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ORIGINAL ARTICLE

Composites of perfectionism and inauthenticity in relation to controlled motivation, performance anxiety and exhaustion among elite junior performers

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Abstract

The present study identified profiles of perfectionism and inauthenticity at baseline and tested whether they differed in the maladaptive outcomes of controlled motivation, performance anxiety, and exhaustion after a nine-month period. We purposefully selected elite junior performers ($N_{T1} = 219$; $N_{T2} = 156$), 16–19 years of age, from Norwegian talent development schools in sports and performing arts. The participants completed questionnaires to report their perceptions of the study variables. The results of the latent profile analysis indicated a multidimensionality of perfectionism, thereby identifying four profiles. Although our identified profiles are in line with the 2×2 model of perfectionism; however, the results of the mean differences between the identified profiles did not align with the 2×2 model's hypotheses. The elite junior performers who displayed non-perfectionism demonstrated to be the most adaptive profile. They reported the lowest level of inauthenticity and the maladaptive outcomes of controlled motivation, performance anxiety, and exhaustion. The mixed perfectionism profile, displaying high levels of perfectionistic concerns (PC) and perfectionistic strivings (PS), demonstrated to be the least adaptive profile. This profile reported higher levels of inauthenticity and was even more maladaptive than the PC dominated profile contrary to the proposed hypotheses. Findings showed that a heightened vulnerability of perfectionism seems evident in PC, independent of the reported PS levels. Because only one out of five elite junior performers were distributed in the non-perfectionism profile, the vulnerability of perfectionism might be an important risk factor to note in talent development settings.

Keywords: Latent profile analysis, motivation, perfectionism, elite performance, self-determination theory

Highlights

- Multidimensionality of perfectionism was identified in line with the 2×2 model of perfectionism;
- The non-perfectionism profiles demonstrated to be most adaptive, whereas the mixed perfectionism profile seemed to be most maladaptive;
- A heightened vulnerability in elite junior performers was related to perfectionistic concerns and inauthenticity;
- Perfectionistic strivings seemed to not play an important role in the studied maladaptive functioning.

Reaching the top in sports and performing arts entails stress and adversity (Hayward, Knight, & Mellalieu, 2017; Hill, MacNamara, Collins, & Rodgers, 2016; Rongen, Coble, McKenna, & Till, 2014). Previous research has demonstrated that elite performers differ in their personal dispositions (i.e. robustness

or vulnerability), supporting diverse ways of perceiving and coping with stressors and demands (Crocker, Gaudreau, Mosewich, & Kljajic, 2014; Doron & Martinent, 2017). Hence, personal factors are likely to influence elite junior performers' motivational functioning and performance development

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(Cumming & Duda, 2012; Gaudreau, 2016; Gucciardi, Mahoney, Jalleh, Donovan, & Parkes, 2012). Most previous studies have focused on how elite performers in general handle stress (Bergman & Andersson, 2015; Doron & Martinent, 2017). However, when the focus is on multivariate relationships between variables, the individual complexity and inter-individual differences (i.e. who are robust in contrast to at risk), are easily lost.

Perfectionism is known as a vulnerability disposition characterised by endless pursuit of high personal standards, perfectionistic concerns, and unstable self-worth (Hill, 2016); it varies among elite performers in sports and performing arts (Hill, Mallinson-Howard, Madigan, & Jowett, 2020; Quested, 2014). Inauthenticity, also a vulnerability disposition, reflects a tendency to possess external locus of causality and to live out of line with one's true self (Ryan & Ryan, 2018). Previous research has indicated that these two vulnerability dispositions are tied to a range of maladaptive performance outcomes, such as controlled motivation, performance anxiety, and mental and physical exhaustion (e.g. Nordin-Bates, Raedeke, & Madigan, 2017; Ryan & Ryan, 2018; Stoeber, Otto, Pescheck, Becker, & Stoll, 2007). Therefore, the aim of this study was to examine how individual composites of perfectionism and inauthenticity among elite junior performers in sports and performing arts are related to a set of maladaptive performance outcomes over time (Stoeber, 2012; Stoeber & Eismann, 2007).

The paradox of perfectionism

Perfectionism is defined as the pursuit of extremely high standards supplemented by excessive critical self-assessments (Frost, Marten, Lahart, & Rosenblate, 1990). It is multidimensional and entails two higher-order dimensions (Burgess, Frost, & DiBartolo, 2016; Frost et al., 1990). First, *perfectionistic strivings* (PS) are associated with setting excessively high performance standards and represent self-directed dimensions of perfectionism. Conversely, *perfectionistic concerns* (PC), which are socially derived, reflect negative reactions to mistakes, such as interpreting mistakes as equivalent to failure and believing one will lose the respect of others after failure (Burgess et al., 2016; Hill, 2016). Hence, perfectionism is seen as paradoxical in that it is likely to energise high levels of motivation, but also nurture maladaptive cognitions, emotions, and behaviour (Crocker et al., 2014; DiBartolo, Frost, Chang, LaSota, & Grills, 2004). Previous research has linked PC with a range of maladaptive performance outcomes (e.g. DiBartolo et al., 2004; Hill et al.,

2020; Stoeber, 2012), whereas PS has been inconclusively related to the same performance outcomes (e.g. Gotwals, Stoeber, Dunn, & Stoll, 2012; Hill et al., 2020; Stoeber & Eismann, 2007).

Recent person-centred studies (e.g. Gaudreau, 2016; Hill & Madigan, 2017; Nordin-Bates et al., 2017) focused on how PC and PS coexist to a certain degree in every person (Gaudreau, 2016). For instance, the 2×2 model of perfectionism differentiates four perfectionism subtypes: (a) *non-perfectionism* (low levels of PS and PC); (b) *pure PS* (high levels of PS, low levels of PC); (c) *pure PC* (low levels of PS, high levels of PC); and (d) *mixed perfectionism* (high levels of PS and PC; Gaudreau, 2016). Based on the four within-person combinations, the model identifies four hypotheses regarding perfectionism's psychological adjustment (Gaudreau, 2016).¹

Previous research examining the 2×2 model of perfectionism reported partial support for the underlying assumptions (Gaudreau, 2016; Hill et al., 2019; Nordin-Bates et al., 2017), offering the strongest support for the benefits of a non-perfectionism profile and self-directed forms of perfectionism (i.e. a pure PS profile) over socially derived perfectionism (i.e. pure PC and mixed perfectionism profiles). However, inconsistent findings concerning the adaptive or maladaptive role of PS (i.e. mixed vs. pure PC perfectionism and pure PS vs. non-perfectionism) are evident in several studies showing that the presence of PS deteriorates, rather than reduces, psychological adjustment (Hill et al., 2020; Nordin-Bates et al., 2017). Previous perfectionism literature (Gaudreau, 2016; Hill et al., 2020) suggests that to identify when and why perfectionism dimensions turn maladaptive is a sound starting point.

Perfectionism and inauthenticity

Self-determination theory (SDT; Ryan & Deci, 2017) postulates that adaptive functioning is differentiated by degree of self-determination or autonomy (Kljajic, Gaudreau, & Franche, 2017). According to SDT, peoples' degree of self-determined behaviour is influenced by individual differences in motivational orientation (Ryan & Deci, 2017). Authenticity (i.e. the congruent self-endorsing of actions) and inauthenticity (i.e. conforming to external influence and feeling self-alienated), represent personal motivational dispositions at a more general and stable level than motivational regulation (i.e. different types of motivation; Ryan & Ryan, 2018; Wood, Linley, Maltby, Baliousis, & Joseph, 2008). Self-directed dimensions of perfectionism (i.e. PS and non-perfectionism) have been linked with higher

levels of autonomous functioning and lower levels of controlled behaviour regulation than socially derived PC (Barcza-Renner, Eklund, Morin, & Habeeb, 2016; Hill et al., 2020).

Inauthentic people tend to be oriented towards contingencies, controls, rewards, and social pressure, monitoring what others might think instead of their own interests, values, and aims (Ryan & Deci, 2017). In addition, inauthenticity entails an external perceived locus of causality and is a driving force of controlled motivation (Ryan & Deci, 2017; Ryan & Ryan, 2018; Taris & Van den Bosch, 2018). As such, different levels of inauthenticity as a personal characteristic may indicate a tendency towards self-directed or socially derived behaviour, which, in turn, may reflect when and why PC and PS influence maladaptive motivational processes.

Maladaptive functioning

Researchers have raised awareness of the cost of pursuing excellence in pressurised and competitive environments, which potentially compromise personal health and increase psychological ill-being (Miller & Kerr, 2002). The “dark side” of talent development is an understudied area compared to the “bright side” within the SDT perspective of motivation (Bartholomew, Arnold, Hampson, & Fletcher, 2017; Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). Controlled motivation is associated with maladaptive functioning and diminished well-being (Gustafsson, Carlin, Podlog, Stenling, & Lindwall, 2018; Haerens, Vansteenkiste, Aelterman, & Van den Berghe, 2016; Mouratidis & Michou, 2011). According to the SDT framework, controlled motivation consists of *external* behavioural regulation, where activities are driven by coercive demands and rewards, and *introjected* behavioural regulation, where activities are driven by obligation, guilt, and shame (Haerens et al., 2016). In previous research, socially derived perfectionism that entails conditional self-worth (i.e. PC and mixed perfectionism), in contrast to merely self-directed perfectionism (i.e. PS and non-perfectionism), has been linked to controlled and conditional motivation (Barcza-Renner et al., 2016; DiBartolo et al., 2004; Gucciardi et al., 2012).

Previous research has shown that socially derived perfectionism (i.e. pure PC and mixed perfectionism) is associated with higher threat appraisals and insufficient coping than self-directed perfectionism (i.e. pure PS and non-perfectionism; Crocker et al., 2014; Hill et al., 2020; Stoeber et al., 2007). Hence, different composites of PC and PS are likely to also influence

how elite junior performers handle their stressful environments (Crocker et al., 2014; Hill et al., 2020). Performance anxiety and exhaustion are both stress-related situational performance outcomes reflecting an imbalance between perceived personal resources and situational requests (Gustafsson, Sagar, & Stenling, 2017; Lazarus, 2000; Stoeber et al., 2007). However, whereas performance anxiety is experienced as stress aroused before and/or during competition (Lazarus, 2000), exhaustion is experienced as a consequence of stress (Gustafsson et al., 2017; Maslach, Jackson, Leiter, Schaufeli, & Schwab, 1986).

The present study

Conceptually, a person-centred approach focuses on people’s similarities and differences instead of relationships between variables (Bergman & Andersson, 2015). A latent profile analysis (LPA) has advantages compared with more traditional cluster analyses. First, the LPA is model-based and data-driven, allowing for less arbitrary decisions regarding class-definitions. Guided by several fit indices and statistical tests LPA has proved to be superior in previous simulation studies (e.g. Bergman & Andersson, 2015; Berlin, Williams, & Parra, 2014; Tein, Coxe, & Cham, 2013). Second, LPA is more flexible and allows a variety of indicator and outcome variables (Wang, Morin, Ryan, & Liu, 2016).

Elite junior performers possess various personal dispositions that expose their personal vulnerability, thereby experiencing unique motivational processes and consequences (Cumming & Duda, 2012; Doron & Martinent, 2017; Gucciardi et al., 2012). Therefore we used LPA, because it facilitates examining inter-individual differences in performers’ motivational mentality (i.e. perfectionism and inauthenticity) as determinants of maladaptive performance outcomes (Bergman & Andersson, 2015; Hill, 2016). We asked the following two research questions:

- (1) Can unique profiles be identified based on elite junior performers’ levels of perfectionism and inauthenticity dimensions, measured at baseline?
- (2) Are there group differences between the identified profiles on self-ratings of introjected motivation, external motivation, performance anxiety, and exhaustion after a nine-month period?

Method

Participants, procedures, and ethical considerations

We recruited elite junior performers (top 20%), who were 16–19 year of age ($M = 17.31$, $SD = .97$) and

attending talent development schools in the sports and performing arts fields in Norway. Two hundred and nineteen performers (117 boys; 102 girls) involved in individual sports ($N=158$; swimming, rowing, athletics, skating, cross-country skiing, biathlon, and alpine skiing) or performing arts ($N=61$; classical music and ballet) participated. All programmes required entrance by competitive auditions. Participants had, on average, nine years of deliberate practice experience and practiced an average of 20 h a week. The overall response rate was 77% with a 29% dropout rate; 219 participants completed Time 1 (T1) and 156 participants completed Time 2 (T2).

The performers were contacted through meetings and/or emails and voluntarily consented to participate in the study after receiving information about it. The Norwegian Centre for Research Data approval for the study protocol. Data were collected using the online survey tool SurveyXact. The first author travelled to collect data in separate activity groups and ensured that the data collection process was in line with research ethics. Some participants answered the survey privately (because of absence).

Measurements

All measurements were Norwegian versions of translated (i.e. translation, back-translation, and adjustment) and contextualised (i.e. instructional “tagging” and item-level adaption) original questionnaires (Madigan & Stoeber, 2016). Two former performers piloted the questionnaire and provided useful feedback on its contextualised delivery. The chosen subscales were intended to represent a wide set of malfunction indicators; thus, complete versions of each instrument were not used.

Perfectionism. The Frost Multidimensional Perfectionism Scale (F-MPS; Frost et al., 1990) was used to measure perfectionism. Four items comprised the doubts about actions subscale (“I tend to get behind in my work because I repeat things over and over”). The F-MPS-brief (Burgess et al., 2016; Frost et al., 1990), based on the original personal standards and concern over mistakes subscales, measured perfectionistic strivings (four items; e.g. “In my activity, I set higher standards for myself than most people”) and perfectionistic concerns (four items; e.g. “If I fail in my activity, I feel like a failure as a person”). The subscales of doubts about actions and perfectionistic concerns comprises the perfectionistic concern (PC) dimension of perfectionism (Hill, 2016). A 7-point Likert scale from 1 (totally disagree) to 7 (totally agree) was used. The F-MPS framework was successfully used in previous

person-centred studies on dancers (Madigan & Stoeber, 2016; Nordin-Bates et al., 2017). The F-MPS-brief was validated in several studies, and has shown acceptable reliability and validity (Burgess et al., 2016).

Authenticity. To identify aspects of inauthenticity dispositions, we used a version of the Authentic Personality Scale (Wood et al., 2008). Eight items from the following two subscales that indicate inauthenticity were used: *self-alienation* (four items; e.g. “I feel as if I don’t know myself very well”) and *accepting external influence* (four items; e.g. “I am strongly influenced by the opinions of others”). Participants responded using a 7-point Likert scale, ranging from 1 (*totally disagree*) to 7 (*totally agree*). Initial validation supported the internal consistency and factor structure of the scale (Wood et al., 2008).

Controlled motivation. The Behavioural Regulations in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008) was used to detect controlled motivation. Eight items from the subscales of *introjected regulation* (four items, e.g. “because I would feel ashamed if I quit”) and *external regulation* (four items, e.g. “because I feel pressure from other people to participate in my activity”) indicated maladaptive motivation. Responses used a 7-point Likert scale, ranging from 1 (*totally disagree*) to 7 (*totally agree*). The BRSQ instrument has been shown to be reliable and valid (Lonsdale et al., 2008).

Performance anxiety. The Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990) was used to measure anxiety in performance settings. We used seven items from the *worry* subscale (e.g. “I am concerned about choking under pressure”), as perfectionism seems to relate most strongly to cognitive anxiety aspects (Miller & Chesky, 2004). The scale and, especially, the *worry* subscale have confirmed support (Smith et al., 1990), including the Norwegian contextualised version (SAS-N; Abrahamsen, Roberts, & Pensgaard, 2006). Even though SAS provides a trait measure, it was previously shown to capture change over time and has been used effectively as a situational outcome variable (Abrahamsen & Pensgaard, 2012; Smith et al., 1990). Responses were given using a 5-point Likert scale, ranging from 1 (*never*) to 5 (*each time*).

Exhaustion. The *exhaustion* subscale (six items; e.g. “I feel burned out because of my activity”), from the Maslach Burnout Inventory (MBI; Maslach et al., 1986), was used to identify mental and physical exhaustion, with the exhaustion dimension

prioritised because it has been identified as the core and most important sub-dimension of burnout (Gustafsson, Lundkvist, Podlog, & Lundqvist, 2016). The MBI has shown acceptable internal consistency in sport contexts in Norway (Bentzen, Lemyre, & Kenttä, 2017). Responses used a 5-point scale, ranging from 1 (*never*) to 5 (*daily*).

Data analytical strategy

Initial screening and descriptive analyses were performed using IBM SPSS statistics version 24. We examined missing data for significant differences using a *t*-test, while the FIML strategy was used to handle the missing data in *Mplus* (Lang & Little, 2018). To validate the measurement model, we conducted confirmatory factor analyses (CFA) of each scale as well as the overall model. 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 (Kline, 2015). Additionally, we used the comparative fit index (CFI; values of .90 or above), the standardised root mean square residual (SRMR; values of .08 or below), and the root mean square error of approximation (RMSEA; values of .06 or below; Marsh, Hau, & Wen, 2004). Pearson's *r* was applied to bivariate correlations.

For the main analyses, we performed LPA on prospectively collected data (T1 and T2) using *Mplus* 8.0. Subgroups were identified based on responses patterns of different questionnaires. Posterior profile probabilities were estimated to define each participant's profile fit (Nylund, Asparouhov, & Muthén, 2007). Specifically, participants were classified into profiles based on the highest probability of belonging ($> .9$ = large; $> .8$ = moderate, $> .7$ = low; Tein et al., 2013). We ran a sequence of nested models, starting with one profile, to examine whether the more complex models provided a better fit for the data than the parsimonious models.

We used several different statistical fit indices (e.g. Nylund et al., 2007). First, the Bayesian Information Criterion (BIC) and the Sample Size Adjusted BIC (SSA-BIC) were inspected. For both of these indices, lower values indicated a better model fit. Second, the adjusted Lo-Mendell-Rubin test (LMR) and the bootstrap likelihood ratio test (BLRT; Nylund et al., 2007) were used. A statistically significant result ($p < .05$) on both of these tests; indicates that the more complex model has a better fit for the data than the more parsimonious one. Third, we inspected the entropy values, where higher entropy is related to a better separation between classes (Tein et al., 2013). Deciding on the

number of classes can be difficult and the research aims, fit indices, substantive meaning of each solution, and parsimony all need to be considered (Berlin et al., 2014). A rule of thumb is that either proportionally $> 1.0\%$ and/or numerically $n > 25$ members are recommended to achieve adequate statistical power (Berlin et al., 2014). Statistical power in LPA depends not only on the sample size ($N > 100$ minimum) but also on the size of the separation between the indicators, the number of indicators (> 5), the quality of indicators, and the estimates of the fit indexes (Tein et al., 2013).

To test whether the identified latent profiles differed in maladaptive outcomes at T2, we used a 3-step approach (Asparouhov & Muthén, 2014) consisting of an overall test of associations with the Wald's test and pairwise profile comparison. Statistically significance was set at $p < .05$. We used the BCH method for continuous outcome variables and the DCAT method for the dichotomous variables (Asparouhov & Muthén, 2014), including gender (male vs. female) and domain (sport vs. art). In addition, independent means Cohen's *d* effect sizes were calculated for all comparisons of mean differences, defined as small (0.20-0.49), medium (0.50-0.79), and large (> 0.80).

Results

Preliminary analysis

Even with 29% missing data was, the *t*-tests showed no statistically significant differences between the participants who did not complete the questionnaires at T2 and those who did (Cohen's *d* ranged between .00 and .53).

We examined and validated each scale individually prior to the overall CFA. The latent factors were based on the original scales, except for the exhaustion factor from which we removed an item with a low factor loading (.46; Kline, 2015). The overall CFA of the latent study variables in the measurement model showed good fit ($\chi^2 [704] = 989.34$, $p = 0.00$, $\chi^2/df = 1.4$, CFI = .92, SRMR = .06, RMSEA = .04 [90% CI, .034-.046]). Descriptive statistics are presented in [Table I](#).

Latent profile analysis (LPA)

The model fit indices are presented in [Table II](#). We identified the fourth profile solution as the conceptually most meaningful (i.e. in line with the 2×2 model of perfectionism) despite its slightly inferior model fit indices. Since the statistical power was in the lower bound for estimating LPA, it was important

Table I. Estimated correlation matrix (Pearson's r) for the study variables and the ANOVA F -values for gender and domain.

Variable	M (SD)	α	1	2	3	4	5	6	7	8	9
1. Perfectionistic concerns_T1	3.07 (1.36)	0.79	–								
2. Doubts about actions_T1	3.61 (1.24)	0.72	.47**	–							
3. Perfectionistic strivings_T1	4.84 (1.16)	0.71	.41**	.25**	–						
4. Accepting external influence_T1	3.57 (1.25)	0.78	.39**	.48**	.18*	–					
5. Self-alienation_T1	2.28 (1.12)	0.79	.35**	.37**	.11	.35**	–				
6. Introjected motivation_T2	2.97 (1.62)	0.89	.54**	.26**	.19*	.33**	.26**	–			
7. External motivation_T2	2.15 (1.33)	0.93	.51**	.20**	.19*	.35**	.29**	.80**	–		
8. Exhaustion_T2	2.41 (0.84)	0.87	.36**	.12**	.15	.26**	.37**	.44**	.40**	–	
9. Performance anxiety_worry_T2	2.60 (0.94)	0.91	.42**	.28**	.05	.27**	.19*	.42**	.42**	.46**	–
Gender differences (ANOVA)			10.08*	2.51	1.08	23.63**	8.55*	1.13	1.18	0.03	10.01*
Domain differences (ANOVA)			6.47*	0.76	2.53*	8.82*	5.25*	2.19	1.42	6.58*	8.03*

Note. * $p < .05$, ** $p < .01$ (2-tailed); M = mean, SD = standard deviation, α = alpha reliability. The ANOVAs with 5000 bootstrap iterations were used for gender and domain and the F -values are reported in the table. Degrees of freedom = 1. Gender refers to boys vs. girls. Domain refers to art vs. sport.

to consider an overall interpretation of several factors (Tein et al., 2013). Hence, the current study fulfilled several criteria, including indicator quality (ranging from .83 to .88), > 5 indicators, separation between indicators (entropy 0.73), and support from the BRLT fit indices.

Four profiles in line with the 2×2 model of perfectionism were identified: (1) non-perfectionism ($n = 46$, 21%), (2) PS dominated perfectionism ($n = 101$, 46%), (3) mixed perfectionism ($n = 41$, 19%), and (4) PC dominated perfectionism ($n = 31$, 14%). An overview of the four different profile scores is presented in Table III. Figure 1 visualises the indicators' absolute and z -scores. The mean T2 values for the predicted outcomes (controlled motivation, performance anxiety, and exhaustion) are presented in Table III. The results suggested that non-perfectionism was more psychologically adaptive than PS dominated (Hypothesis 1b) and PC dominated perfectionism (Hypothesis 2), and that PS dominated perfectionism is better than mixed (Hypothesis 4). However, mixed perfectionism was the least adaptive profile, contrary to Hypothesis 3 (Gaudreau, 2016). Furthermore, the results showed that the self-directed dimensions of perfectionism inherent in non-perfectionism and PS

dominated perfectionism aligned with low levels of inauthenticity. However, the socially derived PC dominated perfectionism showed the highest levels of inauthenticity and higher levels of self-alienation compared to the other three profiles.

Subsequent tests of mean differences between the four profiles for gender and domain, showed clear patterns of statistically significant differences between the profiles. The non-perfectionism (Profile 1) demonstrated lower levels on all the outcome variables compared to mixed and PC dominated perfectionism (Profiles 3 and 4) on the other side in all outcome variables (see Table III). There were also significant, albeit smaller, differences between the PS dominated perfectionism (Profile 2) on one side and (a) mixed perfectionism (Profile 3) for all the outcomes, and (b) the PC dominated perfectionism on all outcomes except performance anxiety. Finally, there were small significant differences between mixed (Profile 3) and PC dominated perfectionism (Profile 4) on introjected motivation. The effect sizes of significant differences ranged from large (Profile 3 vs. 1 and 2), to small and moderate (Profile 4 vs. 1, 2, and 3), ranging from Cohen's $d = 0.36$ – 1.38 . There were no statistically significant

Table II. Fit indices, entropy, and model comparisons for estimated latent profile analyses models.

Model	AIC	BIC	SSA-BIC	Entr	LMR	BLRT	nC < 10/5%
2 profile	3372.85	3427.85	3376.37	0.79	<.001	<.001	0/0
3 profile	3353.82	3428.38	3358.67	0.70	.36	<.001	0/0
4 profile	3336.68	3431.57	3342.84	0.73	.45	<.001	0/0
5 profile	3323.35	3438.58	3330.83	0.76	.22	<.001	0/0
6 profile	3308.82	3444.38	3317.63	0.77	.20	.02	0/0
7 profile	3299.21	3455.11	3309.34	0.79	.61	.02	1/2

Note. 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. $N = 219$. nC < 10/5% = number of profiles with less than 10 and 5% of the cases, respectively.

Table III. Mean values for study variables for the four latent profiles, and χ^2 statistics and effect size (Cohen's *d*) for the differences in the maladaptive outcomes between profiles.

Variable	Profile 1 (<i>n</i> = 46, 21%)	Profile 2 (<i>n</i> = 101, 46%)	Profile 3 (<i>n</i> = 41, 19%)	Profile 4 (<i>n</i> = 31, 14%)		
Profile variables <i>N</i> = 219	<i>Non-perfectionism</i>	<i>PS dominated perfectionism</i>	<i>Mixed perfectionism</i>	<i>PC dominated perfectionism</i>		
Perfectionistic concerns_T1	1.77	2.65	4.94	3.82		
Doubts about actions_T1	2.49	3.45	4.61	4.45		
Perfectionistic strivings_T1	3.76	5.14	5.50	4.72		
Accepting ext. influence_T1	2.62	3.42	4.35	4.38		
Self-alienation_T1	1.59	1.88	2.52	4.13		
Outcome variables <i>N</i> = 156						
Introjected motivation_T2 ⁷	1.99 ^{a,b}	2.65 ^{c,d}	4.97^{a,c,e}	3.74^{b,d,e}		
External motivation_T2 ⁷	1.38 ^{a,b}	1.79 ^{c,d}	3.32^{a,c}	2.27^{b,d}		
Anxiety_T2 ⁵	2.05 ^{a,b}	2.51^c	3.42^{a,c}	2.69^b		
Exhaustion_T2 ⁵	1.93 ^{a,b}	2.25 ^{c,d}	3.11^{a,c}	2.93^{b,d}		
Gender (%)						
Male	57	62	33	50		
Female	43	38	67	50		
Activity (%)						
Sport	90 ^{a,b}	75	58 ^a	45 ^b		
Art	10 ^{a,b}	25	42	55 ^b		
EffPCt size (Cohen's <i>d</i>) for the group differences						
	1 vs. 2	1 vs. 3	1 vs. 4	2 vs. 3	2 vs. 4	3 vs. 4
IntrojPCted mot.	4.12 (0.33)	50.46** (1.38)	18.78** (0.74)	28.06** (0.94)	6.87* (0.43)	4.86* (0.36)
External mot.	3.43 (0.30)	27.61** (0.93)	15.35** (0.93)	15.53** (0.67)	7.54* (0.45)	0.73 (0.14)
Anxiety	3.47 (0.30)	20.23** (0.77)	3.89* (0.32)	10.20** (0.53)	0.39 (0.10)	2.76 (0.27)
Exhaustion	2.60 (0.26)	22.11** (0.81)	13.33** (0.61)	13.10** (0.61)	7.02* (0.43)	0.20 (0.07)
Gender	0.02 (0.02)	0.58 (0.12)	0.03 (0.03)	1.38 (0.19)	0.08 (0.05)	0.07 (0.04)
Activity	2.49 (0.25)	9.28* (0.50)	8.54* (0.48)	2.14 (0.24)	1.91 (0.22)	0.04 (0.03)

Note: Bold indicates above the sample mean. T1 refers to baseline Time 1; T2 refers to Time 2 (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. The Cohen's *d* effect sizes for the continuous variables are reported within the parentheses. Gender refers to boys vs. girls. Domain refers to art vs. sport. *N* = 156.

differences between males and females in the profile distributions. Regarding domain, art performers appeared less likely to be distributed in the non-perfectionism Profile 1 (10%), than in the mixed (42%) and PC dominated (55%) profiles.

Discussion

The aim of the present study was to examine how individual composites of perfectionism and inauthenticity among elite junior performers in sports and performing arts are related to a set of maladaptive performance outcomes over time.

The overall mean scores demonstrated that Norwegian elite junior performers had lower PC than PS and low levels of inauthenticity, indicating a positive self-determined functioning (Ryan & Deci, 2017).

However, with the person-centred approach, a more nuanced and individualised picture emerged. The four identified profiles were non-perfectionism (21%), PS dominated perfectionism (46%), mixed perfectionism (19%), and PC dominated perfectionism (14%). Because the LPA uses a data-driven and inductive approach, the profile solution and number of profiles were not hierarchically predetermined. Despite this, the analysis identified four distinct profiles that were mainly in line with the proposed profiles of the 2 × 2 model of perfectionism (Gaudreau, 2016; Hill & Madigan, 2017). Most performers reported a PS dominated profile and only 21% reported a non-perfectionism profile; therefore, the elite junior performers appeared to have highly self-directed striving towards high standards and performance goals, which is in line with the general characteristics of elite performers (Jordet, 2016).

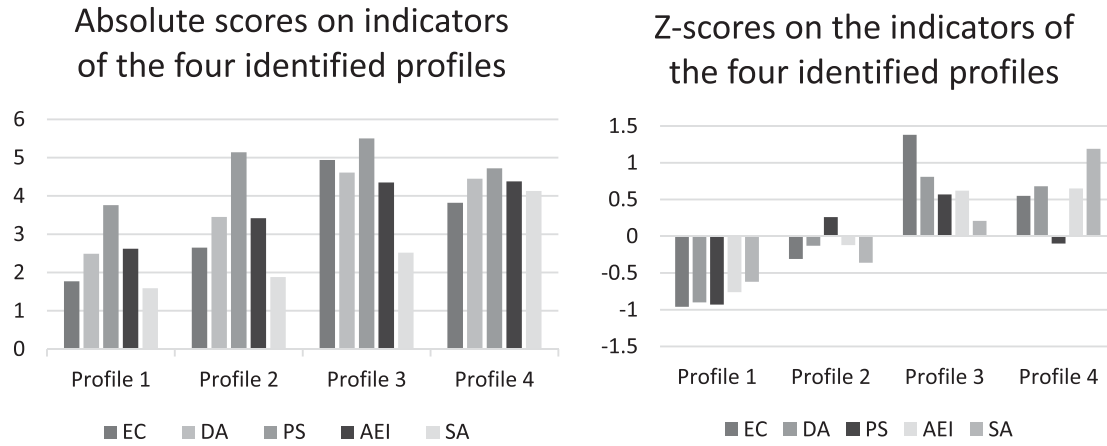


Figure 1. A visualisation of the absolute scores (left) and z -scores (right) of the profile indicators. The Y-axis on the left indicates the absolute (range 1–7) scores and on the right z -scores (indicating SD values) of the profile variables. PC = perfectionistic concerns, DA = doubts about actions, PS = perfectionistic strivings, AEI = accepting external influence, SA = self-alienation. $N = 219$.

The inauthenticity dimension distribution (Ryan & Ryan, 2018; Wood et al., 2008), further supported the proposed distinction between self-directed and socially derived perfectionism dimensions (Hill, 2016; Hill et al., 2020). The non-perfectionism profile and the PS dominated perfectionism profile demonstrated low inauthenticity. In contrast, the mixed and PC dominated perfectionism profiles, which are proposed to be driven by conditional regard and contingent self-worth, demonstrated higher levels of inauthenticity (DiBartolo et al., 2004; Hill et al., 2020). These results indicate that elite junior performers possessing higher levels of PC perfectionism tend to be oriented towards contingencies, controls, rewards, and social pressure, at the risk of suppressing their own sense of autonomy (i.e. deeper interests, values and aims; Ryan & Ryan, 2018). Furthermore, the PC dominated perfectionism profile reported relatively high levels (i.e. 1.19 SD above the mean) of self-alienation (i.e. a sub-dimension of inauthenticity) compared to the mixed perfectionism profile. This finding indicates that performers in the PC dominated profile struggled the most to find an inner drive and deeper meaning when engaging in their activity. This finding is in line with previous studies reporting negative associations between PC dominated perfectionism and engagement (i.e. vigour, dedication, and absorption), as well as positive associations between PC dominated perfectionism and amotivation (Jowett, Hill, Hall, & Curran, 2016; Kljajic et al., 2017).

Group differences in the maladaptive performance outcomes, including controlled motivation, performance anxiety, and exhaustion, supported Gaudreau's (2016) Hypotheses² 1c and 2; the non-perfectionism profile was associated with lower levels in all studied outcomes compared to both the PC and PS

dominated perfectionism profiles. However, significantly only compared to mixed and PC dominated profiles. We also found support for Hypothesis 4, with the PS dominated perfectionism profile showing lower levels in all the outcomes compared to the mixed perfectionism profile. Regarding Hypothesis 3, the results were contradictory, with the mixed perfectionism profile being less adaptive than the PC dominated perfectionism profile (Crocker et al., 2014; Gaudreau, 2016). Hence, this result did not support the adaptive and buffering role of PS dominated perfectionism. Instead, these results are consistent with prior perfectionism literature, which suggests that perfectionism is vulnerable per se (DiBartolo et al., 2004; Hill et al., 2020). This line of research emphasises that PS represents a latent maladaptive counterpart of PC that might be evoked in adversarial conditions; when one's competence, and thus self-worth, is at stake (DiBartolo et al., 2004; Hill et al., 2020; Stoeber, 2012). Hence, when paired with PC (i.e. as reflected in mixed perfectionism), PS seem to become maladaptive as a result of being socially derived and nurtured by the contingent self-worth inherent in PC (DiBartolo et al., 2004).

Introjected motivation, which reflects feelings of obligation, guilt, and shame, is also linked to contingent self-worth (Haerens et al., 2016; Ryan & Deci, 2017). A new and nuanced finding in this study was that introjected motivation was higher in profiles with higher levels of PC (i.e. Profiles 3 and 4). A plausible explanation might be that introjected motivation, nurtured by conditional regard (Haerens et al., 2016), continuously triggers vulnerable self-worth inherent in socially derived dimensions of perfectionism (i.e. mixed and PC dominated perfectionism; DiBartolo et al., 2004 Hill, 2016). In addition, levels of

introjected motivation were highest in the mixed perfectionism profile. Hence, when elite junior performers display co-existing dimensions of perfectionism (i.e. PS and PC), their overall perfectionism increases and seems to be driven by contingent self-worth (Hill, 2016). Instead of buffering the maladaptive nature of PC as proposed by the 2×2 model of perfectionism (Gaudreau, 2016), PS appears to turn more obsessive (i.e. “should”, “must”, “have to”), further increasing the overall maladaptive nature of perfectionism (DiBartolo et al., 2004; Gaudreau, Louvet, & Kljajic, 2019; Mouratidis & Michou, 2011).

The apprenticeship culture within the performing arts is found to be quite authoritarian, with skewed power balance (Lakes, 2005). A recent study found domain differences with performing arts performers reporting higher levels of controlling conditions accompanied by higher levels of PC and controlled motivation compared to sports performers (Haraldsen, Halvari, Solstad, Abrahamsen, & Nordin-Bates, 2019). The current findings supported these results, showing that performing arts performers were more likely to be distributed in the mixed perfectionism profile and the PC dominated perfectionism profile than in the non-perfectionism profile. In contrast, sport performers showed the opposite probability of profile distribution. However, there were no significant gender differences between the identified latent profiles.

Strengths, limitations, and future research

The present study has some strengths and limitations. First, LPA is a model-based and data-driven analytical approach that allows for less arbitrary decisions regarding class-definitions (Bergman & Andersson, 2015; Berlin et al., 2014). The LPA probability technique is an additional strength in that previous simulation studies have shown to be preferable (for details, see Berlin et al., 2014; Tein et al., 2013). Second, the study participants represented 77% of the top 20% of elite junior performers attending Norwegian TDEs. However, the sole reliance on self-report data could pose a threat to the construct validity, resulting from biased interpretation and socially desirable responses (Saw, Main, & Gastin, 2016). Moreover, the study-instrumentation has some limitations. Because the sample consisted of elite junior performers from both sports and performing arts, we used a mix of sport-specific and general instruments building on previous research from both fields. This resulted in using less common measurement tools of perfectionism and elite burnout in the sport e.g. setting (Bentzen et al., 2017; Burgess et al., 2016; Gustafsson et al.,

2017). Despite that all instruments were contextualised to the sport and performing arts settings, the mix of instruments might have affected the overall consistency and relationship between the measured general- and domain-specific study variables (Madigan & Stoeber, 2016). Another limitation might be the use of specific sub-dimensions of instruments constructs as dependent variables instead of using fully extended theoretical to target the maladaptive motivational processes. Hence, the theoretical implications are more specific and less generalisable (Gustafsson et al., 2018).

Future research should continue to examine perfectionism in relation to other theoretical frameworks, such as SDT and personality theories (Hill et al., 2020; Stricker, Buecker, Schneider, & Preckel, 2019). To do this in a more reliable manner, validation studies from the Scandinavian context on the instrumentation are needed. Finally, we suggest more person-centred studies identifying sub-groups that possess a unique set of characteristics (i.e. latent profiles) or development patterns (i.e. latent growth curve modelling) with longitudinal data. Indeed, person-centred approaches seem to provide promising alternatives to the variable-based approaches, which in turn, is likely to move the research on both perfectionism and motivation forward.

Conclusion

The present study aimed to identify latent profiles of perfectionism and inauthenticity and test whether there were differences between the identified latent profiles in terms of the self-reported malfunctioning indicators of introjected motivation, external motivation, performance anxiety, and exhaustion. Our findings indicated that a heightened vulnerability of perfectionism is evident in socially derived dimensions of perfectionism reflected in PC, independent of the reported levels of PS. These findings have theoretical importance, showing that elite junior performers, who report socially derived PC independent of their PS self-ratings, seem to be more prone to malfunctioning than those elite junior performers who report being solely driven by self-directed forms of perfectionism.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes

1. Hypothesis 1a: pure PS > non-perfectionism; 1b: pure PS < non-perfectionism; 1c: pure PS = non-perfectionism;

hypothesis 2: non-perfectionism > pure PC; hypothesis 3: mixed perfectionism > pure PC; hypothesis 4: pure PS > mixed perfectionism (Gaudreau, 2016). > means better psychological adjustment, = means equivalent psychological adjustment.

2. Hypothesis 1a: pure PS > non-perfectionism; 1b: pure PS < non-perfectionism; 1c: pure PS = non-perfectionism; hypothesis 2: non-perfectionism > pure PC; hypothesis 3: mixed perfectionism > pure PC; hypothesis 4: pure PS > mixed perfectionism (Gaudreau, 2016). > means better psychological adjustment, = means equivalent psychological adjustment).

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