

# From Jane Fonda to Jillian Michaels: Off the Couch and Into the Gym— Physical Activity and Women

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## Primary Purposes of Presentation

- Summarize key recommendations for increasing PA in women across the age spectrum
- Illustrate the use of strategies to increase PA in women across the age spectrum with DAMET, GET FIT and Masters Athletes studies as examples
- Present recommendations for future research





## The Problem (Cont'd.)

- When men and women are **normal weight or underweight** (BMI < 25 kg·m<sup>2</sup>), they are **similarly active**
- OW and OB **women are less active** than OW and OB men
- Older individuals (60+ y) are less active than younger individuals (20-59y)—**except when obese** (BMI > 30 kg·m<sup>2</sup>), then they are similarly inactive

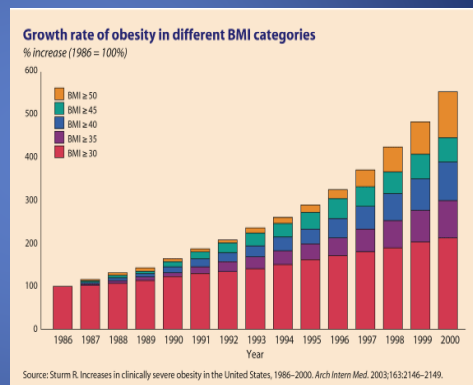


Gao, Sun, & Ransdell, 2010

## A Scary Thought...

- By **2048**, if our obesity rates continue to increase at the current speed, **100%** of the U.S. adult population will be overweight or obese

Wang et al., 2008, *Obesity*, 16(10): 2323-2330



## Increasing Physical Activity is a KEY Public Health Strategy to Improve the Nation's Health and Combat the Obesity Epidemic



## Experiences of Women with PA Across the Age Spectrum

Sedentary Lifestyle ← → Regularly Active Lifestyle

- Depression
- Anxiety
- Stressed Out
- Overweight/Obese
- Hypokinetic Disease

Adolescent Girls

Adult Women

Older Women/  
Masters Athletes

- Higher Self-Esteem
- Lower Unplanned Pregnancy Rate
- Normal Weight
- Lower Hypokinetic Disease Risk

- Compression of Morbidity

- Loss of Independence
- Loss of Function
- Dementia

## Life Course Epidemiology

(Richards et al. (2009). *J Adol Hlth*, 44: 260-267.

- Family influences on PA are environmental, cultural and genetic factors
- Dunedin, New Zealand Longitudinal Study
  - Measured participants at childhood & adolescence
- **Persistent Inactivity:**
  - Lower childhood family-recreation orientation, poorer fitness & general health during adolescence
- **Declining Participation:**
  - Fewer activities at home during childhood
- **Persistent Activity:**
  - Better fitness & less TV watching

### Because of Different Experiences with PA, Various Recommendations are made...

- Use THEORIES and MODELS to guide your interventions

An Application of **SOCIAL COGNITIVE THEORY (SCT)** to a Mother-Daughter PA Intervention:  
The DAMET Project (CSU Phase I)



## Purpose of DAMET

- To provide a fun, effective, SCT-based 12 week PA intervention for mothers (< 60 y) and daughters (11-17 y) that facilitates changes in:
  - Physical Activity
  - Physical Fitness
  - Physical Self-Perception (Self-Efficacy toward physical activity and fitness)

## The Planning Process: Reciprocal Determinism (dynamic interplay of personal, behavioral, environmental constructs)



### Selected Components of SCT and Effect Sizes from Dishman & Buckworth (1996) Used to Plan DAMET

- |   |  |
|---|--|
| <p>Environment<br/>(Facilitation/Empowerment)</p> | <ul style="list-style-type: none"> <li>• Female (r = .91)</li> <li>• Group (r = .75)</li> <li>• Ages Combined (r = .91)</li> <li>• Community (r = .82)</li> <li>• Family (r = .05)</li> <li>• Healthy Participants (r = .75)</li> <li>• Make it FUN!!</li> </ul> |
|   | <ul style="list-style-type: none"> <li>• Newsletters, Websites &amp; email to keep informed</li> <li>• Rewards for process goals</li> </ul>  |

### SCT, ES and DAMET (CONT'D.)

Observational Learning  
(model behaviors)

- Peer coaching
- Mom-Daughter Coaching
- Researcher-to-subject Coaching
- Sport Clinics by Athletes

Self-Regulation

- Behav.Contracts (r = .92)
- "Move Across CO"
- PA Logs
- Individual Meetings
- Relapse Prev. (r = .92)
- Monitor Attend. (r = .88)

### SCT, ES and DAMET (CONT'D.)

Self-Efficacy

- Mod. to Vig. PA (r = .94)
- Lifetime skills (hiking, aerobics, self-defense)
- Strength training (r = .46)
- Set goals each week
- Basic and progressive instruction
- Role playing – dealing with barriers. (r = .92)
- Positive self-talk (r = .10)
- Mental imagery (r = .10)



## Pilot DAMET: Round 1 (CSU)

Ransdell et al. (2003). Women & Health

N = 20

**12-Wk Intervention: Met twice/week  
(May - August)**

**Pre-Test &  
Focus Grp.**

**Post-Test**

**Physiological Variables:**

- VO<sub>2peak</sub>
- BMI

**Physical Activity (d/wk)**

**Qualitative Interview Data**

**Psychological Variables:**

- PSPP Sub-Scales (5)
- Sports Competence
- Strength/Muscularity
- Physical Condition
- Attractive Body
- Physical Competence

### Physical Activities

- 1-day / week
- Ropes Course
- Urban Orienteering
- White Water Rafting
- Indoor Rock Climbing
- Aqua Aerobics
- Step/Box Aerobics
- Golf
- Hiking
- Frisbee Golf
- Sport Clinics by Athletes

### Classroom Activities

- 1 day / week
- Intro Games
- How much PA?
- Calculating EE
- Components of HRF
- Goal Setting
- Move Across CO
- Using Logs
- Busting Barriers
- Computer Diet Analysis
- Fitness Trivia

## Results

### No Change in PA Participation (d/wk) Over Time (Pre- to Post)

<u>Moms</u>	<u>Pre-Test</u>	<u>Post-Test</u>
	3.2 ± .73	3.4 ± .53
<u>Daughters</u>	<u>Pre-Test</u>	<u>Post-Test</u>
	2.6 ± .73	3.6 ± .50

ES (Eta-Squared) = .12 (small ES)

## Results (Cont'd.)

- **3 of 5 PSPP Sub-Scales Improved Over Time:**  
 Sport Competence, Strength and Muscularity,  
 and Physical Condition  
**ES = 0.48 - 0.57**
- No Change in Attractive Body & Physical  
 Competence Sub-Scales
- No Changes in Physiological Measures (BMI,  
 VO<sub>2peak</sub>)
- Qualitative Data: Most **positive** aspect of  
 program was mother/daughter bonding

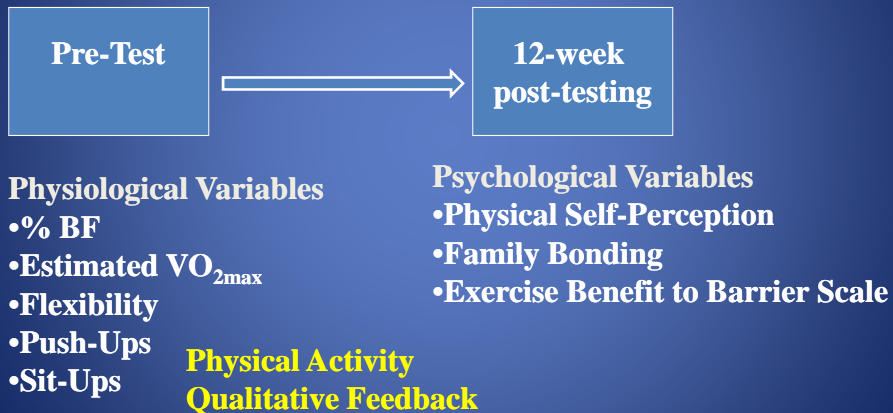
## DAMET—Phase II: Utah Version

- Compare home-based (HB) to university-based (UB) programs (n = 34)
- More days of activity to facilitate improvements in fitness
  - > from 1 to 3 d/wk)
- Lower activity at baseline
- More tests of fitness
- Quantitative measure of Family Bonding



## DAMET: Part 2 (Utah)

12-Week Program (January - April)  
 Compare University-Based and Home-Based Groups



University-Based Group

- 4 classroom sessions
- 2 days / week for fitness (30 mins. wts + 30 mins. aerobic)
- 1 day / week for fun lifetime activity: indoor rock climbing, racquetball, soccer, volleyball, basketball, box aerobics, x-c skiing, snowshoeing, self-defense, orienteering
- Additional lifetime PA

Home-Based Group

- Pre-intervention training on activities & classroom material
- Written handouts
- Website information
- Self-selected activities
- 2-4 days / week of activity
- Progressive increases in weights lifted and length of aerobic activity

## 12-Week Results for Moms

Fitness & Activity

- **Push Up Scores** > in Both Groups
- **Sit Up Scores** > in Both Groups
- **Flexibility** > in Both Groups
- **Aerobic Fitness** > in Both Groups
- **Diastolic BP** < in Both Groups
- NS changes in weight, % BF
- **Days / Week of PA** > Both Groups (Aerobic, Muscular Strength, Flexibility)

Psychological

- NS changes in PSPP Sub-Scales
- **Barriers** decreased (ES = .41)
  - Biggest < in time expenditure
- Largest benefit = life enhancement (sleep, alertness, self-concept)
- **Family Relations Improved** in 80% of Dyads

## 12-Week Results for Daughters

### Fitness and Activity

- **Sit Up Scores** > in Both Groups
- **Days / Week of PA** > in Both Groups (Aerobic, Muscular Strength, Flexibility)
- NS changes in Push-Ups, Weight (lbs), % BF, BP, Flexibility, Predicted  $VO_{2max}$

### Psychological

- **Sports Competence** > in Both Groups
- **Attractive Body** > in Both Groups
- NC in benefits/barriers
- 80% daughters said **family relations improved** w/ participation in DAMET

## Conclusions from DAMET (Part 2)

- HB may be as effective as UB for increasing PA & fitness and improving psychological predictors of PA in mothers and daughters
- Mother-daughter relationship improves
- High adherence rates (Utah?)
- All UB participants wanted to continue beyond 12 weeks

## Phase III: Generations Exercising Together (GET FIT-Utah) (Ransdell et al., 2005)

- Definition of Family Expanded to 3 Generations
- Length of Intervention Increased (4 to 6 mos.)
- Increased Number of HRF Components Tested
- Added Objective Measure of PA (pedometer)
- Examined Changes in Bone Density



## Generations Exercising Together (GET FIT)—Phase III (Ransdell et al., 2005)

- 6 month program comparing home-based program to wait-list control condition (n = 36)
  - Daughters = pre-menarcheal (8-13 yrs)
  - Mothers = normal menstrual status (30-50 yrs)
  - Grandmothers = post-menopausal (50-70 yrs)

## Desired Behavior Changes

### Health-Related Fitness:

- 1 mile walk
- Push-up test
- Abdominal crunch
- Sit-and-reach test
- Body composition (BIA)
- Body mass (kg)



## Desired Behavior Changes

- Self-reported Physical Activity (subjective)
  - Days/week of aerobic, resistance, flexibility training
- Physical Activity (objective)
  - Pedometer step count (steps/d) for 3 days

## Results

- Compared to participants in the CG, participants in the HB group significantly increased their **steps/day**
- Compared to participants in the CG, participants in the HB group significantly increased their **participation in flexibility exercises (d/wk)**
- Effect sizes for all changes were medium to large

## What About Masters Athletes?

- Ideal for the study of optimal aging
  - Resist negative stereotypes associated with aging
  - Present an image that is powerful, vital, and active (vs. passive, disabled, and dependent)



(Dionigi, 2006)



# What is a Masters Athlete?

## Depends on the Sport...

- **21 and older:** diving, skiing, swimming, synchronized swimming
- **30 and older:** cycling, ice **hockey**, judo, luge, soccer, volleyball, water polo
- **35 and older:** badminton, canoe/kayak, softball, tennis, track & field, weight lifting
- **Over 40:** archery, curling, fencing, sailing, shooting



(Ransdell, Vener & Huberty, 2010)

## Percent Difference Calculations

in Running, Swimming, Cycling

### Age-Related Difference

$$\left[ \frac{\text{Age group record} - \text{Criterion record}}{\text{Criterion record}} \right] \times 100$$



### Gender-Related Difference

$$\left[ \frac{\text{Women's record} - \text{Men's record}}{\text{Men's record}} \right] \times 100$$



NOTES: In 1973, King was 29 y and Riggs was 55 y;  
Percent Difference Calculation Methods adapted from Ransdell & Wells, 1998 and 1999

## Masters Athletes

- Performance in women declined faster in running than in swimming or cycling
  - BUT consistent decline occurred after age 50 y
  - More pounding and “wear-and-tear” and injuries with running
  - Percent body fat effects running more than swimming

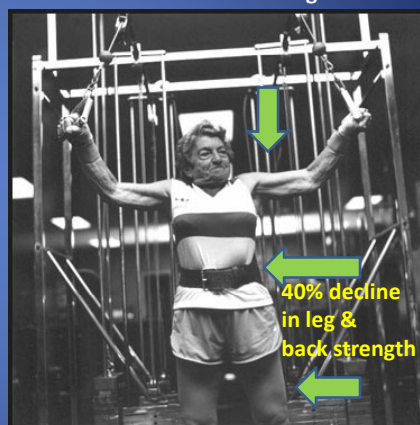


(Ransdell et al. (2010) *J Exerc Sci Fit*, 7(2 Suppl): S61-S73)

## Physiological Factors

### Anaerobic Performance

- Speed/Power (Tanaka, 2010)
  - ⚡ Reaction time
  - ⚡ Muscle size & strength
  - Fewer Type II muscle fibers
  - Less maximal and rapid force generating capacity of involved muscles
    - ⚡ Stride Length



30% decline  
In arm strength

40% decline  
in leg &  
back strength

Helen Zechmeister, 81 y (Wt Lifting)  
(From: <http://ettaclarkphotography.com>)



## So, Let's Summarize The Recommendations For Increasing PA Across the Age Spectrum...



## Recommendations for Adolescent Girls

- **Trial of Activity for Adolescent Girls (TAAG)**

(Pate, Ward, Sallis, Elder, Young, Simons-Morton, Stone, et al.)



Table 2  
Hypothesized girl-level mediators and moderators measured in TAAG

Mediators:

- girls' perceptions of their self-efficacy related to being active
- the degree to which girls enjoy being active and participating in physical education class
- girls' perceived benefits of and barriers to being active
- girls' perception of social support and a positive school climate for being active
- girls' perception of available environmental and recreational facilities
- girls' perception of the school climate for physical activity

Moderators:

- body composition
- sports and activity history
- amount of time spent at home alone
- ethnicity
- socioeconomic status

## Recommendations for Adolescent Girls (Cont'd.)

- **Organized activities work better than recess (unorganized) activities**

(Bengoechea et al., 2010)

- **Variety of activities from which to choose**
- **Facilitate bonding— with peers, families**

(Ransdell et al.)



## Recommendations for Increasing PA in Adult Women

(Ransdell, Dinger, Huberty, & Miller, 2009)

- **Increase self-efficacy, activity enjoyment, and social support**
- **Offer co-ed and single-sex opportunities for activity**
- **Offer moderate and vigorous activities**
- **Recommend 10 minutes**
  - 10 min rule and 10 min bouts
- **Provide contact with a fitness professional**



## Recommendations for Increasing PA in Adult Women (Cont'd.)

(Ransdell, Dinger, Huberty, & Miller, 2009)

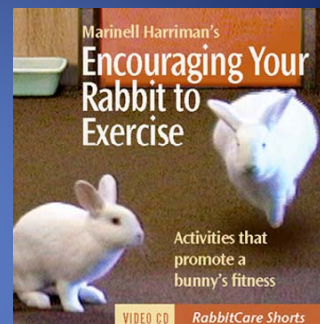
- Think **PROGRESSIVE**
  - Skill development
  - Intensity
- Find Role Models
- Set Process Goals
- Use Self-Monitoring (goal setting, logs, pedometers, etc.)
- Teach Positive Self-Talk
- Minimize Focus on Weight Loss



## More Recommendations for Adult Women

...(Ransdell, Dinger, Huberty, & Miller, 2009)

- **PROMOTE: Sweat is Sexy**
- Improve Neighborhood Safety
- Provide Child Care
- Provide Alternatives to Typical Gym Workout (Home-Based, Multi-Task)
- Provide Culturally Appropriate Activities



## Recommendations For Older Women: What Constitutes Health Aging?

Knight & Ricciardelli (2003)	Tate et al. (2003)	Reichstadt et al. (2007)
Health	Health	Health
Happiness	Satisfaction	Wellness
Mental Capacity	<b>Staying Physically Active</b>	Engagement/Stimulation
Life Satisfaction	Positive Attitude	<b>Physical Activity</b>
<b>Physical Activity</b>	Family	Security/Stability
Close Personal Relationships	Independence	Attitude
Social Activity	Acceptance	Adaptation
Sense of Purpose	Moderation	

From Weir (Chapter 10) in  
Baker, Horton, & Weir (Eds), 2010

## Recommendations for Older Women

(McAuley, King, Gibson)

- **Consider Safety**
  - Environment
  - Equipment
  - Instructors
  - Screening
  - Lower Intensity
  - Health Care Provider Referral
- **Make it Convenient & Inexpensive**
- **Minimize Pain**
- **Maximize Self-Efficacy**



## Recommendations for Continued Healthy Participation for Masters Athletes...

- Accept some aspects of the aging process
  - Performance WILL decline
  - You can play a role in HOW MUCH it will decline by continuing with some hard training
- Focus on QUALITY of training rather than QUANTITY
- Listen to your body (i.e., Recovery is as important as training)
- Don't stop resistance training
- Eat less and eat nutrient dense foods
- Drink more than your thirst mechanism dictates

## Make it FUN!!

(so you will keep wanting to do it)





## Comparison of Strategies to Increase PA in Women Across Age Groups

Strategy	Adolescent Girls	Adult Women	Older Adult Women
> Self-Efficacy	😊	😊	😊
> Enjoyment of PA	😊	😊	😊
> PA Benefit to Barrier Ratio	😊	😊	😊
> Availability of recreational facilities	😊	😊	😊
> Social Support	😊	😊	😊
Use Goal Setting	😊	😊	😊
Use Self-Monitoring	😊	😊	😊
Make Environment Safe & Welcoming (culturally appropriate, single-sex, childcare, progressive)	😊	😊	😊
Increase Opportunities to TRY Various Activities	😊	😊	😊
Offer Moderate PA	😊	😊	😊

## Future Research Directions Related to Increasing PA in Girls and Women

- Increase evidence base for predictive models
  - Mediating and moderating variables
    - Best analysis to identify which technique resulted in change
- Increase evidence base relative to family interventions

O'Connor et al. (2009) *Am J Prev Med*, 37(2): 141-149.



## Future Research Directions Related to Increasing PA in Girls and Women

- Use **CONSORT Checklist** to Ensure that Published RCT Interventions Include Vital Information O'Connor et al. (2009) *Am J Prev Med*, 37(2): 141-149.
  - Randomization procedures
  - Background and explanation of rationale
  - Eligibility criteria
  - Details of intervention
  - Objectives & Hypotheses
  - Outcome measures
  - Power calculation
  - Whether or not participants and researchers were blinded to grp asnt.
  - Stat methods and subgroup analyses
  - Participant flow through each stage
  - Recruitment/follow-up
  - Baseline demographics
  - Number of participants
  - Summary of results and effect sizes & confidence intervals
  - Adverse effects
  - Interpretation of results (including bias)
  - Generalizability of findings

From Moher D, Schulz KF, Altman DG. The CONSORT statement: revised recommendations for improving the quality of reports of parallel-group randomised trials. *Lancet* 2001; 357(9263):1191-1194.

The CONSORT Statement 2001 checklist is intended to be accompanied with the explanatory document that facilitates its use. For more information, visit [www.consort-statement.org](http://www.consort-statement.org)

## Future Directions Related to Increasing PA in Girls and Women

- Center-based programs result in better fitness outcomes
- Home-based programs have better adherence
- Can combination programs be developed that make use of best features of both?



O'Connor et al. (2009) *Am J Prev Med*, 37(2): 141-149

## Future Directions Related to Increasing PA in Girls and Women

- We know little about what happens to PA behavior after the intervention stops
  - Re-randomize initially successful participants into maintenance interventions
  - Develop models that lead to behavior maintenance



Marcus et al. (2006) *Circulation*, 114: 2739-2752.

## Future Directions Related to Increasing PA in Girls and Women

- Examine Factors Related to Successful Group Fitness Programs
  - Solidarity
  - Mutual Trust
  - Feeling of being accepted by others in the group
  - Support Homework (calling each other)



McGonigal (2007) *IDEA Fitness Journal*

## Thanks to....

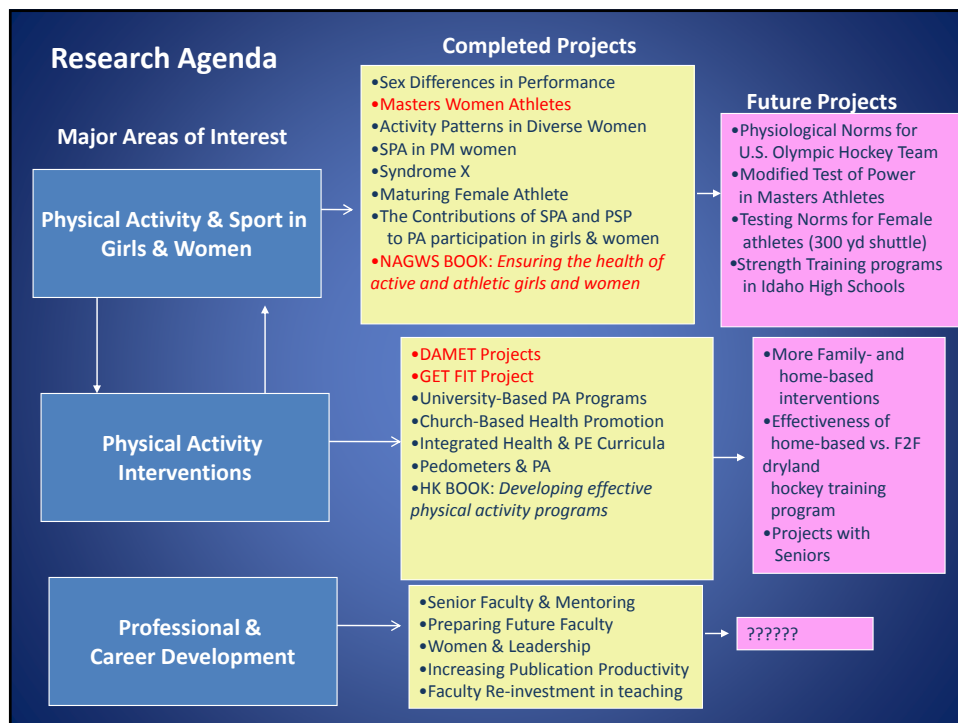
- Dr. Christine Wells
  - My mentor at Arizona State
- My Mom
  - My perennial source of support!




## More Thanks...

- Eastern Kentucky University Faculty (BS Degree)
- Smith College Faculty (MS Degree)
- Arizona State University Faculty (Ph.D.)
- Colleagues at Colorado State University
- Colleagues at University of Kentucky
- Colleagues at University of Utah
- Colleagues at Boise State Univ.





## Book of Interest

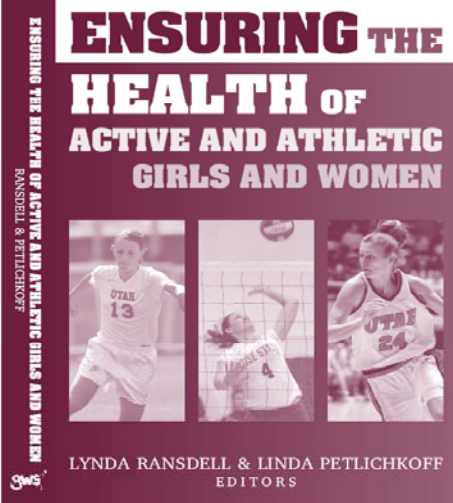


**T**his book serves as a comprehensive and contemporary resource for coaches, athletes, administrators, students and educators who are interested in improving the health of girls and women who participate in sport or recreational activities. The book is organized into three major sections: correlates of participation in physical activity and sport, and physiological and psychological issues related to healthy sport and physical activity participation for girls and women. In addition to updated information about each topic covered, each chapter contains a glossary of important terms and a list of questions for discussion. The topic areas for the book include:

- 1 Factors related to physical activity and sport participation for girls and women
- 2 Exercise and bone density
- 3 Nutrition and the female athlete
- 4 Physical activity and breast cancer
- 5 Preventing ACL injuries
- 6 Masters' women athletes
- 7 Exercise and pregnancy
- 8 Body composition testing and the female athlete
- 9 The female athlete triad
- 10 Eating disorders (Prevalence, Prevention and Treatment Issues)
- 11 Body image for active females
- 12 Sport identity, physical self-perception, and sport participation
- 13 The social psychology of leisure
- 14 The impact of heterosexism and homonegativity on female athletes

**SWS** Women's Association for Sport and Physical Education

WILEY-INTERSCIENCE



**ENSURING THE HEALTH OF ACTIVE AND ATHLETIC GIRLS AND WOMEN**

LYNDA RANSELL & LINDA PETLICHKOFF  
EDITORS

## Thanks for Your Attention!

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