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RESEARCH NOTE

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Long-term effects of basic coach education on ice hockey coaches' beliefs and use of need-supportive behaviors

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Abstract

The long-term impact of education on sport coaches' interpersonal behaviors remains unclear. In this longitudinal study ($N = 52$) we examined one-year changes in ice hockey coaches' use of need-supportive behaviors following a two-day basic coach education both shortly after the intervention and one year later. Coaches reported effectiveness, easy-to-implement, and normative beliefs about need support and their use of autonomy, competence, and relatedness support at baseline, 1.5 weeks (T2), 3 weeks (T3), and 12 months (T4). Bayesian linear mixed effects models estimated changes in each outcome over time. Posterior estimates indicated increases for competence support ($\Delta = 0.20$, 95% CI [0.04, 0.36]; $g = 0.52$) and autonomy support ($\Delta = 0.35$, 95% CI [0.08, 0.63]; $g = 0.48$) between baseline and T3. Between baseline and T4, the posterior estimates suggested a decrease only for competence support ($\Delta = -0.21$, 95% CI [−0.39, −0.03]; $g = -0.12$). No other posterior estimates meaningfully differed from zero across time. Overall, the coaches' need-supportive

Dennis Bengtsson and Ellen Svensson are co-first authors.

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behaviors improved shortly after training but were not sustained over one year to the next competitive season. Findings underscore the value of post-training reinforcement (e.g., booster sessions, flexible digital tools) to support maintenance of learned behaviors in practice.

KEYWORDS

coach education, interpersonal behavior, longitudinal study, self-determination theory, sport, Sweden

INTRODUCTION

Over the past decades, sport governing bodies have invested in structured, formal coach education programs to strengthen coaches' leadership competencies, enhance sport quality, and promote player well-being and performance (Cushion et al., 2003; Jones et al., 2023; Stodter & Cushion, 2019; Sullivan et al., 2012; Wang et al., 2023). Self-determination theory (SDT; Ryan & Deci, 2017) provides a useful framework for such programs by outlining how some coach behaviors can support young players' basic psychological needs for autonomy (e.g., offering choice and rationales), competence (e.g., clear expectations, constructive feedback), and relatedness (e.g., showing genuine care and promote social connection; Ntoumanis & Mallet, 2014). Receiving such positive interpersonal behaviors can facilitate player positive outcomes, including higher performance, engagement, self-efficacy, well-being, and lower burnout (Beauchamp et al., 2023; Cerasoli et al., 2016; Mossman et al., 2024). Hence, it is probably not surprising that SDT has become a commonly implemented framework to promote supportive interpersonal behaviors across educational (Reeve & Cheon, 2016; Howard et al., 2025), organizational (Stenling & Tafvelin, 2016; Tafvelin et al., 2023), and sport coaching contexts (Li et al., 2025; Ntoumanis et al., 2017).

Recent intervention studies illustrate both the potential and the challenges of implementing SDT-based education. For example, our randomized controlled trial (RCT; see Methods below for more details) within a sport governing body found that a brief program increased coaches' provision of competence support three weeks after baseline (Bengtsson et al., 2024a). One RCT with 50 coaches and 197 university sport players (e.g., American football, golf, rugby, soccer) in Canada tested a six-week online SDT-based intervention, delivered via weekly 3-hour group sessions combining theory and hands-on skill-building (e.g., preparation of a practice using players' input; Lemelin et al., 2023). The study found significant changes in coaches' beliefs about autonomy support one month after the program, but not at two months. An RCT in Belgium implemented an intervention with 43 youth sport coaches consisting of one introductory workshop followed by three skills-based sessions at three-week intervals. This RCT combined practical examples, video materials, and group discussions on how to apply need-supportive strategies during training, competition, and rule presentation (Reynders et al., 2019). The results showed that, compared with the control group, the intervention group coaches reported greater autonomy support at post-test (12 weeks after baseline) and greater competence support at seven months follow-up (Reynders et al., 2019). Another intervention in physical education used a multi-component autonomy-supportive training program totaling over 7 hours across three sessions, which included presentations, video modeling, and peer discussion (Reeve & Cheon, 2016). The study found that when teachers believed autonomy support

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was both effective and easy to implement, they were more likely to adopt and sustain the approach in their teaching.

Although need-supportive training can enhance coaches' positive interpersonal skills, benefiting players' autonomous motivation and well-being (Li et al., 2025; Raabe et al., 2019), relatively few studies have quantitatively examined whether coaches' personal beliefs and use of such behaviors sustain beyond typically adopted timeframes in current SDT-based coach interventions (Bengtsson et al., 2024b; Evans et al., 2015), or following formally delivered accreditation education (Lefebvre et al., 2016; Wang et al., 2023). This gap likely reflects limited follow-up duration as a research design choice, rather than expectations that behavioral changes would not be maintained over time. It also inquires whether any short-term increases in both beliefs of and use of need-supportive coaching behaviors due to education are maintained after an off-season period (Reynders et al., 2019). Moreover, beliefs about need support (e.g., regarding its effectiveness in motivating players) play a key role in supporting the salience and continued enactment of need-supportive behaviors over time (Reeve & Cheon, 2016; Ntoumanis et al., 2025), underscoring the need to empirically examine longer-term sustainability of such beliefs and behaviors. Hence, this study investigated the effects of a two-day basic coach education delivered by the Swedish Ice Hockey Association on ice hockey coaches' self-reported effectiveness, easy-to-implement, and normative beliefs, as well as their use of autonomy, competence, and relatedness support shortly after the intervention during the competitive season, and again one year later, at the start of the following season.

METHOD

Design

This study adopts a repeated measures design to investigate the long-term effects (12 months) of a basic coach education program delivered within a sport governing body to ice hockey coaches. This study is an extension of a previous investigation (Bengtsson et al., 2024a) and evaluates within-subject changes in the intervention group. Unfortunately, it was not possible to retain the original control group over 12 months, as these coaches undertook the same education as the intervention group before the final follow-up measurement took place, making the comparison of the original groups ineligible. We collected data at baseline (before intervention), two post-intervention measurements conducted after 1.5 weeks and 3 weeks, and a follow-up measurement 12 months after the baseline. The timing of measurements was constrained by the seasonal structure of ice hockey in Sweden. The intervention was delivered during mid-to-late autumn; hence, data collection had to align with periods of active coaching. A 6-to-9-month follow-up was not possible as it was going to take place during off-season, during which it would not be relevant to assess changes in coaching behaviors (Brown & Stenling, 2025). Instead, we assessed whether the effects lasted until the following season, when all coaches were again actively involved in practice and competition.

Study context

A detailed description of the intervention program, including its theoretical underpinnings, learning activities, and delivery procedures is described elsewhere (Bengtsson et al., 2024a;

Bengtsson et al., 2025). Briefly, the mandatory coach education program was delivered by national coach educators over two consecutive days and integrated interpersonal skills training grounded in self-determination theory (Ryan & Deci, 2017). Content included short presentations, reflection tasks, role-plays, and an applied on-ice session with youth players during which coaches practiced need-supportive strategies and received feedback.

Participants and procedure

This study included 52 ice hockey coaches (49 men, three women). Their mean age was 36.71 years ($SD = 9.27$), and they had been coaching in their club for an average of 2.46 years ($SD = 2.75$), dedicating about 11.15 hours per week ($SD = 9.93$). Most (92%) of the coaches were former ice hockey players at different competitive levels. The coaches coached players of varied ages (six to 20 years), and some (69%) had active children of their own as players in the club they coached. An online survey was sent via email to all 52 participants at all assessment points (see Bengtsson et al., 2024a] for previous power-based sample size calculations). Out of the 52 coaches included at baseline, 44 provided data on the measures 1.5 weeks (T2) and 3 weeks (T3), and 35 coaches (67%) one year after baseline (T4).

The study was approved by the Swedish Ethical Review Authority and conducted in compliance with the Declaration of Helsinki. Prior to participation, coaches received verbal and written information about the study's purpose, potential risks, and confidentiality, and provided written informed consent.

Measurement

We assessed coaches' effectiveness, easy-to-implement, and normative beliefs using 12 items (four items per subscale) adapted from Reeve and Cheon (2016). Items were contextualized from the original physical education context to youth sport coaching (e.g., "students" to "players," "teacher" to "coach") with no changes to the constructs or number of items. Examples encompass: "this approach to coaching is effective in terms of motivating and engaging players (effectiveness belief); "this approach to coaching is easy to do" (easy-to-implement belief); "this approach to coaching describes what most coaches do" (normative belief). Each answer was given on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Reeve and Cheon (2016) demonstrated acceptable internal reliability coefficients and supported the theoretically expected associations between their SDT-based intervention, teachers' beliefs, and self-reported autonomy-supportive behaviors. The composite reliability [ω] of the subscales were: effectiveness belief = 0.86_{T1}, 0.90_{T2}, 0.84_{T3}, 0.86_{T4}; easy-to-implement belief = 0.81_{T1}, 0.88_{T2}, 0.86_{T3}, 0.87_{T4}; normative belief = 0.86_{T1}, 0.86_{T2}, 0.87_{T3}, 0.88_{T4}.

The Interpersonal Behaviors Questionnaire-Self (IBQ; Rocchi et al., 2017) was used to assess the coaches' self-reported use of need support toward their players over time, capturing autonomy, competence, and relatedness support. Twelve items were preceded by a pre-defined stem: "When I am with my players, I ... ". Examples include: "give them the freedom to make their own choices" (autonomy support); "encourage them to improve their skills" (competence support); and "honestly enjoy spending time with them" (relatedness support). Answers were reported on a seven-point Likert scale, ranging from 1 (*do not agree at all*) to 7 (*completely*

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agree). Previous investigations have supported the psychometric properties (e.g., internal consistency, structural validity, convergent and discriminant validity) of the IBQ-self (Rocchi et al., 2017). The composite reliability estimates (omega coefficient [ω]; (McDonald, 1999) of the subscales in this study were: autonomy support = 0.91_{T1}, 0.91_{T2}, 0.89_{T3}, 0.88_{T4}; competence support = 0.62_{T1}, 0.71_{T2}, 0.60_{T3}, 0.68_{T4}; relatedness support = 0.70_{T1}, 0.69_{T2}, 0.61_{T3}, 0.86_{T4}. Composite reliability was interpreted using commonly applied guidelines, with values around .60 often considered questionable, ≥ .70 acceptable, and ≥ .80 good (McNeish, 2018).

Data analysis

We used the JASP computer software version 0.19.0.0 to analyze linear mixed effects models using Bayesian estimation. The models were specified with the default prior distribution settings of the rstanarm R package incorporated in JASP (flat-tailed Cauchy distribution; Gelman et al., 2008; van Doorn et al., 2021). We used manifest variables (i.e., derived from the subscale mean scores) to analyze change in each need-supportive style. Compared with a maximum likelihood estimator, Bayesian model estimation is less susceptible to producing unstable variance estimates or inflated standard errors and is more likely to achieve effective convergence in small-sample multilevel contexts (Hox et al., 2012). These models were used to assess changes in each coach's belief and need-supportive style across four timepoints, while accounting for the nested data structure (i.e., repeated measures nested within individuals). To account for within-person dependence, we specified random intercepts for participants. Time was modeled as a categorical fixed effect, with baseline serving as the reference point, to estimate average differences (Δ) in outcomes at each follow-up relative to baseline. To additionally examine late-stage change, timepoint 3 was set as the reference point in a separate model to estimate change relative to timepoint 4. The Bayesian linear mixed effects models were estimated through four Markov Chain Monte Carlo (MCMC) chains with 6000 total iterations, including 2000 burn-in iterations and 4000 post-burn-in samples retained for inference of the posterior distribution. Moreover, the models included evaluation of convergence diagnostics, specifically the R-hat statistic and the effective sample size (ESS; reflecting sampling efficiency in both the bulk and tails of the posterior distribution), to ensure that the model solutions converged and produced reliable estimates of the model parameters (Vehtari et al., 2021). Parameter estimates were interpreted using the 95% credible interval (CI), and an interval that did not include zero was considered as a credible posterior estimate (van Doorn et al., 2021). Effect sizes (Hedges' *g*) were calculated as within-person standardized mean changes and interpreted using empirically derived benchmarks (Lovakov & Agadullina, 2021): 0.15 (small), 0.36 (medium), and 0.65 (large).

RESULTS

Descriptive statistics are presented in Table 1 and the main findings from the linear mixed effects models in Table 2. The change in each outcome is illustrated in Figure 1. No credible changes were found for any of the belief scales.

For competence support, posterior estimates indicated an inverted U-shaped pattern. Scores increased from baseline to T3 (Δ = 0.20, 95% CI [0.04, 0.36]; g = 0.52), followed by a decrease between baseline and T4 (Δ = −0.21, 95% CI [−0.39, −0.03]; g = −0.12). The contrast between

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TABLE 1 Descriptive data.

	Baseline mean (*SD*)	*N*	Timepoint 2 mean (*SD*)	*N*	Timepoint 3 mean (*SD*)	*N*	Timepoint 4 mean (*SD*)	*N*
Autonomy support	5.28 (1.16)	52	5.49 (1.06)	44	5.78 (0.89)	44	5.10 (1.44)	35
Competence support	6.16 (0.68)	52	6.34 (0.67)	44	6.48 (0.52)	44	6.04 (1.20)	35
Relatedness support	6.16 (0.69)	52	6.13 (0.67)	44	6.17 (0.65)	44	5.90 (1.48)	35
Effectiveness belief	5.89 (0.83)	52	6.06 (0.85)	44	6.13 (0.82)	44	5.92 (0.78)	33
Easy-to-implement belief	4.83 (0.98)	52	5.11 (1.05)	44	5.17 (1.09)	44	5.27 (1.04)	33
Normative belief	4.31 (0.85)	52	4.52 (1.08)	44	4.55 (1.13)	44	4.45 (1.00)	33

T3 and T4 ($\Delta = -0.20$, 95% CI [−0.38, −0.03]; $g = -0.50$) suggests that competence support increased shortly after the intervention and later returned toward baseline levels. Autonomy support followed a similar pattern. Posterior estimates indicated an increase from baseline to T3 ($\Delta = 0.35$, 95% CI [0.08, 0.63]; $g = 0.48$). A subsequent decrease was evident between T3 and T4 ($\Delta = -0.28$, 95% CI [−0.58, 0.01]; $g = -0.57$), although the credible interval included zero. This suggests that autonomy support increased following training, with only uncertain indications of decline at follow-up.

Relatedness support remained largely stable across time. Although no credible changes were observed, a small decrease from T3 to T4 ($\Delta = -0.20$, 95% CI [−0.41, 0.01]; $g = -0.24$) suggested a minimal decline towards the follow-up period.

Posterior diagnostics indicated strong convergence and adequate sampling (R-hat = 1.000 to 1.001, ESS > 5000 across all estimated outcomes; see Table 2).

DISCUSSION

The aim of this study was to investigate the long-term effects of the Swedish Ice Hockey Association's SDT-based coach education on ice hockey coaches' beliefs about the need for support and their use of such behaviors. No credible changes were observed for effectiveness, easy-to-implement, or normative beliefs. In terms of behavior, competence support displayed an inverted U-shaped trajectory: scores increased three weeks after the course and later returned toward baseline at the one-year follow-up. Autonomy support followed a similar pattern, with posterior estimates indicating an increase post-course and a subsequent decline that was uncertain, as the credible interval included zero. Relatedness support remained largely unchanged across time. These findings suggest that short-term gains in behavior use were not maintained across competitive seasons; the modest sample size may have reduced precision in estimating smaller effects.

Echoing previous research (Lacerenza et al., 2017; Su & Reeve, 2011), our findings suggest that coaches are most likely to apply the content immediately after training (e.g., encouraging player efforts, providing guidance and reinforcement, setting expectations), but also that gains can fade without continued support. Like earlier work, coaches in our study tended to revert toward baseline levels of need for support as time passed post-intervention (Mahoney et al., 2016). Although the absolute mean changes were small (i.e., less than one point on a seven-point scale), the standardized effect sizes indicated small-to-moderate within-person

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TABLE 2 Change in beliefs and need-supportive behaviors.

Outcomes	Estimated marginal means (*SE*)	Timepoint 2 Estimate (95% CI)	Timepoint 3 Estimate (95% CI)	Timepoint 4 Estimate (95% CI)	Timepoint 3 vs 4 Estimate (95% CI)
Beliefs					
Effectiveness	T1: 5.90 (0.12) T2: 6.05 (0.13) T3: 6.10 (0.12) T4: 5.90 (0.14)	0.06 (−0.10, 0.22)	0.12 (−0.05, 0.28)	−0.08 (−0.27, 0.10)	−0.08 (−0.26, 0.10)
Posterior diagnostics	R-hat ESS (bulk/tail)	1.001 220,224/8824	1.000 20,742/9166	1.000 19,550/9160	1.001 9184/9069
Easy-to-implement	T1: 4.83 (0.15) T2: 5.11 (0.15) T3: 5.16 (0.15) T4: 5.30 (0.18)	0.10 (−0.20, 0.23)	0.06 (−0.15, 0.27)	0.20 (−0.04, 0.44)	0.20 (−0.39, 0.45)
Posterior diagnostics	R-hat ESS (bulk/tail)	1.001 23,402/9248	1.000 22,230/9361	1.001 22,909/9491	1.001 23,068/8836
Normative	T1: 4.32 (0.14) T2: 4.49 (0.15) T3: 4.49 (0.15) T4: 4.47 (0.17)	0.04 (−0.17, 0.25)	0.08 (−0.14, 0.29)	0.02 (−0.22, 0.25)	0.02 (−0.22, 0.25)
Posterior diagnostics	R-hat ESS (bulk/tail)	1.000 28,115/8487	1.001 28,066/8987	1.001 24,333/9402	1.000 9410/9676
Need-supportive style					
Competence support	T1:6.16 (0.11) T2: 6.31 (0.11) T3: 6.43 (0.12) T4: 6.03 (0.13)	0.08 (−0.08, 0.25)	0.20 (0.04, 0.36)	−0.21 (−0.39, −0.03)	−0.20 (−0.38, −0.03)
Posterior diagnostics	R-hat ESS (bulk/tail)	1.001 12,636/5700	1.001 12,009/6220	1.001 11,398/6229	1.001 11,479/6434
Autonomy support	T1: 5.28 (0.16) T2: 5.47 (0.17) T3: 5.75 (0.17) T4: 5.12 (0.20)	0.06 (−0.21, 0.34)	0.35 (0.08, 0.63)	−0.29 (−0.58, 0.01)	−0.28 (−0.58, 0.01)
Posterior diagnostics	R-hat ESS (bulk/tail)	1.000 14,101/6284	1.001 16,332/5369	1.000 14,441/5764	1.000 10,460/6080
Relatedness support	T1: 6.16 (0.12) T2: 6.09 (0.14) T3: 6.10 (0.13) T4: 5.86 (0.15)	0.04 (−0.14, 0.23)	0.04 (−0.14, 0.23)	0.20 (−0.41, 0.01)	−0.20 (−0.41, 0.01)
Posterior diagnostics	R-hat ESS (bulk/tail)	1.000 10,353/6093	1.001 10,659/5916	1.000 8909/5299	1.001 9496/6320

Note: The table demonstrates the change in the follow-up timepoints (2, 3, 4) relative to the baseline, and the change in timepoint 4 relative to timepoint 3.

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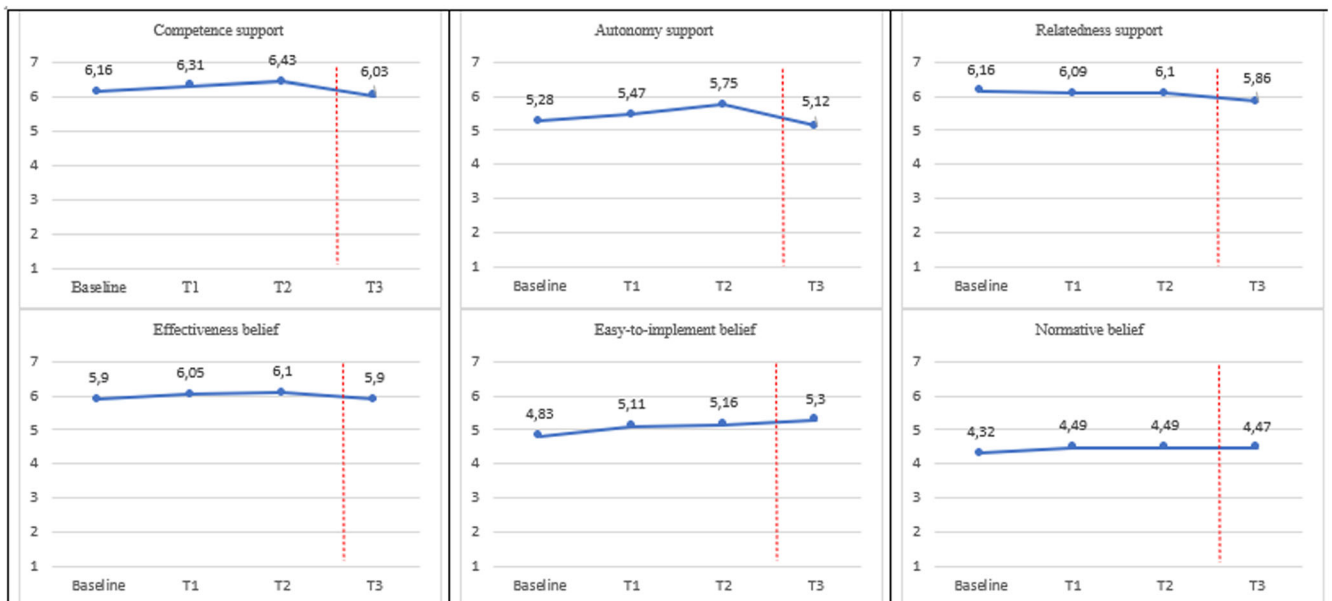

FIGURE 1 *Average change in coaches' beliefs and need-supportive behaviors across each measurement. Note.* The red dotted lines indicate an axis break to reflect the longer time interval between Timepoints 2 and 3, relative to the earlier timepoints.

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changes in autonomy and competence support across time. This pattern aligns with prior need-supportive intervention research in physical education and sport, where mean-level improvements are typically modest and may attenuate over time (Cheon et al., 2012; Huang et al., 2025; Reeve & Cheon, 2016; Reynders et al., 2019). The findings suggest a short-term increase in the behaviors that coaches already perceived themselves to use at relatively high levels, followed by a gradual return toward baseline by the subsequent competitive season. In practical terms, this pattern likely reflects a temporary increase in a small number of competence-supportive (e.g., constructive feedback, clear expectations) and autonomy-supportive interactions (e.g., shared decision making, nurturing volition). Such modest increases may reflect competence support reaching one additional player (e.g., reinforcement following good engagement) or a more systematic incorporation of autonomy-supportive practices across the team (e.g., allowing players to choose drills), both of which, even if small, can meaningfully shape players' practice-related experiences (Almagro et al., 2015). However, these patterns show that without ongoing reinforcement, behavioral increases typically return toward baseline levels over time (Miller et al., 2014).

When behavioral decay has been identified, booster shots can be implemented as context-sensitive strategies to aid re-establishment of learning and skills after initial training (Sullivan et al., 2019). For example, Miller et al. (2014) showed that after teachers' classroom management skills had declined to baseline levels one-year post-training, a brief booster session with modeling and role-play restored these skills to post-intervention levels or higher. Similarly, an RCT showed that asynchronous boosters (e-mailed practical and reflective tasks), when combined with three in-person sessions over five months, increased leaders' autonomy-supportive behaviors as perceived by their employees eight months after baseline (Tafvelin et al., 2023). Compared with synchronous telephone coaching, leaders favored the asynchronous format because it was more informative, flexible (e.g., self-paced), and easier to revisit when needed (Tafvelin et al., 2023).

Together, these findings suggest that incorporating boosters aligned with coaches' schedules and application needs could help address the decline of training effects and strengthen regular education program investments. Tailored, context-sensitive booster formats may offer a promising pathway to support coaches' sustained use of need-supportive behaviors in practice (Li et al., 2025; Zhu et al., 2024).

Considerations for future research and practice

While personal factors such as positive beliefs and autonomous motivation may drive the initial application of new learnings, sustained behavioral salience often requires ongoing support (Ntoumanis et al., 2025; Reeve & Cheon, 2016; Stenling & Tafvelin, 2016). Research suggests that longer programs supplemented with multiple sessions tend to be more effective over time than single-session interventions (Lacerenza et al., 2017; Taylor et al., 2005). This mode of delivery can include follow-up activities (e.g., practically based workshop on how to provide needed support during games), followed by a window for practice before a subsequent workshop, which helps facilitate knowledge transfer and reinforce the application of need-supportive strategies in day-to-day coaching practice (Reynders et al., 2019; Su & Reeve, 2011). In fact, this may be one reason why Reynders et al. (2019), contrasting to this study, found increases in competence-supportive coaching after an off-season, potentially to provide a foundational structure to the team environment from the start of the season.

To leverage flexible and innovative solutions, future research and practice can consider delivering boosters via digital tools, such as smartphone apps for information sharing and monitoring, or video conferencing (Jowett, 2025; Li et al., 2025). Concerning our study findings, such boosters could help re-establish use of learned strategies when their salience has faded, especially if the coaches have not been actively engaging in their coaching environment where the behaviors are to be applied (Miller et al., 2014; Sullivan et al., 2019). These could be delivered as just-in-time adaptive interventions (Zhu et al., 2024), providing brief, timely informative prompts about need support (e.g., reminders about autonomy support and to allow players choice of drills for the upcoming practice) or tasks (e.g., acknowledge all players today before, during or after practice) that are tailored to coaches' schedules and situational demands (e.g., when the season has started and before a practice, game or immediately after practice for reflection) while avoiding overuse that can lead to "alert fatigue."

This study contains several limitations to consider, including reliance on self-reported data, which introduces the risk of common method biases (e.g., social desirability, recall biases, heightened self-awareness; Podsakoff et al., 2003). While longitudinal data demonstrates temporal ordering, that is, any observed changes following the intervention, the absence of a control or comparison group means we cannot rule out alternative explanations to our findings, such as external influences occurring during the same period, limiting causal inferences (Hammerton & Munafò, 2021).

Despite the modest sample size and attrition from Time 3 to Time 4 (33%), credible intervals were not excessively wide, indicating reasonably stable estimates. This precision likely reflects both the Bayesian estimation approach, by integrating prior information with the full posterior distribution, and the relatively simple model specification (Hox et al., 2012). However, because we did not include potential antecedents of coaching behavior change (e.g., motivation to participate, organizational support, personal beliefs; Ntoumanis et al., 2025), the analyses cannot address for whom or under what conditions coach education is effective (Hammerton & Munafò, 2021).

Reliability for competence and relatedness support was lower at some timepoints, indicating greater measurement error. Lower reliability may attenuate associations and reduce statistical power, potentially leading to underestimation of true effects. Accordingly, findings involving these constructs may be interpreted with some caution (McNeish, 2018).

Another caveat of this study is the absence of measurement between one month and one year, which limits our understanding of how long increases were maintained and when decay in need-supportive behaviors started (Brown & Stenling, 2025). Although an intermediate follow-up was not feasible for our study, a measurement before the end of the competitive season could have clarified whether the observed short-term increases were maintained. Booster interventions may be most feasible at the start of a new competitive season, providing a practical means of supporting longer-term maintenance (Sullivan et al., 2019).

Planning sample size in advance, such as simulating data based on expected effect sizes, can investigate whether the planned model will produce estimates that are sufficiently precise under the decided power assumption (Kruschke & Liddell, 2018). However, this study did not include any a priori power analysis as it was based on its previous RCT sample (Bengtsson et al., 2024a) with the goal to longitudinally assess the intervention group. This limited additional recruitment or planning sample size for the long-term evaluation. Owing to such constraints (i.e., the resources available), the preliminary knowledge added from this study should be interpreted as such (Lakens, 2022).

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Conclusion

The findings of this study particularly show that while coaches' reported use of competence-supportive behaviors increased shortly after training in the regular SDT-based education, they declined over the following year until the start of a new competitive season when no ongoing reinforcement or re-establishment of content learnings were provided. This underscores the importance of designing coach education programs with support across seasons (e.g., follow-up booster sessions or flexible digital tools) to facilitate coaches' real-world application over time.

CONFLICT OF INTEREST STATEMENT

The authors declare no competing interests.

DATA AVAILABILITY STATEMENT

This study's protocol, design, and analysis were not preregistered, and the materials, methods, and data used are available on request from the corresponding author.

ETHICS STATEMENT

The Swedish Ethical Review Authority granted ethical approval in July 2022 (grant number: 2022-03235-01).

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