



STRENGTH TRAINING AND STRESS

SOLENT
UNIVERSITY

SOUTHAMPTON

James Fisher Ph.D



Psychological Stress Impairs Short-Term Muscular Recovery from Resistance Exercise

MATTHEW A. STULTS-KOLEHMAINEN^{1,2} and JOHN B. BARTHOLOMEW³

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- Perceived chronic mental stress was measured with the PSS: [10-item]
- Undergraduate Stress Inventory (USQ), which was used to measure school and non-school related [83 item]
- Acute exercise:

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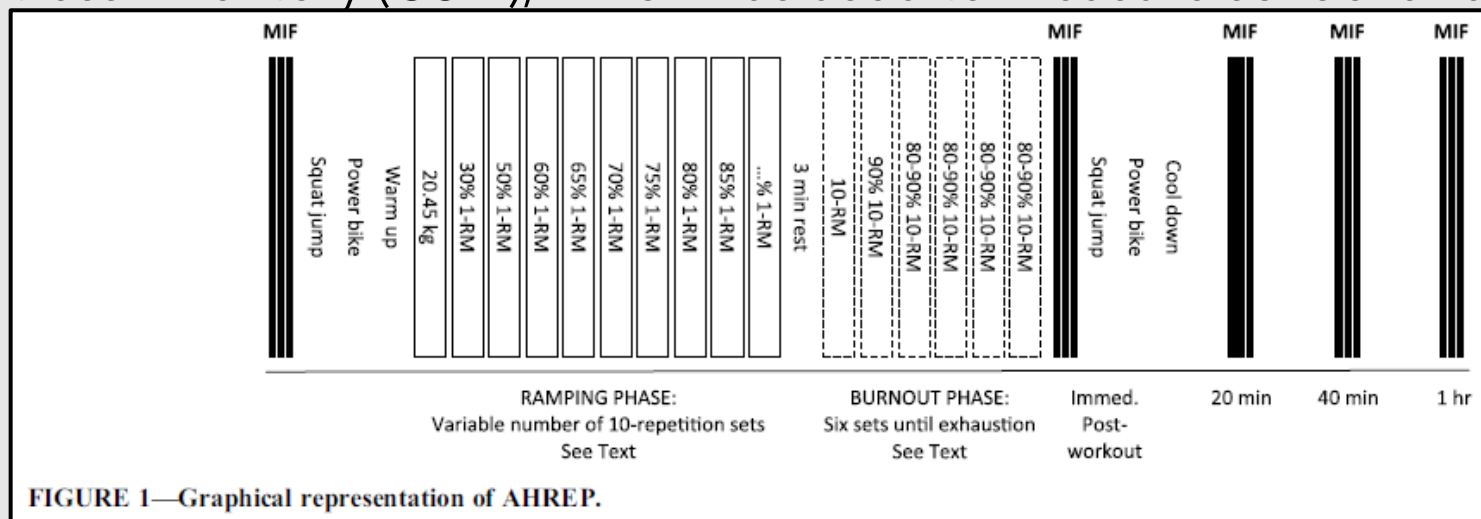
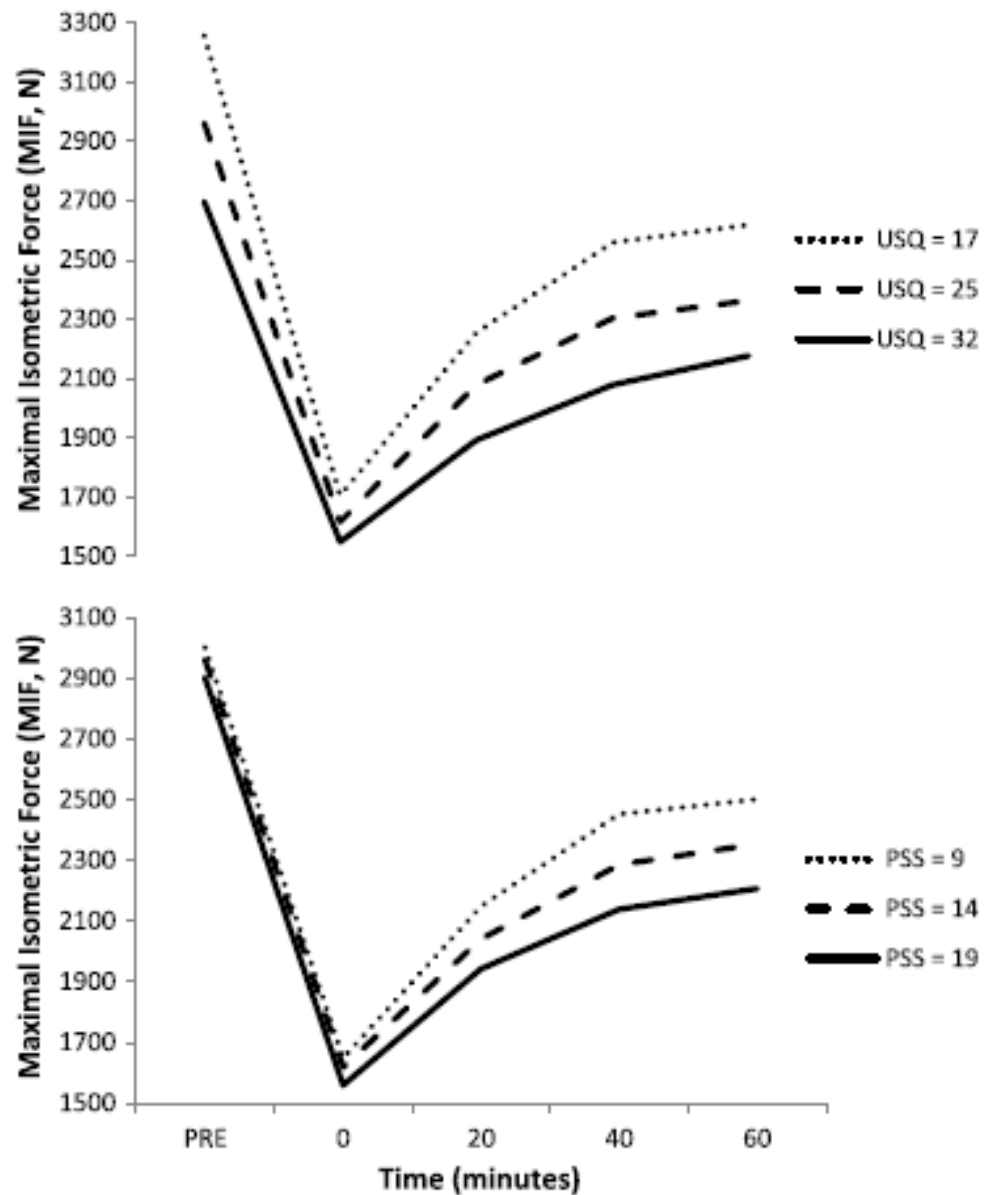


FIGURE 1—Graphical representation of AHREP.



- MIF was determined on a modified leg press machine (45-plate-loaded Cybex).
- The machine was adjusted so that each individual was at a 110- knee joint angle, and the sled was fixed in place with adjustable attachments

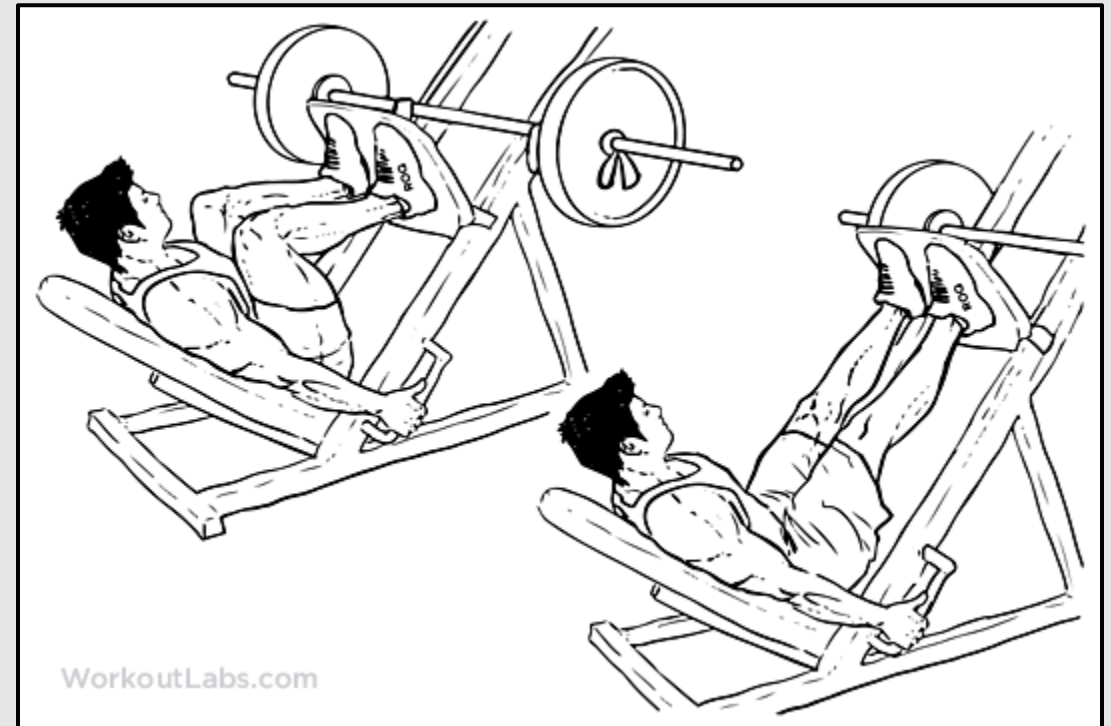


TABLE 2. Recovery of MIF (N) by perceived stress.

	First Visit	Pre-AHREP	Post-AHREP	20-Min Post	40-Min Post	60-Min Post
Low stress ($n = 16$)	2930.2 (1048.3)	2939.1 (1064.0)	1514.1 (635.5)	2089.8 (886.5), 38.0%	2212.4 (1038.5), 46.1%	2427.1 (1089.5), 60.3%
High stress ($n = 15$)	2813.5 (929.7)	2801.8 (1039.5)	1685.8 (554.1)	2051.6 (777.7), 21.7%	2218.3 (799.2), 31.5%	2330.1 (719.8), 38.2%
All subjects ($n = 31$)	2873.9 (977.9)	2872.4 (1036.6)	1596.5 (607.0)	2071.2 (819.8), 29.7%	2215.3 (915.0), 38.8%	2380.1 (914.0), 49.1%

Participants grouped by median split for PSS at the first laboratory visit ($PSS > 13$). Values are means (SD) and recovery percentage change from value immediate postexercise protocol.

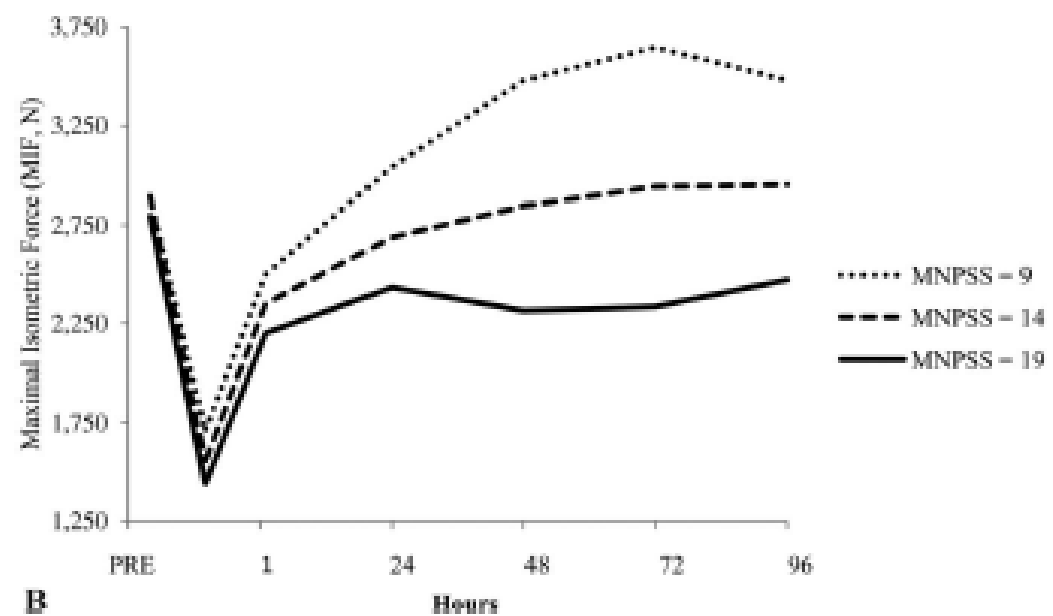
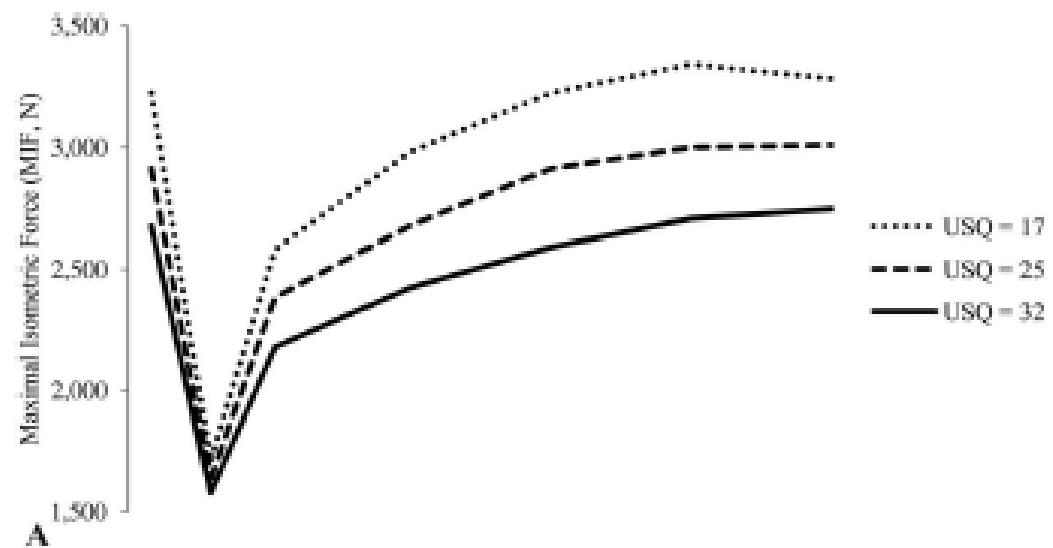
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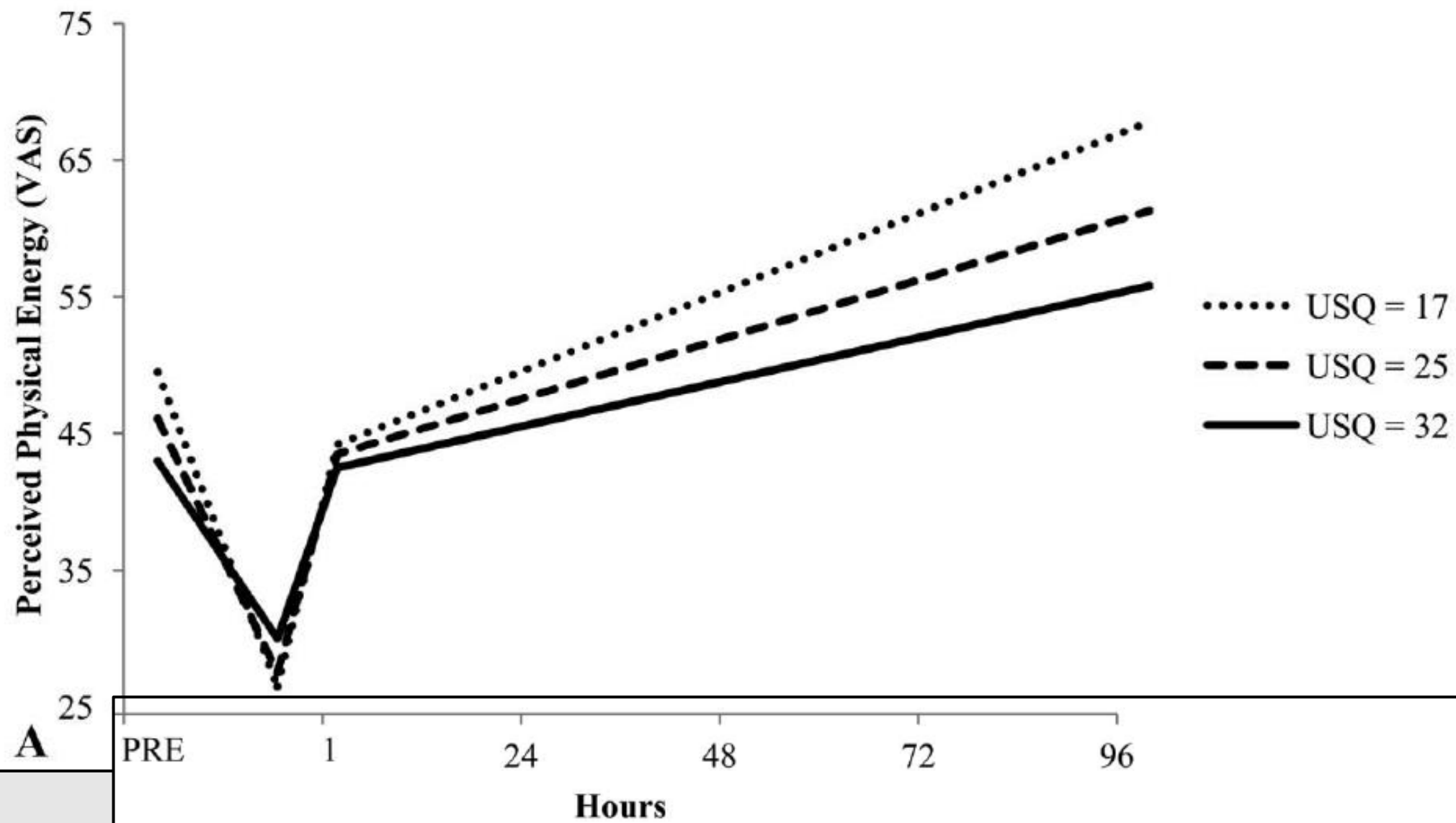
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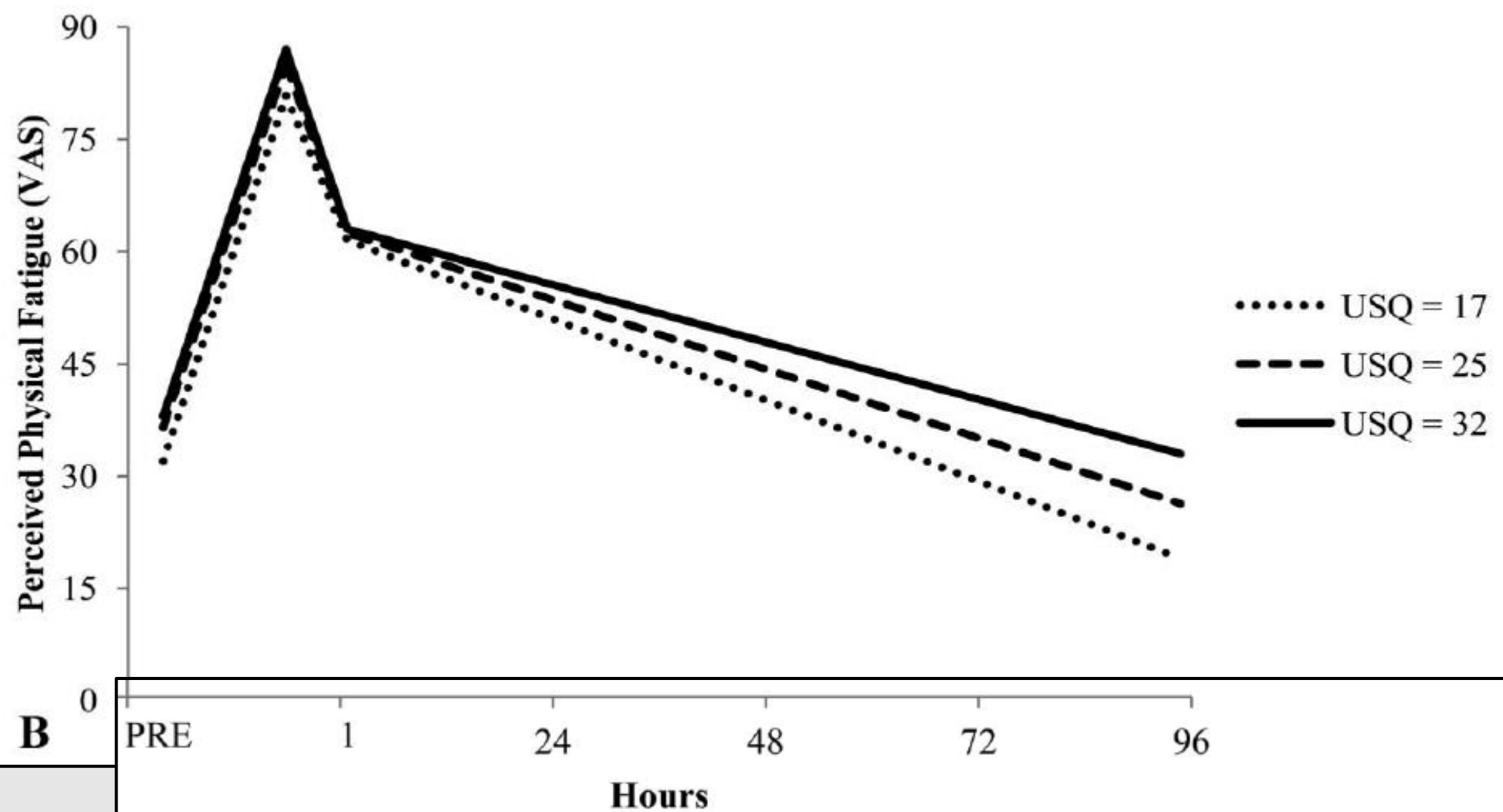
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CHRONIC PSYCHOLOGICAL STRESS IMPAIRS RECOVERY OF MUSCULAR FUNCTION AND SOMATIC SENSATIONS OVER A 96-HOUR PERIOD

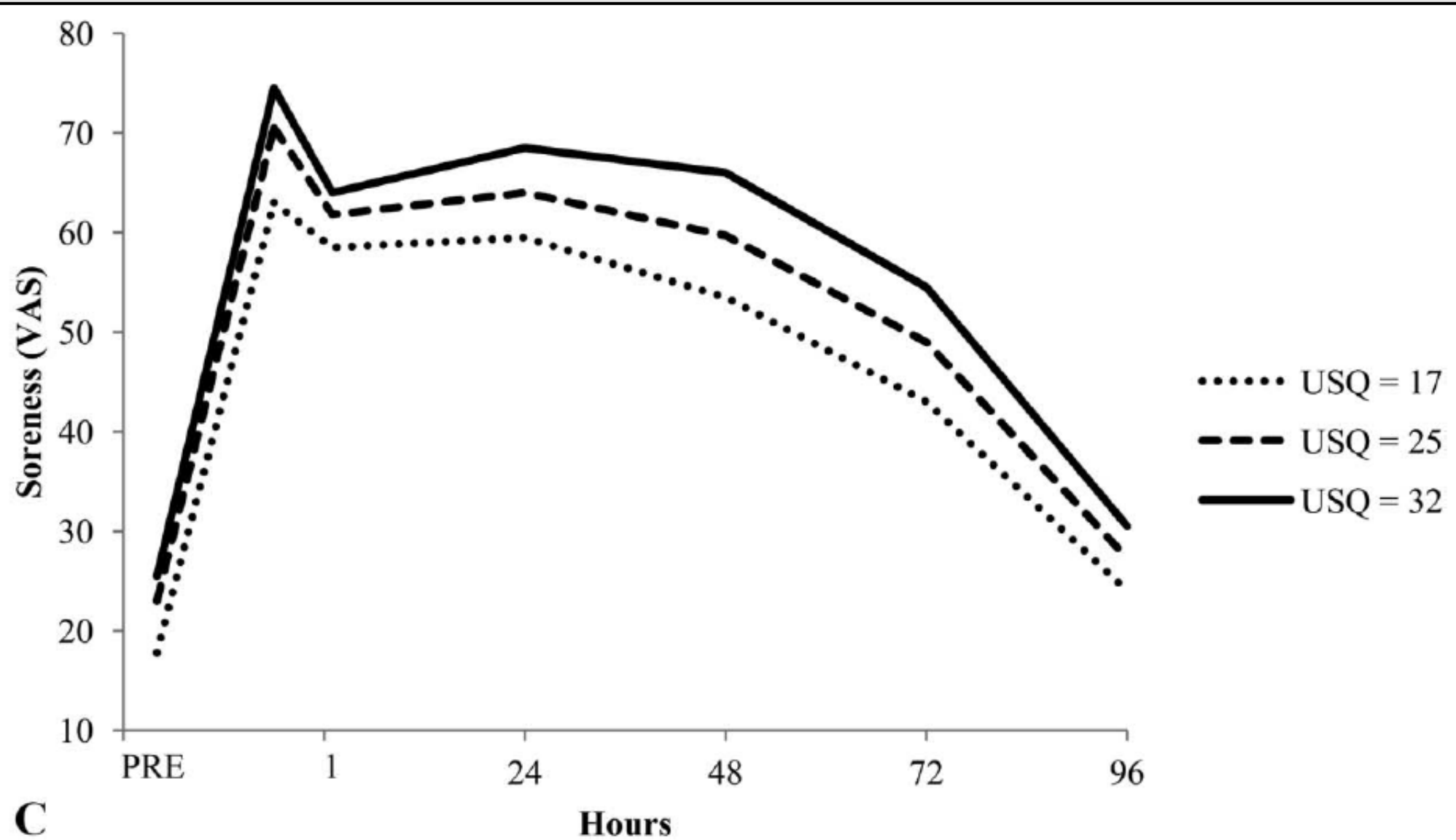
MATTHEW A. STULTS-KOLEHMAINEN,^{1,2} JOHN B. BARTHOLOMEW,¹ AND RAJITA SINHA²







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CHRONIC PSYCHOLOGICAL STRESS IMPAIRS RECOVERY OF MUSCULAR FUNCTION AND SOMATIC SENSATIONS OVER A 96-HOUR PERIOD

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	24 h	48 h	72 h	96 h
Maximal isometric force				
Low stress	2,745.9 (1,093.1); 81.4%	2,958.8 (1,024.5); 95.4%	2,827.4 (1,005.2); 86.7%	2,928.6 (1,076.9); 93.4%
High stress	2,497.9 (999.2); 48.1%	2,489.5 (844.5); 47.7%	2,598.5 (938.5); 54.1%	2,775.0 (1,079.8); 64.6%
All subjects	2,625.6 \pm (1,038.8); 64.5%	2,715.5 \pm (947.8); 70.1%	2,704.2 \S (957.1); 69.4%	2,854.9 (1,058.5); 78.8%
Jump height				
Low stress	45.0 (11.5); 18.1%	49.6 (9.1); 30.2%	45.8 (12.1); 20.2%	47.5 (9.8); 24.7%
High stress	40.4 (12.7); 11.0%	38.6 (10.2); 6.0%	43.9 (12.4); 20.6%	41.1 (11.2); 12.9%
All subjects	43.0 (12.0); 15.3%	44.6 \S (11.0); 19.6%	44.8 (12.0); 20.1%	44.9 (10.7); 20.3%
Cycle power				
Low stress	1,337.3 (297.7); 25.2%	1,385.2 (207.4); 29.7%	1,322.9 (281.5); 23.9%	1,455.8 (356.6); 36.3%
High stress	1,293.9 (413.1); 12.2%	1,301.2 (365.3); 12.9%	1,358.2 (380.4); 17.8%	1,357.8 (401.8); 17.8%
All subjects	1,317.1 (350.5); 18.8%	1,343.2 \parallel (294.2); 21.1%	1,341.2 (330.5); 20.9%	1,408.7 (374.3); 27.0%

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STRENGTH GAINS AFTER RESISTANCE TRAINING: THE EFFECT OF STRESSFUL, NEGATIVE LIFE EVENTS

**JOHN B. BARTHOLOMEW, MATTHEW A. STULTS-KOLEHMAINEN, CHRISTOPHER C. ELROD,
AND JANICE S. TODD**

- $n=135$ college students (males = 81, females = 54)
- 12-week, supervised training intervention 2 x / week for 1-1.5 hours per session
 - U/B exercises included: bench press, incline press, overhead press, biceps curls, triceps extensions, dumbbell rows, pull-downs.
 - L/B exercises included: squat and leg press
- Adolescent Perceived Events Scale (APES), [207-item questionnaire evaluating the level of positive and negative life events]

STRENGTH GAINS AFTER RESISTANCE TRAINING: THE EFFECT OF STRESSFUL, NEGATIVE LIFE EVENTS

JOHN B. BARTHOLOMEW, MATTHEW A. STULTS-KOLEHMAINEN, CHRISTOPHER C. ELROD,
AND JANICE S. TODD

- $n=135$ college students
- 12-week, supervised resistance training program
 - U/B exercises including bicep curls, triceps extensions, dumbbell press
 - L/B exercises including leg press, squats
- Adolescent Perception of Stress Scale (APSS) to measure positive and negative life events

TABLE 1. Pre and post data for bench press, squat, arm, and thigh size.

	Bench 1	Bench 2	%Change
Low stress	129.73 (55.88)	148.67 (60.34)	14.60
High stress	127.16 (62.57)	142.02 (67.57)	11.68
	Squat 1	Squat 2	
Low stress	177.66 (67.70)	222.19 (71.98)	25.06
High stress	173.88 (86.54)	212.84 (93.58)	22.41
	Arm size 1	Arm size 2	
Low stress	15.04 (7.25)	18.00 (6.97)	19.68
High stress	14.36 (6.75)	16.82 (6.78)	17.13
	Thigh size 1	Thigh size 2	
Low stress	33.70 (7.83)	34.16 (8.93)	1.36
High stress	32.45 (8.85)	32.50 (9.27)	0.15

Values are means (standard deviation).

session

bicep curls, triceps

measuring the level of

Final Points...

- A common response to stressful times in active people is to become **more** active ...
- If our higher stress levels is negatively impacting our training then we might be inclined to do more...
- We might perceive sub-standard methods of training/tools are impacting adaptations...

Final Points...

- A common response to stressful times in active people is to become **more** active ...
- If our higher stress levels is negatively impacting our training then we might be inclined to do more...
- We might perceive sub-standard methods of training/tools are impacting adaptations...
- These are stressful times; *prolonged* stress can be negative whether physiological or psychological...
- Some exercise stress (moderate volumes) can be good for the immune system...
- Indirect; sleep patterns, reducing anxiety, nutrition patterns, form of mindfulness because of mental focus switch to the exercise technique, etc. etc.

Final Point...

- Manage your stress like you manage your training

THANK YOU FOR LISTENING

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