International Sport Coaching Journal, **(Ahead of Print)**
https://doi.org/10.1123/iscj.2022-0051

First Published Online: Jan. 30, 2023

Human Kinetics
ORIGINAL RESEARCH

How Do Adult-Oriented Coaching Practices Change Over Time and Correspond With Changes in Key Criterion Outcomes? An 8-Week Study

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The Adult-Oriented Sport Coaching Survey assesses how often coaches use practices tailored to adult and older adult athletes. Cross-sectionally, said practices contribute to a quality masters sport experience for masters athletes (MAs); however, the stability of adult-oriented coaching over time and whether changes in coaching over time correspond with psychosocial outcomes for MAs is unknown. Therefore, coaches ($N = 32$; $M_{age} = 49.0$) and MAs ($N = 103$; $M_{age} = 51.5$) completed the Adult-Oriented Sport Coaching Survey twice 8 weeks apart. MAs also completed criterion measures for facets of the coach–athlete relationship, basic needs satisfaction, and thwarting. Our first question was whether mean group values for adult-oriented coaching changed over time. Repeated measures analysis of variance demonstrated stability of coaches' and MAs' scores. Our second question was whether changes in adult-oriented coaching corresponded with changes on criterion measures. Path analyses showed increased perceived frequency of adult-oriented coaching that, generally, was associated with enhancing three facets of the coach–athlete relationship, relatedness satisfaction, autonomy satisfaction, and reducing competency thwarting. The discussion centers on how adult-oriented coaching might facilitate quality sporting relationships, empowerment, and mastery in adult sport programming. These nonintervention results are interpreted with an eye toward considerations in future Adult-Oriented Sport Coaching Survey-based coaching interventions.

Keywords: adult sport coaching, andragogy in sport, Masters sport, change-based analyses, repeated measures

Masters athletes (MAs) are adults who are registered in competitive sport organized for people beyond the normative age of peak performance (meaning most are over 35 years old) and who acknowledge that they practice to prepare for competition (Young et al., 2018). Much literature supports the psychosocial outcomes that MAs garner from sport. For instance, Gayman et al. (2017) reported that MAs experience positive emotions, develop positive social networks, and satisfy a variety of participatory motivations from sport. Considering such benefits, researchers have explored programming and contextual factors responsible for promoting positive outcomes (Jenkin et al., 2018; Young & Callary, 2018). The coaching that MAs receive appears to be an important factor. For example, coached MAs have increased autonomous motivation (Appleby & Dieffenbach, 2016), are more committed (Santi et al., 2014), have more positive social interactions (Currie, Callary, & Young, 2021), and have enhanced performance (Ferrari et al., 2016).

Turning to why coaches benefit MAs, Callary, Rathwell, and Young (2015) interviewed masters swimmers, who said that coaches helped their self-efficacy and interest. Callary et al. (2017) then interviewed masters swimming coaches, who described the importance of adopting approaches to ensure MAs' sense of autonomy. The coaches described needing to be ready to answer numerous questions from their MAs about what they were learning. Coaches also noted MAs' wealth of knowledge and experiences inside and outside of sport, how their coaching approach could influence the MAs' readiness for a given task, and conversely, how the MAs' readiness to learn influenced their coaching approach. MacLellan et al.'s (2018) case study compared a coach's psychosocial approaches with separate groups of masters and youth paddlers. The coach asserted that autonomy-supportive coaching was important in both groups, yet the masters group was afforded self-directedness to train independently, whereas the coach set boundaries around the youth group's self-directedness.

Literature has increasingly established that MAs have preferences and needs from coaches that are unique to their cohort (see Callary et al., 2021; Dionigi et al., 2021). For example, Callary et al. (2017) described how masters swimmers' preferences align with needs set out in principles of adult education, such as a need to know information and rationale for practice activities, and an orientation toward problem-based learning. In a novel case study of a coach who worked with both MAs and adolescents, MacLellan et al. (2019) found cohort-related differences in coaching approaches. The coach adopted a flexible approach for adult athletes to accommodate their inquisitiveness and self-directedness while considering their motivations to be intrinsic in nature. Conversely, the same coach took a pedagogical approach for youth athletes—directing information, making decisions on their behalf, and considering extrinsic motives as being important to their commitment. These studies, and others (e.g., Callary et al., 2015; Ferrari et al., 2016), suggested that traditional pedagogic practices for younger cohorts do not necessarily apply to coaching in the masters sport context. Moreover, the studies suggest that coaches' use of andragogical approaches, involving collaboration and more bilateral communication, is an integral aspect of the coached masters sport experience.

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As these coaching nuances regarding MAs have come to the fore, discussions in coaching science have advanced the value of coaches using adult-oriented coaching practices among their adult athletes for improving relational interactions, social support, and autonomy support for athletes (Callary et al., 2017; Callary, Currie, & Young, 2020; MacLellan et al., 2019). The utility of considering these adult-oriented coaching themes was further advanced when Rathwell et al. (2020) developed the Adult-Oriented Sport Coaching Survey (AOSCS). The AOSCS is a self-assessment tool that allows coaches to reliably judge the frequency with which they adopt adult-oriented coaching practices. With its face validity informed by prior qualitative work, the AOSCS showed evidence of structural validity and reliability in independent samples of MAs and coaches of MAs. Rathwell et al. (2020) created two versions of a 22-item inventory (i.e., coach and athlete) with each showing adequate psychometric properties with the same factor structure.

The AOSCS assesses five adult-oriented coaching practices (Rathwell et al., 2020): *Considering the Individuality of Athletes*, which describes how coaches tailor their approach to each of their MAs' experiences and motives when planning, organizing, and delivering practice; *Framing Learning Situations*, which involves coaches organizing training through self-discovery, problem-based scenarios, modeling, and assessments; *Imparting Coaching Knowledge*, which concerns coaches sharing their relevant athletic experiences, knowledge, and professional development; *Respecting Preferences for Effort, Accountability, and Feedback*, which describes accommodating how MAs wish to be held to account in training and effort and coaching approaches to tailor feedback; and C*reating Personalized Programming*, which is how coaches adapt scheduling, season-long plans, and support based on MAs' needs and skills. Overall, the AOSCS is used to assess how frequently adult-oriented coaching practices are used by coaches based on self-report by the coach or their MAs.

The AOSCS has been proposed as a possible tool in coach education workshops for coaches of MAs (Callary & Young, 2020). Indeed, there is the possibility for interventions to be built upon the coach and athlete versions of the survey (Callary & Gearity, 2021). However, it is important to first understand trends for adult-oriented practices when no coach education intervention is given. For instance, if we learn that coaches' use of adult-oriented coaching practices does not change over time or that it decreases significantly over time, we might infer that an intervention is needed. Alternatively, if coaches use adult-oriented practices significantly more often over time, intervention work might be less needed as this would suggest that coaches learn to use beneficial adult-oriented practices via their organic interaction and maturation alongside adult athletes. Determining the plausibility of change scenarios around AOSCS values is an important step ahead of any intervention efforts. Hence, our first research question (RQ) is as follows:

> **RQ1:** Do coaches' and MAs' perceptions of the use of (in the case of coaches) and exposure to (in the case of their athletes) adult-oriented coaching practices significantly change across 8 weeks of a season?

To further advocate for the AOSCS as a consideration in coach education schemes, it is essential to determine whether reported adult-oriented coaching practices are associated with athlete outcomes characterizing enriched sporting experiences (Young et al., 2021). To interrogate whether an activity pursuit promotes well-being, many researchers examine relationships with how a phenomenon of interest (in our case, exposure to adult-oriented coaching) relates to satisfaction of athletes' basic psychological needs (i.e., autonomy, competence, and relatedness; Ryan & Deci, 2017). We, thus, sought to understand how AOSCS scores are related to MAs' needs of autonomy and competence, respectively, through the lens of satisfaction and thwarting. Autonomy refers to an athlete's desire to self-regulate their own sport experience and actions (in congruence with their interests/values), which characterizes empowerment because autonomous athletes feel that consequential outcomes are associated with behaviors/decisions that are under their control. MAs have expressed a need for autonomy through self-directed activities and choices in the coached context (MacLellan et al., 2019); thus, we hypothesized that changes in AOSCS scores would positively relate to changes in athletes' reports of autonomy fulfillment and inversely associate with changes in autonomy thwarting. Competence is an athlete's need to feel effectance and mastery within the sports environment, which may be used to infer MAs' sense of mastery of sports skills and interactions. As MAs have orientations toward both physical and social mastery (Hodge et al., 2008) and learning in sport (Rathwell et al., 2015), we expected changes in AOSCS scores to be positively related to changes in competency fulfillment and inversely related to changes in competency thwarting.

The basic psychological needs for relatedness (i.e., athletes feeling socially connected to others in terms of feelings of belongingness, significance, and contribution to others) can be considered a global measure of quality relationships. Considering that MAs have a need to feel belongingness that is integral to their sport experience (Kowal & Fortier, 2000) and that coached MAs have more fulfilled belongingness than noncoached MAs (Hoffmann et al., 2019), we posited that changes in AOSCS scores would positively associate with changes in athletes' relatedness fulfillment and would inversely associate with changes in relatedness thwarting.

An additional consideration of this study was to address Callary et al.'s (2020) call for a better understanding of how adult-oriented coaching practices link to qualities of the coach–athlete (C–A) relationship. According to Jowett and Ntoumanis (2004), three facets (3Cs) characterize mutually beneficial relationships between an athlete and a coach: closeness (i.e., mutual trust and respect), commitment (i.e., shared intent to remain together), and complementarity (i.e., cooperation and responsiveness to each other). These C–A facets are pertinent to quality relationships in masters sport (Young et al., 2021). For example, Currie, Young, and Callary's (2021) qualitative study followed a masters synchronized skating team and their coach across a full season. They found that many athletes noted closeness to their coach that extended beyond sport; both the MAs and the coach indicated intentions to maintain their relationship; and they showed complementary behaviors. Thus, we posited that more frequent use of adult-oriented coaching practices would associate with MAs' greater report on criteria for better relationships with their coach or higher scores on the 3Cs.

Only one aforementioned work, a qualitative study (Currie, Young, & Callary, 2021), had an expressed aim to consider change over time. As such, our second RQ was the following:

> **RQ2:** Do changes in exposure to adult-oriented coaching practices (measured in the AOSCS) correspond to changes in key criterion measures (i.e., autonomy, competence, relatedness, and the C–A relationship) across 8 weeks of a season?

We posited that changes in coaches' use of adult-oriented coaching practices would be positively associated with changes in athletes' autonomy, competence, and relatedness satisfaction as well as the 3Cs of the C–A relationship. Furthermore, we expected that changes in adult-oriented coaching practices would be

inversely associated with MAs' changes in autonomy, competence, and relatedness thwarting.

Methods

Participants

Fifty-four coaches and 277 MAs started the study, with 48 coaches and 214 MAs completing the Time 1 (t1) survey. Thirty-two coaches and 129 MAs finished the Time 2 (t2) survey. Twenty MAs were excluded because their coach opted to not participate in the study or because they erroneously responded to the survey three or more times. We screened to ensure that all athlete participants met the criteria to be considered MAs in their sports (Young et al., 2018): All athletes met minimal age requirements for their sport; were formally registered to a club, team, or event; and indicated that they trained to compete. Three athletes were removed for being too young to be considered MAs. Screening for outliers identified three MAs who were excluded because their responses for adult-oriented practices indicated *z*-score values >3 *SDs* from the mean. The final sample comprised 32 coaches and 103 MAs derived from 32 clubs/teams (Table 1).

Attrition

With protocol for data across more than one time point, attrition analyses are important to check for differences between those who complete a study and those who drop out (Eime et al., 2019). The attrition rate was 33.3% ($n = 16$ dropouts) for coaches and 39.7% ($n = 85$ dropouts) for MAs.[1] We conducted one-way analyses of variance (ANOVAs) comparing completers versus dropouts on all demographic and sport involvement variables for coaches and MAs

Table 1 An Overview of Masters Athletes' and Coaches' Self-Reported Demographic Information

	Coaches			MAs		
Variable	***N* = 32**	**%**		***N* = 103**	**%**	
Gender						
Female	15	46.9		64	62.1	
Male	17	53.1		39	37.9	
Ethnicity						
White	31	96.9		99	96.0	
Asian	1	3.1		—	—	
African American/Black	—	—		1	1.0	
Hispanic	—	—		1	1.0	
Aboriginal	—	—		1	1.0	
Not specified	—	—		1	1.0	
Education						
Graduate degree	5	15.6		48	46.6	
Undergraduate degree	14	43.8		38	36.9	
College diploma	8	25.0		12	11.7	
High school	5	15.6		5	4.9	
Country of residence						
Canada	29	90.6		90	87.4	
Australia	3	9.4		13	12.6	
Primary sport						
Swimming	11	34.4		49	47.6	
Skiing	5	15.6		21	20.4	
Speed skating	5	15.6		10	9.7	
Artistic skating	1	3.1		6	5.8	
Other sports[a]	10	31.3		17	16.5	
	M	***SD***	***Mdn***	***M***	***SD***	***Mdn***
Age	49.0	17.2	49.5	51.4	9.8	52.00
Masters sport participation/coaching						
Competitive events (past year)	3.14	3.65	2.00	2.10	3.18	1.00
Months per year	9.78	2.38	10.00	9.47	2.59	10.00
Times per week	3.28	2.75	3.00	3.28	1.91	3.00
Hours per week	5.25	4.70	3.00	3.73	2.03	3.00
Coach present (times per week)	—	—	—	1.99	0.93	2.00

Note. MAs = masters athletes; *Mdn* = median.
[a]Other sports include biathlon, judo, rowing, athletics, triathlon, and water polo.

and basic needs variables for MAs (with $p < .05$). Coach demographic and sport involvement variables were age, gender, ethnicity, nationality, education level, sport type, paid/unpaid, years coaching, years coaching MAs, months per year coaching, times per week coaching, and hours per week coaching. Results showed that coaches who completed the study were no different than those who dropped out after t1.

For MAs, demographic and sport involvement variables not only were identically assessed at each time point but also included months participating in sport yearly, times participating weekly, age they started adult sport, number of years with current coach, coach importance, and the extent to which they trained to prepare for competition. Several variables distinguished completers from those who dropped out after t1. Dropouts were coached more times weekly ($M = 2.55$, $SD = 1.53$) than completers ($M = 2.05$, $SD = 0.93$). Dropouts had higher participation levels ($M = 3.89$ times practicing weekly, $SD = 1.98$) than completers ($M = 3.27$, $SD = 1.80$). Finally, dropouts also had higher autonomy ($M = 1.81$, $SD = 1.02$) and competence thwarting ($M = 1.54$, $SD = 0.97$) as compared with MAs who completed the study ($M = 1.54$, $SD = 0.82$; $M = 1.31$, $SD = 0.64$, respectively).

Procedure

All procedures received clearance from an institutional research ethics board. MAs and coaches were recruited via publicly available online sources and regional masters sporting events in Australia and Canada. When recruiting online, we searched for groups of MAs and coaches on social media (e.g., Facebook and Twitter) and team/club websites. When contact information was publicly available, we emailed coaches or club managers with a recruitment script. Consenting coaches were sent an online survey wherein they answered questions about their practices and demographic information. They were asked to forward an online survey link to their MAs, who gave informed consent before responding. At in-person events, we gained permission from event managers to recruit on site. Interested participants were given a paper invitation directing them to a secure, personal weblink, which allowed them to give informed consent and do the survey.

We recruited coaches near the beginning of a season (i.e., the first 4 weeks) and inputted codes for time, which we used to match a coach with their MAs. After initial survey completion by the coach, the stamp for t1 was noted for both the coach and any of their consenting MAs, and a second invitation was generated (t2) 8 weeks[2] later by email to the coach and their MAs. Eight weeks allowed for two mesocycles (i.e., average 4 weeks each) of periodized training (Bompa & Haff, 2009) yet was short enough to ensure that athletes' sport seasons were still ongoing at t2. To obtain matched data from coaches and their MAs, we assigned a unique code to each group at the time of recruitment (i.e., to the coach and their MAs), with each participant asked to input the code at the start of the t1 survey. This code followed them to t2. The t2 survey was identical to t1, minus demographic questions.

Coach Self-Report Measures

Coach Version (AOSCS-C)

The AOSCS-C (Rathwell et al., 2020) assessed each coach's perceptions of their use of adult-oriented coaching practices at t1 and t2. After the stem "How frequently do you," coaches responded to items on a 7-point Likert scale anchored at 1 (*never*), 4 (*sometimes*), and 7 (*always*). The 22-item survey assessed five factors: *Considering the Individuality of Athletes* (four items, e.g., "... ask your adult athletes about their past experiences to help you plan their training"); *Framing Learning Situations* (seven items, e.g., "... ask your adult athlete to do drills in which they need to resolve a challenge"); *Imparting Coaching Knowledge* (three items, e.g., "... share information from your own professional coaching development with your adult athletes"); *Respecting Preferences for Effort, Accountability, and Feedback* (three items, e.g., " ... consider how each of your adult athletes wishes to be pushed during practice"); and *Creating Personalized Programming* (four items, e.g., "... pay attention to where your adult athletes are in terms of their progress relative to season-long plans"). The strong factorial validity and reliability of the AOSCS-C have been reported elsewhere for coaches of competitive sport participants between the ages of 18 and 89 years (see Rathwell et al., 2020, for full details). To calculate *specific* AOSCS factors, we averaged the item scores for each respective factor. All AOSCS-C factors showed McDonald's omega (ω) values > 0.70, indicating strong internal consistency reliability (Lance et al., 2006; see Table 2). To calculate *overall* use, we averaged all 22 AOSCS items.

MA Self-Report Measures

Athlete Version (AOSCS-A)

The AOSCS-A (Rathwell et al., 2020) measured MAs' *perceptions of their coach's* use of adult-specific coaching practices at t1 and t2. After the stem "My coach/instructor," the MAs responded to items (e.g., tailors their support to me at competitions) on a 7-point Likert scale anchored at 1 (*never*), 4 (*sometimes*), and 7 (*always*). The AOSCS-A has the same number of survey items located on the same factors as the AOSCS-C (see Rathwell et al., 2020). We, again, calculated *specific* and *overall* AOSCS scores. The strong factorial validity and reliability of the AOSCS-A have been reported elsewhere for competitive sport participants between the ages of 35 and 87 years (see Motz et al., 2022; Rathwell et al., 2020, for full details). In the current sample, all AOSCS-A factors had ω values > 0.70 (Table 2).

C–A Relationship Questionnaire

The C–A Relationship Questionnaire (Jowett & Ntoumanis, 2004) assessed perceptions of the C–A relationship. Eleven items measured three factors: closeness, commitment, and complementarity. Examples of survey items included, "I respect my coach" (closeness), "I feel that my sport career is promising with my coach" (commitment), and "When I am coached by my coach, I am ready to do my best" (complementarity). Likert responses ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). The factors were all reliable, with ω values > 0.78.

Basic Needs Measures

Basic Needs Satisfaction in Sport Scale. The Basic Needs Satisfaction in Sport Scale (BNSSS) (Ng et al., 2011) assessed MAs' degree of satisfaction in terms of autonomy, competence, and relatedness. The Basic Needs Satisfaction in Sport Scale has 20 items assessing five factors: *Competence* (five items; e.g., "I am skilled at my sport"); *Relatedness* (five items; e.g., "In my sport, I feel close to other people"); *Autonomy Choice* (four items; e.g., "In my sport, I get opportunities to make choices"); *Autonomy Volition* (three items; e.g., "I feel I participate in sport willingly"); and *Autonomy Internal Perceived Locus of Causality* (three items;

Table 2 Descriptive Statistics for Coaches ($N = 32$) and Masters Athletes ($N = 103$) Who Self-Reported Data at Time 1 and Time 2

	Time 1					Time 2				Difference
	Mean		z score			Mean		z score		t2 – t1
Factor	Statistic	*SD*	Skewness	Kurtosis	ω	Statistic	*SD*	Skewness	Kurtosis	*M*
AOSCS-coach										
CIA	5.48	1.26	–3.63	2.86	0.82	5.38	1.21	–3.68	5.31	–0.10
FLS	4.45	1.14	–0.76	–0.37	0.81	4.44	1.05	0.17	–0.77	–0.01
ICK	5.39	1.10	–2.93	2.94	0.74	5.35	.91	–0.71	0.43	–0.04
RPE	5.48	1.09	–2.46	2.47	0.78	5.50	1.08	–3.39	3.53	0.02
CPP	5.04	1.62	–2.32	0.49	0.88	5.19	1.46	–3.63	2.51	0.15
AOSCS-C (overall)	5.04	1.03	–2.56	1.48	0.93	5.05	0.97	–2.49	3.44	0.01
AOSCS-athlete										
CIA	5.05	1.38	–3.92	1.15	0.86	5.05	1.36	–2.75	–0.26	0.00
FLS	4.64	1.02	–0.13	–1.53	0.73	4.73	1.23	–1.58	–0.13	0.09
ICK	5.46	1.23	–3.46	1.40	0.81	5.34	1.35	–2.92	0.26	–0.12
RPE	5.40	1.28	–2.79	–0.60	0.84	5.46	1.22	–3.17	0.40	0.06
CPP	4.57	1.55	–1.58	–1.57	0.86	4.74	1.48	–2.17	–0.66	0.17
AOSCS-A (overall)	4.91	1.07	–2.33	–0.19	0.93	4.97	1.16	–2.25	–0.11	0.06
CART-Q										
Commitment	5.87	1.09	–5.08	4.13	0.82	5.90	1.10	–5.29	3.64	0.03
Closeness	6.59	0.64	–7.46	5.36	0.78	6.59	0.69	–10.79	19.87	0.00
Complementarity	6.47	0.78	–9.63	17.09	0.84	6.50	0.74	–7.88	8.64	0.03
BNSSS										
Relatedness	5.85	0.85	–2.63	0.13	0.87	5.76	0.82	–2.17	–0.36	–0.09
Autonomy IPLOC	6.06	0.73	–1.38	–1.47	0.75	5.98	0.78	–2.13	–1.00	–0.08
Autonomy volition	4.10	0.80	–0.08	2.40	0.42	4.16	0.85	–0.08	2.53	0.06
Autonomy choice	5.97	0.71	–1.25	–1.02	0.83	5.87	0.79	–2.50	0.21	–0.10
Competence	4.78	0.57	–1.25	–1.02	0.88	4.70	0.63	–2.50	0.21	–0.08
PNTS										
Autonomy thwarting	1.55	0.82	6.33	2.66	0.76	1.56	0.80	8.17	8.81	0.01
Competence thwarting	1.30	0.53	8.50	8.00	0.70	1.27	0.50	10.96	18.04	–0.03
Relatedness thwarting	1.31	0.58	9.25	9.60	0.75	1.32	0.61	9.83	11.66	0.01

Note. In accordance with Kim (2013), standardized (*z* scores) skewness and kurtosis thresholds are 1.96 when $n < 50$ (i.e., our coach sample) and 3.29 when $50 < n < 300$ (i.e., our athlete sample). CART-Q = Coach–Athlete Relationship Questionnaire; BNSSS = Basic Needs Satisfaction in Sport Scale; PNTS = Psychological Needs Thwarting Scale; CIA = Considering the Individuality of Athletes; FLS = Framing Learning Situations; ICK = Imparting Coaching Knowledge; RPE = Respecting Preferences for Effort, Accountability, and Feedback; CPP = Creating Personalized Programming; IPLOC = internal perceived locus of causality; ω = McDonald's omega coefficient; AOSCS-C = Adult-Oriented Sport Coaching Survey coach version; AOSCS-A = Adult-Oriented Sport Coaching Survey athlete version; t1 = Time 1; t2 = Time 2.

e.g., "In my sport, I feel I am pursuing goals that are my own"). *Autonomy Choice* is a person's decision-making power within an activity; *Autonomy Volition* is to a person's willingness to engage in an activity; and *Internal Perceived Locus of Causality* refers to the perception that one's actions are self-initiated/regulated. Likert responses ranged from 1 (*not true at all*) to 7 (*very true*). All Basic Needs Satisfaction in Sport Scale factors were reliable, with ω values > 0.70, except volition (0.42).

Psychological Needs Thwarting Scale. The Psychological Needs Thwarting Scale (Bartholomew et al., 2011) assessed the degree of frustration of basic psychological needs. Twelve items (four per factor) assessed three factors—autonomy, competence, and relatedness—on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), with higher scores representing greater stymieing of basic needs. Examples of questions included, "I feel forced to follow training decisions made for me" (*Autonomy Thwarting*), "I feel inadequate because I am not given opportunities to fulfill my potential" (*Competence Thwarting*), and "I feel others can be dismissive of me" (*Relatedness Thwarting*). All Psychological Needs Thwarting Scale factors had McDonald's ω values > 0.70.

Planned Data Analyses

RQ1: Do AOSCS Values Change Over Time?

Twelve repeated measures ANOVAs (RM-ANOVAs)—six for coaches and six for MAs (i.e., separate analyses for five specific practices and one for overall AOSCS)—tested whether mean AOSCS scores changed over 8 weeks. Where the screening deemed it warranted, we identified covariates per analysis and conducted RM analyses of covariance (RM-ANCOVAs) using

generalized linear model function in SPSS (IBM, 2017). In all analyses, we interpreted the main effect of time and then any within effects over time in consideration of the covariates. Significance was set at $p < .05$, and effect sizes for η_p^2 were interpreted as small (.01), medium (.06), and large (.14; Cohen, 1988). If a significant effect was found, we planned to use tests of simple effects to tease out differences within the RM-AN(C)OVAs.

In terms of covariates, we followed Tabachnick and Fidell's (2019) screening recommendations for demographic/sport involvement variables in relation to AOSCS variables. To assess associations between AOSCS scores and continuous variables, we used bivariate correlations; we used point-biserial correlations (r_{pb}) for categorical variables ($p < .05$). Coaches' weekly hours in coaching ($r = .35$) and gender ($r_{pb} = -.35$) were related to coach-reported *Framing Learning Situations*. For MAs, times practicing weekly were related to *Framing Learning Situations* ($r = .25$), *Considering the Individuality of Athletes* ($r = .23$), and *overall* AOSCS-A scores ($r = .23$). Years with current coach correlated with *Respecting Preferences for Effort, Accountability, and Feedback* ($r = -.25$), *Creating Personalized Programming* ($r = -.21$), and *overall* AOSCS-A ($r = -.20$).

RQ2: Change-Based Associations Between AOSCS-A and Criterion Outcomes

For the MA data only, we assessed whether change scores for AOSCS-A measures were related to corresponding change scores on our dependent variables relating to basic needs and the C–A relationship. Change scores were calculated by subtracting t2 from t1 scores (Maxwell & Howard, 1981). We conducted four separate path analyses using Mplus (Kelloway, 2015; Muthén & Muthén, 2017). In the first two path analyses, change scores for each of the *specific* AOSCS-A practices were the independent variables. For the second two path analyses, change scores for *overall* AOSCS-A were the only independent variable. Within each of these sets of path analyses, we ran tests with dependent variables representing change scores for the 3Cs of the C–A Relationship Questionnaire and then tests with dependent variables representing changes on the five BNSSS scores and the three Psychological Needs Thwarting Scale scores; see Figure 1. As multiple path analyses were performed, significance was set at $p < .01$. Effect sizes of regression coefficients were interpreted as small ($\beta = 0.10$–0.29), medium ($\beta = 0.30$–0.49), and large ($\beta > 0.49$; Cohen, 1988).

Results

Preliminary Data Analyses

Table 2 displays the descriptive statistics at t1 and t2, and Table 3 displays bivariate correlations among variables at t1 and t2. Inspection of the data set revealed that no more than 1.60% of the data were missing at either t1 or t2. Replacing missing values is appropriate when <5% of the data are missing (Tabachnick & Fidell, 2019), especially when data are missing at random. We ran a missing completely at random (MCAR) Little's test that proved nonsignificant, indicating that data were missing at random. Missing data were treated with multiple imputations using an expectation–maximization method (Tabachnick & Fidell, 2019). Missing data were treated in SPSS using the multiple imputation function—we chose the fully conditional specification as the method and linear regression as the model type with a total of five imputation iterations (Denis, 2019; Leech et al., 2014).

Do AOSCS Values Change Over Time?

For the coaches, the RM-ANOVAs for *overall* AOSCS-C practices and four specific practices showed no changes over time, all Fs < 1.14, ps > .37, and all η_p^2 values < .037. In terms of the fifth coach-reported practice—*Framing Learning Situations*—the RM-ANCOVA results showed no main effect of time, $F(1, 28) = 0.14$, $p = .71$, $\eta_p^2 = .005$. With the covariate "hours per week coaching," the effect of time remained nonsignificant, $F(1, 28) = 0.15$, $p = .70$, $\eta_p^2 = .005$. Within the generalized linear model function for *Framing Learning Situations*, when "gender" was entered as a covariate, the effect of time was significant, $F(1, 28) = 10.61$, $p = .003$, $\eta_p^2 = .275$. To make sense of this result, we conducted follow-up simple effect comparisons. First, at t1, male

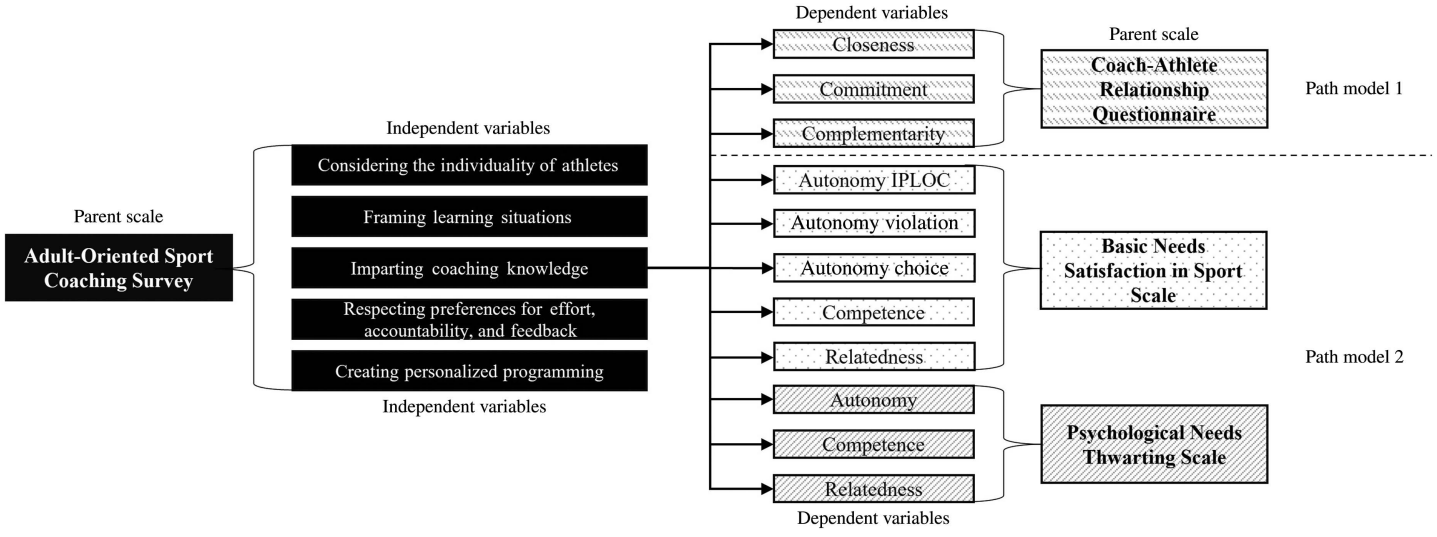

Figure 1 — Delineation of path analysis models with *specific* AOSCS-A factor scores as the independent variables and Masters athletes' responses on the dependent variables pertaining to the coach–athlete relationship (path model 1) and basic psychological needs (a separate path model 2). A *priori* analyses pursued these tests with all variables entered as change scores (t2 – t1). *Note*. IPLOC = internal perceived locus of control; C–A = coach–athlete; AOSCS-A = Adult-Oriented Sport Coaching Survey athlete version.

coaches ($M = 4.83$, $SD = 1.05$) reported higher scores than female coaches ($M = 4.03$, $SD = 1.13$), $p = .023$. However, at t2, there was no gender difference, $p = .948$. Furthermore, women coaches reported gaining greater awareness of *Framing Learning Situations* from t1 to t2 ($M_{t1} = 4.03$, $SD = 1.13$; $M_{t2} = 4.45$, $SD = 1.15$), $p = .037$. On the other hand, male coaches reported losing awareness of *Framing Learning Situations* from t1 to t2 ($M_{t1} = 4.83$, $SD = 1.08$; $M_{t2} = 4.38$, $SD = 1.01$), $p = .022$.

For the MAs, a RM-ANOVA showed no effect of time for *Imparting Coaching Knowledge*, $F(1, 102) = 0.98$, $p = .32$, $\eta_p^2 = .010$. With regard to the other four specific AOSCS-A practices, RM-ANCOVAs showed neither main effects of time, all Fs < 3.17, all ps > .078, and η_p^2 values < .031, nor significant effects when considering a covariate, all Fs < 0.96, ps > .33, and all η_p^2 values < .010. An RM-ANCOVA was performed for *overall* AOSCS-A practices. There was no main effect of time, $F(1, 99) = 1.42$, $p = .23$, $\eta_p^2 = .014$. Within the generalized linear model function for overall AOSCS-A, when MAs' "practice times per week" was considered as a covariate, time remained nonsignificant, $F(1, 99) = 0.20$, $p = .65$, $\eta_p^2 = .002$. Finally, when "years with current coach" was considered as a covariate, time was significant, $F(1, 99) = 6.61$, $p = .012$, $\eta_p^2 = .063$. To treat this finding more fully, we submitted the interaction between "years with current coach" and overall AOSC-A to Hayes' (2022) PROCESS procedure for determining statistical interactions with continuous variables. The interaction, based on a comparison of −1 *SD* versus +1 *SD* permutations for *overall* AOSCS-A (centered) distribution, was nonsignificant, $p = .64$.

Change-Based Associations

Table 4 displays the standardized regression results for the path analyses using change scores based on MA-reported data. Some change-based associations (i.e., four of 11 relationships) between overall AOSCS-A exposure and criterion measures were significant across the 8 weeks, with small to medium effects. Increased exposure to adult-oriented coaching practices (particularly *overall* AOSCS-A scores) was more consistently associated with significant increases in basic needs satisfaction (two of five relationships) than it was with diminished basic needs thwarting (zero of three relationships). Although there were less consistent significant findings attributed to *specific* adult-oriented coaching practices, significant change-based results were noted for *Creating Personalized Programming* (two of 11 relationships); for *Respecting Preferences for Effort, Accountability, and Feedback* (four of 11 relationships); for *Framing Learning Situations* (two of 11 relationships); and for *Considering the Individuality of Athletes* (one of 11 relationships).

Discussion

Do Coaches' and MAs' Perceptions of Adult-Oriented Practices Change Over Time?

Altogether, there was very little change across 8 weeks in the mean level values for the group of coaches in our nonintervention design. Statistical significance aside, the effect of time with respect to coach report of adult-oriented practices was null to small across the various analyses. An exception was *Framing Learning Situations*, where there was a significant large effect of time that was nuanced based on gender. Male coaches became less inclined to use, or less conscious of using, this practice over 8 weeks, whereas female coaches increased use of this practice. This noninterventionist observation should be understood based on our sample, where male coaches began by reporting more frequent use of this practice. It means that future coach education interventions might consider strategies so that male coaches do not wane in how they use this practice, which involves readying athletes by using self-discovery and problem-solving scenarios, using peer modeling, and assessments (Rathwell et al., 2020). It also suggests that female coaches may be particularly open to adopting such practices early in an intervention. To the best of our knowledge, no studies exist that have compared coaching practices based on gender status for coaches of adult athletes. We are not aware of any literature that might explain why male coaches/instructors would become less inclined to stick with a problem- or challenge-oriented frame of presenting learning situations in practice and why women coaches would become more attuned to this over time. As possible explanations are difficult to pinpoint, we tender this as an interesting area for future inquiry.

There was no significant change in the mean levels of adult-oriented practices reported by MAs over time. Effect sizes for change over time were null to small at best. Our analyses suggested that the prior years that an adult athlete has shared with a coach could be an important covariate to consider in future work; although this variable did not moderate trends in our data, we anticipate it could be relevant to any new intervention. For example, an MA who has an established relationship with a coach who has long used such practices may be less sensitive to changes according to an AOSCS coaching intervention. Alternatively, one could speculate that a consistent and lengthier prior C–A relationship could be the foundation for an observed increase in adult-oriented coaching practice scores with the introduction of an AOSCS intervention.

Overall, perceptions of adult-oriented coaching practices were remarkably stable over time. One interpretation could be that two time points, 8 weeks apart, were not sufficient to capture the ebb and flow of adult-oriented coaching practices. It may be that adult-oriented practices are employed in instances, or "coachable moments," which may mean that they would be better captured by methods focused on their application in "critical incidents" (e.g., Halquist & Musanti, 2010; i.e., the application of adult-oriented coaching may not be constant but exceptional, according to the situation) and/or using multiple assessments across time. The absence of change might also be attributed to the analyses, which were at the group level. It is possible that intraindividual trends would be more sensitive to dynamics related to adult-oriented coaching practices. In pursuing RQ1, two implications became evident. First, considering that most coach education interventions are based on group designs (Langan et al., 2013), we should not expect much movement at the group level in the absence of an explicit intervention to enhance the use of AOSCS approaches. Second, with respect to analytics, evidence for individual change over time was potentially obscured by the group-level analyses. Thus, we pursued RQ2 using path analysis, which is based on multiple linear regression analysis on intraindividual data, which offered supplemental insights.

Do Changes in Adult-Oriented Coaching Practices Associate With Changes in Key Criterion Measures Across Two Time Points?

We tested whether changes in MAs' judgments of their exposure to AOSCS-A practices were related to changes in their ratings of the C–A relationship and basic psychological needs. The findings showed that increased exposure to adult-oriented coaching practices overall, across 8 weeks, corresponded with enhanced qualities

Table 3 Bivariate Correlations Between Adult-Oriented Coaching and Outcome (CART-Q, BNSSS, and PNTS) Variables at Both Time Points

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
AOSCS-A																	
Considering the individuality of athletes	—	.71***	.51***	.75***	.75***	.86***	.53***	.45***	.50***	.51***	.42***	.48***	.47***	.47***	−.34***	−.19	−.18
Framing learning situations	.62***	—	.60***	.69***	.73***	.90***	.57***	.46***	.46***	.33**	.21*	.36***	.28**	.28**	−.13	−.06	−.12
Imparting coaching knowledge	.55***	.52***	—	.62***	.65***	.75***	.53***	.50***	.48***	.43***	.31**	.28**	.44***	.44***	−.16	−.21*	−.15
Respecting preferences for effort, accountability, and feedback	.72***	.65***	.52***	—	.78***	.87***	.65***	.51***	.55***	.55***	.42***	.52***	.53***	.53***	−.28**	−.21**	−.16
Creating personalized programming	.70***	.65***	.47***	.69***	—	.92***	.67***	.52***	.53***	.55***	.51***	.49***	.52***	.52***	−.20*	−.16	−.05
AOSCS (overall)	.86***	.85***	.69***	.84***	.88***	—	.68***	.55***	.57***	.53***	.42***	.49***	.50***	.50***	−.24***	−.17	−.14
CART-Q																	
Commitment	.50***	.50***	.52***	.60***	.52***	.62***	—	.76***	.73***	.35***	.42***	.42***	.48***	.48***	−.16	−.22***	−.11
Closeness	.41***	.41***	.51***	.44***	.42***	.51***	.66***	—	.84***	.28***	.32***	.20*	.38***	.38***	−.25*	−.26**	−.25*
Complementarity	.44***	.43***	.46***	.54***	.39***	.53***	.76***	.70***	—	.37***	.39***	.24*	.43***	.43***	−.38***	−.33**	−.26**
BNSSS																	
Relatedness satisfaction	.38***	.27**	.40***	.37***	.42***	.43***	.33**	.35***	.22*	—	.63***	.62***	.88***	.88***	−.36***	−.28**	−.13
Autonomy IPLOC	.34***	.24*	.35***	.37***	.35***	.38***	.49***	.46***	.38***	.65***	—	.38***	.73***	.73***	−.33**	−.38***	−.12
Autonomy volition	.30**	.21*	.36***	.32**	.34***	.36***	.40***	.34***	.28**	.67***	.49***	—	.61***	.61***	−.10	−.10	−.09
Autonomy choice	.44***	.28**	.40***	.41***	.40***	.45***	.46***	.40***	.35***	.78***	.77***	.60**	—	1.00***	−.36***	−.38***	−.15
Competence satisfaction	.44***	.28**	.40***	.41***	.40***	.45***	.46***	.40***	.35***	.78***	.77***	.60***	1.00***	—	−.36***	−.38***	−.15
PNTS																	
Autonomy thwarting	−.15	−.17	−.17	−.25*	−.07	−.18	−.18	−.14	−.31**	−.19*	−.27*	−.19	−.23*	−.23*	—	.63***	.36***
Competence thwarting	−.21*	−.17	−.26**	−.32**	−.14	−.24*	−.16	−.08	−.24*	−.26**	−.25*	−.27**	−.23*	−.23*	.66***	—	.43***
Relatedness thwarting	−.06	−.10	−.20*	−.23*	−.08	−.14	−.21*	−.19	−.28**	−.23*	−.25*	−.25*	−.13	−.13	.56***	.64***	—

Note. Time 1 = bottom diagonal; Time 2 = top diagonal; AOSCS = Adult-Oriented Sport Coaching Survey; AOSCS-A = Adult-Oriented Sport Coaching Survey athlete version; CART-Q = Coach–Athlete Relationship Questionnaire; BNSSS = Basic Needs Satisfaction in Sport Scale; PNTS = Psychological Needs Thwarting Scale.
*$p < .05$. **$p < .010$. ***$p < .001$.

Table 4 Standardized Regression Coefficients From the Path Analyses Testing Relationships Between *Change Scores* for Exposure to *Specific* Adult-Oriented Coaching Practices, and Separately for Change in *Overall* Adult-Oriented Coaching Practices, in Relation to Changes in Criterion Dependent Variables

	Independent variables											
	Specific AOSCS-A variables											
Dependent variables	Considering the individuality of athletes		Framing learning situations		Imparting coaching knowledge		Respecting preferences for effort, accountability, and feedback		Creating personalized programming		*Overall* AOSCS-A	
	β [95% CI]	*SE*	β [95% CI]	*SE*	β [95% CI]	*SE*	β [95% CI]	*SE*	β [95% CI]	*SE*	β [95% CI]	*SE*
1												
Closeness	0.03 [–0.10, 0.16]	0.07	0.24* [0.09, 0.40]	0.08	–0.03 [–0.17, 0.11]	0.07	0.08 [–0.04, 0.19]	0.06	0.21* [0.06, 0.36]	0.08	0.39** [0.27, 0.50]	0.06
Commitment	–0.03 [–0.15, 0.10]	0.06	0.27** [0.14, 0.41]	0.07	0.17 [0.01, 0.33]	0.08	0.20* [0.07, 0.33]	0.07	–0.06 [–0.20, 0.08]	0.07	0.35** [0.24, 0.46]	0.06
Complementarity	0.22* [0.07, 0.37]	0.08	0.03 [–0.15, 0.21]	0.09	0.05 [–0.01, 0.19]	0.07	0.06 [–0.08, 0.22]	0.08	–0.05 [–0.21, 0.12]	0.08	0.18 [0.04, 0.33]	0.07
2												
Autonomy choice	0.04 [–0.15, 0.22]	0.09	0.05 [–0.10, 0.21]	0.08	0.08 [–0.08, 0.23]	0.08	0.17 [0.03, 0.31]	0.07	0.14 [–0.003, 0.28]	0.07	0.29* [0.16, 0.41]	0.06
Autonomy volition	–0.04 [–0.20, 0.12]	0.08	–0.04 [–0.18, 0.10]	0.07	0.10 [–0.03, 0.23]	0.07	0.26* [0.08, 0.44]	0.09	0.15 [0.02, 0.29]	0.07	0.24 [0.08, 0.40]	0.08
Autonomy IPLOC	–0.01 [–0.21, 0.18]	0.10	0.13 [–0.01, 0.27]	0.07	–0.13 [–0.26, 0.01]	0.07	0.09 [–0.04, 0.23]	0.07	0.15 [–0.01, 0.30]	0.08	0.18 [0.06, 0.30]	0.06
Competence	0.04 [–0.01, 0.17]	0.07	0.08 [–0.07, 0.22]	0.08	–0.04 [–0.21, 0.14]	0.09	0.09 [–0.10, 0.27]	0.09	0.14 [–0.004, 0.28]	0.07	0.21 [0.07, 0.34]	0.07
Relatedness	–0.03 [–0.16, 0.11]	0.07	0.06 [–0.09, 0.20]	0.08	0.03 [–0.10, 0.16]	0.07	0.21* [0.07, 0.35]	0.07	0.36** [0.24, 0.49]	0.07	0.41** [0.27, 0.56]	0.07
Autonomy thwarting	0.03 [–0.11, 0.17]	0.07	0.01 [–0.12, 0.13]	0.07	0.14 [0.004, 0.27]	0.07	–0.03 [–0.19, 0.12]	0.08	–0.01 [–0.25, 0.05]	0.08	0.01 [–0.09, 0.11]	0.05
Competence thwarting	0.00 [–0.14, 0.14]	0.07	0.18 [0.04, 0.33]	0.07	0.08 [–0.05, 0.22]	0.07	–0.29* [–0.46, –0.13]	0.09	0.07 [–0.08, 0.22]	0.08	0.09 [–0.07, 0.25]	0.08
Relatedness thwarting	0.05 [–0.09, 0.18]	0.07	0.11 [–0.01, 0.22]	0.06	–0.004 [–0.13, 0.12]	0.06	–0.08 [–0.23, 0.07]	0.08	0.001 [–0.13, 0.14]	0.07	0.07 [–0.09, 0.24]	0.08

Note. 1 = path analyses with Coach–Athlete Relationship Questionnaire as dependent variable; 2 = path analyses with Basic Needs Satisfaction in Sport Scale and Psychological Needs Thwarting Scale scores as the dependent variables. Effect sizes of standardized regression coefficients (β) are interpreted as small (β = 0.10–0.29), medium (β = 0.30–0.49), and large (β > 0.49; Cohen, 1988). IPLOC = internal perceived locus of causality; 95% CI = [lower 95% confidence interval, upper 95% confidence interval]; AOSCS-A = Adult-Oriented Sport Coaching Survey athlete version; *SE* = standard error.
*$p < .01$. **$p < .001$.

within the coached context. In particular, adult-oriented coaching enhanced motivational and affective facets of the C–A relationship, whereby MAs reported significantly more commitment to their coach when they received greater adult-nuanced approaches and similarly felt greater liking and trust, appreciation, and respect for their coach. In addition to enhancing the C–A relationship, increased exposure to adult-oriented coaching practices corresponded with greater basic needs satisfaction.

Increased Adult-Oriented Coaching Practices Enhance an Athlete's Relationship With Their Coach

The medium effects over time between overall adult-oriented coaching practices and commitment and closeness were notable. The enhancements on these aspects of the C–A relationship were in line with our hypotheses. In addition, considering that this was a nonintervention design, they appear to have been derived through organic, daily interactions around adult-oriented practices. This

finding affirms Callary et al.'s (2020) contention that adult-oriented coaching is tantamount to effective social–relational coaching among MAs. Callary et al. described how the coached masters context has a particular emphasis on social relations and mutual reciprocity between coach and MA and cited Jowett and Ntoumanis's (2004) 3Cs as being anticipated benefactors of the application of andragogical (i.e., adult learning) coaching approaches. With the understanding that AOSCS practices are the most valid embodiment of andragogical principles in the sport coaching domain (Rathwell et al., 2020; Young et al., 2020), our findings demonstrate how exposure to adult-oriented coaching practices over time leads to enhanced interdependence with a coach. If an older adult perceives that the coaching has been tailored to their preferences, catered to their experiences, and is respectful of their matured self-concept, they feel an affinity for that coach. Adult-oriented coaching practices, applied comprehensively over 8 weeks of a season, led toward satisfying a social motive held by many MAs: to have a relatable, trusted, and positive relationship with a coach based on "mutual loyalty and reciprocal caring" (Callary, Rathwell, & Young, 2015, p. 7).

Our findings showed benefits mostly for cognitive–emotional facets of the C–A relationship as effects for complementarity or behavioral responsiveness (Jowett & Ntoumanis, 2004) were less notable. The absence of significant corresponding changes between overall AOSCS scores and complementarity may be because it takes longer to develop dyadic behavioral response tendencies. Still, there were significant small effects attributed to *Considering the Individuality of Athletes* that enhanced complementarity. Thus, an emphasis on using this practice—such that athletes see the coach organizing activities based on what they have been able to do in the past and what they have shared they are motivated to do (Rathwell et al., 2020)—may poignantly influence behavioral reciprocity. Future interventionists could take note that more explicit encouragement of *Considering the Individuality of Athletes* through the setup and tailoring of training activities may be necessary to enhance effects that were small by nature in the organic interactions in our noninterventionist design. Callary et al. (2020) noted that complementarity may sometimes be challenging to accomplish with adult-oriented coaching. We agree with Callary's claims, especially if certain adult-oriented coaching behaviors—ones about imparting credible knowledge and structuring workouts—are misinterpreted as coach directing or enforcing. Thus, interventionists should ensure that the tone of bilateral collaboration endemic to all adult-oriented coaching practices, as well as *Considering the Individuality of Athletes*, is properly conveyed to enhance complementarity.

Increased Adult-Oriented Coaching Practices Enhance Relatedness and Autonomy and Reduce Competence Thwarting

Increased exposure to all adult-oriented coaching practices across 8 weeks was associated with significant increases in relatedness satisfaction. This finding, of a medium effect size, suggests that an AOSCS-oriented coach helps ensure that MAs feel a sense of belonging, concern for others, and cared for by others in their sport. In this case, such attachment extends beyond the relationship with the coach alone to others in a club/program (Ng et al., 2011). For many MAs, the need for relatedness (Kowal & Fortier, 2000) and social affiliation motives (Hodge et al., 2008), or community (Lyons & Dionigi, 2007), dominates why they pursue organized sport. AOSCS interventions may enable this more fully as a conduit by which coaches can assume responsibility for athletes' feelings of belongingness in sport (Chu & Zhang, 2019).

As none of the AOSCS items explicitly addresses team building or cultivating togetherness (Rathwell et al., 2020), we suspect that gains in relatedness are a by-product of the social–relational approaches adopted by the coach. That is, should a coach comprehensively model adult-oriented facets for a group, these facets are then adopted more broadly (i.e., a contagion approach) and/or disseminated more fully by intermediary leaders who are players/athletes throughout a team (see Currie, Young, & Callary, 2021). Our results intimated that *Creating Personalized Programming* and *Respecting Preferences for Effort, Accountability, and Feedback* may be particularly impactful in this regard. Increases in the feeling that the coach attends to where I am in a season-long plan, the feeling that the coach engages me explicitly when figuring out scheduling of practices and competitions (with individualized accommodations at times), and increases in the feeling that I am personally supported by the coach while at competitions are the themes that all led toward enhanced relatedness satisfaction in the coached context (medium effect). Moreover, increases in feelings that the coach tailors their feedback to MAs and holds them accountable for their effort in training based on their personal preferences also had small but significant effects on whether athletes felt related to others in the masters sport context.

There was also a small effect for autonomy satisfaction that was attributed to increasing use of adult-oriented coaching practices overall—specifically associated with increasing sense of choice. In this fashion, our results affirm the tenets of offering opportunities for self-directedness and supporting dialog around learner engagement that underpin the origin of the AOSCS (Rathwell et al., 2020). Interestingly, despite there being no significant overall effect for AOSCS practices, we found a small effect whereby increases in *Respecting Preferences for Effort, Accountability, and Feedback* were associated with increases on autonomy volition. This small change-based effect on volition is consistent with Motz et al.'s (2022) cross-sectional finding that MAs experiencing more AOSCS-based coaching were more willing to invest because of their coach and had greater voluntary sport commitment. Together, these findings affirm that AOSCS approaches can result in adult athletes acknowledging more opportunities to make choices, having more of a say, and being engaged in decision making. Notably, our current observations are based on a noninterventionist design; thus, it would be interesting to examine whether effects sizes pertaining to autonomy needs would be further enhanced with a dedicated coach education intervention.

Finally, we did not find a relationship between changes on overall AOSCS practices and changes on competency satisfaction. Although Young et al. (2018) noted that many MAs are motivated to test and assess themselves through sport, and to enhance their skill and/or competitive positioning (i.e., to pursue competency needs), our nonsignificant finding is not surprising considering the social–relational tone of many AOSCS survey items. With this said, our change-based analyses showed interesting small effects for changes on *Respecting Preferences for Effort, Accountability, and Feedback* being inversely related to changes on competency thwarting. In particular, when athletes felt that their coach was making greater efforts to figure out how they wished to be pushed (or not pushed) during training, or to figure out how they wished to be given feedback (including whether they wanted the coach to hold them responsible for working hard), the MAs felt less thwarted in their efforts to gain competence. In essence, being exposed to this practice led to athletes increasingly denying instances wherein they

were made to feel incapable, wherein they were told things that made them feel incompetent, or wherein they felt that they were not given opportunities to improve their potential.

Curiously, this change was accompanied by greater willingness for sport participation and feeling that they were "not being forced to do things they do not want to do." In other words, a coach's artful enactment of respecting each adult's preferences for how they wish to be held to account can be associated with athletes' volition in trying to get better and greater awareness of coach-provided skill development situations in practice. MacLellan et al. (2018) highlighted the collaborative, bidirectional communication approach needed to coach in the masters context; our finding suggests that such a collaborative process may be implicated when coaches are figuring out how to meet their MAs' preferences for feedback/accountability. The demands on how a coach figures out the "art" of this practice were revealed in a qualitative study by Callary et al. (2015). Interviews with masters swimmers illustrated that they varied in how they liked to be pushed and how they responded to public feedback (especially individual critique by coaches). The authors interpreted that this would be challenging for a coach because they would need to adjust their tact depending on the adult, the adult's goals for sport participation, and the situation.

Limitations and Future Research

Due to the moderate-to-low sample sizes of coaches and MAs and the complexity of the models, we believed we were justified in using factor scores for the measured constructs in all the path analyses (Devlieger & Rosseel, 2017). However, because path analyses with factor scores were used, instead of a full factorial measurement model (i.e., structural equation modeling), we did not perform confirmatory factor analyses or calculate model fit indices. Instead, we assumed perfect model fit (i.e., a just-identified model) with our data. Our focus on change score path analyses allowed us to begin to consider the prospect of prediction or causality, though we refrained from making such statements in this discussion. Future longitudinal research would do well to incorporate a greater number of time points and larger sample sizes across extended durations such that data could be submitted to latent growth modeling. Observations from our noninterventionist design should encourage future intervention protocol employing standardized coach education content and using randomized control groups.

Furthermore, although this sample was novel in that athletes were matched to their coaches, a limitation was that we were unable to comment on the effect of different coaches/clubs as our data could not be submitted to a hierarchical linear model (multilevel model).

Finally, our findings should be interpreted within the boundaries of our sample. The attrition analyses revealed that MAs who completed our 8-week protocol participated about three times per week (two coached sessions); this sample was less intensive in its sport activity than the dropouts. Although all MAs who began the protocol felt little basic needs frustration, those who stuck with it began by reporting extremely little frustration of autonomy and competency. They seemed to be already acting out natural curiosity in adult sport and finding their need for competency being satisfied. Taken together, this might mean that future AOSCS interventions will be easiest to promote to such a group and that considered recruitment will be needed to widen the spectrum of MAs and affiliated coaches. It may also mean that samples that are more frustrated on basic needs and/or that are more intensively exposed to coaching may have greater potential for change. We cannot, for example, completely discount that the remarkably stable group-level scores (RQ1 analyses) could be attributable to our sample. Although our sample had a range of competition levels, future work should assess trends in more elite samples of MAs. Finally, it is possible that some serious-minded MAs dropped out of our 8-week protocol because they did not see adult-oriented coaching practices as legitimately as those who completed it. These are all considerations for future intervention work relating to AOSCS-based coach education.

Conclusions

In answering RQ1, results demonstrated that, without intervention, groups of coaches and MAs perceive AOSCS practices as stable across 8 weeks of a season. Despite this stability at the group levels, in pursuing RQ2, we showed that AOSCS coaching practices are associated with changes in several criterion measures essential to adult sport programming. This conclusion is based on noninterventionist observations taken across 8 weeks beginning early in a season. Literature has located the coach as a key agent in the pursuit of quality masters sport experiences (Young et al., 2021), especially when a coach uses adult-tailored approaches in their craft. Of the eight hallmarks of quality masters sport experiences, our change-based findings affirm that adult-oriented coaching practices are associated with positive changes on three—*athletes' feeling empowered*, *athletes' experiencing mastery*, and *quality relationships*. In terms of empowerment, increased adult-oriented coaching practices corresponded with increased autonomy choice, whereas increases in *Respecting Preferences for Effort, Accountability, and Feedback* corresponded with increased volition. In terms of mastery, increased *Respecting Preferences for Effort, Accountability, and Feedback* corresponded with decreased competency thwarting. With respect to quality relationships, more frequent use of adult-oriented coaching practices corresponded with increased commitment, closeness in the C–A dyad, and enhanced relatedness satisfaction more broadly in the coached context, with *Considering the Individuality of Athletes* associated with enhanced complementarity.

Notes

1. This dropout subsample was contrasted against those MAs who initially completed t2 ($N = 129$) before we removed 26 MAs' data as per the exclusion and screening information in the "Participants" section.

2. In accordance with our study procedures, coaches and athletes were requested to complete their second round of data collection 8 weeks after their first responses. However, due to the COVID-19 crisis, sport participation was canceled globally as we neared the end of our project timeline. Thus, due to the oncoming COVID-related sport stoppage, we asked six coaches and 17 MAs to complete their second survey 1–3 weeks earlier than the 8-week schedule to ensure they could recall how they had recently interacted with one another in person, during non-COVID times. Overall, 26 coaches (81%) and 86 MAs (83%) were sent the links for the two time points, 8 weeks apart. The average time between completing the survey time points for our final sample was ($M = 8.40$ weeks, $SD = 1.51$) for coaches and ($M = 8.23$ weeks, $SD = 1.73$) for MAs.

Acknowledgment

This work was supported by the Social Sciences and Humanities Research Council of Canada under Grant no. 227348.

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Dr. Bradley W. Young is full professor in the School of Human Kinetics at the University of Ottawa, in Ontario, Canada. As a researcher, coach, and masters athlete, he has served as an advisor to the Coaching Association of Canada and Active Aging Canada on masters athletes. He is a member of the participatory advisory network for ParticipACTION Canada with an interest in sport literacy among older adults.

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