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## ORIGINAL ARTICLE

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# Predicting adolescents' continuation in club sports: A prospective cohort study of the importance of personal and contextual motivational factors in five sports in Denmark

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## Abstract

**Purpose:** The purpose of this prospective cohort study was to investigate the influence of types of motivation, basic psychological needs satisfaction and of a coach-created motivational climate on continued participation in youth sports across types of sport, competitive levels, ages, and gender.

**Methods:** Participants were 7110 adolescent (age 12–20 years) members of leisure time club organized in basketball, handball, football, badminton, and gymnastics in Denmark. Motivational regulation was measured with BRSQ-6, basic psychological needs satisfaction and frustration were measured with PNSS-S, and coach-created climate was measured with the EDMCQ-C. The participants' continuation or dropout was measured at the beginning of the following season with a short electronic questionnaire.

**Results:** Intrinsic motivation, identified behavior regulation, experiences of competence, relatedness, and autonomy, as well as a coach-created empowering motivational climate, were associated with continuation both in the sport and in the club the following season across different sports, genders, age groups, and competitive levels. Introjected and external behavior regulation, frustrations with the need to experience competence, relatedness, and autonomy, as well as a disempowering coach-created climate, were associated with dropout.

**Conclusion:** In Danish youth sports, autonomous motivation, satisfaction of basic psychological needs, and an empowering coach-created motivational climate have a positive impact on the continuation of the sport and the club the following season. In contrast, controlled types of motivation, needs frustration, and a disempowering coach-created climate are associated with dropout. This is the case at both elite and recreational levels, for boys and girls, adolescents, and youth.

## KEYWORDS

adherence, coach behavior, coaching, dropout, social environment, wellbeing

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## 1 | INTRODUCTION

In Denmark and other Scandinavian countries, leisure time recreational and competitive youth sport is mainly organized in clubs in local communities that are members of regional and national organizations for each sport.

It has been shown that sports environments that are very authoritarian/controlling<sup>1,2</sup> and very ego-involving<sup>3,4</sup> can thwart adolescents' psychological needs and result in low well-being among young participants.<sup>5</sup> However, literature reviews have shown that in general, club-based sports participation through adolescent and adult years is typically associated with improved health and wellbeing.<sup>6–8</sup> Perhaps for this reason, leisure-time club sports participation for youth is considered an important part of health promotion in Scandinavian welfare states.

In general, youth drop-out rates from club sports are high worldwide.<sup>9–11</sup> This is also the case in Denmark where a national survey from 2016 showed that 80% of 7–15-year-olds participated in sport, which dropped to 53% among the 16–19-year-olds and 35% among 20–59-year-olds.<sup>12</sup> This may not only be problematic for individual health and wellbeing from a life-course perspective but also affect the ability of sport clubs and local communities to gather and build social networks through sports when there are too few members to maintain the local teams. Based on their comprehensive review and meta-analysis, Back et al.<sup>13</sup> called for prospective investigations of factors that may predict adolescents' decisions to drop out from team sport. This can provide a better understanding of the reasons for dropout, which could help sport organizations and other stakeholders involved in promoting youth sports participation identify practical steps to prevent it.

A recent systematic review and meta-analysis by Back et al.<sup>13</sup> has synthesized the literature on factors associated with future drop outs from team sport among adolescents. Most of the included studies had a focus on intrapersonal factors' relationship with dropout, and results showed that constructs related to motivation as well as sport experience had the strongest relationships with dropout.<sup>13</sup> This led to the recommendation to focus on developing a high-quality motivational climate that facilitates motivation and enjoyment to prevent drop-out from adolescents' team sport.<sup>13</sup>

The theory and conceptual framework that is most frequently used for explaining and investigating the role of motivation and drop-out in sports is the self-determination theory (SDT).<sup>14,15</sup> SDT provides a nuanced and detailed description of human motivation also described as 'behavior regulation'. SDT identifies five types or styles of motivation and behavior regulation with different levels of internalization and autonomy and different effects on continued

involvement and behaviour.<sup>16</sup> An important distinction is between intrinsic motivation and four types of extrinsic motivation. The most externally controlled (i.e., least autonomous) motivation is *external regulation*, where behavior is motivated and regulated by receiving rewards and/or avoiding punishment from others; somewhat more internalized but still not autonomous is *introjected regulation*, where involvement is regulated by ego inflation through attaining success and avoiding failure relative to (i.e., living up to) the perceived expectations and norms of others. The more autonomous (less controlled) types of extrinsic motivation are: *identified regulation*, where the individual recognizes and identifies with the value or benefits associated with the behavior; and *integrated regulation*, where the underlying value of an activity is not only recognized but is also in coherence with the individual's deeper value system and identity.<sup>17,18</sup> *Intrinsic motivation* is a drive to do something because it is enjoyable in itself, above and beyond the extrinsic benefits of the activity, and is the most autonomous type of motivation.<sup>16</sup> In other words, intrinsically motivated behavior is driven by the enjoyment, positive affect, and wellbeing that are innate to the activity itself. Finally, the construct of *demotivation* describes the absence of any motivation or intention to act. A literature review by Owen et al.<sup>19</sup> has indeed shown that the autonomous types of motivation as described in SDT are positively associated with children and adolescents' activity levels in physical education and in leisure time, whereas the impacts of the more controlled motivation styles and demotivation vary from no effect to a negative effect. Studies of 13–15-year-old French elite female handball players and Swedish adolescent football players have also shown autonomous/self-determined motivation to be associated with actual continuation.<sup>4,20</sup> Our study aims to expand this body of knowledge by investigating how the different motivation styles are associated with continuation in youth sport at both elite and recreational levels for different sport types, different youth age-groups, and both genders.

According to the fourth mini-theory of SDT, the basic psychological needs theory (BPNT), experiencing competence, relatedness, and autonomy are three basic psychological needs that are important for psychological wellbeing and must be fulfilled when doing an activity if high levels of intrinsic motivation are to be sustained.<sup>15,16,21</sup> In contrast, the extent to which these needs are frustrated will determine the degree to which *negative* consequences such as low wellbeing, more controlled motivation, and demotivation are experienced.<sup>22</sup> The need for competence is satisfied when participants feel they are able to overcome the challenges necessary to succeed in an activity. The need for autonomy is fulfilled when individuals perceive their feelings and actions to be in

accordance with their own volition. The need for relatedness is fulfilled when individuals feel connected with and accepted by significant others and therefore experience a sense of belonging.<sup>17</sup> Research in different youth sport contexts has confirmed that satisfaction of participants' basic psychological needs is associated with wellbeing in volleyball,<sup>23</sup> enjoyment and lower intention to drop out in football,<sup>24</sup> and continuation in volleyball and handball.<sup>4,25</sup> Low psychological needs satisfaction has been associated with burnout and devaluation among adult elite rugby players.<sup>26</sup> Studies also point to the specific importance of considering needs frustration (i.e., feelings of failure, isolation/exclusion, and being controlled) as a source for dropout from sport.<sup>1,27</sup> This may also be the case in youth sport. Our study aims to expand and strengthens this body of evidence by exploring whether psychological needs satisfaction can predict actual continuation in the next season for different ages of youth, genders, sporting levels, and different sports. We also examine whether psychological frustration is an important factor in explaining dropout, which should be addressed when trying to prevent discontinuation in youth sport.

Another motivational concept that has implications for continued participation in sport is the coach-created motivational climate. The motivational climate is a construct describing situational social factors in sport that are important for the participants' experiences, affect, and ongoing participation.<sup>28</sup> In their prospective study of psychosocial predictors of drop-out from youth soccer in Sweden, Back et al.<sup>20</sup> found that, in addition to older age, lower intrinsic motivation, being female, and lower socioeconomic status, experiencing the coach-created climates that were less autonomy-supportive was associated with an increased risk of drop-out. Based on this, the authors suggested that the coach-created climate plays a central role in creating a sports context that facilitates motivation and continued participation in soccer.<sup>20</sup>

It has been shown that the coach has a central influence on the social environment of the team.<sup>28,29</sup> In order to support the contribution of club-based youth sport in promoting health, wellbeing, and talent retention, it is therefore important to identify the aspects of the coach-created motivational climate that have a positive and negative influence on young participants' continuation. In order to capture aspects of the coach-created climate in sport, Duda<sup>30,31</sup> proposed a multidimensional conceptualization that highlighted *empowering and disempowering facets of the coach-created motivational climate*. This framework integrates the climate dimensions described in achievement goal theory, that is, task and ego involving climate,<sup>32</sup> which influence especially when and how success/competence are perceived, with SDT's description of climate dimensions of autonomy and social support as

well as controlling coaching.<sup>30</sup> The theory describes how the coach-created motivational climate can be more or less 'empowering' and more or less 'disempowering'. A coach-created, empowering motivational climate is characterized by three main overlapping features. Firstly, by task-involving coach behavior (such as encouraging participants to try new skills and challenges, acknowledging and appraising effort, cooperation learning, and development). Secondly, by autonomy-supportive coach behavior (such as giving participants choices and explaining the purpose of exercises). And, thirdly, by socially/relatedness supportive coach behaviors (such as showing interest in and appreciation of the young sports participants regardless of their performance and not just of their athletic abilities).<sup>30,33</sup> A coach-created disempowering climate is characterized by ego-involving coach behavior (such as making winning the only success criteria, giving recognition and appreciation only to participants that are the best in the team, and neglecting or punishing participants who perform less well) and controlling coach strategies (such as using reward and punishment, acknowledgement, and neglect to control the athletes' behavior).<sup>30,33</sup>

Research has shown positive associations between empowering coach-created climate and autonomous motivation,<sup>34</sup> sport-related enjoyment,<sup>35</sup> indicators of optimal health and functioning,<sup>36</sup> and intentions to continue.<sup>37,38</sup> In contrast, disempowering coach-created motivational climate has been found to be associated with burnout<sup>36,39</sup> anxiety, anger, and intentions to dropout.<sup>37</sup> As empowering coach-created climates have been associated with a range of positive affective outcomes and disempowering climates have been associated with negative affective outcomes, it is likely that more young sports participants will sustain their participation when the coach-created climate is empowering (and less disempowering) and will drop out when it is disempowering (and less empowering). In support of this assumption, a recent cross-sectional study found that dropouts from youth swimming reported their previous coach-created swimming environment as less empowering and more disempowering than the swimmers who had continued with swimming.<sup>40</sup> Furthermore, research has shown that coach-created autonomy-supportive climate in youth football/soccer is positively associated with intentions to continue,<sup>24</sup> that task-involving coach-created environments are associated with continuation in youth handball<sup>4</sup> and volleyball,<sup>25</sup> whereas ego-involving coach-created environments have been associated with dropout in youth volleyball.<sup>25</sup> However, no prospective studies so far have investigated the association between coach-created empowering climate and actual continuation in sport the next season or between disempowering coach-created climate and actual drop-out. This is therefore the third aim of this study.

Except for the study by Sarrazin et al.<sup>4</sup> on female elite handball players, previous studies on the associations between motivation, psychological needs satisfaction, motivational climate, and continuation in youth sport use either retrospective designs<sup>25</sup> or participants' intentions to drop out as a proxy measure of actual dropout. Even though behavioral intentions are a proximal predictor of behavior, it has been shown empirically that they are not strong predictors of actual behavior<sup>41</sup> and asking players who have dropped out about the climate when they were playing the previous season (as in Elsborg et al.<sup>25</sup>) introduces recall bias. Therefore, it is important to supplement these studies with larger studies using measures of actual dropout behavior. Furthermore, continuation in (or dropout from) sport is a nuanced phenomenon that occurs at both a contextual level (i.e., in the club) and at more general level in the sport in general. It is therefore important to investigate the predictors of both types of continuation, which may be influenced by different motivational factors.

Another limitation of previous research on motivation in youth sport is that although a range of sports have been represented, each study tends to recruit participants from one sport, one gender, and one competitive level, leading to Evans et al.'s<sup>42</sup> proposal that future studies should focus more on differences between sport types, settings, and levels of personal involvement and encourage future research on moderator variables. Even though the importance of basic psychological needs satisfaction for wellbeing appears to be universal across gender, culture, and values,<sup>43,44</sup> it is still important to test whether the importance of different motivational aspects for continuation in sport differs between sport types, gender, competitive levels, or age groups. This knowledge has important practical implications for the use of youth sport as a means for general health promotion as well as for talent retention.

In order to improve knowledge about the predictors of continuation and dropout in youth sport, this study aims to investigate the influence of motivation styles, basic psychological needs satisfaction and frustration, and coach-created motivational climate on continuation across different youth sports, competitive levels, ages, and gender.

The hypotheses are that across different sports, competitive levels, age groups, and gender:

1. The autonomous styles of motivation (intrinsic motivation and identified regulation) are positively associated with continuation in the sport and in the club the next season.
2. The controlled styles of motivation (introjected and external regulation) and demotivation are negatively

associated with continuation (i.e., positively associated with dropout) in the sport and from the club next season.

3. Experiences of competence, relatedness, and autonomy are positively associated with continuation in the sport and in the club next season.
4. Experiencing frustrations of the basic needs for competence, relatedness, and autonomy are negatively associated with continuation (i.e., positively associated with dropout) in the sport and in the club next season.
5. An empowering, motivational climate is positively associated with continuation in the sport as well as in the club next season.
6. A disempowering motivational climate is negatively associated with continuation in the sport as well as in the club next season (i.e., predicts dropout).

## 2 | METHODS

### 2.1 | Participants

In total, 11 404 participants, aged 11–20 years, from five sports filled in the baseline questionnaire and gave consent and a phone number to receive a follow-up questionnaire next season about their continuation in sport (7447 from football, 620 from gymnastics, 1619 from handball, 221 from basketball, and 1479 from badminton). Of these, 10 067 had complete data in the measures of motivational climate and the confounding variables adjusted for in the analysis (sport level, sport experience, age, and gender). Of these 10 067, 7110 (71%) also filled in the follow-up questionnaire about their continuation next season. These 7110 participants with both baseline and follow-up measures were included in the analysis. In this analytical sample, 4550 were from football, 425 from gymnastics, 1124 from handball, 157 from basketball, and 854 from badminton. Descriptive statistics about background characteristics of these participants are provided in Table 1.

The electronic survey was set up so that participants could not move on to next page and have answers of the page recorded until all items of the page had been answered. This means that missing data and lower sample sizes for the measures of motivation types and need satisfaction are a product of participants not having continued to this stage of the questionnaire.

Therefore, some of the participants' responses in this sample have missing data in the measures of motivational regulation, satisfaction, or frustration. The precise N for the analysis of these predictors is shown in Table 3, with the smallest sample having  $N = 6249$ . Varying sample sizes were used in order to minimize the selection bias from missing data by using all available data for each analysis.



TABLE 1 Descriptive statistics of the study sample included in analysis.

	Football (N = 4550)	Gymnastics (N = 425)	Handball (N = 1124)	Basketball (N = 157)	Badminton (N = 854)	Overall (N = 7110)
Gender						
Boys/men	3150 (69.2%)	84 (19.8%)	428 (38.1%)	94 (59.9%)	549 (64.3%)	4305 (60.5%)
Girls/women	1394 (30.6%)	341 (80.2%)	696 (61.9%)	63 (40.1%)	302 (35.4%)	2796 (39.3%)
Other <sup>a</sup>	6 (0.1%)	0 (0%)	0 (0%)	0 (0%)	3 (0.4%)	9 (0.1%)
Age in months						
Mean (SD)	175 (22.5)	186 (28.7)	184 (25.2)	184 (22.0)	176 (22.3)	177 (23.6)
Median [Min, Max]	171 [137, 244]	182 [134, 251]	181 [134, 250]	186 [137, 246]	172 [134, 241]	173 [134, 251]
Level						
Recreation	3564 (78.3%)	295 (69.4%)	836 (74.4%)	44 (28.0%)	649 (76.0%)	5388 (75.8%)
Elite	986 (21.7%)	130 (30.6%)	288 (25.6%)	113 (72.0%)	205 (24.0%)	1722 (24.2%)
Continuation						
Stopped in club	739 (16.2%)	125 (29.4%)	341 (30.3%)	47 (29.9%)	159 (18.6%)	1411 (19.8%)
Continued in club	3811 (83.8%)	300 (70.6%)	783 (69.7%)	110 (70.1%)	695 (81.4%)	5699 (80.2%)
Stopped in sport	267 (5.9%)	42 (9.9%)	117 (10.4%)	5 (3.2%)	71 (8.3%)	502 (7.1%)
Continued in sport	4283 (94.1%)	383 (90.1%)	1007 (89.6%)	152 (96.8%)	783 (91.7%)	6608 (92.9%)

<sup>a</sup>This small group was excluded from the analysis.

## 2.2 | Procedure

As in other Scandinavian countries, most leisure-time recreational and competitive sport in Denmark are organized in clubs that are part of a larger national sports federation/organization. Participants were recruited in cooperation with the national sports federations for each of the five sports. The federations assisted the study by using their existing communication channels to reach as many of their members in the target groups as possible.

An electronic baseline questionnaire was circulated in the middle of the season for each sport using SurveyXact. This baseline questionnaire asked participants about their perceived coach-created motivational climate, satisfaction and frustration of basic needs, and motivation in the sport. The following season, participants answered a five-item follow-up electronic questionnaire on whether they had continued in or dropped out from the sport and/or their club.

In the football federation, members gave consent that the federation could send them questionnaires via their personal e-mail. Therefore, personal links to the baseline questionnaire were distributed via e-mail to the football players' parents (asking them to pass on the link to the adolescent) or the participants themselves, depending on which e-mail was given by the members and listed in the federation's database.

The national federations for the four other sports in the study did not have e-mail addresses for their members. Adolescent participants and their parents in these sports were informed about and given a link to the questionnaire in three ways: through their coaches and other leaders of the clubs; through the clubs and federations' webpages and newsletters; and through the clubs and federations' social media forums. The links distributed to the participants in these four sports were therefore not personal but generic. However, participants answering the questionnaire more than once were identified using the phone numbers given for follow-up questions and only their most complete (or, if several were fully completed, their first) series of answers were included in the dataset.

Gymnastics, handball, basketball, and badminton are mainly indoor winter sports in Denmark. Therefore, baseline data was collected at the end of the season before the spring/summer break (February 2020 for gymnastics and handball, March 2020 for basketball, and February 2022 for badminton). Follow-up data were collected at the beginning of the autumn season (early October 2020 for basketball, handball, and gymnastics and early October 2022 for badminton). As football only has a very short Christmas break and a slightly longer summer break, the baseline questionnaire was distributed and collected in late spring (20th May to 10th June 2021 (before the

summer break), and follow-up measure of continuation was collected after the summer break, from 24th August to 10th September 2021).

These data collection periods were selected so that none of the sports were affected by COVID-19 restrictions during the data collection periods.

## 2.3 | Measures

### 2.3.1 | Motivational regulations for participating in the sports

The Behavioral Regulation in Sport Questionnaire Version 6 (BRSQ-6)<sup>45</sup> was used to measure participants' motivation for participating in their sport. The BRSQ is a validated measure of motivation for sport, which measures the six behavior regulation (i.e., motivation) styles described in SDT with four items each.

In this study, only five of the six types of behavioral regulations (intrinsic motivation, identified regulation, introjected regulation, external regulation, and demotivation) were measured. Integrated regulation was left out of the questionnaire for three reasons: because validation studies of the BRSQ indicate that the identified and integration regulation sub-scales did not clearly separate,<sup>45,46</sup> because the questionnaire format might not be suitable for assessing this type of regulation among adolescents<sup>45</sup>; and because it has been suggested that this type of motive/regulation is not prevalent until adulthood.<sup>47</sup>

Using the stem "I participate in Basketball/Gymnastics/... etc.", athletes were asked to rate their agreement with the 20 items on a 7-point scale (1 = not true at all, 7 = very true). In order to enable easier comparison of effects with the other psychological variables, the total score for each motivation regulation was transformed into 1–5 scale by the following equation:  $((\text{total score}/\text{number of items}) - 1) \times (4/6) + 1$ .

### 2.3.2 | Satisfaction and frustration of basic psychological needs

Participants' basic psychological needs, satisfaction, and frustration during sport were measured using the Psychological Need States in Sport-Scale (PNSS-S).<sup>27</sup> PNSS-S is a sport-specific measure of six distinct states of both satisfaction and frustration of the needs for experiencing autonomy, competence, and relatedness during sport that has been validated among adolescent and young adult competitive sport participants.<sup>27</sup> Using the stem "in my sport, I ...", the scale measures satisfaction of the need for experiencing autonomy (with 5 items, e.g., *pursue goals that are my own*), competence (5 items, e.g., *feel that I am*

good), and relatedness (5 items, e.g., *feel cared for*). The scale also measures the frustration of the need for experiencing autonomy (5 items, e.g., *feel pushed to behave in certain ways*), competence (4 items, e.g., *I feel incapable*), and relatedness (5 items, e.g., *I feel disliked*). The 19 items are answered on a 7-point response scale with the anchors 1 = *strongly disagree*, 4 = *neither disagree nor agree*, and 7 = *strongly agree*. The scores for satisfaction and frustration of each of the three basic psychological needs were transformed into a 1–5 scale by the following equation:  $((\text{total score}/\text{number of items}) - 1) (4/6) + 1$ .

Both the BRSQ and PNSS-S were translated into Danish through the principles of forward-backward translation.<sup>48</sup>

### 2.3.3 | Coach-created motivational climate

The coach-created motivational climate was measured using the Danish version of the Empowering and Disempowering Motivational Climate Questionnaire-Coach (EDMCQ-C).<sup>49,50</sup> With 17 items, the EDMCQ-C measures participants' perceptions of empowering coach-created climate in terms of task-involving (e.g., "My coach made sure players felt successful when they improved"), autonomy-supportive (e.g., "My coach answered players' questions fully and carefully"), and socially-supportive (e.g., "My coach really appreciated athletes as people, not just as a sport participants") coaching behavior. Seventeen items measure disempowering strategies that are ego-involving (e.g., "My coach gave most attention to the best players") and controlling (e.g., "My coach threatened to punish players to keep them in line during training"). Items were measured on a 5-point scale (i.e., 1 = *strongly disagree*, 5 = *strongly agree*). As an introduction to the 34 items, participants were asked to "think about what their main coach usually has been saying and doing during the last 3–4 weeks."

The EDMCQ-C was initially validated in samples of younger British athletes by Appleton et al.<sup>50</sup> The validity of a Danish translation of the questionnaire as well as scale invariance across gender was tested in young Danish football players by Elsborg et al.<sup>49</sup> The study confirmed the reliability of the two dimensions of EDMCQ-C, their predictive validity, and measurement invariance across age, gender, and competitive level.<sup>49</sup>

### 2.3.4 | Continuation in the sport and the club next season

The participants' continuation or dropout the next season was measured with a short electronic questionnaire. This follow-up questionnaire was administered at the beginning

of the next season (1–3 weeks after start-up) for two reasons: dropout often takes place between sporting seasons (i.e., during breaks), and dropout the next season could be a result of a different motivational climate created by a new coach and/or team if measured later in the season.

In the follow-up questionnaire, participants were asked if they were still participating this season in the same club as before (when answering the baseline survey) or if they were still playing the sport but had changed to a different club, or if they had stopped playing the sport in any club or association altogether.

Answers were coded into two dichotomous dependent variables describing continuation in the club and continuation in the sport. In the variable *Continued or dropped out from the club*, participants who answered that they had continued in their club were coded 1, and participants who had changed clubs or stopped playing the sport altogether were coded 0. In the variable *continued in or dropped out from the sport*, participants who had continued playing the sport in the same club or had continued playing the sport in another club were coded 1, and participants who had stopped playing the sport in any club altogether were coded 0.

### 2.3.5 | Competitive level

Participants were asked about which league they competed in (or for some gymnasts, performed in) and how many times a week they participated in training organized by the club or the coach. The questions asking participants about their league were formulated in collaboration with the national federations to ensure that they were meaningful and exhaustive. Participants competing in the highest league for their year and participating in organized training more than 4 times weekly were coded as 'elite' and participants competing at lower level and/or training less than 4 times weekly were coded as that is 'recreational' (i.e., non-elite).

### 2.3.6 | Gender and age

Gender was measured with (a Danish language version of) the question "Please select your gender" with the four answer options: "Girl/Woman", "Boy/Man", "Other", "Prefer not to answer."

Age was measured by asking the participants which year and month they were born.

## 2.4 | Statistical analysis

The main purpose of this study was to investigate the importance of motivational factors to adolescents'



TABLE 2 Descriptive statistics and correlations between psychometric study variables.

	N	Mean	SD	alpha	2	3	4	5	6	7	8	9	10	11	12	13
1. Intrinsic Motivation	6704	4.59	0.55	0.86	0.57	−0.35	−0.47	−0.62	0.61	0.52	0.60	−0.37	−0.20	−0.41	0.35	−0.23
2. Identified Regulation	6702	3.96	0.74	0.74	0.74	−0.06	−0.18	−0.30	0.44	0.50	0.46	−0.17	−0.08	−0.20	0.30	−0.08
3. Introjected regulation	6703	1.49	0.72	0.82	0.82		0.64	0.55	−0.42	−0.19	−0.29	0.40	0.31	0.42	−0.22	0.29
4. External Regulation	6702	1.30	0.54	0.81	0.81			0.62	−0.43	−0.24	−0.31	0.40	0.31	0.41	−0.22	0.25
5. Demotivation	6704	1.32	0.61	0.88	0.88				−0.55	−0.35	−0.45	0.45	0.32	0.50	−0.30	0.27
6. Relatedness Satisfaction	6252	4.19	0.68	0.81	0.81				0.61	0.69	0.69	−0.58	−0.26	−0.53	0.56	−0.44
7. Autonomy Satisfaction	6254	3.48	0.74	0.74	0.74					0.60	0.60	−0.34	−0.31	−0.35	0.45	−0.39
8. Competence Satisfaction	6254	4.21	0.71	0.89	0.89							−0.49	−0.23	−0.63	0.38	−0.27
9. Relatedness Frustration	6249	1.38	0.61	0.79	0.79							0.38		0.69	−0.37	−0.26
10. Autonomy Frustration	6253	2.53	0.67	0.61	0.61									0.37	−0.30	0.35
11. Competence Frustration	6254	1.35	0.60	0.84	0.84										−0.33	0.42
12. Empowering Climate	7110	4.10	0.60	0.93	0.93											0.31
13. Disempowering Climate	7101	2.27	0.64	0.85	0.85											−0.63

Note: All correlations were significant at  $p < 0.001$ .

continuation in sport. Therefore, the outcome variables were the dichotomous variables continuation in the sport and continuation in the club.

In order to gain a detailed understanding of the different sources of continuation and dropout in youth sport and how to improve it, this study aims to examine the relative importance of all the types of motivation regulations as well as the importance of each of the three basic needs and two facets of the motivational climate for sustained sports participation among youth. Binary logistic regressions were therefore employed to describe the impact of each motivation regulation, of each of the three needs, and of the empowering and disempowering climate on continuation in the club and in the sport.

The extent that participants' continuation depended on different motivation regulations, basic psychological needs satisfaction (and frustration), and coach-created motivational climate dimensions (empowering and disempowering) was analyzed using multiple binary logistic regression adjusting for the confounding variables gender, sport, competitive level, years participating in the sport, and age, where appropriate. To investigate whether the impact of the predictor variables on continuation depended on age, gender, sport, and competitive level, these variables were also used as moderators in sub-group analysis.

The strengths of the associations are described as odds ratios. For the purpose of comparing (standardizing) the impact of the different predictor variables (motivation regulations, needs satisfaction, and motivational climate), these were standardized to 1–5 scales. Hence, odds ratios are used as indicators of effect size and describe how many times (and hence %) bigger the odds for continuation per 1 unit increase on the 1–5 point scales ( $\approx 25\%$  increase) of the predictor variables.  $p$  values  $< 0.05$  are considered significant. 95% CI are used to see if subgroups differ regarding the prediction of psychological variables on continuation.

Cronbach's alpha values were used to check internal reliability (Table 2) and were calculated using the cronbach.alpha function in the R-package 'ltm'. Confirmatory factor analysis was conducted to check the validity of the measures of motivation, psychological needs satisfaction, and frustration as well as the coach-created climate. The following criteria were used for an acceptable model fit: CFI  $> 0.95$ ; TLI  $> 0.95$ ; RMSEA  $< 0.06$ ; SRMR  $< 0.08$ .<sup>51</sup>

### 3 | RESULTS

Table 1 describes the sample with complete data at baseline and at follow-up that was used for analysis both in total and for each sport. The largest proportion of the sample was from football, which is also the largest sport among adolescents in Denmark. The overall sample had

more girls (60.5%) than boys, and 24.2% were categorized as competing at the elite level. The confounding influence of these variables was adjusted for in the analysis of predictors of continuation. In total, 7.1% had dropped out from the sport completely over the season break while 19.8% had changed to another club.

### 3.1 | Missing data analysis

Comparing the analytical sample of 7110 participants who had data from both baseline survey data on motivational variables and follow up data about their continuation in sport the next season to the 2957 participants who had filled in the baseline questionnaire but not the follow-up data (i.e., drop-outs from the study), showed very small (<2%) differences in motivational variables and age, but the group that did not provide follow-up measures had 7% more boys (Table S1). More specifically, the 2957 participants with no follow-up data were 1.26 months (i.e., 1.1%) older in mean age (95% CI=0.23–2.28), had a 0.02 (i.e., 0.5%) lower mean score for total basic needs satisfaction (95% CI=0.01–0.04), a 0.06 (i.e., 1.3%) lower mean score on intrinsic motivation (95% CI=0.04–0.09), a 0.03 (0.9%) lower mean score on empowering climate (95% CI=0.01–0.06), and 7% more boys/men.

### 3.2 | Descriptive statistics, validity, and reliability of study variables

Table 2 depicts the descriptive statistics for and correlations between the motivational styles, needs satisfaction, frustration, and coach-created empowering and disempowering climates.

All study variables showed acceptable reliability with Cronbach alpha values above 0.7 (range: 0.74–0.93), except from autonomy frustration (alpha=0.61). Acceptable model fit indices were found when conducting confirmatory factor analysis indicating acceptable validity for the measures of motivational styles (CFI=0.994; TLI=0.993; RMSEA=0.060; SRMR=0.052), needs satisfaction and frustration (CFI=0.988; TLI=0.986; RMSEA=0.076; SRMR=0.061), and coach-created climate (CFI=0.987; TLI=0.986; RMSEA=0.065; SRMR=0.050).

All correlations between the study variables were significant at  $p < 0.001$ . Experiencing competence, relatedness, and autonomy during sports were positively correlated to intrinsic motivation and to identified-regulation but negatively correlated with introjected regulation, external regulation and demotivation. An opposite pattern can be observed for needs frustration, however, with little less strong associations. An empowering coach-created climate was positively associated with needs satisfaction,

intrinsic motivation, and identified regulation but negatively associated with needs frustration and controlled types of motivation. A disempowering coach-created climate was negatively associated with needs satisfaction and intrinsic motivation and positively associated with needs frustration, external regulation, and demotivation.

Table 3 and Figures 1, 2, and 3 describe the associations between motivational climate, needs satisfaction, and motivation at the end of one season and continuation the next season when adjusting for gender, age, sport, competitive level, and years of experience with the sport. Tables S2, S3, S4, S5, and S6 describe these associations divided by gender (S2), sporting level (S3), age-group (S4), and sport (S5 and S6).

### 3.3 | Associations between motivation at the end-of-season and continuation the next season

Figure 1 (and Table 3) show a clear pattern of how each of the different motivation regulations was associated with continuation the next season, with the more autonomous motivation regulations having a more positive influence on continuation and the more controlling motivation regulations having a more negative influence.

Intrinsic motivation was associated with 2.96 times (i.e., 196%) higher odds for continuation in the sport next season per 1 unit (i.e., 25%) increase; identified regulation was associated with 1.91 times higher odds per 25% increase.

The two controlling types of motivation as well as demotivation had negative associations with continuation, i.e. to dropout (odds ratios <1). The odds ratios for continuation in the sport were 0.77 for introjected regulation, 0.53 for external regulation, and 0.45 for demotivation. This corresponds to odds ratios for dropout from the sport of 1.30 (i.e., 1/0.77) for introjected regulation, 1.89 for external regulation, and 2.22 for demotivation.

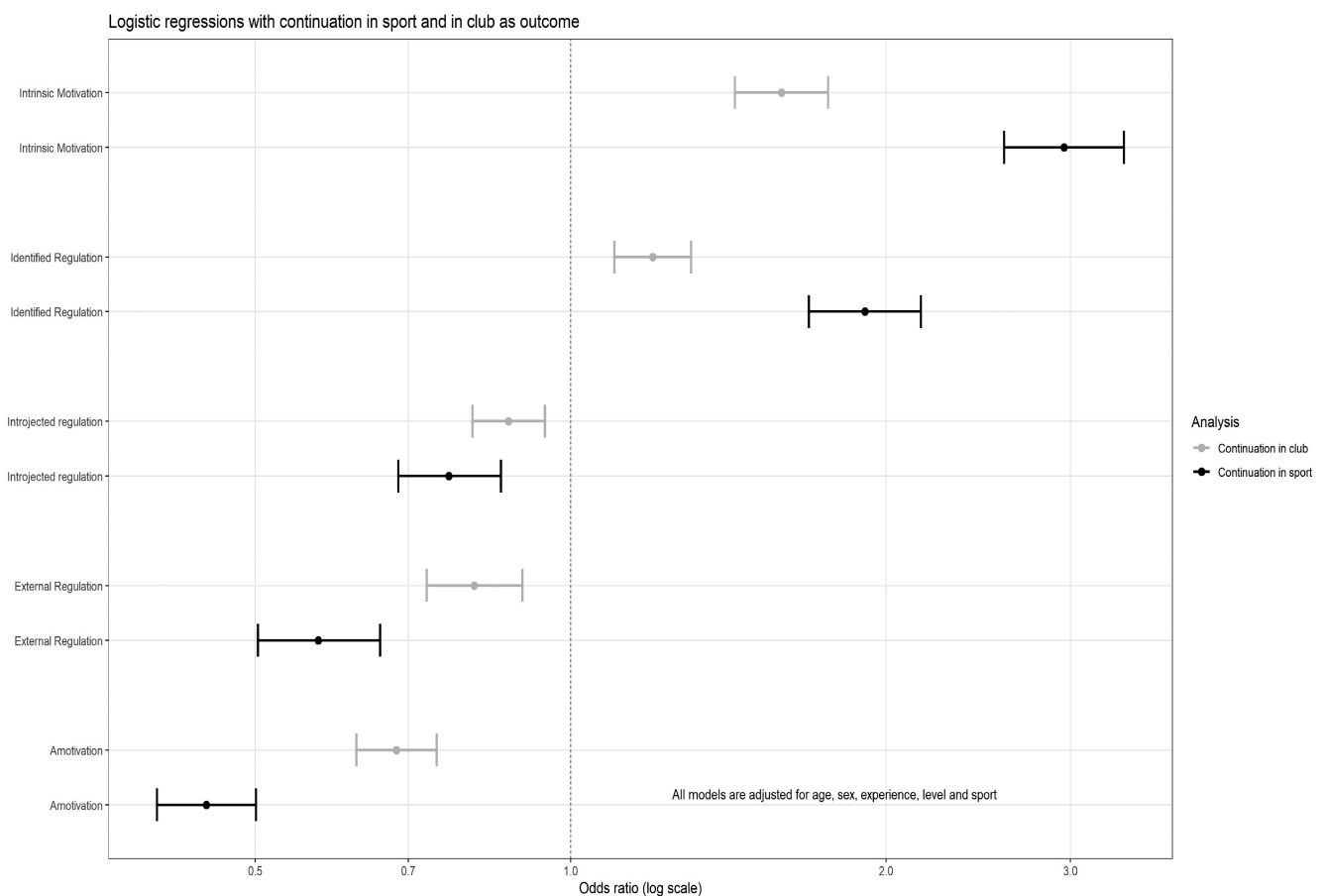
For continuation in the club, the impact on continuation increased as the motivation regulations got more autonomous. The autonomous motivation regulations (intrinsic motivation and identified regulation) were positively associated with continuation in the club while controlling styles of motivation (external regulation and introjected regulation) and demotivation were associated with dropout. However, all motivation styles had stronger associations to continuation in the sport than to continuation in the club (see 95% CI in Table 3). All associations were highly significant ( $p < 0.001$ ).

As can be seen in Table S2, the impact of different motivation types on continuation was quite similar for both girls/women and boys/men, with overlapping 95% CI for the odds ratios (no significant differences). Even though the

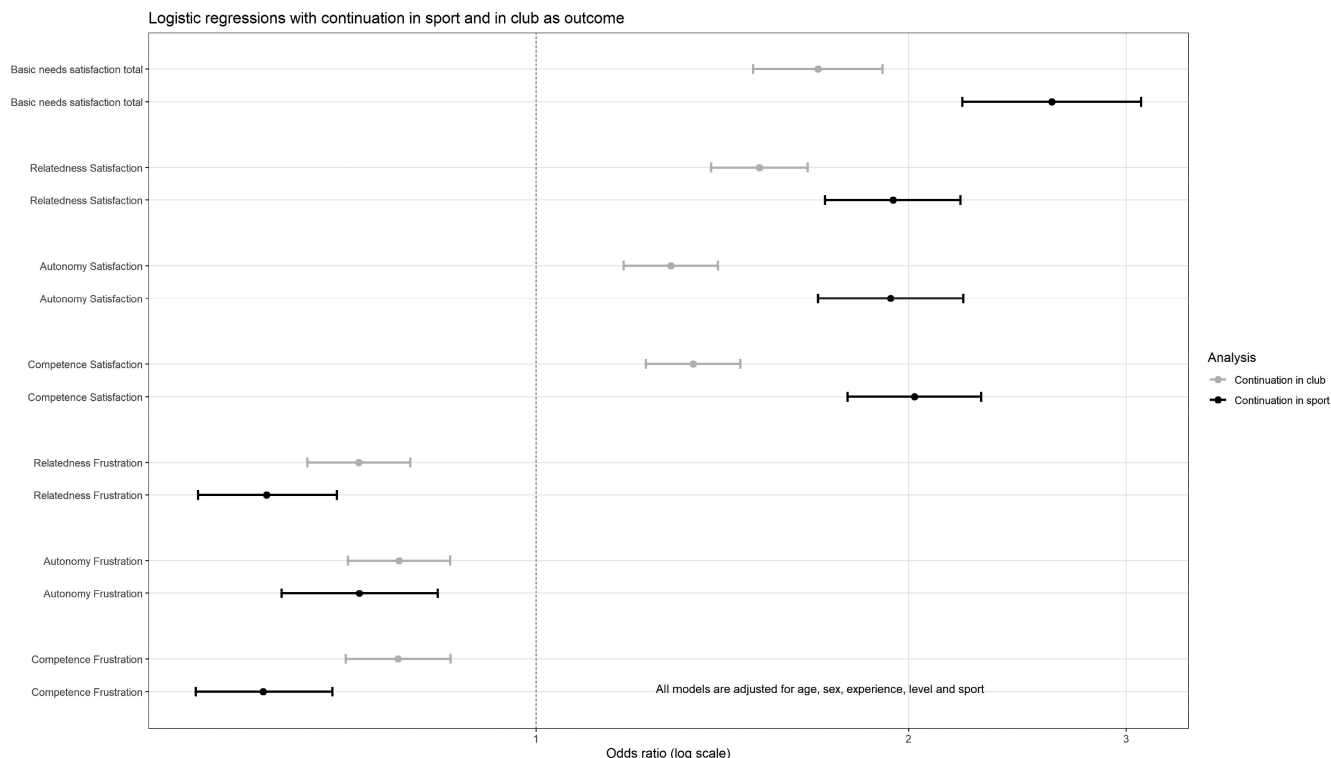
**TABLE 3** Multiple logistic regression models analyzing the associations between motivational variables and odds for continuation in the club and the sport the following year.

	N	Continuation in club				Continuation in the sport			
		Odds ratio	95% CI–	95% CI +	p	Odds ratio	95% CI–	95% CI+	p
Motivation									
Intrinsic Motivation	6254	1.59	1.43	1.76	<0.01	2.96	2.59	3.37	<0.01
Identified Regulation	6254	1.20	1.10	1.30	<0.01	1.91	1.69	2.16	<0.01
Introjected regulation	6249	0.87	0.81	0.95	<0.01	0.77	0.68	0.86	<0.01
External Regulation	6253	0.81	0.73	0.90	<0.01	0.57	0.50	0.66	<0.01
Demotivation	6254	0.68	0.62	0.75	<0.01	0.45	0.40	0.50	<0.01
Needs satisfaction									
Basic needs satisfaction total	6704	1.69	1.50	1.91	<0.01	2.61	2.21	3.08	<0.01
Relatedness Satisfaction	6702	1.52	1.38	1.66	<0.01	1.94	1.71	2.20	<0.01
Autonomy Satisfaction	6703	1.29	1.18	1.40	<0.01	1.93	1.69	2.22	<0.01
Competence Satisfaction	6702	1.34	1.23	1.46	<0.01	2.02	1.79	2.29	<0.01
Relatedness Frustration	6704	0.72	0.65	0.79	<0.01	0.61	0.53	0.69	<0.01
Autonomy Frustration	6244	0.77	0.70	0.85	<0.01	0.72	0.62	0.83	<0.01
Competence Frustration	6252	0.77	0.70	0.85	<0.01	0.60	0.53	0.68	<0.01
Coaching behavior									
Empowering Climate	7110	1.61	1.47	1.78	<0.01	1.68	1.45	1.93	<0.01
Disempowering Climate	7101	0.67	0.61	0.74	<0.01	0.67	0.58	0.78	<0.01

Note: All logistic regression models are adjusted for gender, age, sport, level, and experience.



**FIGURE 1** Associations between motivation and continuation, shown as odds ratios (with 95% CI).



**FIGURE 2** Associations between basic psychological needs satisfaction and continuation shown as odds ratios (with 95% CI).

association between intrinsic motivation and continuation for elite athletes was strong (odds ratio=4.34), the impact of any of the motivation styles was not significantly different between the elite and recreational levels (95% CI did not overlap, Table S3). When comparing age groups (Table S4), the negative influence of demotivation on continuation next season was significantly larger for 11–15year olds. The associations between motivation styles and continuation were not significantly different between the five sports of football, gymnastics, handball, basketball, and badminton either (confidence intervals for these associations in the specific sports also overlapped, Tables S5 and S6).

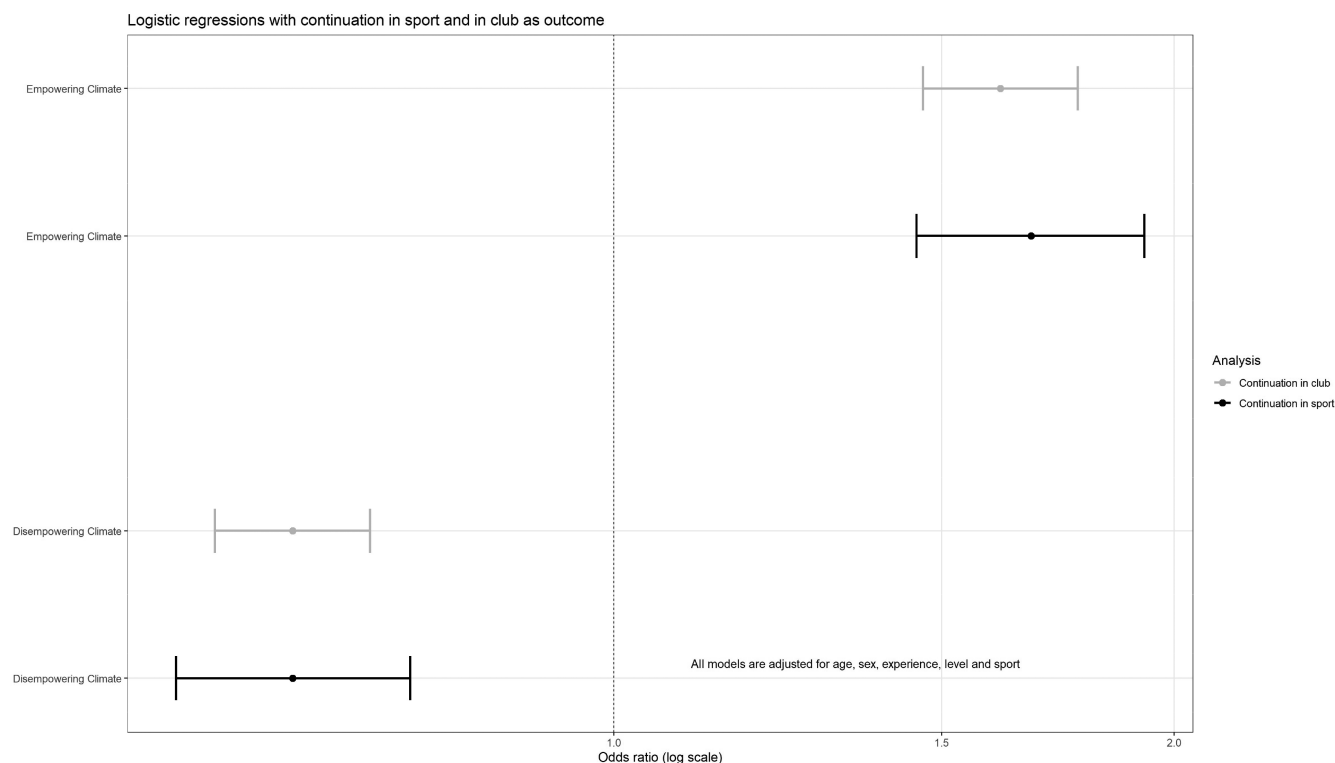
However, when looking at the sub-samples for the five individual sports, introjected regulation was only significantly negatively associated to continuation in the sport in gymnastics, football, and badminton and only associated to continuation in the club in the football sample. Furthermore, identified regulation did not significantly predict continuation in the club among girls or among 16–20year olds.

### 3.4 | Associations between end-of-season satisfaction and frustration of basic psychological needs and continuation next season

Figure 2 (and Table 3) describe how young sports participants' basic psychological needs satisfaction and

frustration during their sport are associated to continuation next season. As can be seen, feelings of relatedness, autonomy, and competence as well at total needs satisfaction were all associated with higher odds for continuation in the sport and in the club. All three feelings were associated with about two times higher odds for continuation in the sport next season per 1 point (i.e., 25%) increase in needs satisfaction (on the 1–5 scale), while the associations with continuation in the club were somewhat less strong. Interestingly, the association between total needs satisfaction and continuation in the sport was stronger than that between any of the three specific needs and continuation. Frustration of the three needs was associated with lower odds for continuation, that is with dropout (odds ratios <1). The odds ratios for continuation in the sport were 0.61 for relatedness frustration, 0.72 for autonomy frustration, and 0.60 for competence frustration. This corresponds to odds ratios for dropout from the sport of  $1/0.61 = 1.65$  for relatedness frustration,  $1/0.72 = 1.39$  for autonomy frustration, and  $1/0.60 = 1.66$  for competence frustration.

When comparing boys to girls (see Table S2), elite to recreational (Table S3), and 11–15year olds to 16–20year olds (Table S4), no significant differences were found regarding the associations between needs satisfaction and continuation or needs frustration and dropout (95% CI for the odds ratios overlapped). The associations were not significantly different between the four sports either (confidence intervals



**FIGURE 3** Associations between coach-created climate and continuation, shown as odds ratios (with 95% CI).

for these associations in the specific sports also overlapped). However, in the badminton sub-sample, needs frustration as well as satisfaction of the need for autonomy were not significantly associated with continuation in the club, and autonomy frustration was not significantly associated with continuation in the sport. In the gymnastics sub-sample, relatedness frustration was not significantly associated to continuation in the sport (see [Tables S5 and S6](#) for details).

### 3.5 | Associations between end-of-season coach-created empowering and disempowering climates and continuation next season

[Figure 3](#) (and [Table 3](#)) depicts how an empowering coach-created climate is associated with both continuation in the sport (odds ratio = 1.68) and continuation in the club (odds ratio = 1.61). Disempowering climate was associated with decreased odds of continuing in both the sport and the club (both odds ratio = 0.67) and is thus associated with dropout from the sports and to change of club (odds ratio = 1.49). As can be seen, the associations between empowering and disempowering climate with continuation in the sport and in the club are very similar and not significantly different.

These associations between motivation climate and continuation did not differ significantly between girls and

boys ([Table S2](#)), the elite and recreational levels ([Table S3](#)), 11–15 year olds and 16–20 year olds ([Table S4](#)), or between the five sports ([Tables S5 and S6](#)).

## 4 | DISCUSSION

In this prospective cohort study of predictors of continuation in Danish youth sports, autonomous motivations, basic needs satisfaction and an empowering coach-created climate were all significant predictors of continuation in the sport and the club the following season. These findings were consistent across different sports, gender, age groups, and competitive levels. In contrast, controlled motivations, demotivation, psychological need frustration, and a disempowering coach-created climate were associated with dropout.

The results showed a very clear pattern of how the impact of the motivational regulations on continuation turned from very positive to less positive to negative (i.e., to dropout) as the motivation types got less autonomous/more controlled. This concurs with SDT's descriptions of how the motivation regulations affect involvement and long-term continuation depending on how autonomous the motivation is and supports the SDT-based hypothesis that the more autonomous the regulation style, the stronger the positive effect will be on sustained behavior. The negative association between external regulation and



sustained sport involvement may be attributed to dependence of externally regulated behavior on continuous maintenance of external reward and punishment. While introjected regulation is more internalized, it is neither fully integrated nor completely volitional and is therefore vitality-draining and ego-depleting. Behavior motivated by introjected regulation thus requires more energy to sustain than the more internalized and autonomous motivation regulations.<sup>52</sup> This may explain why this type of controlled motivation was also associated with dropout. That demotivation (i.e., the lack of any intrinsic or extrinsic motivation) is associated with dropout from youth sport the next season is not surprising, but however important to confirm.

Other empirical research has confirmed that long-term continuation or intentions to continue in physical activity are dependent on autonomous forms of motivation and are not sustained by controlled types of motivation. In a literature review of predictors of continuation in exercise among adults Teixeira et al.<sup>53</sup> found a similar pattern to the one found in our study. The autonomous styles of motivation (i.e., intrinsic, integrated, and identified regulations) were generally associated with continuation. Introjected regulation had a small positive impact on short-term but a small negative impact on long-term continuation. External regulation was generally negatively associated with continuation in exercise among adults.<sup>53</sup> Studies of young Iranian athlete students,<sup>54</sup> elite adolescent male Spanish soccer players,<sup>3</sup> and Spanish elite youth handball players<sup>55</sup> have also shown that autonomous motivation regulations are positively associated with intentions to continue or commitment, and a study of 13–15-year old French elite female handball players has shown autonomous/self-determined motivation to be associated with actual continuation.<sup>4</sup> Our study expands this body of knowledge by showing that autonomous types of motivation are associated with actual continuation in youth sport at both elite and recreational levels, for different sport types, different youth age-groups, and both genders, whereas controlling types of motivation are associated with dropout.

Previous studies have also shown that satisfying the basic psychological needs for experiencing competence, relatedness, and autonomy increases both intentions to continue in youth sport<sup>3,24,54</sup> and actual continuation.<sup>4</sup> Our study expands and strengthens this body of evidence by demonstrating that psychological needs satisfaction can predict actual continuation in the next season for different ages of youth, genders, sporting levels, and different sports. Interestingly, the association between total needs satisfaction and continuation in the sport was stronger than that between any of the three

specific needs and continuation. This may indicate that even though satisfaction of each need is generally positively associated with satisfaction of the other needs (as also shown in Table 2), sometimes some parts of the satisfaction of one need (e.g., experiencing autonomy) can come at the expense of one of the other needs (e.g., experiencing relatedness), and hence the impact on continuation will be less strong than when other needs are also satisfied. This supports the BPNT notion that it is the satisfaction of all three needs (rather than one at the expense of another) that leads to the most positive outcomes. Our study also expands this knowledge by showing that needs frustration (i.e., feeling incompetent/failing, excluded/disliked and controlled) is associated with actual dropout. This confirms that needs frustration is an important factor in explaining dropout and that it is important to minimize these experiences when trying to prevent dropout in youth sport.

In order to address the high drop-out from youth sport in practice, the most important contribution of this study is perhaps the finding that coach-created motivational climates that were task-oriented, socially supportive, and autonomy-supportive (i.e., empowering) predicted actual continuation next season, whereas a coach-created climate that was ego-oriented and controlling (i.e., disempowering) was associated with dropout. A study in Danish volleyball<sup>25</sup> and a study of young female handball players in France<sup>4</sup> have also examined the relations between facets of empowering and disempowering coach-created climates (task and ego-involving), needs satisfaction, and actual dropout/continuation in youth sport. Both studies found that a task-involving climate was positively associated with needs satisfaction and continuation, whereas an ego-involving climate had a small negative-to-no (depending on subgroup) influence on needs satisfaction and continuation. Likewise, studies of young footballers from European countries,<sup>24</sup> young Iranian athlete students,<sup>54</sup> young Australian swimmers,<sup>40</sup> and elite adolescent male Spanish soccer players<sup>3</sup> have shown that autonomy-supportive coach behavior is associated with needs satisfaction, enjoyment/autonomous motivation, and intentions to continue (or lower intentions to dropout). Our study provides further support for these findings but also expands them by including a more holistic approach to the definition and measurement of the coach-created motivational climate as proposed in Duda's<sup>30</sup> multi-dimensional model and by having follow-up measures of actual continuation.

Compared to the studies on dropout by Sarrazin et al.<sup>4</sup> and Elsborg et al.,<sup>25</sup> our study also contributes with a more nuanced measure of continuation/dropout by also including continuation in the particular club environment as a behavior consequence of needs satisfaction and frustration, controlled

motivation and autonomous motivation, and coach-created climate. This enabled the interesting observation that young sports participants' motivation regulation and basic needs satisfaction were stronger predictors of continuation in the sport than of continuation in the specific club, whereas the coach-created motivational climate dimensions were equally important for continuation at the club and in the sport. This indicates that if the coach-created situational climate is disempowering or not empowering enough, participants may still retain some of their intrinsic motivation for the sport in general, and based on this motivation, some may try to continue participating in their sport in another club environment instead of dropping out completely.

In general, the predictive utility of intrinsic motivation, needs satisfaction, and motivational climate on continuation did not differ across competitive level, sports, gender, and age. This is perhaps not surprising, since the three basic psychological needs that underpin intrinsic motivation and wellbeing and are supported by an empowering climate have been shown to be universal.<sup>43,56,57</sup> Other studies confirm that needs support in terms of autonomy support<sup>1,58</sup> and task-involving climates<sup>25</sup> are important to wellbeing, needs satisfaction and motivation in youth sports at both elite and recreational levels and for both genders.

However, when separating the analysis of predictors of continuation for the five specific sports, the extrinsic types of motivation were not always significantly associated with continuation in the club (basketball, gymnastics, handball, badminton). Also in the girls and 16–20-year-olds subsamples, identified regulation did not significantly predict continuation in the club. This may reflect the finding that in general, motivation types were less strong predictors of continuation in the club than of continuation in the sport, and it may reflect that it is not uncommon in the literature that extrinsic types of motivation are not significantly associated with continuation in sport and exercise (and when they are significant, associations vary from weakly negative to weakly positive).<sup>13,53</sup>

That introjected regulation was not significantly associated with continuation in the sport among the 16–20-year-olds is an interesting subgroup finding. Besides the already mentioned general weak associations between introjected regulation and continuation found in the literature, it might also make theoretical sense if sustained sports involvement at this age group is less affected by living up to others, example, parents' expectations than for the younger age group.

## 4.1 | Practical implications

The main purpose of this study was to provide knowledge about how clubs and coaches can prevent dropout in

Danish youth sport. The results clearly show that controlling styles of motivation such as external regulation and introjected regulation should be reduced and more autonomous motivation such as identified regulation and intrinsic motivation should be promoted. In practical terms, this means that trying to motivate young sports participants' involvement in sport solely by the use of external rewards or punishment (external regulation) or by using normative discourse and feelings of guilt (introjected behavior regulation) should be avoided, and that emphasis should instead be put on promoting enjoyment (intrinsic motivation) and making sure that the young participants experience benefits from their sports participation of relevance to them (identified behavior regulation). The results also show the importance of creating experiences of competence, relatedness, and autonomy in youth sports and that frustration of these needs should be minimized in order to prevent dropout from youth sport. Many factors may contribute to this. For example, Jaf et al.<sup>59</sup> showed that parental involvement predicted adolescents' dropout 1 year later via sports values. However, a very concrete factor that organizations and clubs can target is the behavior and motivational style provided by the coach via the motivational climate. Therefore, the most important finding of the study is perhaps that the more empowering the coach-created climate, the more young sports participants will continue in their club and their sport the next season, while the more it is ego-involving and controlling (i.e., disempowering), the more they will drop out.

Three specific indicators of these coach-created empowering climates (i.e., empowering coach behavior) that promote continuation are:

Coaches create a task involving climate by encouraging participants to try new skills and challenges and by acknowledging and appraising effort, cooperation, learning, and development.

Coaches are autonomy-supportive by giving participants some choices and explaining their decisions and the purpose of particular exercises.

Coaches support relatedness by showing interest and appreciation of the participants regardless of their actual achievements and performance.<sup>30,33</sup>

The study's results indicate that if more coaches apply these (leadership) behaviors, more young athletes may continue in their club and sport. How this is done more concretely is described in the theoretical foundation of the training program Empowering Coaching™ as well as in research studies that have developed and tested interventions that seek more empowering motivational climates in sports.<sup>33,37</sup> It is also an important practical finding that disempowering coaching behavior was found to be associated with dropout before the next season. A disempowering coach-created climate is

defined and measured as being ego-involving and controlling. Therefore, such behavior should be avoided and diminished as much as possible. The concrete indicators of the ego-involving part of disempowering coaching approach are: having winning over others as the only success criteria; giving recognition and appreciation only to participants that are the most able on the team; and neglecting and punishing participants who perform less well.<sup>30,33</sup> The indicators of controlling coach behavior are that coaches also use reward and punishment (i.e., acknowledgement and neglect) to control the athletes' behavior.<sup>30,33</sup> Studies imply that it is possible to enable coaches to create a more empowering and less disempowering environment.<sup>33,37</sup> However, research also shows that continuous support from other coaches and coach educators,<sup>60</sup> as well as from club leaders, managers, and parents,<sup>61</sup> is needed for coaches to implement and sustain such coaching behavior over time. The results of our study imply that it might be worth the effort.

## 4.2 | Strengths and limitations

Some strengths and limitations of this study should be highlighted.

The main strength of this study is its longitudinal design with a measure of actual continuation next season. This enabled confirmation of the claim that coach-created climate, needs satisfaction, and motivation have a decisive impact on continuation, which until now has mainly been based on cross-sectional data about intentions to continue or in a few small sport-specific samples.

Another strength of the study is that the findings are based on a large sample of young sports participants from five different sports in Denmark, from all levels of competition and both genders.

Using the EDMCQ-C to measure the coach-created climate can be considered a strength because it provides a comprehensive measure of five different albeit overlapping aspects of the coach-created climate in sport in one relatively short questionnaire that has been validated on different samples including young Danish sports participants.<sup>49</sup> This enabled us to capture the broader climate dimensions of coaches' empowering and disempowering strategies (rather than the unique effects of a few specific facets). It can, however, be seen as a limitation that this instrument cannot distinguish between the three constructs of task-involving autonomy and social support that make up the empowering climate nor the ego-involving and controlling aspect that make up the disempowering coach-created climate.<sup>50,62</sup>

A main limitation of the study is probably its low response rate. It is difficult to know which kind of selection

bias this introduces. The invitation and information about the survey stressed that its purpose was to help improve the sports environments for youth. However, it is still hard to know if the sports participants who are most happy with their sport, coach, or club are more likely to help out by participating, or if the ones who are unhappy with their club, coach, or team see a welcome chance to express their opinions and contribute to change. As the differences between the analytical sample and dropouts from the study were very small regarding motivational aspects, attrition seems to have very little association with the study's targeted motivational variables. However, the gender difference between the analytical sample and dropouts from the study is much larger. However, all analyses were adjusted for gender, and the subgroup analysis showed that genders did not differ significantly in how motivational variables were associated with dropout. It is therefore unlikely that the gender difference in attrition affects the reported associations between motivational aspects and continuation in sport. In general, selection bias and lack of representability can have a large impact on descriptive statistics/results such as the general mean level of intrinsic motivation, empowering coach-created climate, or continuation rate, but have less impact on the associations found between these variables, as long as the sample contains participants with values at each end of the scale.

Another important limitation is that we were not able to take the multilevel nature of the data (participants being embedded in teams, in clubs, in sports) into account, as we did not have data about the specific teams or clubs of the athletes.

Other limitations are that intrinsic motivation and basic needs satisfaction showed clear ceiling effects. However, this may reflect that in a busy life, young people only choose to be involved with voluntary leisure-time sport if it provides a significant amount of enjoyment (as fitness and health can be obtained in more flexible, less time-consuming, and committing ways). In regression analysis, ceiling and flooring effects may increase the chance of type 2 errors (due to variance not explained). This may have contributed to the lack of significance of some of the associations between extrinsic motivations and continuation in the smaller sub-samples. The Cronbach's alpha for autonomy frustration (five items) was also 0.61, which is below the optimal level of 0.7. This somewhat low internal consistency in the measure should be taken into account when interpreting the study's results about the impact of autonomy frustration on continuation.

It may be seen as a limitation that the study did not include other factors that could influence continuation in sport among youth, such as socioeconomic and ethnic background, parental values, peer support, or the peer-created motivation climate.

Furthermore, having only two sporting levels as in this study may not quite capture the wide range of competitiveness, requirements, time and effort involved and investment made in the various competitive levels of youth sport. Future studies could try to collect more details about competitive levels to analyze what this means for the impact of motivational variables on continuation.

## 5 | CONCLUSION

The findings of this study are broadly in line with other studies that have shown that coach-created climate, needs satisfaction, and autonomous motivation in sport are associated with intentions to continue. However, the study further strengthens this knowledge by showing that coach-created empowering climate, needs satisfaction, and autonomous motivations can predict actual continuation the next year at both elite and recreational levels and in different types of sport. Whereas controlled types of motivation, demotivation, needs-frustration, and a disempowering coach-created climate are associated with dropout.

The most important finding for practical efforts to prevent dropout from youth sport is perhaps that the more the coach-created climate is task-involving and gives social and autonomy support (i.e., is empowering), the more young sports participants will continue in their sport the next season, while the more the coach-created climate is ego-involving and controlling (i.e., disempowering), then the more participants will drop out. This has very important implications for the challenge of decreasing the large dropout seen in youth sports as well as improving well-being in and through sports (through the needs supportive effects of employing an empowering coaching style).

## Perspective

Future research needs to address how to enable more coaches to adopt and implement a more empowering coaching behavior in their coaching practice. Future studies should also include other factors that could influence the continuation in sport among youth, such as socioeconomic and ethnic background, parental values and peers support. It would also be interesting to study the impacts of the peer-created and the parent-created motivational climate as well as club culture, which might affect coaches' behavior.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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