

Exploring Coaching Leadership Behaviours in Strength and Conditioning Coaching: Preferences of NCAA Division I and II Collegiate Student-Athletes Based on Task Dependence

Severiano Tiberi*Cardiff Metropolitan University,
United Kingdom**Joseph I. Esformes**Cardiff Metropolitan University,
United Kingdom**George Jennings**Cardiff Metropolitan University,
United Kingdom**Steve Cooper**Cardiff Metropolitan University,
United Kingdom**Jeremy Moody**Cardiff Metropolitan University,
United Kingdom & Nisantasi University,
TURKEY

Article Info**Article history:**

Received: March 10, 2024

Revised: April 18, 2024

Accepted: May 6, 2024

Abstract

To explore collegiate student-athletes' preferences of coaching leadership behaviours in strength and conditioning (S&C) coaching and evaluate differences between the preferences of coaching leadership behaviours based on task dependence. Method a total of 145 National Collegiate Athletic Association student-athletes (independent sports athletes = 48, interdependent sports athletes = 97), aged 18-25 years, with a mean = 3 (SD = ± 1) S&C sessions per week, participated. Participants completed an electronic questionnaire involving the athletes' preference version of the Revised Leadership Scale for S&C. Results summary statistics revealed that the most favoured behaviour was 'training and instruction', median = 4.5 (IQR = 1.0), while the least favoured was 'autocratic', median = 2.0 (IQR = 0.5). Independent sports athletes preferred training and instruction more (median = 5.0, IQR = 0.6) than interdependent sports athletes (median = 4.5, IQR = 1.0). Interdependent sports athletes preferred social support more (median = 3.5, IQR = 1.0) than independent sports athletes (median = 3.0, IQR = 0.6). The observation of a marginal statistically significant difference for social support suggests task-dependence-based variations ($p = 0.018$). However, small effect sizes indicate that differences are not practically significant. Conclusion and recommendation: this study presents insights into the preferences of coaching leadership behaviours among student-athletes in S&C coaching. It highlights key behaviours such as training and instruction, positive feedback, situational considerations, and social support. These findings inform coaching practice and provide a foundation for further research into coaching leadership behaviours in S&C coaching.

To cite this article: Tiberi, S., Esformes, J. I., Jennings, G., Cooper, S., & Moody, J. (2024). Exploring coaching leadership behaviours in strength and conditioning coaching: Preferences of NCAA division I and II collegiate student-athletes based on task dependence. *Journal of Coaching and Sports Science*, 3(2), 76-89. <https://doi.org/10.58524/002024336600>

This article is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by/4.0/) ©2024 by author/s

INTRODUCTION

Roles within the field of strength and conditioning typically use the term "coach" in the title to confirm the requirement and "strength and conditioning" to specify the discipline. Analysing the "strength and conditioning coach" job title shows that the profession combines strength, conditioning, and coaching expertise. The profession gained recognition in 1978 by establishing the USA's National Strength and Conditioning Association (Kraemer et al., 2017). Since the onset, most studies have focused on the specific areas of anatomy, physiology, biology, biomechanics, and training science. This focus on specialised knowledge is consistent with other coaching disciplines, where individuals in executive coaching roles may have a business or social sciences background (Salter & Gannon, 2015), coaching psychologists are qualified psychologists (Law, 2013; Salter & Gannon, 2015), and coaching in sports involves sport-specific, pedagogical, and scientific knowledge (Abraham et al., 2006). Therefore, it is reasonable to expect that coaching in strength and conditioning would require knowledge of these subject areas (Hartshorn et al., 2016). The use of

*** Corresponding author:**

Tiberi, S., Cardiff Metropolitan University, United Kingdom. st20143209@outlook.cardiffmet.ac.uk

"coach" in the titles of these strength and conditioning roles suggests potential connections among these coaching disciplines, or it may simply be a linguistic convention.

Coaching is the process of human development distinguished by focused interaction and strategies aimed at fostering desirable and sustainable athlete change (Bachkirova et al., 2018). As a result, researchers in executive coaching, coaching psychology, sports coaching, and strength and conditioning coaching have identified commonalities that extend beyond specialised knowledge. These commonalities often encompass behaviours, interpersonal skills, and the quality of relationships (Gilbert & Trudel, 2004; Boyce et al., 2010; Passmore, 2010; Baron et al., 2011; Gilbert & Baldis, 2014; Griffo et al., 2019; Fraser et al., 2022). Links between coaching effectiveness, coaching behaviour, and leadership further support these commonalities (Cummins et al., 2018). The authors suggest that the underlying assumption of coaching effectiveness research is that coaches' behaviours can significantly positively or negatively impact an athlete's performance and psychological and emotional well-being. Moreover, they outlined that coaching effectiveness is linked to the leadership skills and behaviours exhibited by the coach. This interconnection has been widely explored over the past five decades in sports coaching research, resulting in many studies focusing on coaching behaviour and the most effective leadership styles (Gilbert & Trudel, 2004; Griffo et al., 2019). These authors reported that between 1998 and 2015, over 300 studies were published.

The evolution of research methods and paradigms in strength and conditioning research has followed a similar trajectory to that observed in sports coaching. Initially dominated by quantitative methods, there has been a noticeable shift towards incorporating qualitative approaches, thus resulting in a more balanced research approach. This transition is also reflected in strength and conditioning coaching, with many studies adopting both methodologies (Brooks et al., 2000; Fraser et al., 2022). Despite the commonalities between coaching disciplines and the considerable research focus on coaching behaviours and leadership styles observed in sports coaching, the investigation of coaching behaviours in strength and conditioning coaching between 2000 and 2023 remains limited, highlighting a clear research gap. The multidimensional model of leadership (MDML) (Chelladurai, 1978, as cited in Chelladurai & Saleh, 1980; Chelladurai, 1993, 2007) has historically served as a framework for studying leadership behaviours in sports contexts. Drawing from previous leadership theories in organisational and psychology literature (Fiedler et al., 1963; Fiedler, 1967, as cited in Chelladurai & Kim, 2023; Yukl, 1971), the MDML has been extensively used for the past four decades (Arthur & Bastardoz, 2020). The MDML presents a pathway that delineates antecedents of behaviour (situational, leader, and member characteristics), central mechanisms (required, actual, and preferred leader behaviour), and outcomes (satisfaction and performance). Central mechanisms act as mediators between antecedents of behaviour and outcomes, where the congruence between actual leader behaviours and the preferred and required behaviours of the followers will determine member satisfaction and group performance (Chelladurai, 1993, 2007; Arthur & Bastardoz, 2020).

Chelladurai and Saleh (1980) introduced the Leadership Scale for Sport (LSS) based on the MDML. This scale, widely employed in sports leadership research (Chelladurai & Carron, 1981; Yenen et al., 2023), comprises 40 items categorised into five behavioural dimensions: training and instructions, democratic and autocratic behaviour, social support, and positive feedback. This scale offers three versions: athlete-reported coach behaviour, athlete-reported preferred leader behaviour, and leader self-reported behaviour. However, according to Zhang et al. (1997), the LSS lacks a dimension for situational considerations. In response, they produced the Revised Leadership Scale for Sport (RLSS), a 60-item scale with the exact quantification and measurement versions as the LSS but with the additional dimension of situational considerations.

Whilst underexplored, research in strength and conditioning coaching has seen various data collection approaches, mirroring the evolving landscape of sports coaching research. These methods include scales (Chesters, 2013; Lee et al., 2013; Eisner et al., 2014; Greenslade & Willams, 2019; LaPlaca & Schempp, 2020; Tiberi & Moody, 2020), observations (Massey et al., 2002; Gallo & DeMarco, 2008), reviews (Gilbert & Baldis, 2014; Fraser et al., 2022; Jones & Newland, 2022), interviews (Dorgo, 2009; Szedlak et al., 2015; Shuman & Appleby, 2016; Foulds et al., 2019; Gillham et al., 2019; Szedlak et al., 2022), and original methods (Szedlak et al., 2018), exploring both the coaches' and athletes' perspectives of effective strength and conditioning coaching behaviours.

Only two published articles have adopted the LSS and the RLSS in strength and conditioning coaching research (Brooks et al., 2000; Magnusen, 2010); however, the study by Brooks et al. (2000)

presented with low internal consistency and Magnusen's (2010) study with unvalidated language modifications. Additionally, both studies used the self-reported leader behaviour version, focusing on coaches' evaluations rather than athletes' preferences. Notably, Gearity (2003) introduced the Revised Leadership Scale for Strength and Conditioning (RLSSC), offering an alternative to the LSS and RLSS in strength and conditioning coaching. Gearity (2003) reported acceptable levels of reliability by employing Cronbach's alpha (α C) coefficients, together with a linguistically altered scale. The RLSSC was used more recently by Tiberi et al. (2023) to investigate athletes' preferences of leadership behaviours in strength and conditioning coaching and examine sex-based differences in athletes' preferred leadership behaviour.

According to Arthur and Bastardoz (2020), and in line with the MDML pathway (Chelladurai 1993), individual athletes' demographic characteristics like sex, personality dimensions, age and ability level, and situational characteristics like sport type, organisational goals and culture can determine preferred leadership behaviours and discern differences in preferred leadership behaviours. Existing quantitative research in strength and conditioning coaching indicated characteristics and behaviours that are valued by athletes with characteristics such as knowledge, positive and approachable temperament (Chesters, 2013), strong communication skills, socially supportive behaviours, and provision of positive and constructive feedback (Lee et al., 2013; Greenslade & Williams, 2019; Tiberi & Moody, 2020). Equally, qualitative studies reported how athletes valued knowledgeable coaches who cultivate relationships based on trust, care, adaptability, and communication (Szedlak et al., 2015; Shuman & Appleby, 2016; Foulds et al., 2019). Although some strength and conditioning studies have considered participants' sport types when investigating situational factors as determinants of athletes' preferred leadership behaviours, it was either not a priority (Magnusen & Rhea, 2009; Lee et al., 2013; Eisner et al., 2014; Szedlak et al., 2015; Foulds et al., 2019; Tiberi et al., 2020; Tiberi et al., 2023), or it was only mentioned to address a different study aim (Shuman & Appleby, 2016). Additionally, there has not been a formal categorisation of sport types, e.g., in terms of task dependence, a concept distinguishing between individual (independent) and team (interdependent) sports (Chelladurai, 1978, as cited in Chelladurai, 1993). While Chesters (2013) found minor differences between rugby and football players' preferences of strength and conditioning coaches' characteristics, this remains an isolated finding. Furthermore, no study has used the RLSSC to explore differences between athletes' preferences towards leadership behaviours in strength and conditioning coaching based on task dependence.

Therefore, the present study aims to explore collegiate student-athletes' preferences of coaching leadership behaviours in strength and conditioning coaching using the RLSSC preference version (Gearity, 2003). Furthermore, it aims to provide an evaluation of differences between the student-athletes' preferences of coaching leadership behaviours based on task dependence across the six RLSSC dimensions.

METHOD

Participants

A total of $n = 145$ male and female National Collegiate Athletic Association (NCAA) Division I and II (DI and DII) student-athletes participated in the study (independent sports athletes, $n = 48$, interdependent sports athletes, $n = 97$). Participants were involved in a variety of sports: American football ($n = 18$); baseball ($n = 9$); basketball ($n = 12$); bowling ($n = 1$); cross country ($n = 3$); fencing ($n = 6$); football ($n = 10$); golf ($n = 1$); hockey ($n = 1$); lacrosse ($n = 16$); rowing ($n = 12$); softball ($n = 8$); swimming ($n = 15$); synchronised skating ($n = 2$); tennis ($n = 5$); track and field ($n = 17$); and volleyball ($n = 9$). The age range of participants was between 18-25 years, and they engaged on average in ($\bar{x} \pm SD$) = 3 ± 1 strength and conditioning sessions per week over one academic year (9 months). There were three inclusion criteria: 1) each participant had to be an NCAA DI or DII student-athlete, 2) they had to have trained for at least one academic year under the supervision of a strength and conditioning coach before this research project, and 3) to ensure that each participant had sufficient experience of the coaching process, they had to have trained on average at least twice per week in that academic year. These inclusion criteria reduced an original sample from $n = 236$ total responses to $n = 162$ because $n = 74$ participants did not meet the full inclusion criteria. The sample was further reduced to $n = 145$ since $n = 17$ participants only provided partial responses. This population was selected based upon three considerations: 1) the adopted instrumentation and the

scales on which they are based have been used extensively in NCAA contexts, 2) the experience relevant to the research topic addressed with inclusion criteria, and 3) accessibility.

Ethical considerations

The Cardiff School of Sport and Health Sciences Research Ethics Committee approved the study (Institutional reference: PGR-3440). Adhering to contemporary ethical considerations (Thomas et al., 2023), openness and honesty were addressed by providing participants with an information sheet detailing the voluntary nature of the study, with the option to withdraw at any point during the survey completion phase. All the institutions and participants contacted were notified that consent was provided by completing the questionnaire and that strict confidentiality and anonymisation were ensured. Additionally, secure measures were implemented to guarantee data security, including encryption on cloud storage (OneDrive) and storage on a password-protected computer.

Instrumentation

The study used an online questionnaire (SurveyMonkey, Momentive, 2021) consisting of demographic and strength and conditioning questions to verify the inclusion criteria. Notably, given the present study's exploratory nature and aims, the research employed the athletes' preference version of the RLSSC [Gearity, 2003]. This scale was selected for two reasons: 1) to address a knowledge gap in the relatively young discipline of strength and conditioning coaching, and 2) to contribute to the accumulation of knowledge that provides the foundation for higher levels of research in a developing field (Anderson & Arsenault, 1998; Gilbert & Trudel, 2004). The 60 leadership items in the RLSSC are distributed randomly among six dimensions of coaching leadership behaviour: autocratic (8 items), democratic (12 items), positive feedback (12 items), situational considerations (10 items), social support (8 items), and training and instruction leader behaviour (10 items). The individual items in this 5-point Likert scale represent the athletes' preferences of the frequencies of specific behaviours exhibited by a strength and conditioning coach. The scale ranges from 1 indicating 'never' = 0% of the time, 2 'seldom' = 25% of the time, 3 'occasionally' = 50% of the time, 4 'often' = 75% of the time, and 5 'always' = 100% of the time. Each item is preceded by the phrase 'I prefer my strength and conditioning coach to ...'.

Procedures

Participants were recruited via e-mail communication. The NCAA website (NCAA, 2023) was used to identify all NCAA institutions across Divisions I, II, and III. The email addresses of the Athletic Directors, Compliance Officers, and Administrative Assistants were collected from each institution's website. Some institutions provided only one email address, with 1,118 institutions identified and 2,839 emails sent. The e-mail requested that the athletic department of each institution distribute the questionnaire on behalf of the researcher to reach student-athletes who met the inclusion criteria and too to protect student-athletes from any potential power relationships with coaches and safeguard their privacy while offering them the opportunity to participate in the study. The e-mail provided details about the study, an information sheet, and a SurveyMonkey questionnaire link for participation. Reminder e-mails were sent every week for four consecutive weeks. The survey was closed after the fifth week. A multi-modal approach was employed to enhance dissemination and increase participant response rates by contacting one, two, or three people as intermediaries at each institution. No DIII institutions were included due to a lack of responses.

Task dependence

Drawing from leadership theories of the MDML, in 1978, Chelladurai (as cited in Chelladurai, 1993) proposed a categorisation of sports based on task dependence, which refers to the degree of interaction among athletes during the execution of the task. The author differentiated between individual sports, where the successful completion of the task does not require interaction among athletes, and team sports, where interaction among teammates is essential for success. Individual sports, including track and field, swimming, tennis, fencing, bowling, cross country, and golf, are independent (Table 1). In these sports, athletes predominantly rely on their performance without significant dependence on others to complete the task successfully. The categorisation of golf is

rather evident. However, sports like tennis and track and field require further explanation. For instance, doubles matches in tennis involve some degree of interaction between teammates. However, in 1978, Chelladurai and Saleh (as cited in [Beam 2001](#)) suggested that the relative level of interaction is lower than that of team sports such as football or baseball.

Similarly, in track and field, relay races require team members to pass the baton, showing a degree of dependence. However, it could be argued that the interaction level is limited compared to team sports such as basketball or lacrosse. Team sports, including basketball, football, American football, baseball, softball, volleyball, synchronised skating, rowing, and lacrosse, are interdependent ([Table 1](#)). In these sports, efficient interaction among teammates is required to complete the task successfully.

Table 1. Categorisation of sports (after Chelladurai, 1978, as cited in Chelladurai, 1993)

| Task dependence | |
|---|---|
| Independent | Interdependent |
| Track and field, swimming, tennis, fencing, bowling, cross country, golf | Basketball, football, American football, baseball, softball, volleyball, hockey, synchronised skating, rowing, lacrosse |

Reliability and validity

Cronbach's alpha coefficients (α_c) were calculated to estimate the reliability of each coaching behaviour dimension. In evaluating the integrity of these coefficients, the recommendation of Taber ([2018](#)) was followed, where values between 0.60 and 0.90 were considered acceptable. Whilst these have been published previously ([Tiberi et al., 2023](#)), they are reported in Table 3 for transparency and completeness. Nevertheless, the originality of the differences being interrogated in the present study focuses explicitly on the non-dependent variable of task dependence as opposed to sex.

Data analyses

[Table 2](#) indicates a summary model of the statistical approach taken to analyse the data collected, highlighting the hypothesis tested, statistical test used, effect size and related table.

Table 2. Summary model of the data analysis approach taken in the study

| Hypothesis tested | Statistical test used | Summary Table | | |
|---|--|--|--|---------------------|
| | | Effect size | | |
| Reliability - internal consistency - do scale items consistently measure the same characteristics? | Cronbach's alpha (α_c) | | | Table 3 |
| Summary of coaching preferences for the total pool of participants | Mean (\bar{x}) \pm standard deviation (SD) Median and interquartile range (IQR) | | | Table 4 |
| Differences between independent and interdependent sports athletes | Mann-Whitney U p -value | Cohen's d Based upon \bar{x} and SD | | Table 5 and Table 6 |

Results from the various sports cited and both sexes were pooled to provide summary data. The non-dependent variable was task dependence, with two independent groups: 1) independent

and 2) interdependent sports athletes. The dependent variables were the six dimensions of coaching leadership behaviour: autocratic, democratic, positive feedback, situational considerations, social support, and training and instruction. Summary statistics were used to indicate the preferences concerning strength and conditioning coaching leadership behaviours of the total pool of student-athletes and describe differences between the two independent groups (independent and interdependent sports athletes). Median scores, interquartile ranges (IQRs), mean scores, standard deviations (SD), and effect sizes were used to describe the data collected. For all participants, preference scores were calculated by summing the scores of all the items in a specific coaching dimension and dividing by the number of items in that dimension (Chelladurai & Saleh, 1980; Zhang et al., 1997; Gearity, 2003). Because of the ordinal nature of the RLSSC, median scores were used to estimate central tendencies (excluding the calculation of effect sizes, where means were used).

Cohen's d was used as the effect size statistic to indicate the practical significance of group differences for each coaching dimension, where $d = \bar{x}_\Delta/s_p$; \bar{x}_Δ = difference between the independent and interdependent sports athletes sample means, s_p = the pooled SD = $\sqrt{[(s_1^2(n_1-1) + (s_2^2(n_2-1)))/(n_1+n_2-2)]}$, s_1 = SD for independent sports athletes, s_2 = SD for interdependent sports athletes, n_1 = sample size for independent sports athletes, and n_2 = sample size for interdependent sports athletes (Cohen, 1988). As a reference, effect sizes were defined as 'small' (0.2 to 0.5 of SD), 'medium' (0.5 to 0.8 of SD), and 'large' (>0.8 of SD) [Cohen, 1988]. Given the study's exploratory nature, and to provide a more easily understood framework, median scores calculated for each participant were categorised as either 'preferred' or 'not preferred' and interpreted according to values, where median scores ≤ 2.59 indicated 'not preferred' behaviours (never and seldom), and scores ≥ 3.40 indicated 'preferred' behaviours (often and always). While the response 'occasionally' (median score between 2.60 and 3.39) could be considered in either category, it was not included in either of the two preference groups. Because of the ordinal nature of the data and the assumptions underpinning the comparison of two independent groups, the median differences between groups (independent vs interdependent) were tested for each of the six dependent variables (coaching leadership behaviour dimensions) using the Mann-Whitney U test (Abbott, 2017). The level of statistical significance was accepted at $p \leq 0.05$ throughout the analyses.

RESULTS AND DISCUSSION

Results

Reliability scores for the RLSSC

Table 3 summarises the Cronbach's alpha (α_C) coefficients for data generated during the current study and references those reported in previous studies for the various coaching dimensions. Subscale scores were similar to those reported in the previous studies, and according to Taber (2018), they indicate acceptable estimates of measurement reliability. Autocratic behaviour showed the highest value ($\alpha_C = 0.74$), and situational considerations reported the lowest value ($\alpha_C = 0.62$).

Table 3. Cronbach's alpha (α_C) reliability test statistics for each of the six coaching behaviour dimensions of leadership scales for the current and previously published studies

| Coaching Behaviour Dimension | No. of items | LSS Chelladurai and Saleh (1980) Preference | RLSS Zhang et al. (1997) Preference | RLSSC Gearity (2003) Preference | RLSSC Tiberi et al. (2023) Preference | RLSSC Present study Preference Task dependence |
|--|--------------|---|-------------------------------------|---------------------------------|---------------------------------------|--|
| <i>Cronbach's Alpha Coefficients (α_C)</i> | | | | | | |
| Autocratic | 8 | 0.45 | 0.59 | 0.64 | 0.74 | 0.74 |
| Democratic | 12 | 0.75 | 0.96 | 0.83 | 0.86 | 0.86 |
| Positive Feedback | 12 | 0.82 | 0.89 | 0.84 | 0.88 | 0.88 |

| Coaching Behaviour Dimension | No. of items | LSS Chelladura i and Saleh (1980) Preference | RLSS Zhang et al. (1997) Preference | RLSSC Gearity (2003) Preference | RLSCC Tiberi et al. (2023) Preference | RLSCC Present study Preference |
|--|--------------|--|-------------------------------------|---------------------------------|---------------------------------------|--------------------------------|
| <i>Cronbach's Alpha Coefficients (α_c)</i> | | | | | | |
| Social Support | 8 | 0.70 | 0.88 | 0.75 | 0.71 | 0.71 |
| Training and Instruction | 10 | 0.83 | 0.87 | 0.90 | 0.78 | 0.78 |
| Situational Considerations | 10 | N/A | 0.84 | 0.76 | 0.62 | 0.62 |

Coaching leadership behaviours preferences of the total pooled sample

Preferences of coaching behaviours for the total pooled sample of collegiate athletes are reported in [Table 4](#). The participants' most preferred behaviour was training and instruction, median = 4.5 (IQR = 1.0), followed by situational considerations and positive feedback, median = 4.0 (IQR = 1.0); then social support behaviour, median = 3.5 (IQR = 1.0); democratic behaviour, median = 3.0 (IQR = 1.0); and autocratic behaviour, median = 2.0 (IQR = 0.5) was the least preferred behaviour. The variability of participants' responses appeared similar for the six coaching dimensions. The greatest variability was recorded for positive feedback behaviour ($SD = \pm 0.6$). The smallest variability was for situational considerations behaviour ($SD = \pm 0.4$), suggesting only small differences in standard deviations between all six coaching dimensions.

Table 4. Summary statistics for the coaching preferences of the total pool of student-athletes

| Coaching Behaviour Dimension | n | Mean | SD | Median | IQR |
|---|-----|------|-----|--------|-----|
| Training and Instruction Behaviour | 145 | 4.3 | 0.4 | 4.5 | 1.0 |
| Positive Feedback Behaviour | 145 | 3.9 | 0.6 | 4.0 | 1.5 |
| Situational Considerations Behaviour | 145 | 3.9 | 0.4 | 4.0 | 1.0 |
| Social Support Behaviour | 145 | 3.3 | 0.5 | 3.5 | 1.0 |
| Democratic Behaviour | 145 | 3.3 | 0.6 | 3.0 | 1.0 |
| Autocratic Behaviour | 145 | 2.5 | 0.5 | 2.0 | 0.5 |

n = number of responses; SD = standard deviation, IQR = interquartile range

Coaching leadership behaviour preferences based on task dependence

The median scores for independent and interdependent sports were similar ([Table 5](#)). Participants responded with the same preferences for four coaching behaviour dimensions. Training and instruction and social support behaviours presented a difference of 0.5 of a scale unit, where independent sports athletes preferred training and instruction behaviour (independent median = 5.0, IQR = 0.6; interdependent median = 4.5, IQR = 1.0) and interdependent sports athletes preferred social support behaviour (interdependent median = 3.5, IQR = 1.0; independent median = 3.0, IQR = 0.6). The variability of responses was similar for both groups across the six dependent variables. For independent sports athletes, the variability ranged between $SD = \pm 0.6$ for positive feedback behaviour and $SD = \pm 0.3$ for autocratic behaviour. For interdependent sports athletes, variability ranged between $SD = \pm 0.6$ for positive feedback, autocratic and democratic behaviours, and $SD = \pm 0.4$ for the situational considerations and training and instruction behaviours.

Similarly, interquartile ranges indicated only small to moderate variability, with the highest being positive feedback behaviour for interdependent sports athletes (IQR = 1.5) and the lowest being autocratic behaviour for independent sports athletes (IQR = 0.5). Effect sizes suggested that

the difference between the preference scores for independent and interdependent sports athletes was small for all six coaching behaviour dimensions. Values of Cohen's d ranged between 0.1 for positive feedback and 0.3 for training and instruction behaviour.

Table 5. Summary statistics and effect sizes for coaching preferences of the total pooled sample grouped by task dependence

| Coaching Behaviour Dimension | <i>n</i> | Mean | SD | Cohen's <i>d</i> | Median | IQR |
|--|----------|------|-----|------------------|--------|-----|
| <i>Training and Instruction Behaviour</i> | | | | | | |
| Independent | 48 | 4.4 | 0.4 | 0.3 | 5.0 | 0.6 |
| Interdependent | 97 | 4.3 | 0.4 | | 4.5 | 1.0 |
| <i>Positive Feedback Behaviour</i> | | | | | | |
| Independent | 48 | 3.9 | 0.6 | 0.1 | 4.0 | 1.1 |
| Interdependent | 97 | 3.8 | 0.6 | | 4.0 | 1.5 |
| <i>Situational Considerations Behaviour</i> | | | | | | |
| Independent | 48 | 4.0 | 0.4 | 0.2 | 4.0 | 0.6 |
| Interdependent | 97 | 3.9 | 0.4 | | 4.0 | 1.0 |
| <i>Social Support Behaviour</i> | | | | | | |
| Independent | 48 | 3.2 | 0.5 | 0.2 | 3.0 | 0.6 |
| Interdependent | 97 | 3.4 | 0.5 | | 3.5 | 1.0 |
| <i>Democratic Behaviour</i> | | | | | | |
| Independent | 48 | 3.2 | 0.5 | 0.2 | 3.0 | 1.0 |
| Interdependent | 97 | 3.3 | 0.6 | | 3.0 | 1.0 |
| <i>Autocratic Behaviour</i> | | | | | | |
| Independent | 48 | 2.4 | 0.3 | 0.2 | 2.0 | 0.5 |
| Interdependent | 97 | 2.5 | 0.6 | | 2.0 | 1.0 |
| Cohen's <i>d</i> : small effect size = 0.2 to 0.5; medium effect size = 0.5 to 0.8; large effect size >0.8; <i>n</i> = number of responses; SD = standard deviation, IQR = interquartile range | | | | | | |

Table 6 summarises the results of the comparative analyses between independent and interdependent sports athletes for coaching leadership behaviours. The results show that there were no statistically significant differences between the groups for five coaching dimensions: training and instruction ($p = 0.078$), situational considerations ($p = 0.676$), positive feedback ($p = 0.321$), democratic behaviour ($p = 0.496$), and autocratic behaviour ($p = 0.208$). A statistically significant difference was observed between groups for social support behaviour ($p = 0.018$).

Table 6. Differences between independent and interdependent sports athletes in coaching leadership behaviour preferences

| Coaching Behaviour Dimension | Independent | | | Interdependent | | | <i>p</i> |
|------------------------------|-------------|--------|-----|----------------|--------|-----|----------|
| | <i>n</i> | Median | IQR | <i>n</i> | Median | IQR | |
| Autocratic | 48 | 2.0 | 0.5 | 97 | 2.0 | 1.0 | 0.208 |
| Democratic | 48 | 3.0 | 1.0 | 97 | 3.0 | 1.0 | 0.496 |
| Positive Feedback | 48 | 4.0 | 1.1 | 97 | 4.0 | 1.5 | 0.321 |
| Social Support | 48 | 3.0 | 0.6 | 97 | 3.5 | 1.0 | 0.018 |
| Situational Considerations | 48 | 4.0 | 0.6 | 97 | 4.0 | 1.0 | 0.676 |
| Training and Instruction | 48 | 5.0 | 0.6 | 97 | 4.5 | 1.0 | 0.078 |

n = number of responses; IQR = interquartile range; statistical significance: $p \leq 0.05$

Discussion

This study aimed to explore collegiate student-athletes' preferences of coaching leadership behaviours in strength and conditioning coaching and provide an evaluation of differences between the student-athletes' preferences of coaching leadership behaviours based on task dependence. The preference version of the RLSSC was used to explore potential variations in preferred leadership behaviours based on task dependence across six behavioural coaching dimensions: autocratic

behaviour, democratic behaviour, positive feedback behaviour, situational considerations, social support, and training and instruction behaviour. Based on the MDML, which posits that preferred leadership behaviours are influenced by situational characteristics (Chelladurai 1993, 2007; Arthur & Bastardoz, 2020), it was hypothesised that task dependence-based differences would emerge. This study aimed to contribute to the distinct research knowledge gap regarding leadership behaviours in strength and conditioning coaching and to accumulate knowledge in this relatively young coaching discipline, thereby providing a basis for future investigations.

Existing research in strength and conditioning supports the results of the current study, where training and instruction, positive feedback, situational considerations, and social support were classified as preferred behaviours. In quantitative research, Chesters (2013) highlighted highly valued characteristics for strength and conditioning coaches, including knowledge and a positive and approachable demeanour. Similarly, Tiberi and Moody (2020) suggested that attributes including being knowledgeable, communicative, providing positive feedback, supportive, honest, organised, and approachable were important to student-athletes. Furthermore, Lee et al. (2013) reported how positive psychosocial behaviours (supportive behaviours) positively influenced the relationship between strength and conditioning coaches and student-athletes. According to Greenslade and Williams (2019), student-athletes value coaches who build trust and respect, provide encouragement and support, offer constructive feedback, and possess strong communication skills.

Similar findings were suggested from a qualitative perspective. Szedlak et al. (2015) indicated that elite athletes viewed strength and conditioning coaches as effective when they built solid relationships based on trust and understanding. These coaches were proficient in instruction and communication, maintaining high-performance expectations, and motivating athletes through confidence and passion. Shuman and Appleby (2016) observed that most participants in their study valued the qualities of knowledge, personality, professionalism, and support in their interactions with their strength and conditioning coach. Foulds et al. (2019) noted that athletes value coaches who cultivate close relationships by building trust and showing care and commitment through a positive outlook that includes planning and mutual goal-setting, displaying adaptability and role model traits, and employ effective communication through feedback, openness, and understanding of individual needs.

The current results on task dependence-based differences contribute to the ongoing discussion in this area. Early research in sports coaching indicated notable differences. Terry and Howe (1985) reported that independent sports athletes preferred more democratic behaviours compared to their interdependent counterparts and preferred less autocratic behaviour than interdependent sports athletes. Terry (1985) also reported how interdependent sports athletes preferred significantly more training and instruction and autocratic behaviours and significantly less democratic and social support behaviour. Building on this, more recent studies in sports coaching have identified additional task dependence-based differences (Beam et al., 2004; Witte, 2011; Aleksic-Veljkovic et al., 2016).

Conversely, Cruz and Kim (2017) did not find significant differences between independent and interdependent sports athletes. A strength and conditioning coaching study highlighted minor differences between rugby and football players (Chesters, 2013). Nevertheless, neither statistical nor practical significance was assessed, and the athletes' sample size was notably limited. The current results align with Cruz and Kim (2017), with no significant differences observed for independent and interdependent sports across five coaching dimensions. While a significant difference was observed for social support behaviour, the small effect sizes across the six coaching dimensions suggest that the magnitude of difference between the preference scores of the two groups was too low to elicit practical significance.

In support of the current findings, a recent review on strength and conditioning coaching by Fraser et al. (2022) underscored the importance of positive psychosocial behaviours, building trust, care, effective teaching skills, and adapting leadership styles in nurturing positive coach-athlete relationships, which contribute to athlete performance and well-being. Arguably, these findings could apply to both types of sports, suggesting no distinct difference in coaching leadership behaviour preferences. The authors anticipated observing differences in participants' behaviour preferences based on task dependence. While a marginal statistically significant difference between independent and interdependent sports athletes was noted, supporting the hypothesis, the small

effect sizes suggest that differences may not be practically significant and that a uniform coaching approach could be adopted.

These findings address a notable research gap in strength and conditioning coaching and provide valuable insights. They indicate that collegiate athletes prefer coaching behaviours characterised by training and instruction, positive feedback, situational considerations, and social support while demonstrating less preference for democratic and autocratic coaching styles. These findings are consistent with prior research, emphasising the significance of positive psychosocial behaviours in the context of strength and conditioning coaching (Fraser et al., 2022). The ranking of preferred behaviours, such as training and instruction, positive feedback, situational considerations, and social support, provides insight into the areas that student-athletes value the most in their coaching interactions. Interestingly, democratic behaviour ranked lower in preference and was not classified as preferred using the proposed framework, suggesting that participative decision-making might not be a top priority for collegiate athletes. Furthermore, autocratic behaviour ranked the lowest, suggesting collegiate athletes may not value authoritarian coaching approaches.

It is important to recognise certain limitations. It was challenging to confirm the true randomness of the sample size due to potential bias from the survey recipient or intermediary at each institution. Although participants engaged on average in $(\bar{x} \pm SD) = 3 \pm 1$ strength and conditioning sessions per week over one academic year (9 months), it was difficult to determine the actual work performed and how that might have impacted the participants' views. A larger sample for each sport would have generated the two independent groups. It is worth noting that there might be differences in sport categorisation that task dependence does not capture. Additionally, the study only quantitatively examined one aspect of situational characteristics (task dependence) associated with one of the MDML central mechanisms (preferred behaviours). At the same time, there are several other factors, such as sex, age, level of competition, categorisations in other sports, and personality dimensions, that might require further quantitative and qualitative exploration, adopting various methods and analyses.

While these findings may apply to similar contexts, caution should be exercised when generalising the findings to other coaching environments, as behaviours are part of a dynamic process influenced by various unique factors. The study's findings have practical implications for strength and conditioning coaches, suggesting the importance of understanding athletes' preferences in coaching behaviours. Areas such as training and instruction, positive feedback, situational considerations, and social support are highlighted as preferred behaviours. Recognising that athletes competing in independent and interdependent sports might value similar coaching behaviours could assist coaches in creating strategies that cater to the diverse needs of athletes. Based on the identified limitations, future research could consider other ways of engaging with participants for direct communication without reliance on an intermediary. Furthermore, aiming to address the considerable gap in strength and conditioning coaching research, expanding beyond task dependence, future investigations should explore a broader range of situational and athletes' characteristics, allowing for a more comprehensive exploration of the MDML applied to strength and conditioning coaching.

CONCLUSION

This study suggests preferences of coaching leadership behaviours among NCAA collegiate athletes in strength and conditioning coaching. The results provide insights into aspects that athletes prioritise in their interactions with strength and conditioning coaches, emphasising key behaviours such as training and instruction, positive feedback, situational considerations, and social support. The findings highlight the importance of these behaviours that coaches may consider in creating strategies to interact with their athletes. Interestingly, democratic behaviour was not considered preferred, suggesting that athletes may not value participative decision-making from their strength and conditioning coach. Furthermore, autocratic behaviour ranked the lowest, suggesting athletes may not value authoritarian coaching approaches.

While minor variations were noted between independent and interdependent sports athletes' preferences, they were not practically significant, suggesting how there may be an underlying common trend of preferred strength and conditioning coaching leadership behaviours where both independent and interdependent sports athletes value similar coaching leadership behaviours.

These findings have potential implications for coaching practice as strength and conditioning coaches should consider preferences of coaching behaviours with their athletes, specifically training and instruction, positive feedback, situational considerations, and social support. Furthermore, the awareness that athletes competing in independent and interdependent sports share similar preferences could guide coaches in developing strategies that adapt to all athletes' needs. This study aimed to contribute to the distinct lack of knowledge regarding leadership behaviours within strength and conditioning coaching research, thus providing a foundation for future investigations that might expand beyond task dependence, directing the attention to other antecedents of behaviour, and, consequently, leading to the adoption of, and development of different research avenues to explore leadership behaviours in strength and conditioning coaching.

AUTHOR CONTRIBUTION STATEMENT

JM, JIE, & GJ helped with the study's design, proofreading, and organisation. SC helped with the selection of statistics and proofreading.

REFERENCES

Abbott, M. (2017). Independent sample T-test. In M. Abbot (Ed.), *Using statistics in the social and health sciences with SPSS and Excel* (pp. 207-254). Hoboken, New Jersey: Wiley. <https://doi.org/10.1002/9781119121077.ch8>

Abraham, A., Collins, D., & Martindale, R. (2006). The coaching schematic: Validation through expert coach consensus. *Journal of Sports Sciences*, 24(6), 549-564. <https://doi.org/10.1080/02640410500189173>

Aleksic-Veljkovic, A., Djurovic, D., Dimic, I., & Mujanovic, R. (2016). College athletes' perceptions of coaching behaviours: Differences between individual and team sports. *Baltic Journal of Sport and Health Sciences*. 101(2), 61-71. <https://doi.org/10.33607/bjshs.v2i101.57>

Anderson, G., & Arsenault, N. (1998). The nature of educational research. In G. Anderson, & N. Arsenault (Eds.), *Fundamentals of Educational Research*, (3rd ed., pp. 3-16). London: Falmer Press.

Arthur, C.A., & Bastardoz, N. (2020). Leadership in sport. In G. Tenenbaum, & R.C. Eklund (Eds.), *Handbook of Sport Psychology*, (4th ed., pp. 344-371). Hoboken: NJ Wiley. <https://doi.org/10.1002/9781119568124.ch16>

Bachkirova, T., Cox, E., & Clutterbuck, D. (2018). Introduction. In: E. Cox, T. Bachkirova, & D. Clutterbuck (Eds.), *The Complete Handbook of Coaching*, (3rd ed., pp. xxix-xlviii). Thousand Oaks: CA, Sage.

Baron, L., Morin, L., & Morin, D. (2011). Executive coaching: The effect of working alliance discrepancy on the development of coaches' self-efficacy. *Journal of Management Development*, 30(9), 847-864. <https://doi.org/10.1108/02621711111164330>

Beam, J.W. (2001). *Preferred leadership of NCAA Division I and II intercollegiate student-athletes* [Doctoral dissertation]. University of North Florida.

Beam, J.W., Serwatka, T.S., & Wilson, W.J. (2004). Preferred leadership of NCAA Division I and II intercollegiate student-athletes. *Journal of Sport Behavior*, 27(1), 3-17.

Boyce, L.A., Jackson, R.J., & Neal, L. (2010). Building successful leadership coaching relationships: Examining impact of matching criteria in a leadership coaching program. *Journal of Management Development*, 29(10), 914-931. <https://doi.org/10.1108/02621711011084231>

Brooks, D.D., Ziatz, D., Johnson, B., & Hollander, D. (2000). Leadership behaviour and job responsibilities of NCAA Division 1A strength and conditioning coaches. *Journal of Strength and Conditioning Research*, 14(4), 483-492. <https://doi.org/10.1519/00124278-200011000-00018>

Chelladurai, P. (1993). Leadership. In R.N., Singer, M. Murphrey, & L.K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 647-671). Oxford: Maxwell Macmillan International.

Chelladurai, P. (2007). Leadership in sports. In G. Tenenbaum, & R.C. Eklund (Eds.), *Handbook of Sport Psychology* (3rd ed., pp. 113-135). Hoboken: NJ Wiley. <https://doi.org/10.1002/9781118270011.ch5>

Chelladurai, P., & Carron, A.V. (1981). Applicability to youth sports of the leadership scale for sports. *Perceptual and Motor Skills*, 53(2), 361-362. <https://doi.org/10.2466/pms.1981.53.2.361>

Chelladurai, P., & Kim, A. (2023). Leadership. In P. Chelladurai, & A. Kim (Eds.), *Human Resource Management in Sport and Recreation* (4th ed., pp. 227-252). Champaign, IL: Human Kinetics, Inc. <https://doi.org/10.5040/9781718235960>

Chelladurai, P., & Saleh, S.D. (1980). Dimensions of leader behaviour in sports: Development of a leadership scale. *Journal of Sport Psychology*, 2(1), 34-45. <https://doi.org/10.1123/jsp.2.1.34>

Chesters, R. (2013). *What makes a good practitioner in strength and conditioning?* [Unpublished Bachelor's Dissertation]. Cardiff Metropolitan University.

Cohen, J. (1988). The t-test for means. In J. Cohen (Ed.), *Statistical Power Analysis for the Behavioural Sciences* (2nd ed., pp. 19-66). Hillsdale, NJ: L. Erlbaum Associates.

Cruz, A.B., & Kim, H.D. (2017). Leadership preferences of adolescent players in sport: Influence of coach gender. *Journal of Sports Science and Medicine*, 16(2), 172-179.

Cummins, P., O'Boyle, I., & Cassidy, T. (2017). Coaching effectiveness and leadership: a theoretical perspective. In Leadership in Sports Coaching (pp. 6-27). Routledge. <https://doi.org/10.4324/9781315267005-2>

Dorgo, S. (2009). Unfolding the practical knowledge of an expert strength and conditioning coach. *International Journal of Sports Science & Coaching*, 4(1), 17-30. <https://doi.org/10.1260/1747-9541.4.1.17>

Eisner, M. T., Elder, C., Sinclair-Elder, A., & Kelly, C. (2014). Collegiate Athletes' Perceptions on the Importance of Strength and Conditioning Coaches and Their Contribution to Increased Athletic Performance. *Journal of Athletic Enhancement*, 3(4), 1-9. <https://doi.org/10.4172/2324-9080.1000159>

Fiedler, F.E., Osgood, C.E., Stolzrow, L.M., & Triandis, H.C. (1963). *A contingency model for the prediction of leadership effectiveness* (Report No. 10). University of Illinois. <https://apps.dtic.mil/sti/tr/pdf/AD0409275.pdf>.

Foulds, S.J., Hoffmann, S.M., Hinck, K., & Fraser, C. (2019). The coach-athlete relationship in strength and conditioning: High performance athletes' perceptions. *Sports*, 7(12), 244. <https://doi.org/10.3390/sports7120244>

Fraser, C., Mackenzie, B., Foulds, S.J., Hinck, C., & Hoffmann, S.M. (2022). Behaviours and actions of the strength and conditioning coach in fostering a positive coach-athlete relationship. *Journal of Strength & Conditioning Research*, 36(11), 3256-3263. <https://doi.org/10.1519/JSC.00000000000004073>

Gallo, G.J., & De Marco, G.M. (2008). Self-assessment and modification of a Division I strength and conditioning coach's instructional behaviour. *Journal of Strength and Conditioning Research*, 22(4), 1228-1235. <https://doi.org/10.1519/JSC.0b013e318173dae9>

Gearity, B. (2003). *The revised leadership scale for strength and conditioning* [Unpublished master's thesis]. University of Tennessee.

Gilbert, W., & Baldis, M. (2014). Becoming an effective strength and conditioning coach. *Strength and Conditioning Journal*, 36(1), 28-34. <https://doi.org/10.1519/SSC.0000000000000026>

Gilbert, W., & Trudel, P. (2004). Analysis of coaching science research published from 1970-2001. *Research Quarterly for Exercise and Sport*, 75(4), 388-399. <https://doi.org/10.1080/02701367.2004.10609172>

Gillham, A., Doscher, M., Krumpos, J., Diltz, M.M., Moe, N., Allen, S., & Bridgeman, R. (2019). A roundtable with college strength and conditioning coaches: Working with sport coaches. *International Sport Coaching Journal*, 6(1), 98-109. <https://doi.org/10.1123/iscj.2018-0047>

Greenslade, A., & Williams, G. (2019, June 04). *What does good coaching look like?; Youth athlete perceptions of effective strength and conditioning coaching in a leading UK talent development environment*. Millfield Institute of Sport and Well-being. <https://millfieldinstitutewellbeing.sport.blog/2019/06/04/what-does-good-coaching-look-like-youth-athlete-perceptions-of-effective-strength-and-conditioning-coaching-in-a-leading-uk-talent-development-environment/>

Griffo, J.M., Jensen, M., Anthony, C.C., Baghurst, T., & Kulinna, P.H. (2019). A decade of research literature in sport coaching (2005-2015). *International Journal of Sports Science & Coaching*, 14(2), 205-215. <https://doi.org/10.1177/1747954118825058>

Hartshorn, M.D., Read, P.J., Bishop, C., & Turner, A.N. (2016). Profile of a strength and conditioning coach: Backgrounds, duties, and perceptions. *Strength and Conditioning Journal*, 38(6), 89-94. <https://doi.org/10.1519/SSC.0000000000000255>

Jones, D., & Newland, A. (2022). Implementing effective coaching behaviours and pedagogical practices into strength and conditioning. *Strength and Conditioning Journal*, 44(3), 80-87. <https://doi.org/10.1519/SSC.0000000000000671>

Kraemer, W.J., Ratamess, N.A., Flanagan, S.D., Shurley, J.P., Todd, J.S., & Todd, T.C. (2017). Understanding the science of resistance training: An evolutionary perspective. *Sports Med*, 47(12), 2415-2435. <https://doi.org/10.1007/s40279-017-0779-y>

LaPlaca, D.A., & Schempp, P.G. (2020). The characteristics differentiating expert and competent strength and conditioning coaches. *Research Quarterly for Exercise and Sport*, 91(3), 488-499. <https://doi.org/10.1080/02701367.2019.1686451>

Law, H. (2013). Definitions: Coaching psychology, coaching, mentoring and learning. In H. Law (Ed.), *Coaching psychology: A practitioner guide* (pp. 43-50). Hoboken: Wiley. <https://doi.org/10.1002/9781118598399.ch4>

Lee, W.O., Magnusen, M.J., & Cho, S. (2013). Strength coach-athlete compatibility: Roles of coaching behaviours and athlete gender. *International Journal of Applied Sports Sciences*, 25(1), 55-67. <https://doi.org/10.24985/ijass.2013.25.1.55>

Magnusen, M.J. (2010). Differences in strength and conditioning coach self-perception of leadership style behaviours at the national basketball association, Division I-A, and Division II levels. *Journal of Strength and Conditioning Research*, 24(6), 1440-1450. <https://doi.org/10.1519/JSC.0b013e3181d321ec>

Magnusen, M.J., & Rhea, D.J. (2009). Division I athletes' attitudes toward and preferences for male and female strength and conditioning coaches. *Journal of Strength and Conditioning Research*, 23(4), 1084-1090. <https://doi.org/10.1519/JSC.0b013e3181d321ec>

Massey, D.C., Maneval, M.W., Phillips, J., Vincent, J., White, G., & Zoeller, B. (2002). An analysis of teaching and coaching behaviours of elite strength and conditioning coaches. *Journal of Strength and Conditioning Research*, 16(3), 456-460. <https://doi.org/10.1519/00124278-200208000-00019>

National Collegiate Athletics Association (2023, August 01). *NCAA Directory*. <https://web3.ncaa.org/directory/>

Passmore, J. (2010). A grounded theory study of the coachee experience: The implications for training and practice in coaching psychology. *International Coaching Psychology Review*, 5(1), 48-62. <https://doi.org/10.53841/bpsicpr.2010.5.1.48>

Salter, T., & Gannon, J.M. (2015). Exploring shared and distinctive aspects of coaching and mentoring approaches through six disciplines. *European Journal of Training and Development*, 39(5), 373-392. <https://doi.org/10.1108/EJTD-02-2015-0014>

Shuman, K.M., & Appleby, K.M. (2016). Gender preference? National collegiate athletic association Division I student-athletes and strength and conditioning coaches. *Journal of Strength and Conditioning Research*, 30(10), 2924-2933. <https://doi.org/10.1519/JSC.0000000000001384>

Szedlak, C., Batey, J., Smith, M.J., & Church, M. (2022). Examining experienced S&C coaches' reflections on the effectiveness of psychosocial behaviours in coaching. *International Sport Coaching Journal*, 9, 1-9. <https://doi.org/10.1123/iscj.2020-0092>

Szedlak, C., Smith, M.J., Day, M., & Callary, B. (2018). Using vignettes to analyse potential influences of effective strength and conditioning coaching on athlete development. *The Sport Psychologist*, 32, 199-209. <https://doi.org/10.1123/tsp.2017-0060>

Szedlak, C., Smith, M.J., Day, M.C., & Greenlees, I.A. (2015). Effective behaviours of strength and conditioning coaches as perceived by athletes. *International Journal of Sports Science and Coaching*, 10(5), 967-984. <https://doi.org/10.1260/1747-9541.10.5.967>

Taber, K.S. (2018). The use of cronbach's alpha when developing and reporting research instruments in science education. *Research in science education (Australasian Science Education Research Association)*, 48(6), 1273-1296. <https://doi.org/10.1007/s11165-016-9602-2>

Terry, P.C. (1985). The coaching preferences of elite athletes competing at Universiade '83. *Canadian Journal of Applied Sport Sciences*, 9(4), 201-208.

Terry, P.C., & Howe, B.L. (1985). Coaching preferences of athletes. *Canadian Journal of Applied Sport Sciences*, 9(4), 188-193.

Thomas, J.R., Martin, P.E., Etnier, J.L., & Silverman, S.J. (2023). Ethical issues in research and scholarship. In J.R. Thomas, P.E. Martin, J.L. Etnier, and S.J. Silverman (Eds.) *Research Method in Physical Activity*, (pp. 79-93). Champaign, IL, USA: Human Kinetics.

Tiberi, S., & Moody, J. (2020). An analysis of desirable attributes for strength and conditioning coaches as perceived by male and female population of collegiate athletes. *International Journal of Physical Education, Fitness and Sports*, 9(2), 16-29. <https://doi.org/10.34256/ijpefs2023>

Tiberi, S., Esformes, J.I., Jennings, G., Cooper, S., & Moody, J. (2023). Preferred strength and conditioning leadership behaviours of NCAA Division I and II Collegiate student-athletes based on sex. *International Journal of Physical Education, Fitness and Sports*, 12(4), 23-35. <https://doi.org/10.54392/ijpefs2343>

Witte, K.S. (2011). Coaching leadership preferences: Insight from the national collegiate athletic association Division III athlete. *Journal of Coaching Education*. 4(2), 73-87. <https://doi.org/10.1123/jce.4.2.73>

Yenen, E., Atamturk, H., & Atamturk, N. (2023). Exploring leadership behaviours of the coaches of champion teams. *Frontiers in psychology*, 13, 1-9. <https://doi.org/10.3389/fpsyg.2022.1091703>

Yukl, G. (1971). Toward a behavioural theory of leadership. *Organisational Behaviour and Human Performance*, 6, 414-440. [https://doi.org/10.1016/0030-5073\(71\)90026-2](https://doi.org/10.1016/0030-5073(71)90026-2)

Zhang, J.J., Jensen, B.E., & Mann, B.L. (1997). Modification and revision of the leadership scale for sport. *Journal of Sport Behaviour*, 20(1), 105-122.