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Citation for published version:

Niven, A, Bradley, C & Phillips, S 2017, 'Individual differences in affective responses to and intention to repeat low volume high-intensity interval exercise', The British Association of Sport and Exercise Sciences Conference 2018, United Kingdom, 27/11/17 - 28/11/17.

Link:

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Document Version:

Peer reviewed version

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Background

Despite the established physical health benefits of high intensity interval exercise (HIIE)¹, its public health potential has been subject to considerable debate². In this debate, opponents draw from Dual Mode Theory³ to argue that individuals will not intend to do HIIE regularly because they will likely experience negative affect whilst exercising at an intensity that is above ventilatory threshold (VT).

Consequently, there has been a growth in research examining affective responses to HIIE compared with moderate intensity continuous exercise. However, the findings are contradictory with some studies reporting affect was more negative in HIIE⁴, and others reporting no differences between conditions⁵.

Limited research has considered how moderator variables may influence affective responses to HIIE. One potential moderator is exercise tolerance, which is defined as 'a trait that influences one's ability to continue exercising at an imposed level of intensity even when the activity becomes uncomfortable or unpleasant' (p.354)⁶

Purpose of this study

To examine how the trait of exercise tolerance influences affective responses to, and intention to repeat low volume HIIE.

Method

Participants: Healthy participants (n=114) initially completed the Preference for and Tolerance of Exercise Intensity Questionnaire⁶. From this sample, high tolerance (HT; n=19; male =7; mean age = 20.37 ± 1.46) and low tolerance (LT; n=17; male =5; mean age = 21.8 ± 2.0) groups were identified.

Protocol: Both groups completed 10 x 6 sec all-out cycle sprints on a mechanically braked ergometer against a resistance of 7.5% (males) or 6.5% (females) body mass, interspersed with 60 sec passive recovery⁷. Affective valence and perceived activation were recorded before exercise, immediately after sprints 2, 4, 6, 8, and 10, and 20 min post-exercise.

Participants' intentions to repeat HIIE 1 and 3 times per week for the next month were assessed 20 min and 24 hours post-HIIE.

Analysis: 2 (group) X 7 (time) repeated measures ANOVAs with appropriate post-hoc and effect size calculations.



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Individual differences in affective responses to and intention to repeat low volume high intensity interval exercise

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Results

Affective valence significantly decreased across the sprints in both groups ($P = 0.019$, $\eta_p^2 = 0.103$) and was significantly different between groups ($P = 0.018$, $\eta_p^2 = 0.154$). Affective valence was significantly lower in the LT at only sprint 2 ($P = 0.022$, $d = 0.94$); however, medium to large effect sizes ($d = 0.66 - 0.94$) were found at each time point (Figure 1).

Perceived activation significantly increased across sprints in both groups ($P < 0.001$, $\eta_p^2 = 0.497$), with no significant between-groups differences ($P = 0.174$, $\eta_p^2 = 0.054$), although effect sizes progressively increased from small to medium ($d = 0.24-0.56$). (Figure 2)

Figure 1: Feeling state scores for each group at 7 time points

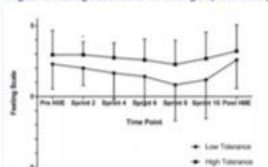
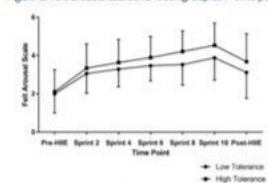


Figure 2: Felt arousal scores for each group at 7 time points

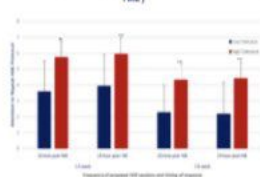


Intention to repeat HIIE – At 20 minutes and 24 hours post-exercise, the HT group reported significantly stronger intentions to repeat the session both 1 X and 3 X per week for the next month, and all effect sizes were large ($d = 1.03-1.32$) (Figure 3)

Conclusions

- Affective responses to HIIE are influenced by the dispositional trait of exercise tolerance, with low tolerance participants experiencing more negative affect than high tolerance participants.
- High tolerance participants had stronger intentions to repeat HIIE, which may have been reflective of less negative affect.
- These findings suggest that HIIE is likely to be experienced more positively by some individuals than others, and that exercising at an intensity that is above ventilatory threshold does not always lead to negative affect.
- Future research should consider the influence of these responses on participants' subsequent exercise behaviour.

Figure 3: Intention to repeat the HIIE protocol 1X and 3X per week for the following 4 weeks (reported 20 mins and 24 hours post-HIIE)



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