

MISS HEIDI MARIAN HARALDSEN (Orcid ID : 0000-0002-5987-6651)

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Change in Basic Need Frustration in Relation to Perfectionism, Anxiety and Performance in Elite Junior Performers

Heidi M. Haraldsen,^{1,3} Bård Erlend Solstad,^{1,3} Andreas Ivarsson⁴, Hallgeir Halvari,^{1,2} & Frank E. Abrahamsen¹.

Author note

¹Department of Coaching and Psychology, Norwegian School of Sport Sciences, Oslo, Norway.

²Department of Business, Marketing and Law, University of South-Eastern Norway, Hønefoss, Norway.

³Norwegian Research Centre of Children and Youth Sports, Oslo, Norway.

⁴School of Health and Welfare, Halmstad University, Halmstad, Sweden.

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Correspondence concerning this article should be addressed to Heidi M. Haraldsen, Department of Coaching and Psychology, Norwegian School of Sport Sciences, Postboks 4014 Ullevål stadion, 0806 Oslo, Norway. Email: heidi.haraldsen@nih.no

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Abstract

The present study examined if there were different growth profiles in basic needs frustration in elite junior performers over a nine months period. Subsequently, we examined if the identified growth profiles differed in their levels of perfectionistic strivings and evaluative concerns measured at baseline, and additionally, whether they were associated with higher or lower levels of anxiety and perceived performance level in the end of the period. A sample of 259 ($M_{\text{age}} = 17.31$; $SD_{\text{age}} = .97$) elite junior performers from sports and performing arts completed an online questionnaire to report their self-ratings of the study variables. The analyses were conducted using growth mixture modelling in Mplus 8.0. Two main contrasting growth profiles were identified in each of the basic needs frustration. Perfectionistic strivings were overall higher than evaluative concerns, but did not differ between the growth profiles. Conversely, evaluative concerns differed significantly between the identified growth profiles. Higher levels of evaluative concerns were associated with the most maladaptive growth profiles. Indeed, elite junior performers who experienced moderate and increasing levels of competence and autonomy frustration, reported higher levels of anxiety and lower levels of perceived performance level than those who reported low and decreasing levels of competence and autonomy frustration. Based on these findings, evaluative concerns and basic needs frustration appear to play key roles in the development of maladaptive motivational processes over time.

Keywords: Basic psychological needs, Growth Mixture Modelling, Perfectionism, Self-determination theory, Talent development

Introduction

Reaching the top in sports and performing arts can be hard and stressful [1-3]. The motivational mechanisms of the basic psychological needs [4] might over time underpin why some elite junior performers survive and thrive, despite adversity, and why others experience ill-being and diminished functioning [5-7]. Both personal and contextual factors are found to influence the motivational functioning of elite junior performers [8-10]. Yet, few studies based on self-determination theory (SDT) have investigated personal factors [4], even though they are likely to influence the perception of and reaction to environmental requests and demands, thereby influencing the satisfaction or frustration of the three basic psychological needs [11-13]. Hence, the purpose of the present longitudinal cohort study was to examine the role of perfectionism and basic needs frustration [6, 11] in the development of maladaptive motivational processes over time.

Basic Need Frustration and Perfectionism

According to SDT, autonomy, competence, and relatedness are basic psychological needs for optimal functioning and thriving [7]. SDT postulates that persistent deprivation of any of the aforementioned psychological needs has costs for personal growth and well-being [4, 7]. There are two key issues in this regard. First, there is a distinct difference between the lack of fulfilment (i.e., low levels of satisfaction) and experienced basic need frustration [14, 15]. When experiencing need frustration, the basic needs are likely to manifest in feelings of inferiority and failure (competence need frustration), pressure and manipulation (autonomy need frustration), and distance and isolation (relatedness need frustration) [7]. These outcomes may be missing when levels of satisfaction are low, as opposed to frustrated. Second, although a large number of studies have examined composite measures of basic needs satisfaction or frustration, studies have shown that people experience differing levels of each of the three basic psychological needs [16-18]. Therefore, in order to study this process effectively, researchers must examine frustration (or satisfaction) of each need separately. Past research in sports and performing arts support this approach [17-19].

Perfectionism may be one personal factor associated with psychological needs frustration. Perfectionism is viewed as a multidimensional personality trait or disposition, which is likely to influence motivational functioning in unique ways [9, 20]. Moreover, it is claimed to be paradoxical, energize a strong motivational force (i.e., dedication, effort, and persistence), yet,

might also nurture debilitating patterns of cognition, emotion, and behaviour [21-23]. More specifically, perfectionistic strivings (PS), which are associated with the setting of excessively high standards for performance, represent self-directed dimensions of perfectionism. Conversely, evaluative concerns (EC), which are socially derived, reflects negative reactions to mistakes, the interpretation of mistakes as equivalent to failure, and the belief that one will lose the respect of others after failure [23-25]. Hence, the different dimensions of perfectionism might be important indicators of how elite junior performers give meaning to and act upon demanding performance tasks [26, 27].

EC are likely to undermine the three basic psychological needs, because EC is related to an overcritical self-evaluation (i.e., frustration of competence), being externally driven and rigid (i.e., frustration of autonomy), and social inflexible (i.e., frustration of relatedness) [6, 23, 28]. EC are also associated with insufficient coping strategies (i.e., threat appraisal and avoidance coping) [29] and being less resilient when faced with adversity [26, 27, 30]. Previous research has shown associations between socially derived dimensions of perfectionism, such as EC, and a range of maladaptive and unhealthy outcomes including basic need frustration [6, 11], anxiety [31], and decreasing performance development [32]. This is a paradox, as growth-oriented functioning, despite strain, is essential to thrive and succeed as an elite performer [33, 34]. In contrast, self-directed forms of perfectionism, such as PS, have shown to be ambiguously (i.e., positively, negatively, and unrelated) associated with similar abovementioned outcomes [6, 11, 30-32]. Additionally, PS have been found to relate to behavioural approach tendencies (i.e., approach goals and problem-focused coping strategies) and psychological adjustment [20, 27, 30] that are proposed to be a sign of self-determined and growth oriented behaviour [5, 13, 20, 35]. Based on past research, PS and EC therefore seem to represent distinct relations to basic needs frustration [6, 11, 35].

Anxiety and Perceived Performance Level

Two relevant outcomes of the maladaptive motivational process, at odds with the ultimate goal of reaching the top, are (higher) anxiety and (lower) perceived performance. Specifically, anxiety is a stress related phenomena that reflects a perceived imbalance between requests and competence, likely to be aroused in stressful and pressurized TDEs [36, 37]. Anxiety comprises somatic dimensions (i.e., increased heart rate, muscle tensions) and cognitive dimensions (i.e., worry, catastrophizing, and negative self-talk) [29, 37-39]. The latter, linked to both EC [24, 38]

and basic need frustration [7], has been found to most strongly influence elite performers, unanimously interpreted as debilitating to performance development [36, 40].

Perceived performance level reflects the performers' overall subjective judgments of their normative performance level relative to their age group [41]. The distinct ways performers' perceived their performance status and outlooks, are likely to affect their psychological adjustment (i.e., emotional, cognitive, and behavioural responses) when faced with exposed situations [29, 32, 41]. Hence, how elite junior performers perceive their performance status within TDEs that compare, scrutinize, and assess performance at a daily basis [32, 38], is indeed of psychological importance. Hence, when elite junior performers experience basic needs frustration, and thus, lack a growth-oriented behaviour to encounter the stressful and pressurized performance situation, increased anxiety and hampered performance development are more likely to occur [13, 29, 42].

The Present Study

Set within Norwegian TDEs from sports and performing arts, the present study examined the role of perfectionism and basic need frustration in relation to two indicators of an experienced maladaptive motivational process; namely, anxiety and perceived performance. We tested if change in basic needs frustration played an underpinning role in maladaptive motivational processes, and if PS and EC, related differently, to unique change patterns of basic needs frustration. Finally, we examined how change in basic needs frustration would influence anxiety and perceived performance level. Hence, the present study asked the following three research questions:

1. Can unique growth profiles of elite junior performers' change in basic needs frustration be identified over a period of nine months?
2. Are there group differences between the identified growth curve profiles in PS and EC at baseline?
3. Are there differences between the identified growth profiles in relation to anxiety and perceived performance level at the end of the nine-month period?

Methods

Participants and Procedure

A sample of $N = 259$ (137 boys; 122 girls; $M_{age} = 17.31$; $SD_{age} = .97$) high-achieving Norwegian elite junior performers from sports and performing arts participated. They were purposefully recruited based on two inclusion criteria: (a) high-achieving performers within top 20% of their age group in their activity; and (b) selected to and attending junior talent

development (TD) schools parallel to upper secondary school. They came from individual sports ($n = 188$; swimming, rowing, athletics, skating, cross-country skiing, biathlon, and alpine skiing), and performing arts ($n = 71$; classical music and ballet). Within the arts, the TD programs were run by specialized art universities. The national sports federations operated the TD programs in sport. Participants spent at average 21.10 ($SD = 7.50$) hours on their activity each week, and had 9.09 ($SD = 3.40$) years of previous experience in deliberate practice in their activity. The study gained an overall response rate of 77.73%. There were some dropouts and while 138 (53%) completed all three time-points, 74 (29%) completed two time-points, and 47 (18%) completed only one time-point.

We recruited performers through sport federations and leaders of TD programs. Participants consented to participate voluntarily, after receiving oral and/or written information about the participation in line with the Helsinki declaration. The Norwegian Center for Research Data gave ethical approval upfront. SurveyXACT, a digital survey tool, was used to collect data. The first author traveled to collect data directly in separate activity groups and monitored that the data collection was in line with research ethics. However, some participants replied at home due the lack of scheduled team practice or to absence. The data was transferred to IBM Statistics SPSS 24.0 and then to *Mplus* version 8.3 for analyses.

Measures

All measures are domain-based adapted versions on Norwegian versions, based on translated (i.e., translation, back-translation and adjustment), and contextualized (i.e., instructional “tagging” and item-level adaption) original questionnaires [43]. Finally, two former TD performers piloted the questionnaires and delivered useful feedback on its contextualized delivery.

Perfectionism. The Frost Multidimensional Perfectionism Scale –Brief (F-MPS-brief), 8 items from two sub-scales, was used [24, 25]. The subscale of perfectionistic strivings (four items; e.g., “In my activity, I set higher standards for myself than most people”) assessed self-directed dimensions of perfectionism. Dimensions of EC were measured with the subscales of evaluative concerns (four items; e.g., “If I fail in my activity, I feel like a failure as a person”). A 7-point Likert scale from 1 (*totally disagree*) to 7 (*totally agree*) was used. The F-MPS-brief has been validated in several studies, and has shown acceptable reliability and validity [25].

Competence need frustration. The Basic Psychological Need Satisfaction and Frustration Scale [44], was adapted to measure basic need frustration. Four items captured need frustration for each of competence (e.g., “I feel insecure regarding my ability to master my activity”), autonomy

(e.g., “Most of the things I do feel like 'I have to’”), and relatedness (e.g., “I feel the relationships I have are just superficial”). The subscales were measured on a 7-point Likert scale from 1 (*totally disagree*) to 7 (*totally agree*). This scale has been validated and assessed across contexts and cultures [45].

Anxiety. To measure anxiety experienced in performance settings a version of the Sport Anxiety Scale (SAS; [39]) was adopted. We used the two subscales of somatic anxiety (nine items; e.g., “My stomach feels upset”) and worry (seven items; e.g., “I am concerned about choking under pressure”). The Norwegian version of the instrument (SAS-N) has demonstrated adequate validation [45]. The answers were marked on a 5-point Likert scale ranging from score 1 (*never*) to 5 (*each time*).

Perceived performance level. The perceived performance level was developed by the researchers. The elite junior performers were asked to rate their performance level relative to their age group in their activity on a scale between 1 (*at the lowest performance level*), 2 (*below the average performance level*), 3 (*average performance level*), 4 (*above the average performance level*), and 5 (*at the highest performance level*). They were told to use national ranking (sport performers), grades, and assessments from teachers/coaches (art performers) to guide their performance evaluation.

Data Analytical Strategies

Initial screening and descriptive analyses were performed using SPSS version 24. We examined missing data for significant differences using a t-test, while the FIML strategy handled the missing data in *Mplus* 8.0 [46, 47]. To validate the overall measurement model of included study variables, we performed alpha reliability, measurement invariance analysis (MI), and confirmatory factor analyses (CFA). To evaluate the model we applied several fit indices such as the chi-square test supplemented by the relative chi-square test that is less sensitive to sample size than the chi-square test [48]. Additionally, we used the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residuals, and the SRMR [48]. An acceptable fit was established by non-significant p-value ($> .05$) or $\chi^2/df < 2$, CFI values of .90 or above, RMSEA values of .08 or below, and SRMR values of .08 or below [47]. MI is claimed acceptable if change in the CFI of $< .01$, changes in RMSEA of $< .015$, and the SRMR values of $< .015$ are confirmed [48].

The concept of change included in longitudinal data is often studied using variable-based analysis [49]. In recent years, however, person-centred analytical approaches have gained

increased interest as they are flexible and provide investigation of both inter- and intra-individual variability, and might test both predictors and outcomes of growth profiles over time [50]. Hence, for the main analyses, we performed growth mixture modelling (GMM) in *Mplus* [51]. To reach sufficient statistical power [51], we used manifest variables and tested three separate models; one model of each of the three basic psychological needs. We used three time-points, measured in 3-month interval from October to June within a school-year season, to estimate the growth curves. Subgroups of growth curves in each basic need frustration were probabilistically assigned to growth profiles based on each participant's own estimated intercept (start value at time 0) and slope (rate of average change from T1-T2-T3) [50]. Posterior profile probabilities were estimated to define each participant's profile fit [52]. Specifically, participants were classified into profiles in which the probability of their belonging was the highest. We ran a sequence of nested models, starting with one profile, to examine whether the more complex models provided a better fit to the data than the more parsimonious ones.

We used several different statistical fit indices [52]. First, the Bayesian Information Criterion (BIC [53]) and the Sample Size Adjusted BIC (SSA-BIC [54]) were inspected. Lower values indicate a better model fit for both of these indices. Second, entropy values were inspected. Higher entropy is related to a better separation between classes [55]. Third, the adjusted Lo-Mendell-Rubin test (LMR [56]) and the bootstrap likelihood ratio test (BLRT [57]) were used. On both of these tests, a statistically significant result ($p < .05$) indicates that the more complex model has a better fit for data in comparison to the more parsimonious one. Deciding on the number of growth profiles can be difficult, and the substantive meaning, the fit indices of each solution, and parsimony all need to be considered [50].

To test if the identified growth profiles differed in the predictor variables (measured at baseline) and the outcome variables (measured at Time 3), we used the 3-step approach [57]. The procedure consists of an overall test of associations by the use of Wald's test accompanied by pairwise profile comparison. In the present study, $p < .05$ was considered to be statistically significant. Moreover, independent means Cohen's d effect size of small (0.20-0.49), medium (0.50-0.79), and large (> 0.80) effects was calculated for all comparisons of mean differences. We used the BCH method for the continuous outcome variables, while the DCAT method was used for the dichotomous ones [58]. The dichotomous variables tested were domain (sport vs. art) and gender (male vs. female).

Results

Preliminary Analyses

The data was screened prior to the analyses to assess the magnitude of missing data. Missing data were moderate (23.51%) ranging between 16.7-18.3% (Time 1), 18.3-22.0% (Time 2), and 28.4-32.3 (Time 3). The *t*-tests results showed no statistically significant differences between the participants who completed the questionnaires at all time-points and those who did not (Cohen's *d* ranged between 0.08 and 0.05). CFA's of each study variable, as well as an overall CFA comprising all the study variables¹ in each model showed acceptable fit to the data: (a) Autonomy frustration; (χ^2 (309df) = 350.69, $p = .05$, $\chi^2/df = 1.1$, CFI = .98, SRMR = .06, RMSEA = .02, CI 90% [.000-.034]), (B) Competence frustration; (χ^2 (237df) = 444.79, $p = .00$, $\chi^2/df = 1.9$, CFI = .90, SRMR = .08, RMSEA = .06, CI 90% [.050-.066]), and (c) relatedness frustration; (χ^2 (309df) = 449.95, $p = .00$, $\chi^2/df = 1.5$, CFI = .94, SRMR = .06, RMSEA = .04, CI 90% [.033-.050]). Note also that the reliability estimates ranged from $\alpha = .72$ -.91. The initial assessment of the measurement equivalence of each of the three basic needs frustration across the three time-waves showed that the growth curve variables were invariant over time. Descriptive statistics are presented in Table 1.

Main Growth Mixture Modelling Analyses (GMM)

The fit indices of the different models are presented in Table 2. The model fit indices supported several profile solutions. The final 2 profile solution in each model was chosen because all profiles was robust ($n > 25$) and theoretically meaningful [50]. In the 3 profiles solutions for all models a very small profile (n ranging from 5-11) were identified. The GMM analysis identified two main opposite profiles in each basic need model, as presented in Table 3. They were as follow: competence need frustration, (1) low and decreasing ($n = 158$, 61%) and (2) moderate and increasing ($n = 101$, 39%); autonomy need frustration, (1) moderate and increasing ($n = 64$, 25%) and (2) low and decreasing ($n = 195$, 75%); relatedness need frustration, (1) high and decreasing ($n = 28$, 11%) and (2) low and increasing ($n = 231$, 89%). All growth curves (i.e., slopes) for each of the identified profiles reflected a significant change factor ($p < .05$) over the period of nine months, except the slope of profile 1 in the model with autonomy frustration (slope = .20, $p = .22$; see Table 3)².

¹ See supplemental material for details concerning preliminary validation procedure, the final chosen measurement model, and measurement invariance results of the growth curve variables.

² This non-significant results are likely due to low statistical power [51] in this profile ($n = 64$), as the strength of the slope 0.20 are higher than the significant slope of profile 2 in competence frustration (0.19), however that profile had higher power ($n = 101$). See Table 3 for more details on the intercepts levels and slope effects.

Subsequent tests of mean differences between the distinct growth profiles in each basic need showed that PS did not differ between each of the identified profiles. Conversely, EC differed significantly between the identified profiles of each basic need frustration, respectively (see Table 3 and 4). Higher levels of EC was associated with the most maladaptive growth curve profiles.

The reported mean values of the predicted outcomes of anxiety and perceived performance level at Time 3 differed significantly between the identified growth curve profiles in frustration of competence and autonomy (see Table 3 and 4). In contrast, the two outcomes did not differ significantly between the growth curves in frustration of relatedness. Specifically, elite junior performers, who were distributed in the growth profiles of moderate to high levels of increasing competence and autonomy frustration, reported statistically significant higher levels of anxiety and lower levels of perceived performance than those who reported low and decreasing frustration of competence and autonomy.

The findings also showed that sports performers had statistically more probability to belong to the low and decreasing profiles in frustration of competence and autonomy (see Table 3 and 4), than the performing arts performers. In terms of gender, did significantly profile differences emerge only in the model of competence frustration, showing that boys were more likely to be distributed in the low and decreasing growth profile than girls. The independent means Cohens d effect size of the significant differences were moderate to large (ranging from Cohen's $d = 0.40$ to 1.11) as reported in Table 4.

Discussion

Set within stressful and pressurized TDEs in sports and performing arts, the present study examined the role of perfectionism and basic need frustration in maladaptive developmental motivational processes. In line with the three outlined research questions, the discussion starts by reflecting on the characteristics of the identified growth profiles of change in basic need frustration. Next, we discuss how PS and EC differed between the identified growth profiles. Lastly, we reflect on how the different growth profiles differed with respect to anxiety and perceived performance level.

Change in Basic Need Frustration and Perfectionism

The typical Norwegian elite junior performer experiences low, but changing levels of basic needs frustration. However, a smaller sub-group seemed to be operating within reverse and more maladaptive motivational processes than the majority of elite junior performers. Specifically,

competence frustration seemed to be especially at risk, as about 4 out of 10 elite junior performers were distributed in the most maladaptive growth profile. With respect to autonomy frustration, 1 out of 4 performers belonged to the maladaptive growth profile. However, as the distribution within relatedness frustration showed that only 1 out of 10 elite junior performers' experienced high levels of relatedness frustration, the need for relatedness seemed to be less exposed in this sample of elite junior performers.

The perfectionism dimensions of PS and EC showed diverse relationships with the identified growth profiles. PS showed overall higher levels than EC in all of the growth profiles, and did not differ noticeably between the different growth profiles. Overall, this PS dominated result indicate that extreme dedication and relentless pursuit for high standards are quite common within these groups of elite junior performers. Moreover, PS seemed to co-occur with different levels of EC, which theoretically is socially derived and entails conditional self-worth [22, 58]. When displaying a combined PS and EC perfectionism score, the extreme striving for PS seemed to be underpinned by conditional regard, and take a more rigid and more obsessive form than pure self-directed PS (i.e., high PS, low PC) [22, 30, 58]. This notion was supported by the bivariate correlations, which showed positive associations between PS and EC, and additionally, between PS and each basic need frustration. Previous person-centred studies of perfectionism in sport and performing arts have demonstrated similar findings, highlighting the importance of distinguishing between the levels of self-directed and socially derived underpinnings of perfectionism [9, 58, 59].

EC differed significantly between the different growth profiles in each of the three basic need frustration models, indicating that higher levels of EC were associated with higher levels of each basic need frustration. These finding are in line with previous research, which have consistently found EC to be associated with maladaptive motivational processes [22, 27, 35]. One plausible explanation of the occurred relationship between EC and each basic need frustration is the biased mind-set of EC, which in turn influence the perception of and reaction to environmental requests [60]. The way EC relates to performance evaluations (i.e., self-critical and devalue) may negatively influence the need for competence. Moreover, the need for competence might also be frustrated by the way the EC mind-set monitors for critique and disapproval in feedback from others, and thus, further nurture feelings of inferiority and low self-worth [59]. In turn, these feelings of imperfection might influence interpersonal relations by a decrease in social status [61], and subsequently, frustrate the need for relatedness [62, 63]. In addition, as EC are linked to controlled, rigid, and neurotic behavioural regulations, EC might additionally nurture autonomy

and relatedness frustration [12, 64]. Lastly, the lack of adaptive coping strategies to encounter stress and adversity, which have been found associated with EC might also contribute to escalation in each basic need frustration over time [27]. An escalation, which in the present findings seemingly is reflected in the maladaptive growth profiles of competence and autonomy frustration, which demonstrated to be increasing in a reinforcing maladaptive motivational cycle.

Change in Basic Need Frustration in Relation to Anxiety and Perceived Performance

When examining how the growth profiles differed with respect to mean levels of anxiety and perceived performance level at the end of the nine month period, some clear patterns emerged. First, there were no statistically significant differences in the two outcomes in the two growth profiles of relatedness frustration. This finding might relate to the decreasing tendency in the change curve, despite high intercept levels. However, it might also reflect that social relations, when driven by more rigid and obsessive forms of perfectionism (visible in the profiles with moderate levels of EC), are not valued as having high importance to this elite junior sample [63, 65]. Thus, relatedness frustration seemed to have no influence on the performers' levels of anxiety and perceived performance level.

Conversely, there were significant differences between the growth profiles (i.e., competence and autonomy frustration) in relation to the outlined outcomes. The results showed that the subgroups of higher and increasing competence and autonomy frustration reported significantly higher levels of anxiety and lower levels of perceived performance compared with those who reported low and decreasing competence and autonomy frustration. These findings are in line with previous research, which has supported the notion that people who are externally driven, experiencing conditional self-worth, and social isolation, interpret their situations as less controllable, more stressful, and more threatening [13, 29, 42]. Additionally, the vulnerability associated with a mixed perfectionism profile [58, 66] is likely to be triggered within performance-oriented TDEs (i.e., high expectations, competitive, and external feedback [12, 67, 68]). Furthermore, when experiencing basic needs frustration, a heightened need to be resilient in order to encounter the maladaptive situation appears. As a paradox, research based on the SDT framework has highlighted that when less self-determined, the ability to negotiate stress and adversity to engage in resilience and restoration processes are hampered [5, 7, 69]. Altogether, the above factors seem to trap the vulnerable and exposed elite junior performers, which experience moderate and increasing frustration of autonomy and competence, into a maladaptive motivational process [36, 40, 67]. Instead of reaching perfection and enhance their performances, maladaptive

patterns of cognition (i.e., harsh self-critique, inferiority, shame, and fear of failure) seem to be nurtured, thereby bringing about diminished growth, increased levels of anxiety, and non-optimal performance development [11, 31, 32].

Domain and Gender Differences in the Development of Basic Need Frustration

Findings also showed some interesting results in distribution of domain and gender within the different growth profiles. With respect to gender, there were only differences in competence frustration. As females were more likely to belong to the maladaptive growth profiles than the males were, the findings aligned with other studies that has identified gender differences in relation to perceived competence and fear of failure [70-72]. In regards to domain, differences emerged in both competence and autonomy frustration, as the performing arts performers were more likely to belong to the maladaptive growth profiles compared to the sport performers. This finding might relate to the Nordic sport model, as it is founded on egalitarian values and known to promote broad participation, late specialization, and holistic development approaches [73]. Conversely, the performing art context is associated with more authoritarian apprenticeship cultures known to facilitate early specialization, teacher led activities, and involve asymmetric power relations [74, 75].

Limitations

One potential limitation was the proportion of missing data, which might create less robust estimates and reduce statistical power [47]. We established that the missing were completely at random and used robust imputation methods to meet some of these challenges. However, as a result of reduced power the analyses were performed with manifested defined factors instead of latent factors, missing out on the advantage linked to modelling latent factors [76]. The reliance on self-report data might have validity issues due to biased interpretation and socially desirability [77]. In addition, the use of a self-reported perceived performance variable might be another limitation; however, we argue that the way performers perceive and interpret their performance processes are of psychological importance in relation to maladaptive motivational processes [38, 41]. Their perceptions will affect their cognitive, emotional, and behavioural responses to their situation, which over time are likely to affect their performance development [71, 78].

Perspectives

In line with the SDT framework, the present study demonstrated that basic need frustration plays a key role in the elite junior performers' maladaptive motivational processes [4]. Moreover, the results concerning each basic need frustration, supported previous suggestions of the

importance of examining and assessing the unique contribution of each basic need, separately [16, 17]. Finally, the unique findings of distinct growth profiles highlighted the importance of examining both inter- and intra- individual variability when examining how personal characteristics interact with environmental requests and relate to change in human functioning [49, 79].

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Table 1*The estimated Correlation Matrix for the Study Variable and the ANOVA F-value for Domain and Gender*

Variable	M (DS)	α	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Evaluative Concern _{T1}	3.07 (1.36)	0.79	-												
2. Perfectionistic Striving _{T1}	4.84 (1.16)	0.71	.39**	-											
3. Frustration competence _{T1}	2.65 (1.28)	0.76	.48**	.06	-										
4. Frustration competence _{T2}	2.54 (1.21)	0.77	.54**	.02	.66**	-									
5. Frustration competence _{T3}	2.57 (1.29)	0.78	.55**	.19*	.63**	.63***	-								
6. Frustration autonomy _{T1}	2.55 (1.22)	0.84	.41**	.11	.50**	.45**	.49**	-							
7. Frustration autonomy _{T2}	2.48 (1.14)	0.84	.43**	.14	.45**	.64**	.47**	.65**	-						
8. Frustration autonomy _{T3}	2.35 (1.21)	0.88	.38**	.14	.36**	.43**	.60**	.67**	.65**	-					
9. Frustration relatedness _{T1}	2.23 (1.22)	0.84	.40**	.07	.48**	.44**	.40**	.57**	.48**	.44**	-				
10. Frustration relatedness _{T2}	2.20 (1.15)	0.85	.43**	.13	.40**	.55**	.37**	.46**	.57**	.48**	.71**	-			
11. Frustration relatedness _{T3}	2.23 (1.15)	0.82	.40**	.14	.39**	.47**	.56**	.51**	.56**	.60**	.68**	.74**	-		
12. Anxiety_worry _{T3}	2.60 (0.94)	0.91	.42**	.05	.40**	.48**	.53**	.35**	.40**	.45**	.16	.20*	.28**	-	
13. Performance level _{T3}	4.07 (1.08)		-.03	.21**	-.28**	-.31**	-.29**	-.20*	-.17	-.18*	-.02	-.06	-.12	-.24**	-
Domain differences (ANOVAs)			10.08*	2.51	19.36**	23.50**	17.48**	6.52*	10.69**	5.16*	5.91*	16.97**	15.29**	10.01*	4.49*
Gender differences (ANOVAs)			6.47*	0.76	6.51*	10.02*	7.03*	0.34	0.02	0.01	1.65	0.23	0.57	8.03*	1.61

Note. * $p < .05$, ** $p < .01$ (2-tailed); M = mean, SD = standard deviation, α = alpha reliability. The ANOVAs with 5.000 bootstrap are used for domain and gender and the F-values in the table. Degree of freedom is 1. Domain refers to performing art (= value 1) and sports (= value 2). Gender refers to boys (= value 1) and girls (= value 2).

Table 2*Fit Indices, Entropy, and Model Comparisons for Estimated Latent Profile Analyses Models*

Model	AIC	BIC	SSA-BIC	Entr	LMR	BLRT
Competence						
2 profile	1776.40	1815.53	1780.65	0.68	0.17	<.001
3 profile	1761.06	1810.85	1766.47	0.74	0.22	<.001
4 profile	1755.53	1815.99	1762.10	0.70	0.53	0.10
Autonomy						
2 profile	1680.01	1719.14	1684.26	0.76	0.14	<.001
3 profile	1672.13	1721.93	1677.54	0.79	0.44	0.02
4 profile	1661.24	1721.71	1667.81	0.82	0.02	0.02
Relatedness						
2 profile	1611.54	1650.67	1615.79	0.86	<0.001	<.001
3 profile	1594.25	1644.05	1599.66	0.92	0.05	<.001
4 profile	1582.51	1642.98	1589.08	0.85	0.16	<.001

Note. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SSA-BIC = Sample Size Adjusted Bayesian Information Criterion; LMR = p-value for Adjusted Lo-Mendell-Rubin likelihood ratio test; BLRT = p-value for bootstrap likelihood ratio test.

Table 3*Mean Values for Study Variables for the Growth Profiles*

Growth profile variables	Frustration Competence⁷		Frustration autonomy⁷		Frustration relatedness⁷	
	Growth profile 1	Growth profile 2	Growth profile 1	Growth profile 2	Growth profile 1	Growth profile 2
<i>Frustration competence⁷</i>						
Distribution	<i>n</i> = 158 (61%)	<i>n</i> = 101 (38%)				
Intercept	2.04*	3.50*				
Change T1-T2-T3	-0.15*	0.19*				
<i>Frustration autonomy⁷</i>						
Distribution			<i>n</i> = 64 (25%)	<i>n</i> = 195 (75%)		
Intercept			3.66*	2.16*		
Change T1-T2-T3			0.20	-0.16*		
<i>Frustration relatedness⁷</i>						
Distribution					<i>n</i> = 28 (11%)	<i>n</i> = 231 (89%)
Intercept					4.33*	1.78*
Change T1-T2-T3					-0.59*	0.15*
Predictor variables						
Perfectionistic strivings _{T1} ⁷	4.78	4.94	5.03	4.78	5.00	4.82
Evaluative Concerns _{T1} ⁷	2.45 ^a	4.03 ^a	3.88 ^b	2.80 ^b	4.14 ^c	2.90 ^c
Outcome variables						
Anxiety worry _{T3} ⁵	2.13 ^a	3.36 ^a	3.44 ^b	2.38 ^b	2.62	2.59
Perceived performance level _{T3} ⁵	4.40 ^a	3.55 ^a	3.39 ^b	4.28 ^b	4.04	4.08
Gender (%)						
Male	65 ^a	35 ^a	49	55	44	55
Female	35 ^a	65 ^a	51	45	56	45
Domain (%)						
Sport	86 ^a	52 ^a	54 ^b	79 ^b	56	75
Art	14 ^a	48 ^a	46 ^b	21 ^b	44	25

Note: * $p < .05$, ** $p < .01$. T1 refers to Time 1 (baseline), whereas T3 refers to Time 3 (nine months later). ⁷ = 7-point Likert scale; ⁵ = 5-point Likert scale. Significant group differences are indicated with similar letter superscripts in the compared profiles. Gender refers to boys (= value 1) vs. girls (= value 2). Domain refers to art (= value 1) vs. sport (= value 2). $N = 259$

Table 4

χ^2 statistics and effect size (Cohen's *d*) for the differences in the maladaptive outcomes between profiles.

Predictor and Outcome variables	<i>Frustration competence</i> 1 vs. 2	<i>Frustration autonomy</i> 1 vs. 2	<i>Frustration relatedness</i> 1 vs. 2
Evaluative Concerns	56.44** (1.51)	23.52** (0.84)	16.78** (0.69)
Perfectionistic Strivings	0.68 (0.13)	1.38 (0.19)	0.43 (0.11)
Anxiety	61.17** (1.11)	35.97** (0.80)	0.04 (0.02)
Perceived Performance Level	16.48** (0.52)	10.33** (0.41)	0.00 (0.00)
Domain	21.38** (0.60)	0.58 (0.09)	2.00 (0.18)
Gender	17.11** (0.53)	9.73* (0.40)	0.75 (0.11)

Note: All χ^2 analyses used one degree of freedom. *= p <.05, **= p <.001. The Cohen's *d* effect size for the variables are reported within the parentheses. Gender refers to boys (= value 1) vs. girls (= value 2). Domain refers to art (= value 1) vs. sport (= value 2). $N = 259$