Commentary

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Hardcastle Takes a HIT! Commentary: Why Sprint Interval Training is Inappropriate for a Largely Sedentary Population

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Commentary

Our previous paper prompted a lively debate concerning the efficacy of sprint interval training (SIT) [1,2]. For clarification, SIT refers to protocols that involve supramaximal efforts (>100% maximal oxygen uptake) and high-intensity-interval-training (HIIT) involves 'vigorous' or 'near-maximal' efforts (target intensity: 80% to 100% peak heart-rate) [3]. In the current commentary, we return to the role of affect and perceived effort on exercise adherence raised in the recent commentary by Jung et al. [4]. We contend that the considerable anticipated effort required to participate in SIT and aversive psychological states experienced during such 'all out' supramaximal exercise may likely to damage adherence to such protocols.

Although we recognize the health-related physiological benefits of classic SIT, which involves up to six 30-s-sprints, we agree that 'considering the need for specialized equipment and the extremely elevated level of subject motivation, this form of training may not be safe, tolerable or practical for many individuals' [5]. Therefore, we contend that the considerable effort required to participate in classic SIT is such that it is unlikely to be experienced as pleasant and enjoyable for most people, especially those less active individuals [6].

More recently researchers have proposed SIT protocols with fewer and shorter sprints than classic SIT [7-9]. For example, Metcalfe et al. [7] have proposed the reduced-exertion high-intensity training, which involves two 'all out' 20-s-sprints, while Gillen et al. [8] have proposed a SIT protocol involving three 'all out' sprints of 20s. Despite the interesting preliminary findings regarding the health-related physiological benefits, adherence to these very-low-volume SIT protocols remains unknown. Moreover, it should be noted that these SIT protocols [7,8] were supervised in a laboratory setting. In a 'real world' setting, albeit supervised, Lunt et al. [10] reported drop-out rates were much higher in the SIT and HIIT groups compared to the walking condition (44% vs 18% respectively). Three (19%) SIT participants picked up an injury. These drop-out rates are likely to be much higher in free-living HIIT and SIT programs. It is likely that high degree of effort involved explained some of the drop-out of participants from the study, which included inactive and overweight participants.

We need not to refer solely to the Dual Mode model (DMM) to describe the negative affective responses to high-intensity exercise. Research has demonstrated a repeatedly negative association between perceived effort and exercise adherence [11]. We recognize that most of this evidence relates to continuous exercise protocols. However, Oliveira et al. [12] found that perceived effort predicted affective response during HIIT and Frazão et al. [13] showed a negative correlation between perceived effort and affective response during HIIT. Wood [14] also found similar declines in affect in SIT and HIIT. In our opinion the negative association between perceived effort and exercise adherence holds for HIIT. Therefore, it is based on this body of evidence and propositions of the DMM that we claim that 'near maximal' and 'supramaximal' interval-training programs are unlikely to produce long-term exercise adherence.

Jung et al. [4] claim that 'interval training' is not that hard and that for inactive/unfit populations it is equated to "walking on a treadmill at a speed of ~3-3.5 mph, at a ~3-5% incline" (~5-6 METs) (p.2) and suggest that relative exercise intensity innate in all prescriptions of 'vigorous' exercise' is 'left out'. However, according to the ACSM guidelines [15], ~5-6 METs is equivalent to 'moderate' intensity exercise, and not 'vigorous', for most individuals. Moreover, whilst the speed and incline may not be excessively high, it may be experienced as extremely hard in sedentary populations. Relative exercise intensity refers to the level of physiological stress imposed to subjects' organism (i.e., internal load) [16] and not given walking speed or treadmill inclination (external load markers) as proposed by Jung et al. [17]. Most HIIT protocols use a percentage of peak heart-rate or peak-power output to prescribe the interval work bouts. Thus, less is known about the true relative intensity according to metabolism and its relationship with affective responses and adherence. It seems important that future studies characterize the HIIT protocols according to the ventilatory threshold and respiratory compensation point.

The transfer of SIT and HIIT to an unsupervised setting requiring a high degree of self-regulation and motivation to engage in such 'near maximal' and 'supramaximal' exercise, respectively, is likely to be problematic and further research exploring whether SIT and HIIT can be successfully implemented in a 'real life' setting is necessary. Currently, there is insufficient evidence to promote the efficacy of interval training for public health. Although we agree with Gibala and Hawley [18] that 'SIT is only one option in the armory of primary care interventions that can be used to fight chronic metabolic diseases', we argue that this exercise approach fits for few people and to date the findings from laboratory and supervised studies cannot be transferred to the domain of public health and applied to inactive populations.

In summary, we have argued that the considerable effort required to participate in SIT and HIIT is such that it is likely to damage adherence to such protocols, particularly for independent self-regulation of 'near maximal' and supramaximal efforts protocols. We also argue that SIT and HIIT are unlikely to be experienced as pleasant and enjoyable for most people and that such anticipated displeasure and effort will also damage exercise adherence [19]. Finally, we disagree that disciplinary rivalry exists and note that the previous commentary was co-authored by both physiologists and psychologists working together undertaking HIIT research [13]. We expressed an opinion that such high-intensity training protocols are unlikely to be taken up by most of the sedentary population. We should be united in our pursuit to explore which interventions effectively foster exercise adherence to gain health benefits.

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