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Physiological responses of the 12-3-30 workout: Exercise Myth or Reality

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ABSTRACT

Purpose: The purpose of this study was to quantify the acute cardiovascular, metabolic, and affective responses to the 12-3-30 workout. **Methods:** Seventeen women and men (mean \pm standard deviation: age, height, weight, and maximal oxygen uptake = 28.2 ± 9.5 years, 172.5 ± 9.3 cm, 67.0 ± 9.8 kg, and 45.1 ± 5.3 mL/kg/min, respectively) completed both a maximal graded exercise test and completed a 12-3-30 workout on non-consecutive days. Cardiovascular and metabolic data were collected via heart rate monitor and a Parvo metabolic cart. Additionally, participants completed questionnaires to assess affective responses to the 12-3-30 workout. **Results:** Overall average heart rate for the 12-3-30 workout was 124.2 ± 17.9 beats/min, which corresponded to $47.4 \pm 14.7\%$ heart rate reserve. Exercise intensity in metabolic equivalents was 5.5 ± 1.4 which equated to $44.0 \pm 9.2\%$ oxygen uptake reserve. Total energy expenditure for a 12-3-30 workout equated to 220.8 ± 49.7 kcal/workout. Affect (feeling scale) scores ranged from +2 to +4 with a median score of +4. **Conclusions:** Completion of the 12-3-30 workout provokes physiological responses known to elicit positive and substantial health benefits. Additionally, the 12-3-30 workout was generally found to leave participants feeling 'good' to 'very good' and overall participants found the routine to be enjoyable in terms of 'the body feeling good' and 'getting something out of it'. In summary, we have provided important preliminary evidence that supports one of the most popular workouts recommended by a top health & fitness social media influencer.

KEYWORDS: Group Exercise, Energy Expenditure, Exercise Intensity, Exercise Myth.

Introduction

A myth can be defined as an untrue explanation for a natural phenomenon. Unfortunately, numerous myths remain pervasive and well-engrained throughout the health and fitness world. In this study we will more closely scrutinize the 12-3-30 workout. The 12-3-30 workout has been projected to be a top fitness trend for 2024. Nevertheless, because of its relative novelty,

there is an absence of research on the 12-3-30 workout. Understanding the physiological responses to exercise is essential for designing safe and effective fitness and rehabilitation training programs. For example, it would be beneficial to understand the metabolic equivalent (MET) value associated with the 12-3-30 workout. A MET value would allow the classification of

the 12-3-30 workout exercise intensity as low, moderate, or vigorous in nature, and hence, aid in establishing a safe and effective target workload. It would also be valuable to identify if the energy expenditure from the 12-3-30 workout is sufficient to elicit meaningful weight loss.

Background: myth or reality?

Physical inactivity is a major health concern today¹. Physical inactivity is associated with at least 17 unhealthy conditions, including obesity, hypertension, gestational and Type 2 diabetes, and cardiovascular disease; and contributes annually to 250,000 premature deaths². Cardiorespiratory exercise training plays a significantly positive role in risk reduction for cardiovascular diseases, which include coronary artery disease, stroke, and hypertension. Epidemiological studies have shown the risk for coronary artery disease associated with physical inactivity are comparable to those from smoking, abnormal lipid levels, and high blood pressure³. Unfortunately, lack of cardiorespiratory exercise is between two to three times more prevalent than is smoking, abnormal lipid levels, or high blood pressure. Walking has long been recognized as one of the best cardiorespiratory exercises for overall health. One type of walking that is projected to be the top fitness trend for 2023/2024 is the 12-3-30 workout⁴. The 12-3-30 workout has gained attention across social media platforms since influencer Lauren Giraldo first shared a video of the fitness routine on [YouTube in 2019](#). Over the last several years, variations of the 12-3-30

workout have amassed billions of views on [TikTok](#). The 12-3-30 workout involves walking at a 12% incline at 3.0 miles per hour for 30 minutes. Proposed benefits of the 12-3-30 workout include improved cardiorespiratory fitness, muscle tone, weight loss, and enhanced cardiovascular health. The 12-3-30 workout has been proposed to be appropriate for people of all ages and fitness levels and a great starting workout for those who are inactive/sedentary. But are these proposed benefits circulating social media just myth or reality – in the next section we put this to the test in the High Altitude Performance Laboratory at Western Colorado University.

Methods

Participants

Healthy, but not regularly active, men and women were recruited. After obtaining informed consent, study participants were screened using Western Colorado University's Screening Questionnaire for Research Involving Exercise to confirm that all participants were low risk before any exercise testing. Inclusion criteria required participants to be healthy, 18 years or older, able to perform a moderate bout of physical activity but not physically active per ACSM guidelines, which states that the participant does at least thirty minutes per day, three days a week for at least three months⁵. Participants with high risk for heart disease when screened by the ACSM criteria⁵, pregnant or planning on being pregnant and with musculoskeletal or orthopedic conditions that could limit exercise

participation, were excluded from this study. This research was approved by the Western Colorado University IRB [HRC-2023-01-02-R09].

Experimental design

1st visit: familiarization with equipment and the laboratory

On the first visit, informed consent was obtained and signed by all participants. The first meeting was held at the High Altitude Performance laboratory, which is located on the Western Colorado University's campus. All participants were screened using the Western Colorado University's Screening Questionnaire for Research Involving Exercise to confirm that all of them were rated as low risk before any exercise testing. During the meeting all participants went through an orientation over the laboratory and all equipment such as treadmill, metabolic cart, heart rate monitor, mouthpiece, and mask. Participants were allowed to address any questions about the equipment or study. The participant's capabilities and movement were also observed during this visit. Corrections and modifications such as how to straddle the treadmill or stop the treadmill at any time were advised to all participants. No testing or value measurements were taken on this visit. This visit ranged from 45 to 60 minutes per participant.

2nd visit: pre-testing and baseline data measurements

During the second visit, participants met with the researchers to gather

anthropometric data and completed a maximal oxygen uptake ($VO_2\text{max}$) test. Anthropometric measurements included height, weight, and age. This visit took approximately 45 to 60 minutes in total per participant.

3rd visit: familiarization of the 12-3-30 workout

On the third visit, participants met with the researchers in the laboratory to go through a familiarization process of the 12-3-30 workout two to four days prior to testing for data analysis. On this visit participants were familiarized with the required effort level and learned the structure of this workout which involves walking at a 12% incline at 3.0 miles per hour for 30 minutes. Participants were asked to step on a motorized treadmill and under the supervision of the researchers to complete the workout. No data was recorded on this visit and it took approximately 45 minutes per participant.

4th visit: 12-3-30 workout measurements

On the fourth and last visit, participants met for the last time in the laboratory for final testing. Participants were asked to complete the 12-3-30 workout on a motorized treadmill while being hooked up through a mask and mouthpiece to the metabolic cart for data collection. Affect (with the feeling scale) and enjoyment (with the physical activity enjoyment scale) were also assessed following the 12-3-30 workout. This visit took approximately 45 to 60 minutes in total per participant. The overall experimental design of the study is presented in Figure 1.



Figure 1. Experimental flow diagram.

Procedures

Resting metabolic rate and maximal exercise test

After being connected to the Parvo Medics calorimetric measurement system (TrueOne 2400 Metabolic Cart; Sandy Utah, USA). The metabolic cart was calibrated 30 minutes prior to the test. Participants rested quietly for 5-min in a seated position. The last minute of breath-by-breath oxygen consumption (VO_2) and heart rate (HR) data was averaged and considered to be resting metabolic rate (VO_2) and resting HR. On a motorized treadmill, a modified Balke protocol was performed with the participants selecting a comfortable walking or jogging speed that could be maintained for the duration of the test. The purpose of the VO_{2max} test was to determine each participant's maximum exercise capacity. Participants were instructed to wear exercise clothing and shoes that allow free movement during vigorous exercise. Participants were instructed to be rested, well nourished, and hydrated for the test. Participants were told to avoid alcohol, caffeine, and tobacco 3 hours before the test; avoid significant exertion or exercise the day of testing and report any medication that could be used to the testing staff before the test. The test began with an exercise warm-up period of 5 minutes, and then participants either walked/ran on the treadmill at a speed that felt comfortable. During the test, participants wore an apparatus that allowed them to inhale and exhale air that was analyzed by the metabolic cart. Throughout the VO_{2max} test,

the participant's heart rate was monitored with a Polar FT4 heart rate monitor. Participants were instructed to communicate with the researchers during the test by using a 1-10 rating of perceived exertion scale to indicate how the exercise feels per stage. Participants were informed of the purpose of the test and allowed to ask any questions before the beginning of the test. Participants were informed of their right to terminate the test at any time.

After measuring resting expired gases for 2 min, participants were gradually brought to the selected walking or jogging speed for the first minute of the test, which then was maintained throughout the duration of the test. The first 2 min of the protocol were performed at 0% grade, thereafter, every two minutes the treadmill grade was increased by 2% until volitional fatigue was attained. The criteria for attainment of maximal oxygen consumption (VO_{2max}) was two out of three of the following: (1) a plateau ($\Delta VO_2 < 150$ mL/min) in VO_2 with increases in workload, (2) maximal respiratory exchange ratio (RER) > 1.1 , and (3) maximal HR within 10 beats/min of the age-predicted maximum ($220 - \text{age}$).

Exercise intensity and metabolic calculations

Individual heart rate reserve (HRR) was determined as the difference between resting and maximal heart rate (HR_{max}) values. Percent HRR was calculated by subtracting resting HR from the 12-3-30 workout HR response, divided by HRR, and then multiplying the quotient by 100.

Likewise, individual oxygen uptake reserve (VO₂R) was determined by the difference between resting and maximum VO₂ values. Percent VO₂R was calculated by subtracting resting VO₂ from the 12-3-30 workout VO₂ response, dividing by VO₂R, and then multiplying the quotient by 100. The metabolic equivalent (MET) for the 12-3-30 workout session was determined by dividing the exercise VO₂ by resting VO₂ for the 12-3-30 workout portion (warm-up and cool-down metabolic data were omitted in this analysis). Energy expenditure (kcal/session) for the 12-3-30 workout session was calculated by using the above-calculated MET equivalent of 12-3-30 workout. This MET value was multiplied by individual resting VO₂ and individual body mass, then divided by 1000, multiplied by 5 (the assumption was made for an energy cost of 5 kcal/L of oxygen), and last multiplied by 30-min (length of 12-3-30 workout).

12-3-30 Workout

Participants were asked to perform the 12-3-30 workout which involved walking at a 12% incline at 3.0 miles per hour for 30 minutes. For the data collection of this workout, participants completed a 5-minute warm up prior to the beginning of the workout at a speed and gradient that they felt adequate for their warmup. After their warmup, participants were instructed to complete the workout while hooked to the metabolic cart for data collection. A short 5-minute cool down at a self-selected intensity was performed after the 12-3-30 workout.

Body Weight and Height

Participants were weighed upon arrival to the laboratory. Body weight was recorded to the nearest 0.1 kilogram from the digital readout. Consecutively, after weight measurement were done, height was taken. Height was recorded to the nearest centimeter.

Statistical Analysis

Measures of centrality and spread are presented as mean \pm SD and range. GraphPad Prism version 10.2.2 was used for the analyses.

Results

17 healthy individuals volunteered to participate in this study. Each participant completed all four required visits to the laboratory. Descriptive characteristics of the participants are presented in Table 1.

Acute cardiovascular and metabolic responses to the 12-3-30 workout

All cardiovascular and metabolic responses for the 12-3-30 workout are presented in Table 2. During the workout, participants average a heart rate of 124.2 ± 17.9 beats per minute which represented $47.4 \pm 14.7\%$ of HRR and $44.0 \pm 9.2\%$ of VO₂R. Figure 2 illustrates the exercise intensity in terms of HRR for a representative participant throughout the 12-3-30 workout. Absolute exercise intensity in METs was 5.5 ± 1.4 . The overall total energy expenditure of the 12-3-30 workout equated to 220.8 ± 49.7 kcal.

Table 1. Descriptive characteristics of the participants.

Parameter	Women (N=10)	Men (N=7)	Combined (N=17)
Age (years)	25.4 ± 5.7	32.1 ± 12.7	28.2 ± 9.5
Height (cm)	167.6 ± 7.6	179.4 ± 7.1	172.5 ± 9.3
Weight (kg)	63.1 ± 9.2	72.4 ± 8.3	67.0 ± 9.8
Resting Heart Rate (bpm)	69.3 ± 3.7	72.3 ± 7.4	70.5 ± 5.5
Maximal Heart Rate (bpm)	188.2 ± 7.4	178.4 ± 17.5	184.2 ± 13.0
Maximal Oxygen Uptake (mL/kg/min)	44.9 ± 4.4	45.5 ± 6.7	45.1 ± 5.3
Resting Oxygen Uptake (mL/kg/min)	5.5 ± 1.5	4.7 ± 0.7	5.2 ± 1.3

Values are mean ±SD.

Table 2. Acute Cardiovascular and Metabolic Responses

Parameter	Women (N=10)	Men (N=7)	Combined (N=17)
HR (beats/min)	130.4 ± 14.7	115.3 ± 19.3	124.2 ± 17.9
Range	108-151	83-140	83-151
%HRR	51.2 ± 11.5	42.0 ± 17.9	47.4 ± 14.7
Range	39.2-67.8	16.1-70.6	16.1-70.6
%VO ₂ R	45.9 ± 8.0	41.1 ± 10.7	44.0 ± 9.2
Range	39.6-63.6	21.8-53.9	21.8-63.6
METs	5.9 ± 1.4	5.1 ± 1.3	5.5 ± 1.4
Range	3.7-8.1	2.7-6.8	2.7-8.1
kcal/min	7.2 ± 1.6	7.5 ± 1.9	7.4 ± 1.7
Range	5.4-10.7	5.1-10.4	5.1-10.7
kcal/workout	217.0 ± 47.2	226.4 ± 56.4	220.8 ± 49.7
Range	161-321	154-312	154-321

Values are mean ± SD. (HR, heart rate; %HRR, percentage heart rate reserve; kcal, kilocalories; METs, metabolic equivalents; %VO₂R, percentage oxygen uptake reserve).

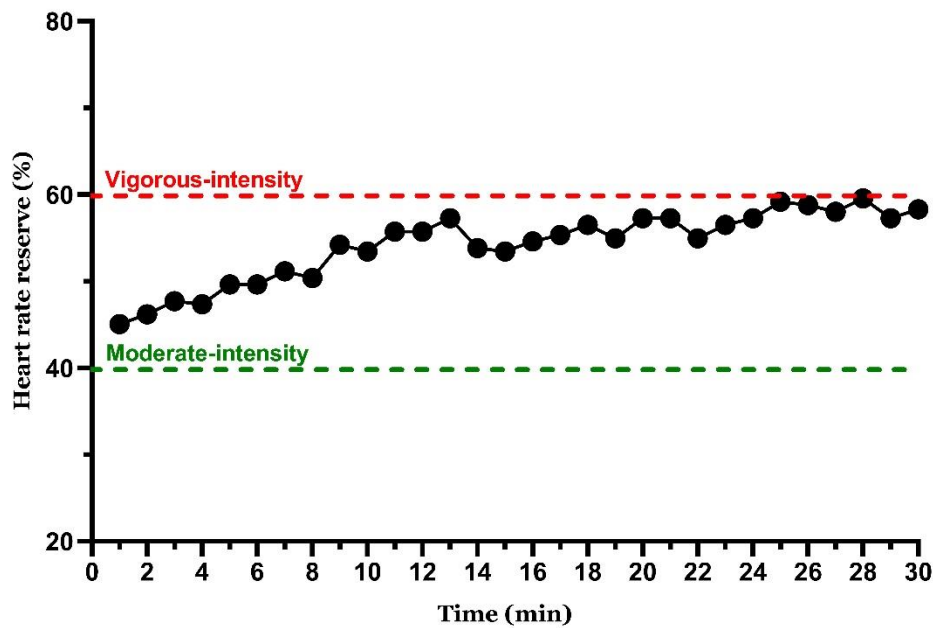


Figure 2. Heart rate reserve response throughout the 12-3-30 workout for a representative participant. The green dashed line (----) denotes the threshold for moderate-intensity exercise and the red dashed line (----) denotes the threshold for vigorous-intensity exercise.

Affect and exercise enjoyment

Affect (feeling scale) scores ranged from +2 to +4 with a median score of +4. The Affect findings are also presented in Figure 3.

Participant responses to the exercise enjoyment questionnaire following the 12-3-30 workout are presented in Figure 4.

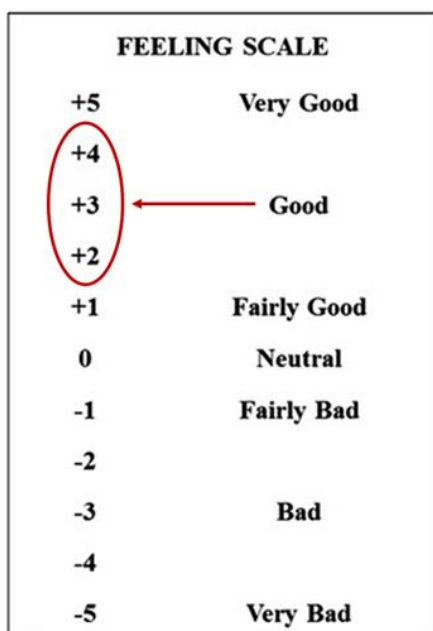


Figure 3. Feeling scale results.

Items	Disagree a Lot	Disagree	I am not sure	Agree	Agree a Lot
1 I enjoy it			50%	37.5%	12.5%
2 I feel bored		37.5%	25%	37.5%	
3 I dislike it	25%	75%			
4 I find it pleasurable		12.5%	37.5%	37.5%	12.5%
5 It is no fun at all	37.5%	50%	12.5%		
6 It gives me energy		25%	37.5%	37.5%	
7 It makes me depressed	87.5%	12.5%			
8 It is very pleasant			37.5%	50%	12.5%
9 My body feels good				75%	25%
10 I get something out of it			12.5%	62.5%	25%
11 It is very exciting	12.5%	37.5%	25%	12.5%	12.5%
12 It frustrates me	25%	62.5%		12.5%	
13 It is not at all interesting	12.5%	50%	25%	12.5%	
14 It gives me a strong feeling of success		12.5%	50%	37.5%	
15 It feels good			12.5%	62.5%	25%
16 I feel as though I would rather be doing something else	12.5%	12.5%	25%	50%	

Figure 4. Exercise enjoyment responses to the 12-3-30 workout.

Discussion

What do our findings mean?

The main finding of the present study is that the 12-3-30 workout elicits cardiovascular and metabolic responses that fulfill exercise intensity guidelines for improving and maintaining cardiorespiratory fitness, along with achieving weight loss/maintenance⁵. Mean exercise intensity was 47.4% of HRR, 44.0% of VO₂R, and 5.5 METs, respectively. Overall energy expenditure for the 12-3-30 workout was ~221 kcal/workout. Collectively, these findings support the 12-3-30 workout as an ideal form of cardiorespiratory exercise for young to middle-aged adults.

12-3-30 Workout Intensity

Exercise intensity is arguably the most critical component of the exercise prescription model⁶. Failure to meet minimal threshold values may result in lack of a training effect, while too high of an intensity could lead to over-training and negatively impact adherence to an exercise program. Results from the present study indicate the 12-3-30 workout can be classified as “moderate” according to various organizations (e.g., ACE⁷ and ACSM⁵) definition of physical activity intensity. For example, moderate exercise intensity in relative terms has been defined as 40-59% of HRR/VO₂R⁵. Participants in the present study exercised at workloads during the 12-3-30 workout that elicited HRR (47.4%) and VO₂R (44.0%) values that fall within the moderate relative intensity category. However, it is also important to note the considerable

between-participant variability in the HRR/VO₂R responses to the 12-3-30 workout (see ranges reported in Table 2). Although the mean exercise intensity response fell within the recommended “moderate” intensity range of 40-59% HRR/VO₂R, it is also evident that for some participants the HRR/VO₂R responses were above the “moderate” category and within the “vigorous” category of exercise intensity. Research is quite clear that for most individuals the benefits of low-to-moderate intensity exercise substantially outweighs any risks; however, for a small segment (i.e., *the high risk*) of the population, the risk of exercise-related events such as a heart attack or sudden death, is substantial when performing unaccustomed exercise bouts, in particular vigorous intensity exercise⁵. Consequently, caution may be advised when recommending the 12-3-30 workout for higher risk individuals (e.g., Type 2 diabetics or cardiac-diseased).

Metabolic Equivalent for the 12-3-30 Workout

In both the Physical Activity Guidelines for Americans⁸ and elsewhere⁹, moderate-intensity physical activity in metabolic terms has been classified as 3 to 5.9 METs. In the present study, the MET response to the 12-3-30 workout averaged 5.5 and ranged from 2.7 to 8.1. Thus, participants in the present investigation exercised at workloads during the 12-3-30 workout that elicited metabolic responses within the accepted moderate-intensity range. This is an important finding given the fact that moderate-intensity

exercise has been widely recommended⁸ for health benefits. MET values described in the present study compare favorably to more traditional land-based cardiorespiratory values and non-traditional physical activity values⁵. For instance, treadmill and over ground walking at 3.0 miles per hour is an equivalent moderate-intensity physical activity at 3.3 METS. Likewise, an 80kg individual cycling between 50 and 100 Watts will elicit a MET value ranging from 4.0 to 6.0 METS. Smith and colleagues (2016) reported that participation in a TRX Suspension Training class also elicited an absolute moderate-intensity metabolic response at 5.8 METs¹⁰. More recently, Byrd and colleagues (2019) found a 30-minute exercise routine on the Core-Tex averaged 4.8 METs¹¹.

12-3-30 Workout Energy Expenditure

Research has demonstrated that there is a dose-response relationship between exercise and multiple health outcomes, including cardiorespiratory fitness, risk of coronary artery disease and all-cause mortality, obesity, dyslipidemia, type 2 diabetes, and colon cancer¹. For the prevention of chronic diseases, a target energy expenditure of 150 to 400 kilocalories per day (kcal/day) has been recommended¹². From a practical perspective, results from the present study highlight that completing a 12-3-30 workout yields a mean energy expenditure of ~221 kcal that satisfies the 150-400 kcal/day recommendation.

Affect and exercise enjoyment

All participants completed the Feeling Scale (Figure 3) and PACES questionnaire (Figure 4) after the 12-3-30 workout. Affect (feeling scale) scores ranged from +2 to +4 with a median score of +4. These scores correspond to feeling 'good' to 'very good'. None of the participants "Disagreed a lot" with statements that were indicative of enjoyment. 100% of participants disagreed with the statement "I disliked it". 100% of the participants reported that the workout resulted in 'the body feeling good' and 87.5% indicated 'getting something out of it'. Overall, the Affect and exercise enjoyment scores suggest the 12-3-30 workout might be an exercise routine that individuals are motivated to participate in on a regular basis.

Methodological Considerations

Possible limitations to the present study merit discussion. The present study investigated the acute cardiovascular and metabolic responses to a representative sample of healthy, yet previously physically inactive, men and women completing a 12-3-30 workout. The cardiovascular and metabolic responses to a 12-3-30 workout would undoubtedly vary across different populations. There are also different variations of the 12-3-30 workout and physiological responses would differ accordingly with different routines. Another possible limitation is the relatively short resting period used for collecting resting HR and VO₂. However, unpublished pilot testing data from our laboratory found no

significant differences ($p > 0.05$) between resting HR and VO_2 values obtained following 5min and 30min of rest.

Conclusion

Completion of the 12-3-30 workout provokes physiological responses known to elicit positive and substantial health benefits. Additionally, the 12-3-30 workout was generally found to leave participants feeling 'good' to 'very good' and overall participants found the routine to be enjoyable in terms of 'the body feeling good' and 'getting something out of it'. In summary, we have provided preliminary evidence that supports one of the most popular workouts recommended by a top health & fitness social media influencer. Overall, these findings are beneficial for exercise physiologists, personal trainers, and other health professionals who design exercise programs and promote physical activity in the adult population. Final consensus of the 12-3-30 workout: **Reality**.

Competing interests

This investigation was supported financially by the American Council on Exercise (ACE). The American Council on Exercise (ACE) was not involved in development of the study design, data collection and analysis, or preparation of the manuscript. There are no other potential conflicts of interest related to this article.

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