Mediterranean Lifestyle Program

The Natural History of Maintenance

Deborah J. Toobert, Oregon Research Institute
Lisa A. Strycker, Oregon Research Institute
Russell E. Glasgow, Kaiser Permanente Colorado

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Sample (N = 279)

- Postmenopausal
- Women with type 2 diabetes

Purpose of Study

To examine the longer-term (3- to 7-year) maintenance of multiple health behavioral changes of the Mediterranean Lifestyle Program (MLP)

Study Outcomes

- Behavioral Outcomes (Primary)
  - Diet, Physical Activity, Stress Management, (Smoking)
- Biologic Outcomes (Secondary)
  - BMI, Hemoglobin A1c, Lipids, Vascular Reactivity
- Psychosocial Outcomes (Secondary)
  - Problem-solving, Social Support, Self-efficacy, Depression

Primary Initial Intervention Components

- 2½-day retreat
- Weekly 4-hour meetings with 1 hour each of:
  - Physical activity
  - Stress management
  - Mediterranean-diet potluck
  - Support groups

Operationalization of Maintenance

(6 months through 24 months)

After the initial 6 months:

- Meetings were faded (for final 18 months)
- MLP participants were further randomized to one of two types of maintenance (for final 18 months):
  - Continued weekly meetings led by lay leaders *OR*
  - Four meetings with a project staff member to complete an interactive computer program focused on using supportive social resources

Definition of HMC Maintenance Project (36 through 84 months)

- Documentation of the natural history of longer-term (3- to 7-year) maintenance

- Study participants assessed annually without further treatment

Findings

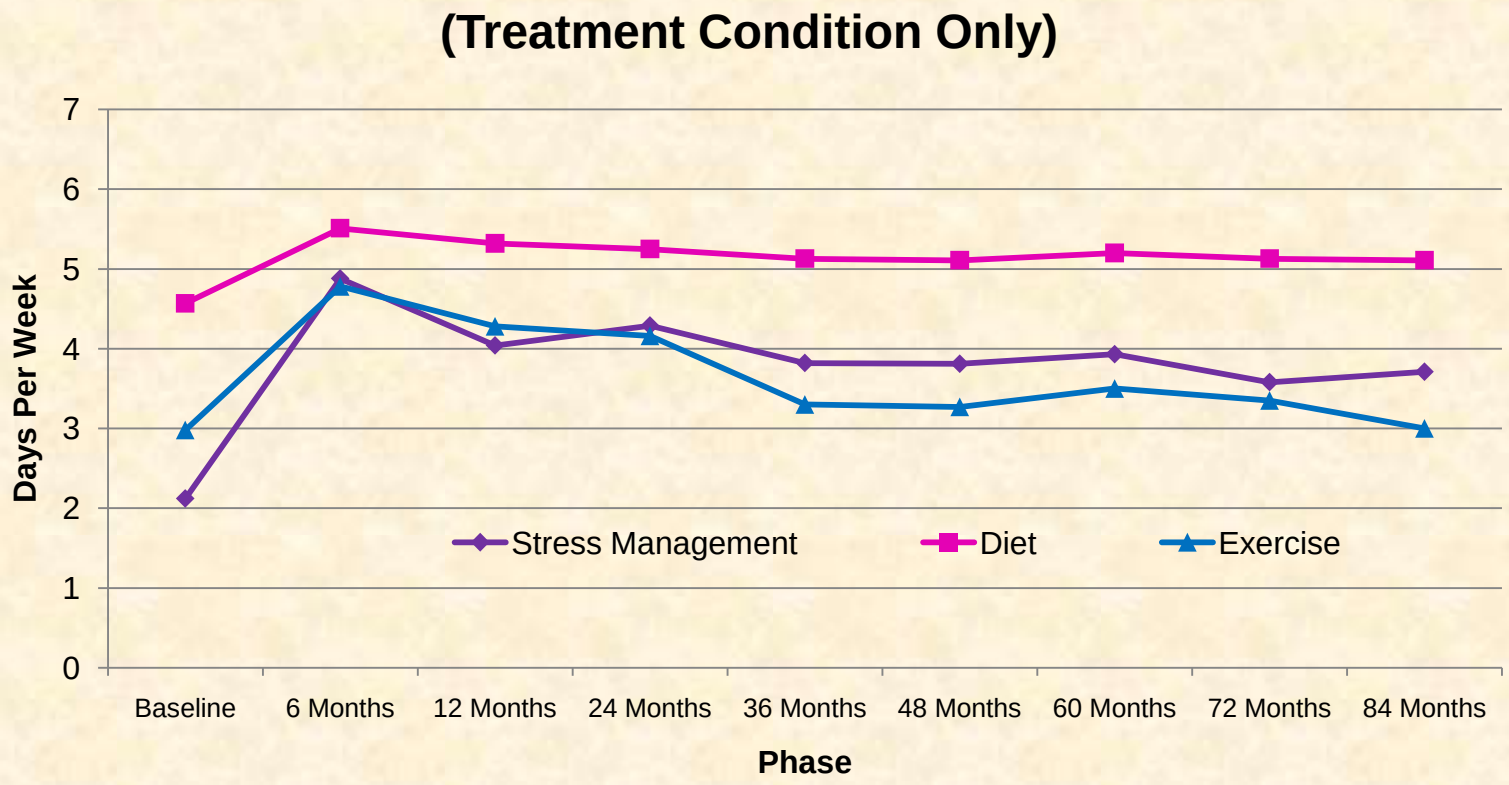
Sample Size

Depends on the time point and variable

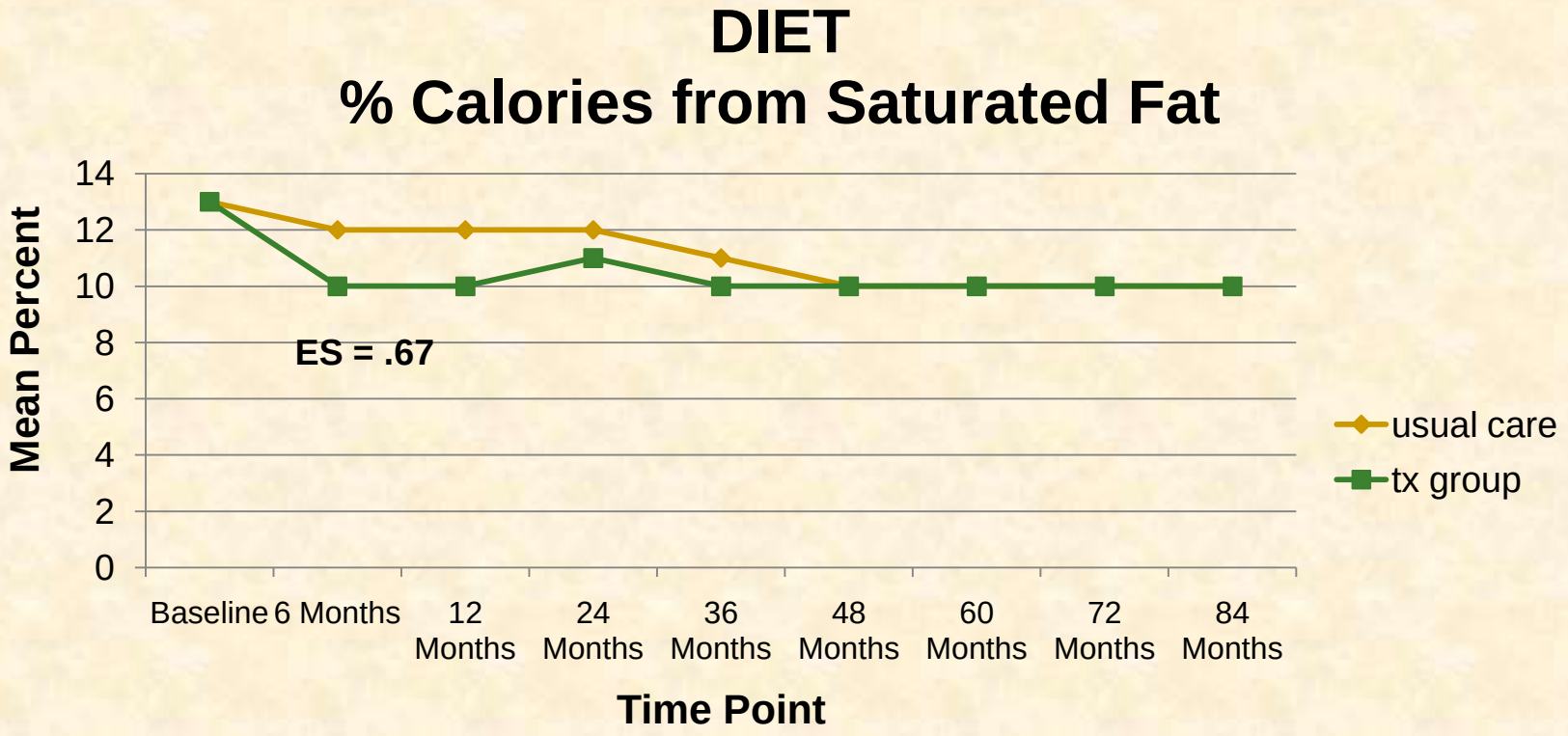
N=279 at baseline

At 84 months, N =185 - 210

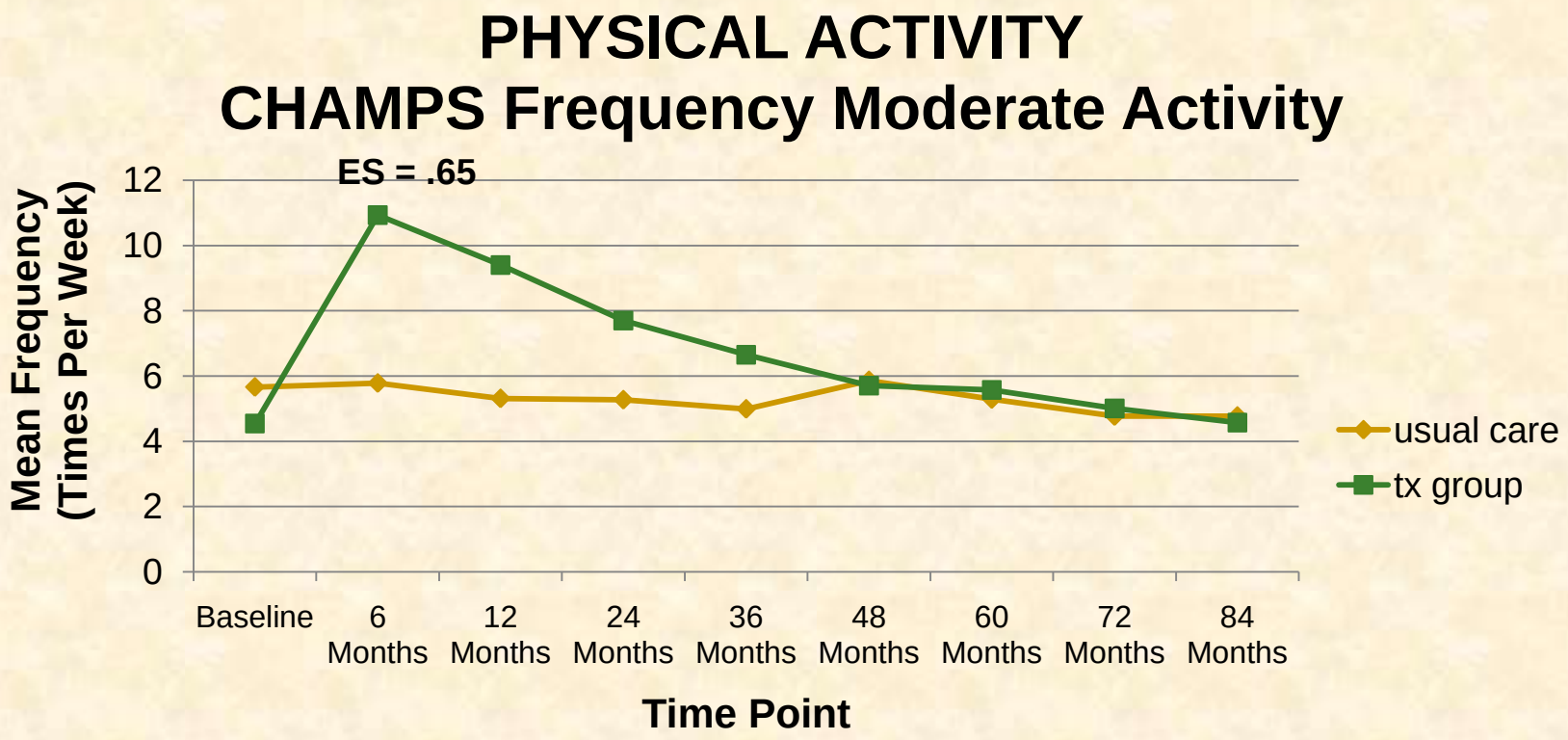
Means from 7-Day Self-monitoring Form



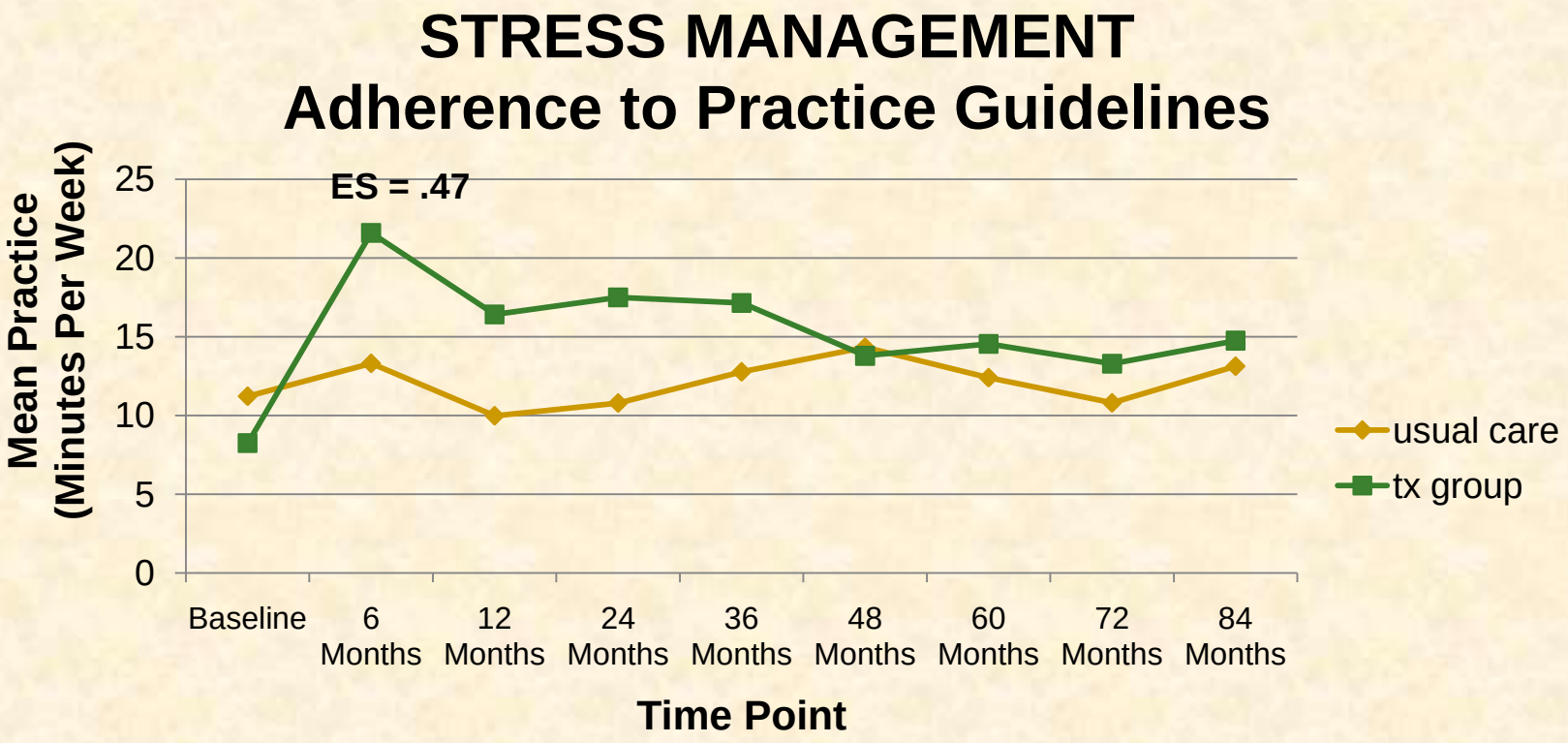
Shape of Change: Diet



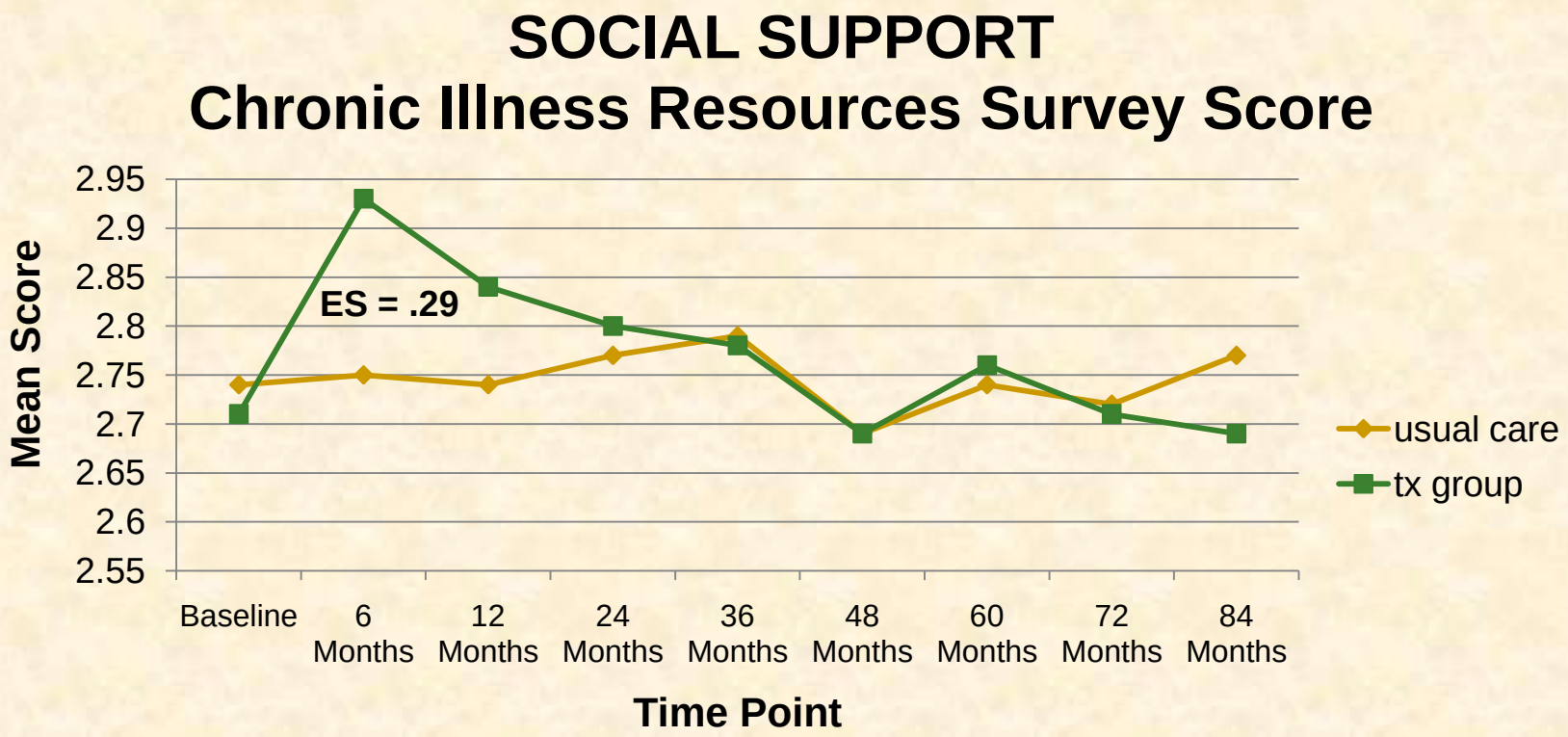
Shape of Change: Physical Activity



Shape of Change: Stress Management



Shape of Change: Social Support



Weight (kg)

(Means Based on Repeated Measures Analysis, NS)

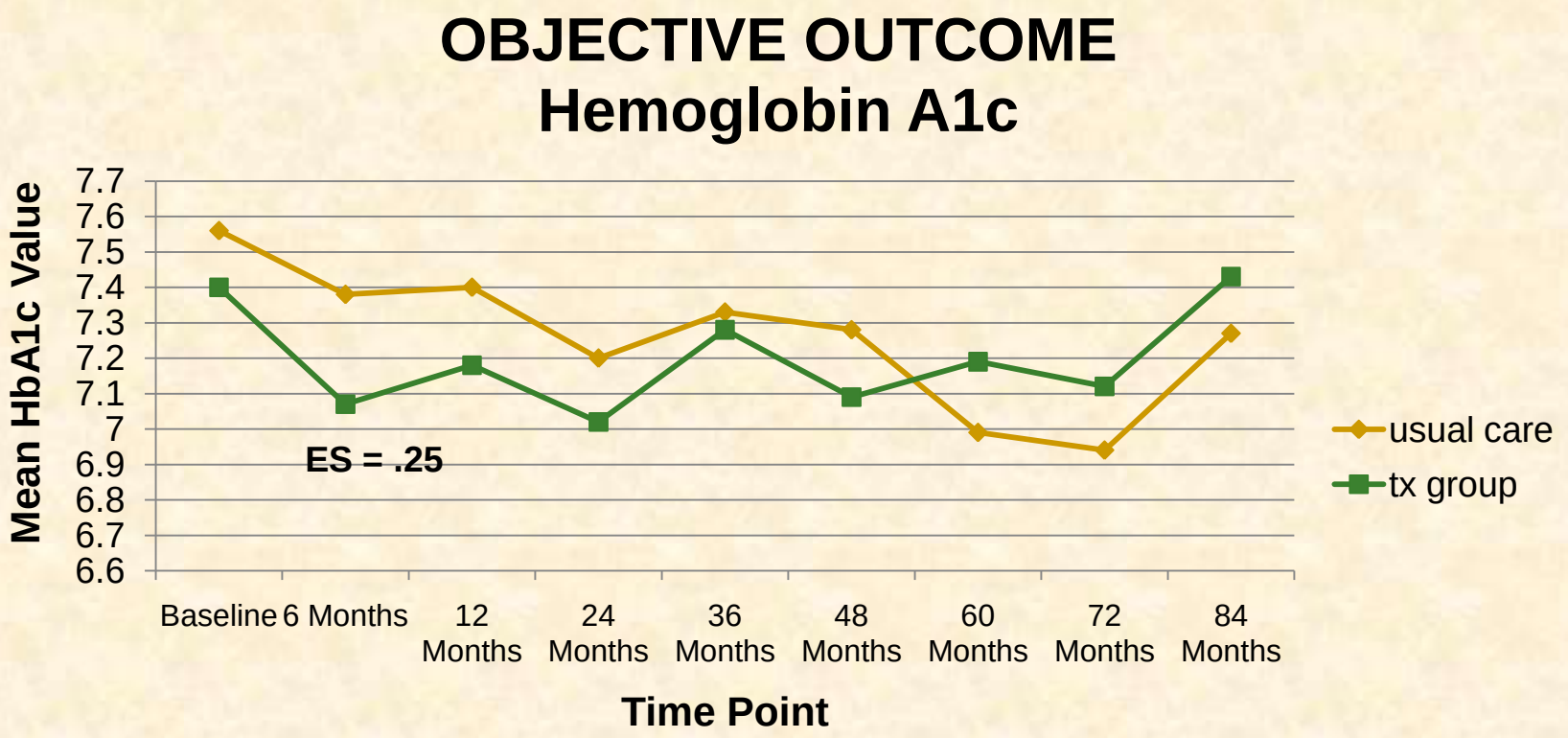
Condition	Base-line	6 Mo	12 Mo	24 Mo	36 Mo	48 Mo	60 Mo
Control	91.6	92.6	92.6	92.5	93.7	92.9	92.2
Treatment	92.5	91.9	91.6	91.7	93.0	92.5	92.5

Hemoglobin A1c

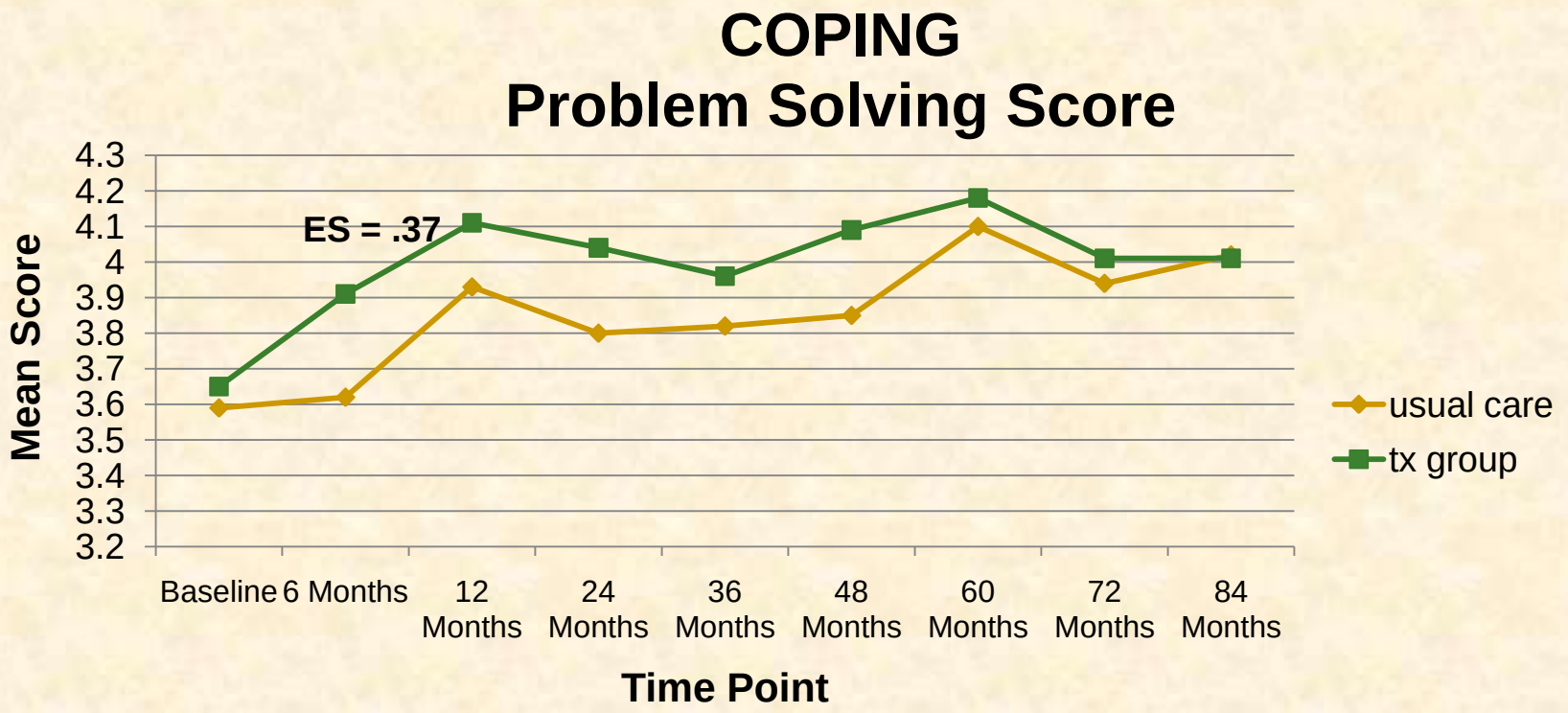
(Means Based on Repeated Measures Analysis, p <. 005)

Condition	Base-line	6 Mo	12 Mo	24 Mo	36 Mo	48 Mo	60 Mo
Control	7.44	7.39	7.34	7.03	7.33	7.22	6.89
Treatment	7.23	6.89	7.07	6.91	7.29	7.11	7.09

Shape of Change: Hemoglobin A1c



Shape of Change: Coping



Key Learnings

What did the Mediterranean Lifestyle Program study add to the science of behavior change – especially maintenance?

Results

Trends followed a similar pattern across outcome measures

Significant improvements through the 24-month treatment

Improvements greatest in most intense phase of intervention (first 6 months; mean Effect Size = .39)

Treatment effects declined as intervention faded (6 - 24 months)

Some behavior change sustained through 2-year treatment

At 1 to 2 years post-treatment with no additional maintenance intervention, treatment and control conditions converged

Our Suggestions for

Future Research

Why Did the Two Treatment Conditions Converge After 2 Years?

Should sustained gains be expected without intervention?

After an intensive intervention, would a minimal booster assist maintenance (and for what sorts of participants)?

Long-term mechanisms of multiple-behavior change especially difficult to untangle

Why Did the Two Treatment Conditions Converge After 2 Years?

Statistical approaches attempted to untangle multiple-behavior-change mechanisms:

- Mediation
- Latent Growth Modeling
- Cluster Analysis + Dendrograms (Tree Diagrams)
- Conditional Probabilities
- Various Ways of Defining/Combining Outcomes

No emerging relapse patterns, nor predictors of relapse

Percentage of Participants Meeting Behavioral Guidelines

- N meeting guidelines for each healthful lifestyle factor independently
- N healthful lifestyle factors for which guidelines were met
- Combination of healthful lifestyle factors met
- Prevalence of each healthful lifestyle factor singly
- For participant, sum factors for which guideline met, compute % study population meeting guidelines for five, four, or more healthy lifestyle factors (or success population meeting multiple guidelines)
- For each behavior cluster, report % population within each cluster; this view indicates which clusters of healthy lifestyle factors are most prevalent

Definition of Levels of the 5-point Multiple-Outcome Scale

The four outcomes and reaching criterion at T2) were:

Body Mass Index = less than vs. greater than or equal to 35

Moderate PA = less than vs. greater than or equal to 5 days per week

Fruits and vegetables = less than vs. greater than or equal to 5 servings per day

Fat = less than vs. greater than or equal to 30% of daily intake

% at each Level of the 5-point Multiple-Outcome Scale

	Group Frequency		
	Control	Tx Group	*p*
Guidelines Met at 6 months	*N*=116	*N*=156	
0	15 (13%)	7 (4%)	.000
1	36 (31%)	13 (8%)	
2	24 (21%)	46 (29%)	
3	31 (27%)	58 (37%)	
4	10 (9%)	32 (20%)	

Cluster Analysis

Are there inter-related behaviors or mutually exclusive clusters?

If there are, do the clusters or subgroups relapse differently over time and across our behavioral outcomes?

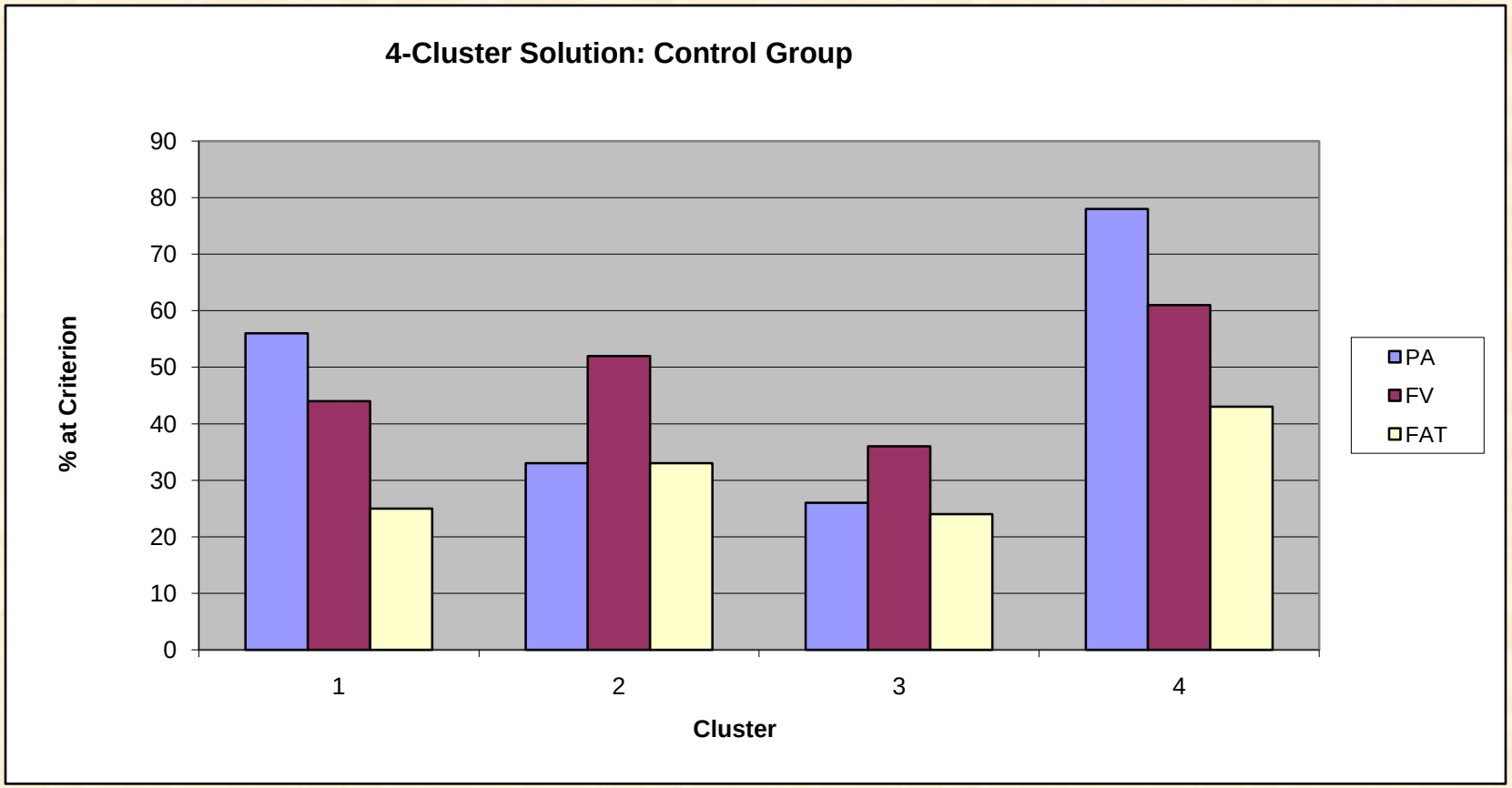
Example: Maybe in one subgroup, diet relapses early but others later; another group sees only minimal relapse; another group has equal relapse across all outcomes

One clusters identified, do the clusters have demographic characteristics or psychosocial characteristics?

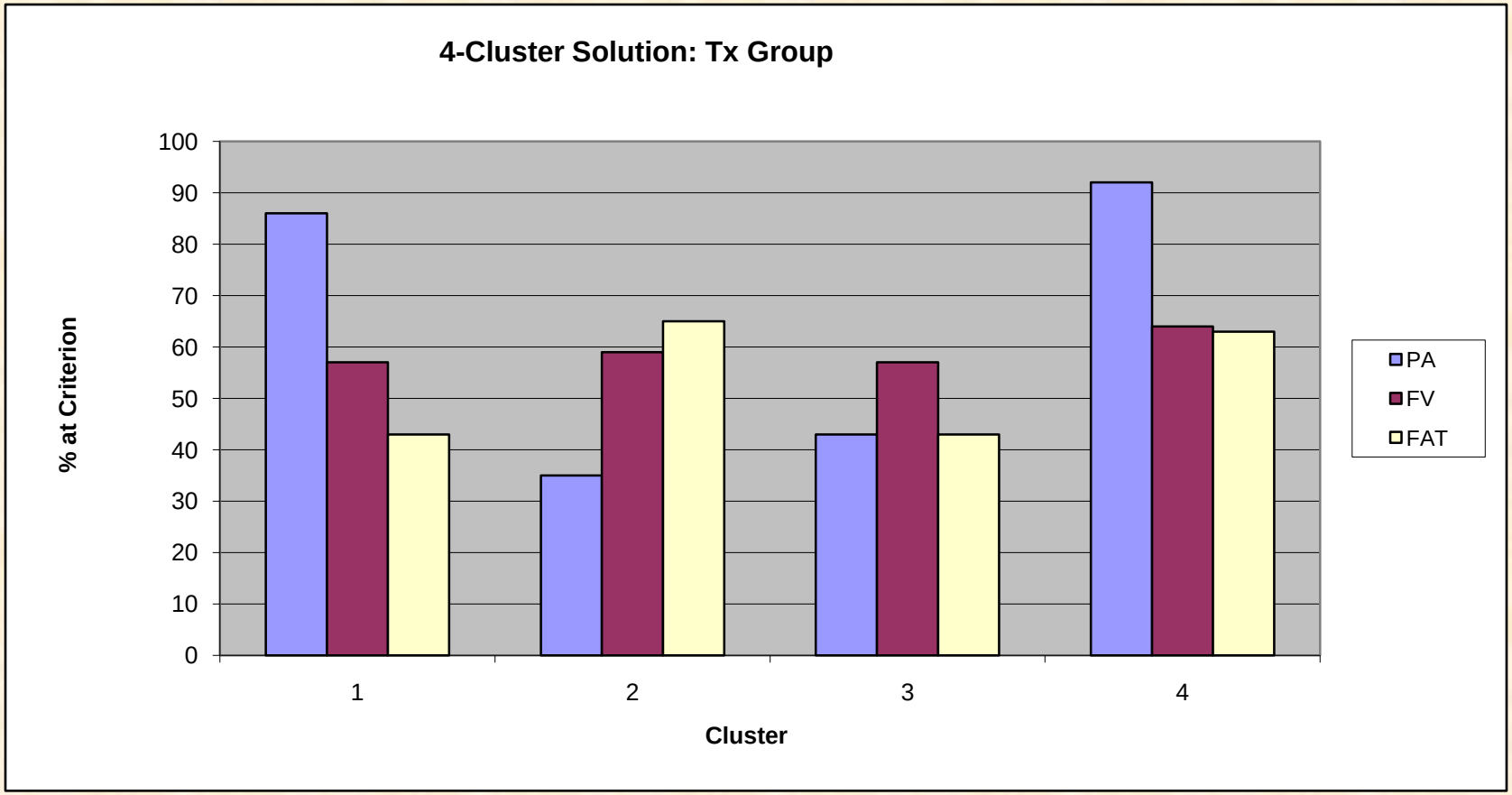
Do clusters predict other outcomes?

So far, no clearly interpretable clusters have emerged

Reaching Criteria (or Not) at 6 Months (Control Group)



Reaching Criteria (or Not) at 6 Months (Treatment Group)



Conditional Probability

If behavior X relapses, what are the impacts on behavior Y and behavior Z?

Set a cutoff of .20 SD or more for maintenance or improvement versus relapse (dichotomous to keep it simple)

Use two assessment points only (to start)

Compare conditional probability: Given relapse on physical activity, what is the probably of relapse vs. maintenance/improvement in diet (or stress management)?

We haven't fully investigated this but would be interested in discussing the approach with others

Final Thoughts

Some populations may always need intervention

Initial intervention delivered in context of
a very supportive environment

When intervention fades, participants returned to obesogenic environment

FINAL Final Thoughts

Different processes may underlie initial change versus maintenance

When intervening on lifestyle practices, partner with others to tackle comprehensive, multilevel policy change

Stress Management Program Components

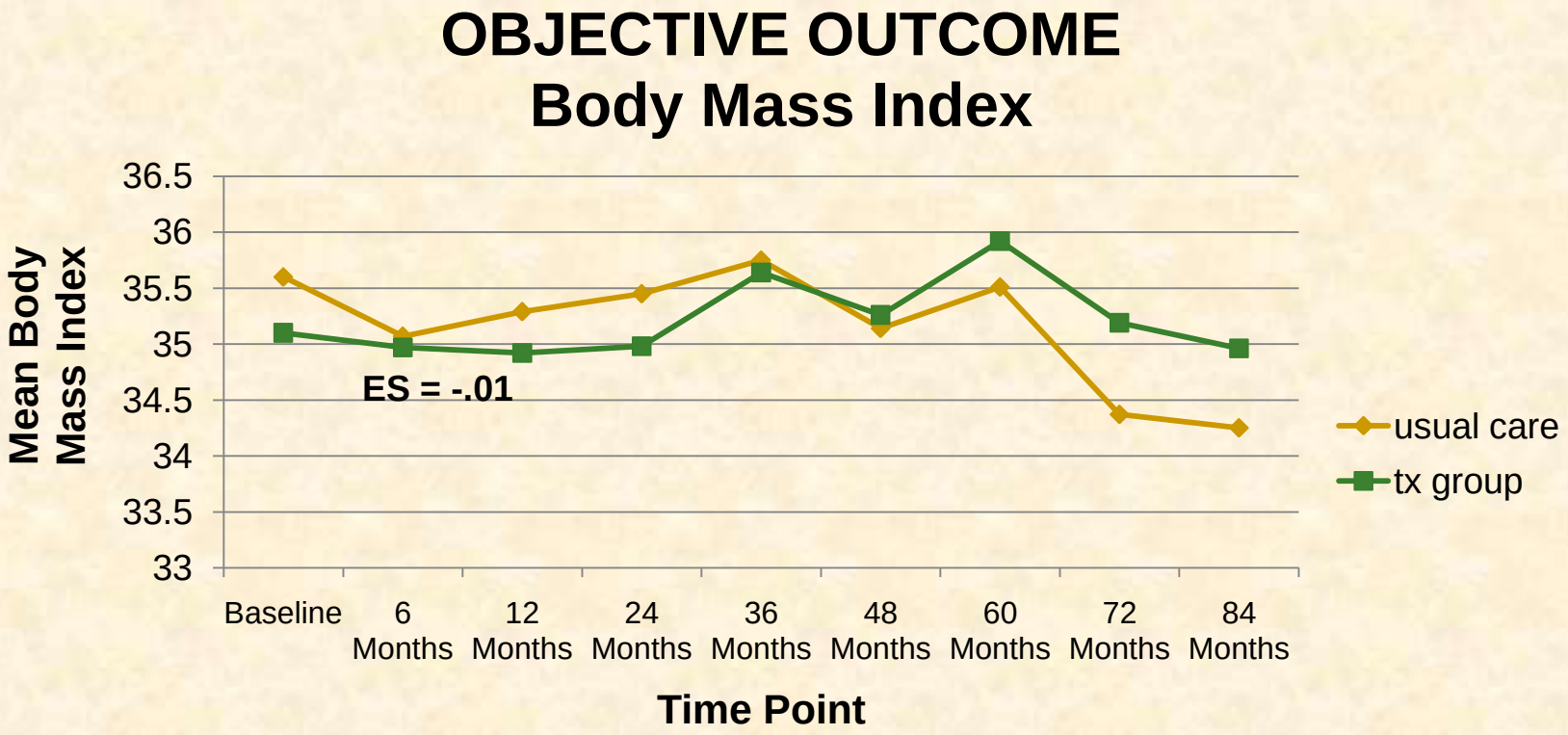
Practice these techniques each day:

- 20 minutes of yoga/stretching
- 15 minutes of progressive deep relaxation
- 15 minutes of meditation
- 5 minutes of directed or receptive imagery

Physical Activity Program Components

- Aerobic Activity = 30 minutes most days
- Strength Training = twice per week
- Flexibility Training = before and after aerobics

Shape of Change: Body Mass Index



Measures

- Physical activity**:** CHAMPS (frequency of moderate activity)
- Fat intake: FFQ and NCI Fat Screener (% calories from fat)
- Fruit and vegetable intake: FFQ and NCI Fruit/Vegetable
- Stress management: self-monitored number days practiced
- Hemoglobin A1c
- Vascular reactivity
- Body weight
- Lipid panel
- Quality of life: MOS, Healthy Days
- Psychosocial variables: self-efficacy, problem solving; social support, depression