Acute Affective Responses to Prescribed and Self-Selected Exercise Intensities in Young Adolescent Boys and Girls

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This study examined the patterning of acute affective responses to prescribed and self-selected exercise intensities in a young adolescent population. Twenty-two young adolescents (13.3 ± .33 years) completed a maximal exercise test to identify ventilatory threshold (VT). Participants then completed two prescribed intensities (one set above and one below the VT) and a self-selected intensity. Pre-, during, and postexercise affective valence was measured. Results revealed that during exercise, affective valence assessed by the Feeling Scale (FS) remained positive in the self-selected and low-intensity conditions but declined in the high-intensity condition. Postexercise FS responses rebounded to preexercise levels, eradicating divergent trends that occurred during exercise.

There is growing public health concern over the effects of sedentary lifestyles on the health of young people, particularly in relation to overweight and obesity. Declines in participation have been found to be greatest in the adolescent age group (19). The American College of Sports Medicine guidelines (2) state “as children move into their adolescent and young adult years, physical activity levels decline strikingly” (p. 219). The task of trying to identify factors that could impact individuals’ motivation to participate in physical activity has led researchers in exercise psychology to focus on affective responses to exercise. The short-term rewards of positive affective responses that can be derived from a positive exercise experience might prove to be significant in helping people stay motivated to sustain regular exercise (8) and avoid the dropout that is inextricably linked to exercise.

Several investigators have suggested that affective changes related to exercise play an important role in exercise adherence (27,31), and initial research with an adult population has shown that the amount of time individuals choose to spend exercising is predicted by the affect experienced in that situation (34). It could therefore be proposed that a positive affective response to an exercise experience might be the first link in a chain between exercise and adherence (30).

The intensity of an exercise experience has been shown to be one variable that influences affective responses. In discussing the prescription of exercise intensity, Ekkekakis and Petruzzello (9) state that instead of using relative methods (percentages of HRmax, VO2max), important individually determined metabolic landmarks...
Sheppard and Parfitt (9, p. 366) should be considered in setting exercise intensity that presents a metabolically standard stimulus across individuals. Individually determined metabolic landmarks are the lactate or ventilatory (gas exchange) threshold and the level of critical power, or power-time asymptote (12). These metabolic landmarks are of strong adaptational significance because the metabolic profile changes considerably when exercise is performed slightly below or above them. Setting intensity using this method is suggested to achieve a more effective standardization of exercise intensity across individuals (13).

Traditionally, studies measuring affective responses at differing exercise intensities have chosen relative methods to prescribe exercise intensity (e.g., 28), and very few have attempted to use individually determined metabolic landmarks (e.g., 5,13). Furthermore, moderate intensity exercise (55–69% of HRmax; 2) is prescribed in the belief that it leads to positive affective change in all, or most, individuals (9). Kirkcaldy and Shephard (16), supported by Ojanen (20), proposed the notion of an inverted-U relationship between intensity and affective benefit. Ojanen concluded that doses of moderate-intensity exercise were optimal for exercise to be effective (20) and indicated that “too little” exercise is likely to have no significant impact on affect (20), whereas “too much” exercise is likely to be aversive (4,16). This intuitively appealing proposal has permeated exercise psychology research and public health physical activity guidelines without full empirical support. In addition, weak methodologies might also have clouded the full impact of “moderate” exercise intensity.

Methodologies have typically assessed affective responses pre- and postexercise, but this approach potentially misses dynamic changes that might occur before, during, and after exercise (5). Bixby et al. (5) suggest that there are different temporal dynamics in affective responses, one of which is described as a rebound model. This model shows that affective states during exercise are opposite those experienced during recovery, with both states different from baseline. This rebound model is similar to that proposed by Solomon (25,26) in the opponent−process theory, which implies that if the work stimulus is perceived as aversive (as might be experienced during high-intensity exercise), then the affective state postexercise would be relatively positive. Conversely, the affective state during recovery could be relatively negative if the work stimulus was perceived as enjoyable and cessation of the exercise was seen as a “letdown.”

If a research methodology does not include this in-task measurement, then the change in affect will be missed. If affect is the first link in the chain for exercise adherence (30), then the impact of changes in affect during exercise, particularly a decline in affect, could be significant to decisions on future exercise participation even though affect recovers postexercise. There have been relatively few studies that have tracked the temporal course of affective responses before, during, and after exercise of different intensities (e.g., 21) and certainly as far as the researchers are aware, none that have investigated the temporal dynamics in a young adolescent population.

From a motivational perspective, the culture of exercise prescription and programming (of being told what exercise to do and at which intensities) can be perceived as highly controlling. According to the theory of self-determination (SDT; 6), this type of environment would thwart rather than encourage the development of intrinsic motivation, a central element in promoting adherence to exercise.
Intrinsic motivation is based on three innate needs: the need for competence, self-determination (autonomy), and relatedness (belonging). An exercise program that supports these needs should help an individual become more intrinsically motivated. Offering choice to the individual in the exercise programming provides a means of supporting self-determination and, when choice is offered, research has shown that participants select an intensity not dissimilar to the intensities typically prescribed to improve cardiovascular fitness (>50% \( VO_\text{max} \); 21). Therefore, an interest of this study is to explore the exercise intensity chosen by the young adolescent population and the affective response that is elicited.

The purpose of this study was to investigate (1) the temporal dynamics of affective responses of a young adolescent sample during prescribed and self-selected exercise and (2) affective responses across the prescribed and self-selected exercise intensities on removal of the exercise stimuli.

**Method**

**Participants**

Twenty-two healthy young adolescents (11 boys and 11 girls; mean age 13.3 ± .33 years) were recruited for the study. Participants were recruited from a school in the west of England following selection by staff from the physical education department. The participants were asymptomatic of illness and preexisting injury and were able to exercise to exhaustion. All participants, along with their parent or guardian, read and signed informed consent forms approved by the university’s ethics committee.

**Measures**

**Perceived Exertion.** Perceived exertion was used as part of a manipulation check and was assessed using the Cart and Load Effort Rating scale (CALER; 10). A child-specific scale, the CALER has a range of numbers familiar to children (1 to 10) and verbal expressions chosen by children as descriptors of exercise effort. The illustrated scale shows a child pulling a cart that is loaded progressively with bricks. The number of bricks in the cart corresponds with numbers on the scale. Wording on the scale has been selected from the Children’s Effort Rating Table (CERT; 33) and accompanies some of the categories of effort.

**Affective Valence.** Affective valence was assessed using the Feeling Scale (FS; 14). The FS is an 11-point, single-item, bipolar scale, which is commonly used for the assessment of affective responses during exercise (9). The scale ranges from –5 to +5. Anchors are provided at 0 (‘neutral’), and at all odd integers, ranging from very good (+5) to very bad (–5). The FS has been found to correlate between .51 and .88 with the valence scale of the SAM and from .41 to .59 with the valence scale of the affect grid (30).

**Procedures**

Participants took part in four laboratory-based exercise sessions over a period of 2 weeks; a graded exercise test (GXT) to establish maximal aerobic power (\( VO_\text{2 max} \))
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and ventilatory threshold (VT) was followed by three submaximal protocols, set at a low intensity (below the VT), high intensity (above the VT), and a self-selected intensity. Participants completed the high- and low-intensity tests on the same day, in a counterbalanced order, with a minimum of 30 min between exercise sessions. The self-selected intensity was always completed last and on the following day.

On arrival at the laboratory on the first occasion, participants were briefed on procedures for the maximal test and any outstanding questions were addressed. Mass and stature were recorded, heart rate monitors were fitted, and participants were asked to complete a brief questionnaire about their activity and fitness levels. Questions asked how active (inactive to highly active) and fit (unfit to very fit) participants perceived themselves on scales ranging from 1 to 4. Participants were introduced to the CALER (10) and FS (14) and given standardized instruction on how to implement these scales in the forthcoming exercise tests. A period of familiarization and practice with the scales was provided when participants first arrived at the laboratory and during the warm-up period before the test. Any questions concerning the use of the scales were answered during this time, and emphasis was placed on the perception of overall whole body exertion when using the CALER.

Tests were conducted on an electronically braked cycle ergometer (Lode Excalibur Sport, Groningen, Netherlands). The resistance on the cycle was manipulated using the Lode Workload programmer and calibrated to an accuracy of ±1 W, independent of pedal speed. Participants’ seat height and handlebar positions were established using standard criteria noted by investigators and subsequently maintained for each test thereafter. Facemasks, with an unobstructed mouth and nose design (Hans Rudolph, 8,940 series) to allow participants to verbally communicate with the experimenter, were fitted using head caps once the participant was comfortably settled on the cycle ergometer.

Online gas analysis was carried out via a breath-by-breath system (Cortex Metalyser 3B, Biophysik, Leipzig, Germany). The system was calibrated before every test in accordance with manufacturer’s guidelines against known concentrations of cylinder gases and a 3-L syringe (for flow volume). Heart rate was assessed as an indicator of exercise intensity using a wireless chest-strap telemetry system (Polar Vantage NV) and recorded continuously via a link to the Cortex gas-analysis system. All display screens on the workload programmer, cycle ergometer, and computer were concealed from the participant during each trial. The exception to this was the “revolutions per minute” (rpm) counter on the cycle ergometer, which was visible during all tests to allow control of cadence to remain between 60–80 rpm throughout all trials.

**Graded Exercise Test (GXT).** The GXT consisted of a 3-min warm-up against a light resistance (40 W) followed by a continuous, incremental, step protocol starting at 20 W and increasing by 20 W every 2 min. Participants pedaled at a cadence of between 60–80 rpm and were given verbal encouragement in the final minutes of the tests to encourage maximal effort. Maximal effort was considered to be given if, in addition to subjective indications of intense effort (facial flushing, sweating, discomfort), participants could not maintain pedal speed above 60 rpm. At 2-min intervals during the test, participants were asked to state their rating of perceived exertion (CALER; 1–10 scale) and affective valence (FS; –5 to +5 scale) using scales mounted on the wall in front of them for reference. On termination of the test, facemasks were removed, and participants were then required to cool
down for a period of 5 min on the cycle ergometer and then complete a series of demonstrated stretches.

From the data generated, the ventilatory threshold was determined using a computerized v-slope method (3) using linear regression analysis to detect the point at which \( VCO_2 \) begins to rise at a more rapid rate than \( VO_2 \), and is independent of the ventilatory response to exercise. This method has been shown to be useful in assessing patient populations with irregular breath-by-breath oscillations with whom the use of traditional methods of visually detecting the ventilatory threshold was found to be difficult. This problem exists in children, and therefore it is an attractive technique to use with the population (11). Breath-by-breath data from each test was smoothed to average every 20 s, making visual identification clearer. Two investigators carried visual inspection out independently. If there was any disagreement between reviewers, a discussion was held to find agreement on the value for the breakpoint. In the event of any significant disagreement (two occasions arose), a third researcher was consulted.

**Submaximal Tests.** Three submaximal exercise tests were conducted on the electronically braked cycle ergometer. Heart rate was monitored using a wireless chest-strap telemetry system (Polar Vantage, NV), and values were concealed from participants during the tests. In each of the submaximal tests, preexercise heart rate and FS responses were taken 5 min before the start of the test when participants were seated on the cycle ergometer before commencing the test’s warm-up. Preexercise heart rate and FS responses were also taken immediately before the start of the test. Participants were given 3 min warm-up against a light resistance and were then required to exercise for 15 min and maintain a cadence of between 60–80 rpm.

The cycle ergometer was loaded for each participant using individual ventilatory threshold data to elicit a response at one of two intensities: low (below VT: 80% of VT power output) and high (above VT: 130% of VT power output). The typology of exercise intensity set by Gaesser and Poole (12) was used to guide the intensity levels. Workloads below the VT are defined in the moderate domain, and a level of 20% below the VT was set after consultation with a physiology colleague (32). The onset of critical power can vary widely between 25% and 95% of the range from VT to \( VO_2 \) max (18). Therefore, to achieve a high-intensity level following the definition of a severe intensity domain (12), 30% above VT was chosen as targeting the level of critical power (the highest work rate at which blood lactate and \( VO_2 \) can be maintained in a steady state).

For the third test, participants set a self-selected intensity. This was set by asking the participant to “select an intensity that you would be happy to sustain for fifteen minutes and that you would feel happy to do regularly” (21). Participants were told that they could modify the self-selected intensity during the test at minutes 5 and 10 if they wished. Any adjustments made to the exercise intensity were recorded.

Before each test, participants were introduced to the CALER and FS and were provided with standardized instructions on how to employ the scales in the pending exercise test. During all three tests, the scales were mounted on a wall in full view of the participant. Participants were asked for FS and CALER responses in the last 45 s of each 5-min period (minutes 5, 10, and 15). On the completion of the test, immediate postexercise FS scores were recorded. Participants were then again asked for responses at 5 min, 10 min, 15 min, and 30 min postexercise.
Statistical Analysis

Analyses were split into four sections: descriptive statistics, manipulation checks for the intensity conditions, and analysis of FS data.

Descriptive Statistics. Independent \( t \) tests were conducted on \( \text{VO}_2\text{max} \) scores from the GXT, BMI, fitness, and activity levels to explore any differences between genders.

Manipulation Checks. Two factor-repeated measures analyses of variance (ANOVA) were conducted on heart rate and on CALER data to verify participants worked at different intensities (high and low) during the prescribed intensities and to identify the intensity worked at during the self-selected intensity bike tests. A one-way repeated measure ANOVA was also conducted on exercise-intensity levels to explore potential differences in the three intensities.

FS Data. Two factor repeated measures ANOVAs were conducted on FS data to analyze the patterning of responses during each exercise intensity condition and the patterning of FS responses pre- to postexercise in each condition. All statistically significant findings were investigated, using Tukey posthoc tests, to identify where significant differences lay. Greenhouse-Geisser epsilon corrections were used to adjust the degrees of freedom in which the sphericity assumption was violated.

Results

The descriptive data of participants who took part in the study can be found in Table 1. Independent \( t \) tests indicated a significant difference \( [t(20) = 3.67, p < .01] \) between boys’ and girls’ \( \text{VO}_2\text{max} \) scores with boys reaching significantly higher

<table>
<thead>
<tr>
<th>Variable: Boys</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
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<tr>
<td>Height (m)</td>
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<td>1.6</td>
</tr>
<tr>
<td>Mass (kgs)</td>
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<td>48.3</td>
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<tr>
<td>Body mass index (kg/m(^2))</td>
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</tr>
<tr>
<td>Average ( \text{VO}_2\text{max} ) (mL \cdot kg(^{-1}) \cdot min(^{-1}))</td>
<td>48.2</td>
<td>48.4</td>
</tr>
<tr>
<td>Activity level (1–4)</td>
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<td>3.2</td>
</tr>
<tr>
<td>Fitness level (1–4)</td>
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<td>2.7</td>
</tr>
</tbody>
</table>

Table 1 Mean Descriptive Characteristics of Participants
average VO_{2}\text{max} (see Table 1). No other differences between gender groups were found. The participants reported themselves to be active (mean = 3.36 ± .66) and moderately fit to fit (mean = 2.91 ± .68). Both boys’ and girls’ VO_{2}\text{max} scores were close to typical values for their ages (15).

**Manipulation Checks**

To examine the hypotheses, it is important to verify that the exercise intensity conditions were significantly different and that individuals did indeed work at high and low intensities above and below their VT. Two-factor repeated measure ANOVAs (condition × time) were conducted on both the recorded heart rate and CALER responses. A one-factor (intensity) repeated measure ANOVA was also conducted on the average power output from each of the three exercise intensity conditions to identify any differences.

**Heart Rate.** Analysis of the heart rate data resulted in a significant time × condition interaction \[F(2.7, 56) = 9.69, \varepsilon = .67, p < .01, \eta^2 = .32\]. Post hoc analysis revealed that, at minute 15, HR responses in self-selected and low-intensity conditions differed significantly with a greater HR increase in the self-selected intensity condition.

Significant main effects were found for condition \[F(2, 42) = 63.8, p < .01, \eta^2 = .75\], with HR responses in the high-intensity condition significantly greater (182 ± 11.5) compared with the low (150.3 ± 18.3) and self-selected (155.4 ± 14.2) conditions. A main effect for time was also found \[F(1.5, 31.5) = 61.93, \varepsilon = .75, p < .01, \eta^2 = .75\] with all HR responses increasing significantly between minute 5 and minute 15.

**Cart and Load Effort Rating Scale (CALER).** Analysis of the CALER data revealed a significant condition × time interaction \[F(3, 63.4) = 23.4, \varepsilon = .75, p < .01, \eta^2 = .53\]. Post hoc analysis showed the high-intensity condition responses increased significantly across all time points in comparison with the low and self-selected condition responses. Responses were higher in the self-selected condition compared with the low-intensity condition at minutes 10 and 15.

Significant main effects were found for condition \[F(2, 42) = 95.3, p < .01, \eta^2 = .82\] and time \[F(1.4, 30.3) = 105.5, \varepsilon = .72, p < .01, \eta^2 = .83\]. Significantly different CALER responses were recorded in all three conditions with the high-intensity condition having significantly higher CALER responses (6.2 ± .95) than both the low (2.59 ± 1.1) and the self-selected (3.53 ± 1.1) conditions. All CALER responses increased over time.

**Intensity.** The result of the single-actor (intensity) repeated measures ANOVA was significant \[F(2, 42) = 158, p < .01, \eta^2 = .88\]. Posthoc analysis showed the difference to lie between the high-intensity condition (121 ± 21 W) and both the low-intensity (75 ± 15 W) and averaged self-selected (83 ± 22 W) conditions. There was no significant difference between the low and averaged self-selected intensity conditions.

Results of the manipulation checks indicate that the experimental manipulations were effective in producing significantly different exercise intensities in the low and high conditions.
Two-factor repeated measures analysis of variance on the feeling scale data revealed a significant condition × time interaction \[F(2.9, 59.9) = 10.6, \varepsilon = .71, p < .01, \eta^2 = .34\]. Post hoc analysis showed that there was a significant reduction in FS responses in the high-intensity condition compared with the low and self-selected intensity conditions at minutes 5, 10, and 15.

Significant main effects were found for time \[F(1.6, 32.6) = 19.8, \varepsilon = .78, p < .01, \eta^2 = .49\] and condition \[F(1.5, 30.6) = 61.4, \varepsilon = .73, p < .01, \eta^2 = .75\]. These results reflect the interaction: FS becoming less positive over time and FS becoming more positive in the self-selected intensity (2.84 ± 1.85) and low-intensity (2.5 ± 1.89) conditions compared with the high-intensity condition (4.2 ± 2.00). There was no significant difference between the self-selected and low-intensity conditions at any time point (see Figure 1).

Significant main effects were found for time \[F(2.3, 46.5) = 29.9, \varepsilon = .39, p < .01, \eta^2 = .60\] and condition \[F(2, 40) = 13.4, p < .01, \eta^2 = .40\]. Post hoc tests showed that post-0 mins significantly differed from all other time points and post-5 mins differed significantly from pre-5 mins, post-15 mins, and post-30 mins. The high-intensity condition (3.0 ± 1.7) differed significantly from the low (3.6 ± 1.7) and the self-selected intensity conditions (3.7 ± 1.75).

**Pre- to Postexercise Affective Changes**

A two-factor repeated measures ANOVA was conducted on FS responses at time points: pre-5 mins, pre-0 mins, post-0 mins, post-5 mins, post-10 mins, post-15 mins and post-30 mins. A significant condition × time interaction was found \[F(5.5, 109.5) = 8.67, \varepsilon = .46, p < .01, \eta^2 = .30\]. This interaction lay with post-0 mins in the high-intensity condition and all other time points and also with post-5 mins in the high-intensity condition and all other time points except post-0 mins in the low and self-selected intensity conditions. A significant difference was also found between pre-5 mins (3.62 ± 2) and post-30 mins (4.19 ± 2) in the self-selected intensity condition with an increase in FS response (see Figure 2).

Significant main effects were found for both time \[F(2.3, 46.5) = 29.9, \varepsilon = .39, p < .01, \eta^2 = .60\] and condition \[F(2, 40) = 13.4, p < .01, \eta^2 = .40\]. Post hoc tests showed that post-0 mins significantly differed from all other time points and post-5 mins differed significantly from pre-5 mins, post-15 mins, and post-30 mins. The high-intensity condition (3.0 ± 1.7) differed significantly from the low (3.6 ± 1.7) and the self-selected intensity conditions (3.7 ± 1.75).
Discussion

The purpose of this study was to develop an understanding of the temporal dynamics of affective responses during and after prescribed and self-selected exercise in a young adolescent population. Based on the self-report data and GXT data, the young adolescent population recruited for this study were predominately fit and perceived themselves as active.

Manipulation checks confirmed that the prescribed exercise conditions of low and high intensity were significantly different from one another and were situated below and above the VT, respectively.

Examination of FS responses during exercise found that affective responses were positive in both the self-selected and low-intensity conditions but declined above the VT in the high-intensity condition. No differences were found between FS responses in the self-selected and low-intensity conditions, with FS responses in both intensity conditions between “fairly good” and “good.” These similarly positive responses mirrored findings in previous adult-based research (21) and echoed the likeness in participants’ physiological efforts at the first two time points in these intensity conditions. When the self-selected intensity exceeded that of the low-intensity at the last time point, FS responses in the condition remained stable; they did not deteriorate with increased intensity. It is, however, relevant to note that the participants were aware of the duration of the test and the time lapsed and this might have influenced levels of exertion and given FS responses. This could link into the concept of teleoanticipation, which is described by Ulmer (29) but yet to be investigated in a young adolescent population. The observed pattern of decline in FS responses in the high-intensity condition is confirmed in previous research (13,21).

Figure 2 — The time × condition interaction in FS responses pre- to postexercise.
Results of pre- to postexercise affective responses showed greater uniformity in the temporal courses of affective responses. Regardless of the affective responses during exercise, the positive change found postexercise in the data is consistent with the rebound phenomenon described by Bixby et al. (5) and consistent with predictions of the affective contrast phenomenon, described in the opponent−process theory of acquired motivation (25,26). The opponent−process theory describes two contrasting processes (a and b processes). The a process begins immediately upon the start of exercise and arouses an opponent b process. The b process slowly builds in strength until it reaches its peak, and at the same time the intensity of the a process is reduced. Termination of the exercise stimulus leads to the end of the a process and then a slow deterioration of the b process until a return to baseline. The rebound patterns shown in the data reflect the peak of the b process and the end of the a process. In terms of the impact of the high-intensity exercise condition, the strength of physiological cues experienced in the body during exercise and the resulting negative affective responses would suggest that a weaker b process did not counter the effect of the a process. This was associated with the reduction in affect during exercise, a smaller rebound, and a relatively slow return to baseline following exercise.

Results highlight the importance of measuring affective responses throughout the exercise experience so that accurate conclusions can be drawn about the impact of differing exercise intensities. Analysis of FS data showed that affective responses during exercise were sensitive to exercise intensity. The high exercise intensity led to reductions in affect during exercise, but the divergent trends between intensity conditions were diminished postexercise with a rebound in responses, albeit slower than anticipated in the high-intensity condition. Clearly, a research protocol that only measures pre- to postexercise affect offers a limited view of the temporal course of affective responses.

Analysis of HR data showed the self-selected intensity to be significantly lower than the high-intensity condition across all time points. The self-selected intensity was comparable to the low-intensity at the first two time points and significantly higher at the last time point in the test. Comparisons between the HR data in the self-selected intensity condition and VT data (derived from the GXT) showed that at minute 15 participants had higher heart rates than at VT, indicating that participants chose to work harder in the last 5 min of self-selected exercise.

CALER responses did not reflect the physiological effort of the HR data in the self-selected intensity condition, only matching (rather than exceeding) the VT responses at minute 15. This patterning of CALER responses suggests that, despite participants choosing to work at an exercise intensity physiologically the same as then exceeding the VT, they perceptually underestimated their efforts. This is consistent with findings by Dishman et al. (7) who noted that “RPE at [a] preferred intensity of exercise can uncouple from indicators of relative metabolic intensity typically linked with RPE” (p. 787).

These data provide the first insight into the intensity at which young adolescents choose to exercise. The self-selected intensity level sat between the low and high-intensity conditions and differed significantly from the high-intensity condition. The chosen average final self-selected intensity was significantly different to both the final low- and high-intensity condition even though this change in intensity was not reflected in either reductions in positive affect or increases in perceived
exertion. As previously highlighted, the knowledge participants had of the tests’ duration and their corresponding physiological resources might have influenced these results. Nevertheless, similar to previous research with adults (21), the results show that when a fit young adolescent population was given choice, they chose to exercise at an intensity of physiological benefits (around the VT) and perceive it to be less of an effort than when an intensity of a similar level is prescribed. This finding supports recommendations that emphasize the importance of recognizing individual preferences when setting exercise intensities (23). It is important to acknowledge, however, that an individual’s preferential choice of intensity might be influenced by the instructions given by the exercise facilitator such as the goals of the exercise session.

In this way, careful consideration of instructions given to participants regarding the selection of a preferred intensity is needed. We identified that our instructions, which asked participants to “select an intensity that you would be happy to sustain for 15 min and that you would feel happy to do regularly” might have misled some participants. Potentially, individuals might have construed these instructions as “select an intensity which makes you feel happy,” which would impact the affective responses given during exercise. It is unknown whether the positive affective response during the self-selected intensity condition is because of the possible misinterpretation of the instruction or because of the choice and self-determination in the self-selected intensity condition. In future research, it is recommended that these instructions should read “select an intensity that you are able to sustain for 15 min and that you would consider doing regularly” to avoid this potential confusion.

Limitations of this study are recognized. This study was conducted in a laboratory environment and therefore the validity of extrapolating findings to a nonlaboratory context is questionable. Affective responses elicited under laboratory conditions could be very different to those given during similar exercise bouts in a natural environment (8). In addition, only exercise intensity was manipulated, and duration was fixed throughout the tests. Manipulation of both variables should be considered in future research. It should also be noted that the FS has not been explicitly validated with this population. This single-item bipolar scale with a simple range of numbers, which are considered familiar to young adolescents and are anchored with easy comprehensible verbal anchors, was regarded as an appropriate tool to use, however.

In summary, temporal patterns in affective responses, previously reported in research with adults, were replicated in a fit young adolescent population. During exercise, declines in affective states were found in the high-intensity condition and positive affective states were found in the self-selected and the low-intensity conditions. Postexercise, a rebound phenomenon was observed across all intensity conditions. These results could have implications for teachers and exercise professionals, indicating that caution should be employed when prescribing high-intensity exercise (above the VT) because of the large decline in affect that occurs during exercise. If long-term adherence to exercise can be influenced by affect (34), then results indicate that teachers and exercise professionals should encourage exercise at either self-selected or low-intensity levels (below the VT) so that affective responses stay predominately positive to maximize the chance of positive affective states being experienced. Future research should explore whether these temporal
patterns of affective responses also occur in exercise of varying durations, as well as intensity, and confirm the influence of affective responses to acute exercise on the long-term exercise behavior of young adolescents.

References


