

Need satisfaction and Sport motivation predict selection in a competitive Youth Soccer Team over and above the relative age effect

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Throughout their development, youth athletes must endure several selection camps to make it into the most competitive organizations/teams. Researchers have shown that athletes born earlier in the calendar year are more likely to be selected into such teams. However, little is known about the psychological processes that distinguish the athletes who successfully get selected from those who don't. This study investigated the role of motivational factors (i.e., need satisfaction and sport motivation) as predictors of selection into competitive youth soccer teams, over and above the relative age effect. Using a six-month prospective design, 67 youth elite soccer players ($M_{age} = 12.29$; $SD_{age} = 0.65$) were followed throughout the selection camp. Results showed that autonomous sports motivation mediated the relationship between need satisfaction and team selection. These findings suggest that motivational processes are important factors to consider for talent identification and development of expertise in competitive youth sports.

KEY WORDS: Sport motivation, Relative age effect; Team selection, Expertise development; Talent.

Every year, a legion of youth athletes take part in training and selection camps with the goal of making it to the best possible level of play. Many are invited to demonstrate their skills and competitiveness but very few are chosen. Being selected to compete in competitive teams exposes athletes to

This research was supported by a Sport Canada Sport Participation Research Initiative grant from the Social Sciences and Humanities Research Council of Canada (862-2009-7) and a teaching release from the Faculty of Social Sciences awarded to Patrick Gaudreau. The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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a more experienced coaching staff, highly skilled training partners, tougher opponents, and greater access to peripheral resources (i.e., nutritionists, physiotherapists, psychologists). In contrast, failure to be selected can result in reduced sports enjoyment, increased negative emotions, and the likelihood of dropping out of sports participation (Burgess & Naughton, 2010).

Parents, athletes, coaches, and governing bodies would like to believe that the most skillful and motivated youth athletes will be selected on the better teams or organizations. Unfortunately, selection decisions are often biased in favor of the athletes born earlier in the calendar year (e.g., Helsen et al., 2012; Wattie et al., 2015). Coaches run the risk of overestimating the long-term potential and giftedness of taller athletes (Furley & Memmert, 2016) only because they are relatively older and more physically mature. Described as the relative age effect (RAE), this phenomenon influences the team selection process by overrepresenting athletes born at the start of the selection period in youth sports. Researchers have demonstrated the presence of RAE in both boys (Helsen et al., 2012) and girls (Delorme et al., 2010) youth soccer teams.

According to Wattie and colleagues (2015), the RAE is attributable to three types of constraints that influence the developmental trajectories of youth athletes by affording some of them with opportunities to play in more competitive teams. First, individual constraints offer relatively older athletes an advantage over their younger peers both from structural (e.g., height, weight, speed) and functional (e.g., development of psychological/social characteristics, such as resilience) standpoints (Konarski et al., 2021; Unnithan et al., 2012). Second, environmental constraints encompass the social factors that influence the way sport is governed within a particular context (e.g., popularity of the sport in a country, family and coach influence, social norms). For example, coaches are more likely to select youth athletes that are more physically-developed compared to their peers in regions, countries, or sports where age grouping policies are strictly based on date of birth when compared to policies that also account for the physical maturation of athletes (e.g., Cogley et al., 2009; Williams & Reilly, 2000). The final type of constraints is related to the tasks in which athletes are involved. Specifically, task constraints refer to sport type and competitive level of play. Consequently, RAEs are more likely to occur in physically demanding sports, such as soccer and ice hockey (Helsen et al., 2005, 2012; Lemoyne et al., 2021), and in competitive settings (Jackson & Comber, 2020).

Despite decades of research and knowledge transfer, the *relative age* of athletes unfortunately remains associated with team selection and performance (Lemoyne et al., 2021). The capacity to find modifiable and novel factors likely to accelerate the development of sport expertise is probably one

of the central aims of sports scientists and practitioners (Farrow et al., 2013). In this study, we proposed that the motivational characteristics of the athletes should be considered as factors that can alleviate the effects of the individuals constraints of RAE because they have been related to sport achievement (e.g., Cerasoli et al., 2016). Therefore, we carried out a six-month longitudinal study to examine whether athletes' need satisfaction and sport motivation – measured at the inception of a selection camp – can be related to team selection after a six-month training camp, over and above their relative age.

Self-Determination Theory

Self-Determination Theory (SDT; Ryan & Deci, 2017) is a humanistic theory of human motivation. SDT has been applied to a host of domains and populations, including sports. In this context, SDT proposes that athletes (as any humans) have an innate desire and propensity for growth and optimal development. The theory also posits that athletes are influenced by the social context in which they evolve, which will either provide or thwart opportunities for need satisfaction. Athletes are thus more likely to perform optimally in their sport when three basic psychological needs are satisfied. Those needs are the ones of autonomy (desire to feel a sense of personal initiative), competence (desire to interact effectively with the environment), and relatedness (desire to feel connected to significant others). Researchers in sports have shown that need satisfaction is positively associated with deliberate practice and performance (Verner-Filion et al., 2017; Verner-Filion & Vallerand, 2018). Results of a meta-analytical review (Cerasoli et al., 2016) provided compelling evidence for a moderate-to-strong correlation between need satisfaction and performance in physically-demanding tasks.

Need satisfaction is the starting point of a motivational process in which athletes are more likely to participate in their sport with *autonomous motivation* (Ryan & Deci, 2017). Autonomous motivation happens when athletes engage in their sport because of the pleasure they derive from the activity (e.g., intrinsic motivation). With autonomous motivation, athletes also feel that sport engagement is aligned with their sense of self and values (e.g., integrated motivation) and strongly identify with their sport (e.g., identified motivation). Athletes with high autonomous motivation have a sense of volition, autonomy, and pleasure when playing their sport. They typically engage in their sport because they love it, feel it is important to them, and believe it is part of who they are as a person. Athletes can also engage in sports out of *controlled motivation*. Controlled motivation occurs when athletes feel pres-

sured to engage in sport to avoid experiencing feelings of shame and guilt (e.g., introjected motivation), because they wish to obtain a reward or avoid punishment from others (e.g., external regulation), or when they engage without motivation (e.g., amotivation). With controlled motivation, athletes perceived little to no autonomy and feel pressured to behave in certain ways when engaging in their sport. They typically play their sport because they feel obligated to, want to obtain something from it, or even have no clear motive to keep participating.

SDT proposes that the quality of one's motivation matters more than the mere quantity of motivation. Consequently, autonomous motivation is expected to relate to better functioning in athletes. With regards to sports performance, autonomous sport motivation was shown to facilitate goal progress and optimal performance in athletes (e.g., Amiot et al., 2004). Conversely, controlled motivation is proposed to be associated with poorer functioning. In general, controlled sport motivation is not significantly related to indicators of sports performance (e.g., Amiot et al., 2004). Several empirical studies in the realm of sport – and other domains – have provided strong empirical support for those assertions (see Ryan & Deci, 2017, for a review).

This Study

In this study, we investigated the associations of need satisfaction and sport motivation in the development of expertise in a sample of youth competitive soccer players taking part in the selection camp of a competitive regional soccer team. Specifically, we expected that need satisfaction and autonomous sport motivation (but not controlled sport motivation) at the start of the selection camp would be positively associated with the selection in the regional team six months later. We also hypothesized that the relationship between need satisfaction and team selection would be significantly mediated by autonomous sport motivation. Furthermore, we tested whether those effects were influenced by the relative age of those soccer players. We thus tested two versions of this model – one not controlling for and one controlling for the relative age of the soccer players. We expected that players born in the first quartile of the calendar year (i.e., January to March) would be more likely to be selected in the team compared to the players born in the last nine months of the year. However, we also expected need satisfaction and autonomous sport motivation to significantly increase the likelihood of team selection.

Method

PARTICIPANTS AND PROCEDURE

Participants were 73 regional youth soccer players (39 boys and 34 girls) that had been identified as the most promising soccer players of their age group by the coaching staff from the regional boys and girls' teams¹. Players were invited to participate in a six-month training camp with the hope of being selected in the regional male and female soccer teams for the 2010 summer provincial games in Québec, Canada. From October through April, players took part in weekly training sessions supervised by the coaching staff of the regional team. Children assented to take part in the study and parental consent was also obtained for all athletes. To minimize social desirability, all athletes were informed that their responses would remain anonymous and confidential. Players were also told that the purpose of this longitudinal study was to better understand the factors that could influence their motivation over time. The psychological variables used in the current study were collected at the beginning of the training camp in October (Time 1). The final team selection was announced at the end of April (Time 2). Three trained research assistants collected the data throughout the selection process. In exchange for their participation in this study, players took part in a draw to win one of two professional soccer shirts of their choice. The study was received approval by a university research and ethics board.

Out of the 73 participants that started the selection process in October, six did not complete the Time 1 questionnaire. Thus, the final sample consisted of 67 soccer players (female, $n = 31$; male, $n = 36$) ranging in age from 11 to 13 years ($M = 12.29$; $SD = 0.65$). Participants mainly considered themselves as White (90.2%). They had been practicing soccer for an average of 6.54 years ($SD = 1.82$) and were training between one and 21 hours each week ($M = 6.08$; $SD = 3.62$). Athletes were born between January and March ($n = 24$), April and June ($n = 23$), July and September ($n = 12$), and October and December ($n = 7$). A total of 32 and 35 players were respectively selected or not selected on the regional team at the end of the selection camp. G*Power 3.1 (Faul et al., 2009) was used to calculate statistical power. It was determined that the sample of the current study would allow to detect medium-sized effects ($R^2 = 0.13$; Cohen, 1988) with 0.95 power and $\alpha = 0.05$ (two-tailed) for the proposed statistical model. Moreover, our sample consisted of the entire population of athletes training for that specific competition in the region in which the study took part. Recruiting additional athletes would have required compromising the internal validity of our study (i.e., recruiting athletes in other sports or regions and/or training under different conditions and coaches).

Measures

Need satisfaction. A 12-item version of the Basic Need Satisfaction Scale was used to assess players' needs for autonomy (e.g., "I am free to express my ideas and opinions in my sport", $\alpha = .72$), relatedness (e.g., "I get along with

¹ This sample was also used in prior research by Gaudreau et al. (2016; Study 1) for the purpose of examining the combined effects of autonomy support provided by parents and coaches on athletes' functioning. No prior publication using this dataset has looked at the role of need satisfaction and sport motivation as antecedents of team selection.

people in my sport”, $\alpha = .86$) and competence (e.g., “I feel like I am a competent athlete”, $\alpha = .84$) in sport. This scale has been used in past research with competitive youth soccer players and showed good reliability (Gaudreau et al., 2016; Verner-Filion & Vallerand, 2018). Items were rated using a scale ranging from 1 (*not at all agree*) to 7 (*very strongly agree*). Considering the moderately high inter-scale correlations in this sample and the good level of internal consistency of the aggregated score ($\alpha = .86$), all three needs were aggregated into a single indicator of need satisfaction (see Gaudreau et al., 2016; Verner-Filion et al., 2017, for a similar procedure).

Sport motivation. Players also completed a 15-items shortened version of the Sport Motivation Scale (Pelletier et al., 1995). This questionnaire assesses the reasons underlying players’ involvement in soccer. Using a scale ranging from 1 (*not at all agree*) to 7 (*very strongly agree*), athletes indicated whether they engaged in their sport out of amotivation, external, introjected, identified, or intrinsic motivation (3 items per subscales). Consistent with prior research in the sport domain (e.g., Amiot et al., 2004), scores of autonomous (i.e., intrinsic and identified motivation; $\alpha = .88$) and controlled (i.e., introjection, external, and amotivation; $\alpha = .91$) motivation were computed.

Selection for the team. After the completion of the six-month selection camp, coaches had to finalize their team composition for the provincial games. Coaches informed us about the identity of the players selected and not selected in the regional team.

Relative age. The month of birth of the players was transformed into quartiles (i.e., January to March; April to June; July to September; October to December). In our analyses, we tested whether players born in the first quartile of the calendar year are more likely to be selected on the team compared to other players (see Lemoyne et al., 2021 for a similar procedure).

Plan of Analyses

Prior to analyses, all variables included in the subsequent path analyses were examined for accuracy of data entry, missing data, and fit between their distributions and the assumptions underlying maximum likelihood procedures. From the initial 73 participants, six were either cut from the team or dropped out of the study before our first assessment. Of the remaining 67 participants, seven did not complete all the measures at Time 1 but were involved in the selection camp throughout the six-month period. To maximize the statistical power and minimize the loss of information, missing data for those seven participants were imputed using full information maximum likelihood estimator

Table I
Means, Standard Deviations, and Correlations Between all Variables (N = 67)

	M	SD	1	2	3	4	5	6	7	8
1. Need satisfaction	5.783	0.552	---							
2. Autonomy	5.436	0.856	.731**	---						
3. Relatedness	6.013	0.709	.736**	.271*	---					
4. Competence	5.899	0.712	.716**	.230†	.390**	---				
5. Autonomous motivation	5.144	1.195	.370**	.163	.241*	.426**	---			
6. Controlled motivation	2.650	1.172	.082	.128	-.134	.171	.499**	---		
7. Team selection	0.522	0.499	.243*	.061	.243*	.250*	.301*	.010	---	
8. Relative age	-0.159	0.643	-.245*	-.286*	-.162	-.065	.001	.050	-.236†	---
9. Year of birth	0.669	0.745	.015	.080	-.035	-.025	-.139	-.006	.136	-.085

Note. Team selection: not selected ($n = 35$) versus selected ($n = 32$) Relative age in quartiles: 1st quartile ($n = 27$) versus 2nd quartile ($n = 25$), 3rd quartile ($n = 13$), and 4th quartile ($n = 7$); one missing. Year of birth: 12th birthday ($n = 11$) versus 13th birthday ($n = 55$); one missing. † $p < .10$. * $p < .05$. ** $p < .01$.

(FIML). Estimates produced by FIML have been shown to produce significantly less bias compared to those generated by other missing data handling techniques such as listwise deletion and simple imputation (Enders, 2010).

The structural equation modeling analysis with a binary outcome (0 = not selected; 1 = selected) was conducted using Mplus 7.3 (Muthén & Muthén, 2012) to test the mediating role of sport motivation in the relation between need satisfaction and selection in the soccer team after a six-month training camp. No fit indices are available for this type of model because such a mediation model requires linking a continuous mediator and a binary outcome (Muthén et al., 2017, see chapter 8). The analyses were conducted using the MLR estimator, as it is more robust to potential deviations to normality. Indirect effects were tested using the Monte Carlo integration method with 95% bias-corrected confidence intervals (CIs) using the maximum likelihood procedure (ML) because such bootstrapping is unavailable using MLR estimation. We tested models without and with controlling for the relative age effect. The relative age variable was contrast coded to compare athletes born in the 1st quartile of the year (-1) to those born in the 2nd (0.33), 3rd (0.33), and 4th (0.33) quartiles of the year. U13 soccer contains minor players (the year of their 12th birthday; coded as -1) and major players (the year of their 13th birthday; coded as 1). This year of birth variable was also considered, but it did not substantially correlate with the team selection (see Table I) and was not included in our main analyses.

Results

MAIN ANALYSES

Descriptive statistics and correlations are presented in Table I. Results of the model without and with controlling for athletes' relative age are shown in Table II. In the first model (not controlling for relative age), need satisfaction had a significant total effect on team selection and was significantly associated with autonomous sport motivation. In return, autonomous sport motivation was significantly and positively related to team selection. Autonomous sport motivation significantly mediated the relationship between need satisfaction and team selection. As shown in Figure 1, the results of the second model (controlling for relative age) were very similar. However, the total effect of need satisfaction on team selection was no longer statistically significant. Yet, need satisfaction was related to sport motivation which, in turn, was positively associated with team selection. In both models, controlled sport motivation was unrelated to need satisfaction and team selection. The

Table II
 Mediation Results with Binary Outcome, Continuous Mediators, and Continuous Predictor Without and With Controlling for Relative Age Effect of Soccer Players

Effects	Without relative age			With relative age		
	Beta	S.E.	95% CI	Beta	S.E.	95% CI
Total effect						
Need satisfaction → Team selection	.312*	0.152	[.015, .610]	.235	0.165	[-.088, .557]
Direct effects						
Need satisfaction → Team selection	.171	0.148	[-.119, .461]	.079	0.157	[-.230, .387]
Need satisfaction → Autonomous motivation	.379**	0.142	[.101, .657]	.392**	0.153	[.093, .691]
Need satisfaction → Controlled motivation	.086	0.129	[-.166, .338]	.121	0.129	[-.133, .375]
Autonomous motivation → Team selection	.418**	0.154	[.117, .719]	.460**	0.151	[.163, .757]
Controlled motivation → Team selection	-.200	0.160	[-.513, .113]	-.200	0.157	[-.508, .108]
Relative age → Team selection	---	---	---	-.254†	0.137	[-.522, .013]
Relative age → Autonomous motivation	---	---	---	.088	0.115	[-.137, .313]
Relative age → Controlled motivation	---	---	---	.064	0.119	[-.170, .297]
Indirect effects						
Autonomous motivation	.159*	0.077	[.027, .337]	.180*	.092	[.023, .462]
Controlled motivation	-.017	0.028	[-.125, .024]	-.024	.032	[-.158, .019]
Variance explained R²						
Selection	.287			.323		
Autonomous motivation	.144			.162		
Controlled motivation	.007			.019		

Note. N = 67. Dependent variable is team selection coded as 0 = selected in team (n = 32) and 1 = not selected in team (n = 35). Beta = standardized beta. S.E. estimated with robust maximum likelihood. 95% CI of the indirect effects were estimated with biased corrected bootstrapping with maximum likelihood. ** p < .01. * p < .05. † p < .10.

proposed model accounted for a substantial portion of the variance in team selection (R² = .323). Overall, the results indicated that need satisfaction was indirectly while autonomous sport motivation was directly related to team selection after controlling for the relative age of youth soccer players.

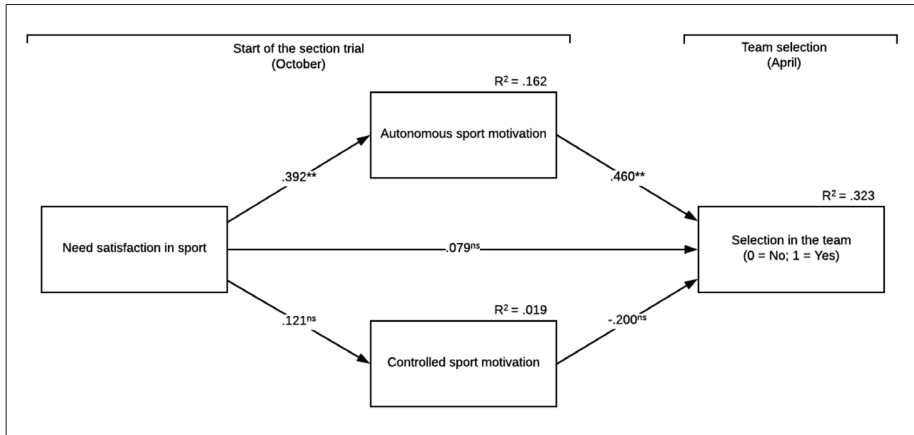


Fig. 1. - Final Model of the Relationship Involving Need Satisfaction, Sport Motivation, and Selection in the Final Team, Controlling for Athletes' Relative Age. Note. ^{ns} $p > .05$, * $p < .05$, ** $p < .01$.

ANCILLARY ANALYSES

Being in your second year as a U13 soccer (the year of your 13th birthday) is potentially advantageous but it was not significantly correlated with team selection ($r = .136$, $n = 66$, $p = .272$). We explored if the correlation between relative age and team selection could differ for the athletes playing their 2nd year and their 1st year of U13 soccer. Relative age was significantly correlated with team selection but only for the players in their 2nd year of U13 soccer ($r = -.266$, $p < .05$, $n = 55$ versus $r = .039$, $p = .756$, $n = 11$). This finding should be interpreted with extreme prudence because only eleven 1st year athletes took part in this selection camp, this analysis was unplanned (post hoc), and the statistical power to compare a .30 difference between two correlations would have been extremely low (power $< .25$)².

Discussion

Being selected or not into a competitive team or organization is a pivotal moment in the developmental and sporting trajectories of youth athletes. To

² Autonomous motivation still predicted team selection ($\beta = 0.50$, $p = .009$) in a model in which we included year of birth ($\beta = 0.316$, $p = .181$), relative age ($\beta = -.178$, $p = .607$), and their interaction ($\beta = -0.393$, $p = .251$).

this date, the likelihood of becoming a competitive athlete remains tainted by a relative age effect (e.g., Lemoyne et al., 2021) and little is known about the psychological factors that can help youth athletes being selected into competitive teams. To the best of our knowledge, our study was the first to examine whether the motivational characteristics of the players can be associated with team selection in soccer. In this study, we built upon the principles SDT and discovered that need satisfaction *indirectly* increased the likelihood of being selected into competitive soccer teams through its positive association with autonomous sport motivation. More precisely, when their basic psychological needs are satisfied at the beginning of the training camp, youth soccer players are more prone to engage in their sport out of pleasure and volition, while being in concordance with their sense of self. In return, playing soccer with such an autonomous sport motivation *directly* increased the likelihood of being selected for the team six months later. We also offered a stringent answer to this research question by statistically controlling for the relative age of the athletes. Our findings are important for sporting organizations as they indicate that the motivational characteristics of the players should be seriously considered in their model of talent identification and players' development.

IMPLICATIONS FOR IDENTIFICATION AND DEVELOPMENT OF TALENT IN SPORTS

In our study, the relative age and autonomous sport motivation of soccer players were both non-negligible factors related to team selection. This finding has practical implications because it shows that modifiable psychological characteristics should be part of a more holistic bio-psycho-social model of talent identification and team selection. Altogether, our findings depict a "bittersweet story". On the one hand, we show that among athletes with the same amount of autonomous motivation, the ones born between January and March are more likely to be selected on the team. Thus, youth athletes born later during the calendar year thus run the risk of being underestimated by selection committees. On the other hand, our results show that among soccer players with the same relative age, the ones with higher autonomous motivation are more likely to be selected on the team. Athletes who participate with a quality motivation (i.e., autonomous) can sufficiently impress the selection committee to make it on the teams; autonomous motivation should be seen as a *psychological equalizer* improving the probabilities of team selection over and above the effects of the constraints associated with RAE (Wattie et al., 2015). Specifically, our results suggest that deriving one's engagement in soccer out of fun and volition can help overcome some of the obstacles athletes born in the later part of the year regularly face due to their often-smaller phys-

ical stature compared to older athletes (i.e., individual constraints; Konarski et al., 2021; Unnithan et al., 2012). This disadvantage plays a pivotal role in physically-demanding competitive sports (i.e., tasks constraints; Smith et al., 2018). Our results thus show that fostering autonomous motivation in athletes might represent an interesting avenue to alleviate some of the negative effects associated with RAE, both in boys (e.g., Helsen et al., 2012; Lemoyne et al., 2021) and girls sports (e.g., Delorme et al., 2010; Smith et al., 2018). To that regard, researchers have shown that coaches and parents acting in an autonomy-supportive manner play an important role in the development and maintenance of autonomous motivation in youth athletes (Carpentier & Mageau, 2016; Gaudreau et al., 2016; Mageau & Vallerand, 2003).

The current results are also in line with recent research showing that need satisfaction is positively associated with both short-term (i.e., during a soccer tournament) and long-term (i.e., throughout the career of professional hockey players) performance in youth athletes (Verner-Filion et al., 2017). In addition to performance, researchers in the sport and educational domains have shown that need satisfaction and autonomous motivation are beneficial to perseverance and psychological well-being (e.g., Quedstedt et al., 2013; Verner-Filion & Vallerand, 2018). Altogether, those results suggest that more attention should be paid to the motivational characteristics of athletes to inform talent identification and the development of expertise and optimal functioning of youth athletes.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Our study was conducted with a small sample of soccer players from one administrative region. First, the small sample size limited the power to detect statistically significant effects. As such, the relative age effect did not reach statistical significance ($p > .05$) but was nonetheless interpretable ($p = .06$) and moderate in size. Second, our study was conducted in only one of the administrative regions of Qu  bec, Canada. Factors such as the enrollment, the length and format of the selection camps, the performance culture, the experience of the regional team coaching staff, and the pervasiveness of the relative age effect can largely differ across sporting associations. As such, future research could try to adopt a multilevel design (Gaudreau et al., 2020) to examine if the relative age and motivational effects reported in this study can replicate across within and between other sporting associations. Third, our sample was limited to soccer players in U13 soccer. Future work should investigate the role of the relative age and autonomous motivation in team selection across the athletes of

different age groups. Finally, the satisfaction of basic psychological needs was measured with regards to the athletes' involvement in soccer in general, rather than specifically to their participation in the selection camp. In the future, researchers could try to replicate the current findings using a context-specific assessment of athletes' need satisfaction within the selection camp (e.g., relatedness with the specific coaches and teammates involved in the selection camp). Despite these limitations, it is important to note that we voluntarily selected this sample of players because it allowed for the conditions in which they were evolving throughout the selection camp to be homogeneous (e.g., same coaching staff, same age, same level of expertise) to maximize the internal validity of the findings. Using a larger sample would have required to recruit other teams, with athletes from different teams training in different circumstances. Although beneficial to maximize statistical power and external validity, it would have also created difficulties in interpreting the results. It should also be noted that our sample contained 67 of the 73 (92%) male and female athletes who were invited to participate in the regional selection camp. Considering our longitudinal design and the parsimony of our model (e.g., only five variables), the sample size was deemed adequate and is comparable to similar studies in the field (e.g., Hartigh et al., 2018). However, future research should try to replicate the current findings with different populations to support their generalizability.

Finally, this study relied on a prospective correlational design in which causality cannot be inferred. Given our research question, it would have been premature to use an experimental design to intervene or manipulate the motivational variables under investigation. However, SDT proposes that coaches and sports programs can promote the satisfaction of psychological needs and the development/maintenance of autonomous sport motivation. In future applied research, psycho-educational prevention programs could be created to teach coaches and members of selection committees to integrate key motivational principles into their daily interactions with players (see Duda, 2013 for an example). This type of research is warranted to offer sporting organizations with novel evidence-based tools to facilitate the development of expertise among their youth athletes.

Conclusion

Overall, the current study builds upon past research on the identification of talent and athletic development of youth athletes by demonstrating the pivotal role of key motivational variables, namely need satisfaction and

autonomous sport motivation, in the selection process to competitive youth teams. Indeed, experiencing high levels of need satisfaction is conducive to autonomous sport motivation which, in turn, is positively related to the likelihood of being selected in a competitive youth team. In addition to other pivotal aspects of talent identification and athletic development in youth athletes (e.g., physical, tactical, technical skills), athletes' psychological and motivational characteristics are also important to consider to more thoroughly understand athletic performance. Thus, everyone involved in selecting and developing youth athletes in competitive sports should also try to promote environments that foster need satisfaction and autonomous sport motivation to give to all their players – not only those born during the 1st quartile of the calendar year – the fairest and best possible chances of developing their expertise within sports in the best conditions and for as long as possible.

REFERENCES

- Amiot, C. E., Gaudreau, P., & Blanchard, C. M. (2004). Self-determination, coping, and goal attainment in sport. *Journal of Sport and Exercise Psychology*, 26(3), 396-411. <https://doi.org/10.1123/jsep.26.3.396>
- Burgess, D. J., & Naughton, G. A. (2010). Talent development in adolescent team sports: A review. *International Journal of Sports Physiology and Performance*, 5, 103-116. <https://doi.org/10.1123/ijsp.5.1.103>
- Carpentier, J., & Mageau, G. A. (2016). Predicting sport experience during training: The role of change-oriented feedback in athletes' motivation, self-confidence and needs satisfaction fluctuations. *Journal of Sport and Exercise Psychology*, 38, 45-58. <https://doi.org/http://dx.doi.org/10.1123/jsep.2015-0210>
- Cerasoli, C. P., Nicklin, J. M., & Nassrelrgawi, A. S. (2016). Performance, incentives, and needs for autonomy, competence, and relatedness: a meta-analysis. *Motivation and Emotion*, 40, 781-813. <https://doi.org/10.1007/s11031-016-9578-2>
- Cobley, S., Baker, J., Wattie, N., & McKenna, J. (2009). Annual age-grouping and athlete development. *Sports Medicine*, 39, 235-256. <https://doi.org/10.2165/00007256-200939030-00005>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Academic press.
- Delorme, N., Boich  , J., & Raspaud, M. (2010). Relative age effect in female sport: A diachronic examination of soccer players. *Scandinavian Journal of Medicine and Science in Sports*, 20, 509-515. <https://doi.org/10.1111/j.1600-0838.2009.00979.x>
- Duda, J. L. (2013). The conceptual and empirical foundations of Empowering CoachingTM: Setting the stage for the PAPA project. *International Journal of Sport and Exercise Psychology*, 11, 311-318. <https://doi.org/10.1080/1612197X.2013.839414>
- Enders, C. K. (2010). *Applied missing data analysis*. Guilford Press.
- Farrow, D., Baker, J., & MacMahon, C. (2013). *Developing sport expertise: Researchers and coaches put theory into practice*. Routledge.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149-1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Furley, P., & Memmert, D. (2016). Coaches' implicit associations between size and giftedness:

- implications for the relative age effect. *Journal of Sports Sciences*, 34, 459-466. <https://doi.org/10.1080/02640414.2015.1061198>
- Gaudreau, P., Morinville, A., Gareau, A., Verner-Filion, J., Green-Demers, I., & Franche, V. (2016). Autonomy support from parents and coaches: Synergistic or compensatory effects on sport-related outcomes of adolescent-athletes? *Psychology of Sport and Exercise*, 25, 89-99. <https://doi.org/10.1016/j.psychsport.2016.04.006>
- Gaudreau, P., Schellenberg, B., & Gareau, A. (2020). Multilevel designs and modeling in sport and exercise psychology: Riding the current wave and looking beyond at the horizon. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of Sport Psychology* (4th ed., pp. 1074-1096). Wiley.
- Hartigh, R. J. R. Den, Steen, S. Van Der, Hakvoort, B., Wouter, G. P., Lemmink, K., & Wouter, G. (2018). Differences in game reading between selected and non-selected youth soccer players. *Journal of Sports Sciences*, 36, 422-428. <https://doi.org/10.1080/02640414.2017.1313442>
- Helsen, W. F., Baker, J., Michiels, S., Schorer, J., van Winckel, J., & Williams, A. M. (2012). The relative age effect in European professional soccer: Did ten years of research make any difference? *Journal of Sports Sciences*, 30, 1665-1671. <https://doi.org/10.1080/02640414.2012.721929>
- Helsen, W. F., Van Winckel, J., & Williams, A. M. (2005). The relative age effect in youth soccer across Europe. *Journal of Sports Sciences*, 23, 629-636. <https://doi.org/10.1080/02640410400021310>
- Jackson, R. C., & Comber, G. (2020). Hill on a mountaintop: A longitudinal and cross-sectional analysis of the relative age effect in competitive youth football. *Journal of Sports Sciences*, 38, 1352-1358. <https://doi.org/10.1080/02640414.2019.1706830>
- Konarski, J. M., Krzykała, M., Skrzypczak, M., Nowakowska, M., Coelho-E-Silva, M. J., Cumming, S. P., & Malina, R. M. (2021). Characteristics of select and non-select U15 male soccer players. *Biology of Sport*, 38(4), 535-544. <https://doi.org/10.5114/biol-sport.2021.101126>
- Lemoyne, J., Huard Pelletier, V., Trudeau, F., & Grondin, S. (2021). Relative age effect in canadian hockey: Prevalence, perceived competence and performance. *Frontiers in Sports and Active Living*, 3. <https://doi.org/10.3389/fspor.2021.622590>
- Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21, 883-904. <https://doi.org/10.1080/0264041031000140374>
- Muthén, B. O., Muthén, L. K., & Asparouhov, T. (2017). *Regression and mediation analysis using Mplus*. Los Angeles, CA: Muthén & Muthén.
- Muthén, L. K., & Muthén, B. O. (2012). *MPlus. The comprehensive modeling program for applied researchers: User's guide* (7th ed.).
- Pelletier, L. G., Tuson, K. M., Fortier, M. S., Vallerand, R. J., Brière, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology*, 17, 35-53. <https://doi.org/10.1123/jsep.17.1.35>
- Quested, E., Ntoumanis, N., Viladrich, C., Haug, E., Ommundsen, Y., Van Hoye, A., Mercé, J., Hall, H. K., Zourbanos, N., & Duda, J. L. (2013). Intentions to drop-out of youth soccer: A test of the basic needs theory among European youth from five countries. *International Journal of Sport and Exercise Psychology*, 11, 37-41. <https://doi.org/10.1080/1612197X.2013.830431>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford.
- Smith, K. L., Weir, P. L., Till, K., Romann, M., & Copley, S. (2018). Relative age effects across and within female sport contexts: A systematic review and meta-analysis. *Sports Medicine*, 48(6), 1451-1478. <https://doi.org/10.1007/s40279-018-0890-8>

- Unnithan, V., White, J., Georgiou, A., Iga, J., & Drust, B. (2012). Talent identification in youth soccer. *Journal of Sports Sciences*, *30*(15), 1719-1726. <https://doi.org/10.1080/02640414.2012.731515>
- Verner-Filion, J., & Vallerand, R. J. (2018). A longitudinal examination of elite youth soccer players: The role of passion and basic need satisfaction in athletes' optimal functioning. *Psychology of Sport and Exercise*, *39*, 20-28. <https://doi.org/10.1016/j.psychsport.2018.07.005>
- Verner-Filion, J., Vallerand, R. J., Amiot, C. E., & Mocanu, I. (2017). The two roads from passion to sport performance and psychological well-being: The mediating role of need satisfaction, deliberate practice, and achievement goals. *Psychology of Sport and Exercise*, *30*, 19-29. <https://doi.org/10.1016/j.psychsport.2017.01.009>
- Wattie, N., Schorer, J., & Baker, J. (2015). The relative age effect in sport: A developmental systems model. *Sports Medicine*, *45*, 83-94. <https://doi.org/10.1007/s40279-014-0248-9>
- Williams, A. M., & Reilly, T. (2000). Talent identification and development in soccer. *Journal of Sports Sciences*, *18*(9), 657-667. <https://doi.org/10.1080/02640410050120041>