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Cohesion is Associated with Perceived Exertion and Enjoyment during Group Running

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ABSTRACT

Carnes AJ, Mahoney SE. Cohesion is Associated with Perceived Exertion and Enjoyment during Group Running. **JEPonline** 2016; 19(6):24-39. The purpose of this study was to determine if interval running with a group affects average speed, perceived exertion (RPE), and/or enjoyment in recreational runners, and if these variables are associated with cohesion and/or social support. Twenty adult runners performed two trials under different social conditions (alone, group), consisting of high intensity intervals. Average interval time, enjoyment, and RPE were compared between trials. Social support and cohesion were assessed separately. There were no main or interaction effects on average speed (P>0.87), RPE (P>0.08), or enjoyment (P>0.26). Task cohesion (*r* = -.58, P=0.01) and social support (*r* = -.73, P=0.001) were negatively associated with RPE in the group condition only, and positively associated with enjoyment. Running with a group did not affect speed, enjoyment, or RPE during an interval workout. However, higher perceived task cohesion and social support were associated with lower perceived exertion and greater enjoyment during group running. While the group environment did not augment the subjects' average running speed during a high intensity interval workout, group training may nonetheless furnish psychological benefits that could aid in the completion of challenging, high intensity training sessions.

Key Words: Group Running, Cohesion, Recreational Runners, Social Support, Social Facilitation

INTRODUCTION

Distance running is a highly popular fitness and athletic activity among US adults of both sexes and a wide range of ages. Over 17 million individuals participate in organized running events from 5 km to marathon (42.2 km) distances, and more recently ultramarathon (>42.2 km) distances annually (45). Among competitive and recreational runners alike (32), training in a group is commonly viewed as a simple yet effective strategy to boost performance. Various elements of a group environment are thought to encourage harder training effort and, therefore, produce greater improvements in fitness than when training alone (24,30). This strategy reflects similar recommendations by fitness professionals to increase the motivation to exercise (19,33).

Knowledge of the potential benefits of exercising with others is not new. Ample research points to social support as a strong correlate of physical activity (55), and the phenomenon of "social facilitation" – that is, enhanced performance in the presence of others – was proposed over a century ago (53,54,62). Although the social environment appears to have a positive influence on total exercise behavior as well as cognitions and attitudes associated with exercise (13), it is not a foregone conclusion that every individual who trains with others for an athletic event (e.g., a footrace) will exert a greater effort than he or she would alone during training sessions. For instance, while social support has been shown to increase the amount of physical activity and promote adherence to exercise programs in adults who are not competitive athletes (57), such results cannot be generalized to the voluntary effort of athletes during individual training sessions.

Social facilitation, by contrast, has a stronger basis of examination in the athletic population. Studies on cyclists (16,61), swimmers (59), and weightlifters (42) suggest that the presence of an audience and/or competition can improve maximal physical performance. Yet, despite the positive effect on maximal athletic performance shown in these studies (16,42,59,61), only a small number of studies by our research group (7-10) have examined the potential role of social factors during athletes' submaximal training sessions. Many athletes, especially those in endurance sports, perform a substantial amount of training below maximal effort (22,49). Recent evidence supports a "polarized" endurance training scheme comprised of a large volume of low intensity training, interspersed with a smaller proportion of structured, high intensity efforts (29,49). Increased intensity in the presence of others during either type could augment the total training stimulus (52,37). However, increased effort could also be detrimental if intended low intensity training becomes excessively strenuous, which could inhibit recovery (35,37), and/or the intensity of structured sessions (6). Therefore, a better understanding of factors which could modulate the volume or intensity of submaximal training (such as a partner or group) is warranted.

While a small number of experimental studies on non-athlete adults (27,39) and children (1,43,47,48) suggest that the presence of others (i.e., peer influence) can increase the intensity, amount of physical activity (via accelerometer), or enjoyment of self-regulated exercise, our recent studies on competitive and recreational adult runners (7-10) raise the question: Is the link between training with others and individual effort consistent across different types of exercisers (e.g., non-athletes vs. athletes). Our prior studies diverge from previous findings of positive effects, showing null (9,10) or negative (7,8) responses to the presence of a peer. The unexpected findings of these preliminary studies on adult runners,

compared with the enhanced maximal athletic performance in previous social facilitation literature (16,42,59,61), highlight the need for further experimental research on the behavioral and psychological effects of performing submaximal training coactively with others.

Local running clubs and groups offer the most common avenue to train with others. Also, they are widely available throughout the US (44), and provide scheduled training sessions in a group environment (24). However, no existing research has examined the effect of training in a regularly meeting group (vs. alone) on voluntary intensity or volume, or the perceived effort (i.e., ratings of perceived exertion (RPE), and enjoyment of a bout of training. Within this context, an individual's perception of the group's social environment and collective goals may be more important as the mere presence of the other group members. In this regard, an established body of research has investigated group cohesion, which is characterized by a sense of common unity in the pursuit of specific collective goals and/or objectives and a tendency to "stick together" in the face of adversity or obstacles (11). Cohesion has been shown to be a robust predictor of the adherence behavior of exercise group (15,50) and sport team (14) members, but we are aware of only one study that has empirically examined the effect of perceived cohesion on physical exertion in athletic individuals.

Prapavessis and Carron (40) found that individual sport team members' perception of the team's task cohesiveness had a positive impact on exertion relative to individual maximum in a running task. However, the authors did not test for a difference in exertion between performing the task simultaneously with teammates and performing it alone. Another proposed benefit of group exercise, the provision of social support, has also been consistently identified as a strong correlate of physical activity and a predictor of adherence behavior (13,23). Yet, despite the extensive research showing the utility of social support in promoting regular physical activity, it has seldom received attention as a possible moderating influence on acute exercise intensity (28).

The existing experimental research on the effect of partner or group influence on acute training intensity in athletic individuals is limited, and the idea of universally increased motivation and intensity when running in a group relies on anecdotal support. Although previous studies on peer influence during voluntarily paced continuous running showed inconsistent results (7-10), high intensity intervals within the polarized training model (29,37,49) require effort more similar (25,36) to the maximal effort shown to be enhanced in previous social facilitation studies on athletes (16,42,59,61). Furthermore, this type of training can have a powerful effect on endurance performance (25,36,37). If social facilitation or perceived cohesion in a group setting augments the rate of work sustained during high intensity training, running in a group may indeed be an effective means to enhance the adaptive response (25,52) and ultimately, competitive performance (37). However, no empirical evidence currently exists to support this potential outcome of training in a group.

The purpose of this study was to determine if running with a group affects average speed, perceived exertion, and enjoyment in members of an established public running group during a structured, high intensity interval session. Secondly, we sought to determine if any changes in these variables were related to individuals' perceptions of group cohesion or social support. Based on the previous social facilitation research (16,42,59,61) showing enhanced maximal performance in athletes, we hypothesized that runners performing a structured interval running session coactively with familiar group members would increase average

speed and report greater enjoyment compared to running the same workout alone. From previous cohesion research showing a positive effect on relative running effort (40), we also hypothesized that the magnitude of any changes in average speed and/or enjoyment would be positively associated with perceived cohesion and social support.

METHODS

Subjects

Twenty habitual adult runners (11 women, 9 men), all belonging to the same local running group, were recruited through fliers and verbal announcements by the principal investigator at group training sessions. The principal investigator had no other affiliation or involvement with the group. Three participants withdrew from the study, one due to knee pain and two due to scheduling conflicts, leaving data from 17 subjects (10 women, 7 men) to be analyzed. To be eligible for the study, subjects were required to report running at least 3 $d \cdot wk^{-1}$ and at least 20 $km \cdot wk^{-1}$ for the prior 6 months, compete in 3 or more organized running events during the prior 12 months, and free from medical complications (such as metabolic, orthopedic, and cardiovascular disorders). The subjects took part in the group to train for a series of local road racing events ranging from 5 km to the marathon (42.2 km). Each subject reported training with the group for at least 2 $sessions \cdot wk^{-1}$ for the last 4 wks. All subjects were provided a written informed consent, and all study procedures were approved by the University Institutional Review Board. Table 1 presents the subjects' physical characteristics.

Table 1. Descriptive Data of the Subjects. Values are reported as means ± SD (N = 17).

	Men	Women
Age (yr)	45.3 ± 6.52	44.5 ± 14.9
Body Mass (kg)	80.7 ± 10.4	64.5 ± 8.87
Height (cm)	178 ± 2.28	162 ± 5.62
Weekly Volume ($km \cdot wk^{-1}$)	32.6 ± 10.6	30.4 ± 9.89

Procedures

Each subject completed two experimental trials. Each trial was a different social condition (group, alone) and in a randomized order. In the group condition, the subjects were observed while performing a previously scheduled "speed" session coactively with the entire running group, including those who were not study participants. This session was part of the group's prearranged schedule and was selected for examination due to its intermittent, high intensity nature. In order to observe the subjects' customary training habits, they were allowed to run with anyone with whom they normally did during group sessions, but were not required to run alongside any other specific group member. Because the group included members with varying ability, individual runners progressed through the session at varying rates. While many of the training group's members simultaneously completing the session were not subjects in the study, participants were observed within this environment in order to mimic as closely as possible an actual group training environment and preserve the usual interactions the subjects had with other accustomed group members.

Initial Session

Prior to the data collection sessions, the principal investigator met individually with each subject in the university laboratory to explain the study procedures, obtain written informed consent, and collect anthropometric measurements. Height and weight were measured to the nearest millimeter using an analog stadiometer (Seca, Chino CA) and to the nearest 0.2 kg using a calibrated balance beam scale (Seca, Chino CA), respectively. During this session, the subject also completed validated questionnaires to assess perceived cohesion of the running group and the provision of social support from the group. Perceived cohesion and social support were assessed using the Group Environment Questionnaire (GEQ) (14) and the Exercise Social Provisions Scale (EXSPS) (18), respectively. The subject was given standardized instructions on the completion of each questionnaire, and was permitted to ask questions at any time. All questionnaires were completed privately and the order in which the subjects completed the GEQ and EXSPS was counterbalanced. Lastly, the subject was introduced to the Borg 6-20 RPE scale (5) and provided standardized instructions on its use.

Group Interval Session

Each interval running session consisted of 8 uphill 400 m intervals. The hill was part of a paved pedestrian path closed to vehicular traffic, and had an average inclination of 7.6%, as calculated using Google Earth. The same hill was used for all intervals under both social conditions. Upon arrival to the data collection site, subjects were individually fitted by research staff with a heart rate monitoring chest strap and wrist unit. The instructions for the session were explained by the principal investigator to the subjects, who were then given the opportunity to ask any questions before the session began. Then, the subjects performed a 10-min light intensity warm-up, on a flat section of the path used for the warm-up in both sessions. The subjects were instructed to run each interval at a “hard” but not maximal effort, correspondent to 90 to 95% of maximal effort and 16 to 18 on the Borg RPE scale (37,38). The recovery between each interval was dictated by the time required for the subject to jog down the hill at a light effort. The subsequent interval began as soon as the subject returned to the starting point. Any timing or monitoring devices worn by the subject were obscured by black nontransparent tape, and group members not participating in the study were asked not to share any temporal feedback with the subjects until the conclusion of the workout. At the end of each interval, the elapsed time, average heart rate, and rating of perceived exertion (RPE) for that interval were recorded. The elapsed time of each recovery period was also recorded between intervals. The data recorded for each of these variables was then averaged over the 8 intervals. Each subject’s enjoyment (i.e., liking) of the entire session was assessed at the conclusion of the workout in a private area via visual analog scale.

Alone Interval Session

The alone trial took place at the same time of day, 5 to 7 days before or after the group trial. The subjects were given identical directions to the group trial, and completed the same training session on the same course. Measures were identical to those in the group trial.

Measurements

Group Environment Questionnaire

The Group Environment Questionnaire (GEQ) is a four scale instrument that provides a valid and reliable measure of perceived cohesion in sport teams (14) and exercise groups (15,50,51). The questionnaire is based on a recognized conceptual model (21) describing

cohesion as a construct consisting of four elements, as illustrated in Figure 1. The model distinguishes between individual and group aspects of cohesion, which are each subcategorized into task and social orientations. The individual aspect is divided into Individual Attraction to Group-Task (ATG-T) and Individual Attraction to Group-Social (ATG-S), while the group aspect is divided into Group Integration-Task (GI-T) and Group Integration-Social (GI-S).

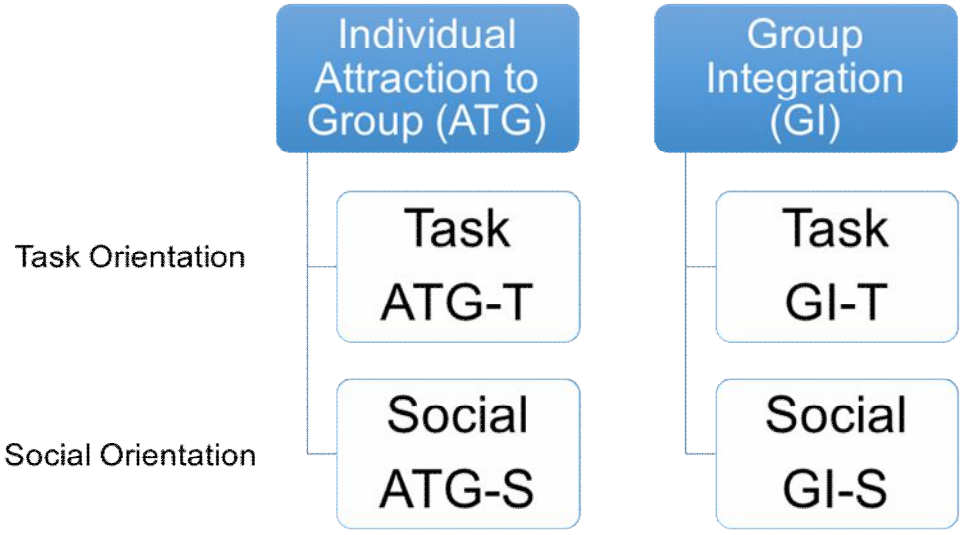

Figure 1. Conceptual Model of Group Cohesion (14).

Individual Attraction to Group-Task (ATG-T) is a measure of the individual's perception of his or her personal involvement in the group's common task and/or goals, while Individual Attraction to Group-Social (ATG-S) is a measure of the individual's perception of his or her acceptance, inclusion, and involvement in the group's social atmosphere. Group Integration-Task (GI-T) is a measure of the individual's perception of the group's unity around the shared pursuit of common goals, while Group Integration-Social (GI-S) is a measure of the individual's perception of the group's closeness as a social entity (21). The GEQ assesses an individual's perception of the four separate elements of group cohesion using an 18-item questionnaire to which responses are given on a 9 point Likert scale ranging from 1 ("strongly disagree") to 9 ("strongly agree").

Exercise Social Provisions Scale

The Revised Exercise Group Social Provisions Scale (EXSPS) is a validated questionnaire developed by Cutrona and Russell (18) to assess six distinct components of social support, as described by Weiss (56): attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance. The questionnaire consists of 24 items to which responses are given on a 4 point Likert scale ranging from 1 ("strongly disagree") to 4 ("strongly agree").

Enjoyment

Subjects rated their enjoyment of each interval session using a visual analog scale (VAS) that consisted of a continuous horizontal 100-mm line anchored by "do not like it at all" on the left

and “like it very much” on the right (4). The subject was shown the scale and was instructed to make a mark on the line to indicate his or her level of enjoyment of the session, with a higher millimeter measurement indicating greater liking.

RPE

Undifferentiated, whole-body RPE was assessed at the conclusion of each interval using the validated Borg RPE scale (5). The subject was shown a large placard of the scale and allowed to point to or verbally express the number (6 to 20) indicating his or her level of perceived exertion.

Statistical Analyses

Statistical analyses were conducted using SPSS 21 (IBM Inc, Armonk, IL) with an alpha level of $P \leq 0.05$. Means and measures of variability were calculated for the primary dependent variables (average interval time, average interval RPE, and enjoyment) in each social condition. Assumptions of normality were tested and confirmed for each dependent variable using Shapiro-Wilk tests. Because the running group included multiple study participants, interdependence occurred between the subjects who completed the group condition coactively. Therefore, mixed-effects regression models were used to examine main and interaction effects of social condition and sex for each dependent variable. Mixed models assume that the data within subjects are dependent among the observations and can therefore be used to account for interdependence (26). Separate models were performed for each of the dependent variables. All regression analyses utilized the following model:

$$\text{Dependent variable} = \alpha + \beta 1\ (\text{social condition}) + \beta 2\ (\text{sex}) + \beta 3\ (\text{social condition*sex})$$

Post-hoc paired *t*-tests were performed for any significant main or interaction effects. Individual ratings of cohesion and social support were compared between sexes using unpaired *t*-tests. Pearson’s correlations were used to detect associations between perceived cohesion and social support and the primary dependent variables (interval time, enjoyment, and RPE) in each social condition.

RESULTS

The data for all dependent variables, grouped by sex, are presented in Table 2 (Values are reported as means ± SD, N = 17; *Significant main effect of sex, $P \leq 0.05$). The heart rate data were incomplete for numerous subjects. Therefore, the data were eliminated from the final analysis. Mixed model regression analysis showed a main effect of sex on average interval time ($F = 12.15$, $P=0.002$) in which the men (122 ± 16.1 sec) completed the intervals in less time than the women (155 ± 27.8 sec) across both social conditions. No main effect of social condition or sex by condition interaction occurred on average interval time ($P>0.87$). There were no main or interaction effects on RPE ($P>0.08$) or enjoyment ($P>0.26$). Data for ratings of perceived social support and individual aspects of cohesion are shown in Table 3 (means ± SD, N = 17). No aspect of cohesion nor social support differed between the sexes ($P>0.11$).

Table 2. Average Interval Time, Enjoyment, and RPE Across Social Conditions

	Men		Women	
	Alone	Group	Alone	Group
Time (sec)*	122.9 ± 16.1	121.1 ± 15.8	151.0 ± 27.7	151.8 ± 28.9
Enjoyment (mm)	79.4 ± 20.9	86.0 ± 13.5	71.9 ± 21.9	80.9 ± 12.9
RPE	14.6 ± 2.12	15.2 ± 1.95	15.8 ± 1.41	16.1 ± 1.47

Table 3. Perceived Cohesion and Social Support.

	Men	Women
ATG-T	8.14 ± 0.76	8.20 ± 0.57
GI-T	7.17 ± 1.54	7.50 ± 1.12
ATG-S	6.65 ± 1.13	7.46 ± 1.38
GI-S	6.00 ± 2.07	6.42 ± 1.72
EXSPS	3.21 ± 0.47	3.18 ± 0.45

Both individual and group aspects of task cohesion, Individual Attraction to Group-Task (ATG-T) and Group Integration-Task (GI-T), were negatively associated with RPE in the group condition (ATG-T: r = -0.58, P=0.01; GI-T: r = -0.54, P=0.03), but not RPE in the alone condition (P>0.25). The association between ATG-T and group condition RPE is shown in Figure 2. Neither measure of social cohesion (i.e., Individual Attraction to Group-Social (ATG-S), Group Integration-Social (GI-S)) was associated with RPE in either condition.

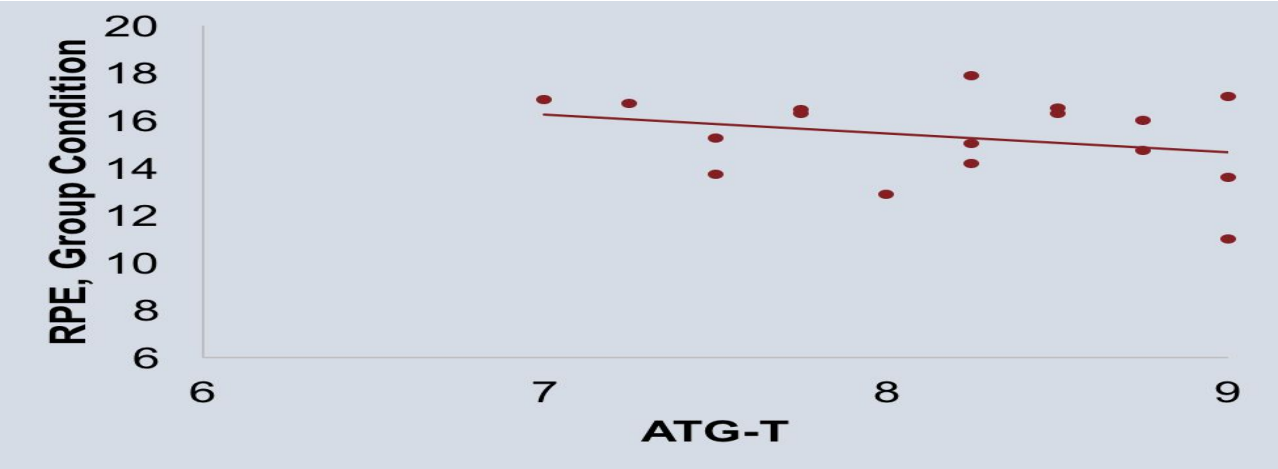

Figure 2. Task Cohesion (ATG-T) and RPE. Perceptions of task cohesion (ATG-T shown) were negatively associated with RPE only during the group condition (*r* = -0.58, P=0.01).

The subjects' perceived social support was negatively associated with RPE in the group condition (r = -0.73, P=0.001) but not RPE in the alone condition (P=0.17). The association between perceived social support and group condition RPE is shown in Figure 3.

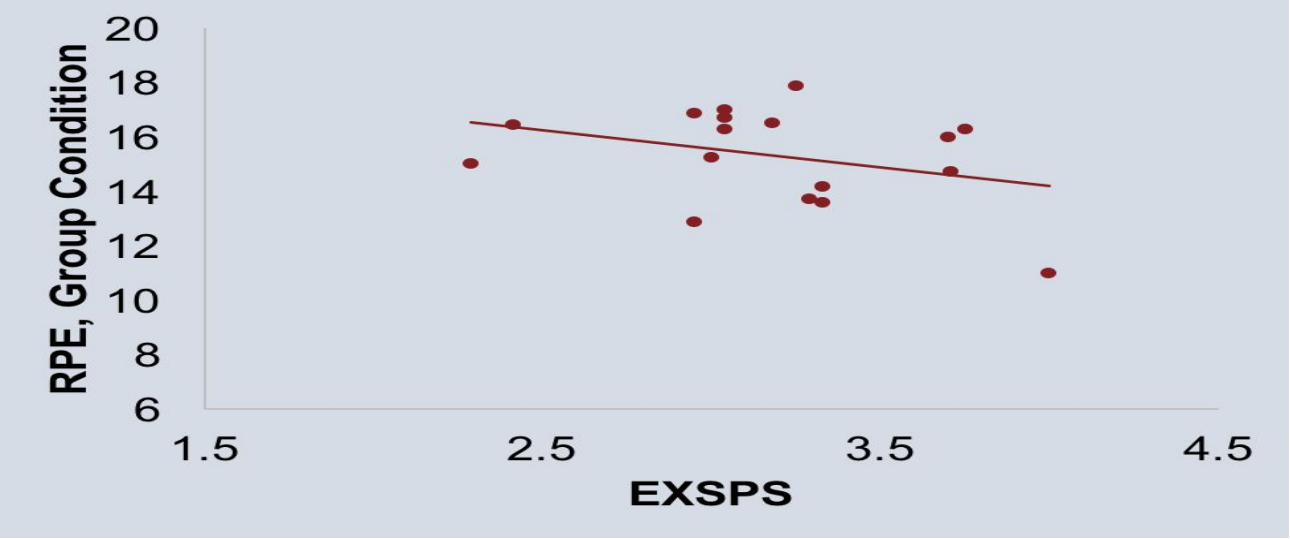

Figure 3. Perceived Social Support and RPE. Perceived social support was negatively associated with RPE only during the group condition (*r* = -0.73, P=0.001).

DISCUSSION

The primary finding of this study was that completing an interval running workout with familiar group members did not significantly influence the recreational runners' average speed, perceived exertion, or enjoyment of the workout. However, perceptions of both types of task cohesion (ATG-T and GI-T) and social support were negatively associated with perceived exertion during the group running condition, but not during the alone condition. This association, in concurrence with a lack of difference in average speed between conditions, may suggest that individuals who perceived higher task cohesion and social support reported lower effort in the group environment to run the same average speed. In addition, perceived task cohesion was positively associated with ratings of enjoyment of both interval running sessions.

Interestingly, the runners' average speed was not different between the two social conditions. Numerous studies on athletes have shown that an audience or competition can improve maximal performance (16,42,59,61) through a "social facilitation" process (53). However, in studies on recreational and competitive runners performing submaximal exercise (7-10), such an effect was not observed. During a self-paced, submaximal training session, collegiate male runners ran slower in the presence of teammates versus running alone (7). In a similar study on recreational runners, female runners decreased speed in the presence of an unfamiliar peer while male runners showed a positive change in speed (8). A later study showed no differences in voluntary speed, duration, perceived exertion, or enjoyment between running alone, with a familiar peer, or with an unfamiliar peer in recreational runners (9). The intensity in these studies was self-selected, but runners were advised to approach

the experimental trials as they would an unstructured, light to moderate intensity training session, which comprises a majority of endurance athletes' training (22).

The present study investigated the possibility that a group setting, through social facilitation (16,42,59,61) or the influence of cohesion (40) would stimulate volitional intensity during a strenuous interval training session. While such workouts represent a small proportion of endurance athletes' training regimen, they are nonetheless an integral part of structured endurance training programs (49) and deliver large adaptive benefits (25,36). Given that they involve markedly higher intensity than continuous, moderate running and more closely resemble the maximal effort (25) shown elsewhere to be enhanced in the presence of others (16,42,59,61), we hypothesized that the stimulatory effect absent from submaximal running studies (7-10) would occur. Yet, despite the higher intensity involved in such an interval workout, no consistent difference in average speed occurred between performing the workout alone or amidst a familiar group in the present study. While the potential for competition to enhance physical performance cannot be discounted, the present results more closely align with the findings of Bath et al. (2), who showed that the 5-km time trial performance of trained runners was not affected by a second runner acting as a pacer, but the runners subjectively rated the "pacer" condition as easier than running alone. Our findings reflect the conclusion of Bath et al. (2) that a runner's pacing strategy appears to be robust and not altered by the presence of another runner. The present similarity in average interval speed between social conditions limits the likelihood of an augmented volitional intensity by a group environment. However, concurrence with Bath's (2) proposal of robust pacing strategy may have the benefit of allowing runners to train in a group environment while adhering to individually appropriate training paces (35,37) even at high intensities.

While average speed was not altered between social conditions, measures of perceived task cohesion (ATG-T and GI-T) and social support were negatively associated with RPE only in the group condition. Past research on cohesion, particularly individual attraction to group task (ATG-T) has shown positive effects on individual adherence behavior, including reduced withdrawal and absenteeism (15,50). Similarly, social support has consistently been identified as a robust correlate of physical activity behavior (55). However, these relationships do not allow conjecture on the effect that cohesion or social support may have on acute individual effort in a group setting. Evidence does exist to support a positive relationship between cohesion and performance in sport (12), although the index used to gauge performance has not been consistent across reports. For example, performance in interactive team sports has been gauged using win-loss records (34,58), and in a coactive sport using individual golf scores (60). Only Prapavessis and Carron (40) have empirically examined the effect of cohesion on physical exertion during a running task. Athletes in various team sports that benefit from cardiovascular fitness (rugby, basketball, soccer, netball, water polo) were grouped by their reported perceptions of task cohesion (ATG-T, GI-T) before a maximal effort 3-min run. Athletes in the "high cohesion" group exerted significantly greater effort, as indicated by percentage of maximal aerobic capacity, than those in the "low cohesion" group (40). Runners in the present study were not separated into groups based on reported cohesion, but did not change average speed between the alone and group interval sessions, regardless of perceived cohesion. Although cohesion did not appear to impact voluntary running speed, the negative association between group session RPE and perceived task cohesion reflects the findings of Courneya (17), who reported higher feeling states in relation to higher perceptions of task cohesion in exercise class participants. Furthermore, in addition

to its inverse relation with group session RPE, task cohesion was positively associated with ratings of enjoyment of both running sessions. Although affect was not directly assessed in the present study, a relationship between enjoyment and positive effect has been previously reported (41).

Notably, group session RPE was related only to measures of task cohesion (ATG-T, GI-T), but not to those of social cohesion (ATG-S, GI-S). Past work showing that cohesion positively affects performance (12), adherence (15,50), and effort (40) suggests that task cohesion most consistently exerts a positive effect on these variables than social aspects of cohesion (21). Here, while group influence did not produce the greater effort widely thought to occur in such a setting (24,30,32), the association between task cohesion and group session RPE suggests that an individual's perception of a group environment may have important effects other than altering the intensity of exercise. Similar to the positive cohesion – affective relationship in exercise class participants (17), Bath et al. (2) showed that even without a performance effect from a second runner, trained runners felt that a maximal effort 5-km time trial was easier in the "pacer" condition than alone.

In the present study, the lower RPE and greater enjoyment reported for a group workout by those with higher perceptions of task cohesion could be especially valuable during high intensity interval training sessions. This format of training provides a potent stimulus for enhanced fitness (25), but requires much higher effort and discomfort than continuous moderate intensity training (20), and may produce negative affective states (31,46). Despite the lack of an effect on running speed, it is possible that the lower RPE and greater enjoyment associated with the perceived task cohesiveness of the group could potentially mitigate the discomfort and/or negative feelings often experienced during intense training. This could be of benefit to experienced runners aiming to enhance performance through the inclusion of higher intensity training, or help make such training more approachable for novice runners (36,37). However, further examination under experimental conditions is necessary to support this possibility.

The present study is not without limitation. Foremost, the small sample size (N = 17) necessitates that the results, while novel, be interpreted as preliminary. While all participants fulfilled the criteria for participation, their wide ranging ability levels likely contributed to considerable variability in average running speed. However, public running groups most frequently welcome all levels of ability, which may contribute to their growing popularity (3). Thus, the subjects' varying ability in the present study may reflect the variation present in many running groups, making the present findings highly relevant to these groups.

Conversely, these results cannot be generalized to highly competitive runners in elite training groups or collegiate teams. Despite the moderate and significant correlations between measures of task cohesion and RPE in the group condition, the range of task cohesion ratings in this sample was fairly homogeneous, which restricts the assessment of these associations with lower levels of perceived cohesion. Most importantly, the significant correlations between perceptions of cohesion, social support, exertion, and enjoyment are compelling, but cannot be used to infer causation without further controlled empirical study. Future research should involve larger samples of both recreational and highly competitive runners with a wider range of perceived cohesion who can be stratified into groups of low and high perceived cohesion and/or social support.

CONCLUSIONS

The present findings are the first to suggest that performing a challenging running workout coactively with a highly cohesive and supportive group may positively affect the perception of effort and enjoyment of the workout. While the group environment did not augment the subjects' average running speed during the high intensity interval workout, the present study provides preliminary evidence that group training may nonetheless furnish psychological benefits that could aid in the completion of challenging, high intensity training sessions. However, such benefits likely depend on the perception of strong group cohesion, without which the group environment may have little impact. Additional research is necessary to elucidate the behavioral and psychological responses to group training in a variety of athletic settings.

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