	6.3 (4.3)	-0.86	0.39
FSS	5.0 (1.4)	4.9 (1.5)	1.71	0.09
MPQ	10.7 (7.8)	10.7 (7.8)	0.72	0.85
SPS	76.9 (10.7)	76.4 (10.9)	1.00	0.32
MSSE	146.9 (26.9)	147.6 (27.9)	-0.99	0.32



RESULTS: DIRECT ASSOCIATION?

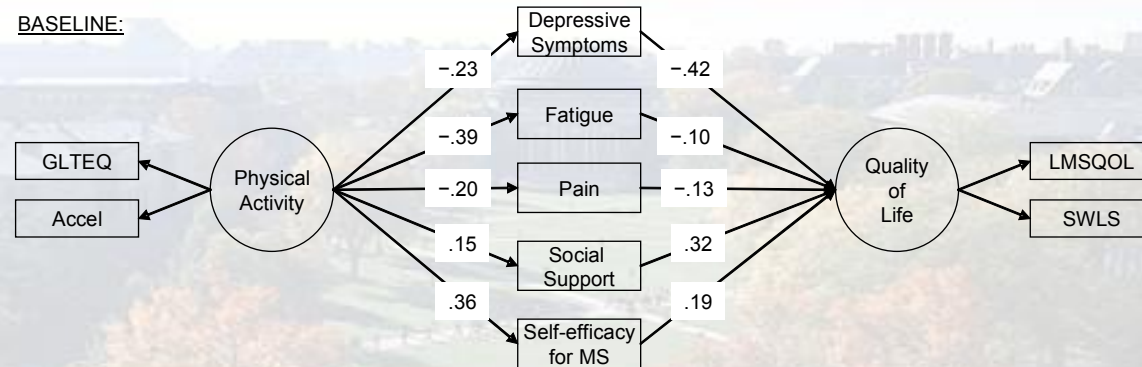


($\chi^2 = 19.78$, $df = 14$, $p = .14$, SRMR = .01, CFI = 0.99)

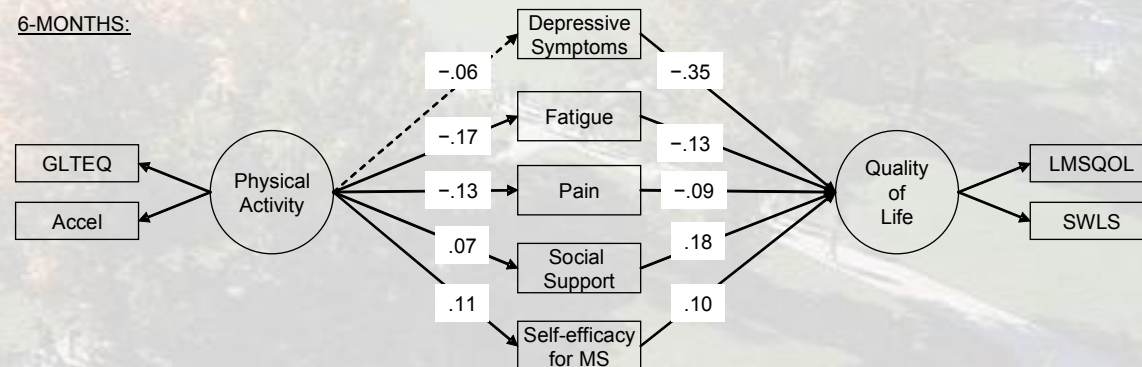


RESULTS: INDIRECT ASSOCIATION?

BASELINE:



6-MONTHS:



$(\chi^2 = 301.92, df = 95, p < .001, SRMR = .04, CFI = .95)$



DISCUSSION

CHANGE IN PHYSICAL ACTIVITY WAS ASSOCIATED WITH A CHANGE IN QOL ACROSS A 6-MONTH PERIOD OF TIME IN PERSONS WITH MS

THE PATHWAY WAS INDIRECT THROUGH CHANGES IN FATIGUE, PAIN, SOCIAL SUPPORT, AND SELF-EFFICACY FORMS, BUT NOT DEPRESSION



IMPLICATIONS

PHYSICAL ACTIVITY MIGHT REPRESENT A MODIFIABLE BEHAVIORAL FOR IMPROVING QOL IN MS

PHYSICAL ACTIVITY PROGRAMS SHOULD BE DESIGNED BASED ON TARGETING INTERMEDIATE VARIABLES AWAITS A RCT



LIMITATIONS AND FUTURE DIRECTION

**PRE DOMINANT CAUCASIAN AND FEMALE
COMPOSITION OF THE SAMPLE LIMITS
GENERALIZABILITY**

**RELATIVELY SHORT FOLLOW-UP OF 6-
MONTHS**

**ALTERNATIVE MODELS, OTHER POSSIBLE
MEDIATORS, AND MODERATORS**



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THANK YOU



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