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Abstract

Objectives: This longitudinal study examined potential predictors of disordered eating attitudes (DEA) for male and female dancers, with a particular focus on whether environmental predictors (perceptions of task- and ego-involving motivational climate) added significantly to the prediction made by intrapersonal predictor variables (demographics/training, self-esteem, perfectionism).

Methods and Design: Young dancers (N = 597, 73.4% female, *M* = 14.69 years old, *SD* = 2.04) from UK Centres for Advanced Training completed questionnaires 1-5 times over a two-year period, depending on how long they were enrolled at their centre. Multilevel modelling was employed to examine both between- and within-person predictors of DEA.

Results: For females, lower self-esteem and higher perfectionistic concerns were significant between-person predictors of DEA. Increased levels of perfectionistic strivings and perfectionistic concerns were significant within-person predictors. For males, increased perfectionistic concerns and perceptions of the motivational climate as more task- *and* ego-involving were significant between-person predictors of DEA. No significant within-person predictors emerged.

Conclusions: Findings contribute to the literature on DEA in aesthetic activities and the debate concerning the (mal-)adaptiveness of perfectionistic strivings. They also raise questions about how environmental aspects should best be conceptualized and measured in studies of this type. In particular, however, results demonstrate that the predictors of DEA among males and females may not be the same, and suggest that future interventions may therefore need to be sex-specific.

Within- and Between-Person Predictors of Disordered Eating Attitudes among Male and Female Dancers: Findings from the UK Centres for Advanced Training

In the context of dance, the prevalence of disordered eating attitudes (DEA) has received considerable research attention over the past few decades (for a review see Arcelus, Witcomb, & Mitchell, 2014). Hobart and Smucker (2000) defined DEA as the presence of unhealthy attitudes and behaviours that range from strict dietary habits, aimed at losing or maintaining weight, to severe food restriction. On the basis of studies into prevalence, numerous authors have concluded that dancers should be considered an at-risk group for DEA (e.g., Arcelus et al., 2014; Ringham et al., 2006; Thomas, Keel, & Heatherton, 2005; Tseng et al., 2007). However, relatively low rates of DEA have also been observed (de Bruin, Bakker, & Oudejans, 2009; Toro, Guerrero, Sentis, Castro, & Puértolas, 2009). It is likely that some of these inconsistencies can be explained by inadequate sample sizes, given that some studies have included as few as 29 dancers (Ringham et al., 2006). Importantly, examining rates of DEA can at best highlight potential problems, yet give little guidance as to what might be suitable areas for intervention if those problems are to be prevented. Hence, there is a need to move beyond questions of prevalence and toward a better understanding of the *predictors* of DEA so that prevention, identification, and treatment can be optimised. In the present study, we examined both intrapersonal (demographic/training and personality-related) and environmental (dance motivational climate) variables as potential predictors of DEA in dance contexts using a longitudinal design.

Intrapersonal Predictors of Disordered Eating Attitudes: Demographic and Training Variables

Research into DEA in dance has predominantly focused on females and classical ballet (see Arcelus et al., 2014). The focus on ballet may have been warranted because the body ideal in this dance style is particularly strict and centered on slender, long-limbed pre-

pubescent physiques. Classical ballet subculture has therefore at times been seen as a unique risk factor, as it might encourage dancers to strive for a body ideal so slim that it for some dancers may only be achievable via unhealthy eating practices (see e.g., Neumärker et al., 1998; Toro et al., 2009). Similarly, the focus on females is unsurprising: most dancers are female and they have been identified as having a greater risk of DEA (e.g., Neumärker, Bettle, Bettle, Dudeck, & Neumärker, 1998; Sundgot-Borgen & Torstveit, 2004). Such findings are typically explained using arguments that females experience stronger pressures relating to appearance and slimness (e.g., Neumärker et al., 1998). Lately, however, it has been argued that such pressures on males have increased, emphasizing the enhanced cultural importance of a fit, muscular body (e.g., Petrie, Greenleaf, Carter, & Reel, 2007). Petrie et al. (2007) also found that risk factors commonly associated with DEA for females were not significant for male athletes. Furthermore, DEA may be constructed, viewed and disclosed differently for male and female athletes (Busanich, McGannon, & Schinke (2014). In a recent study of young dancers training in mixed dance styles, equal proportions of males (7.6%) and females (7.3%) scored above clinical cut-off on a measure of DEA (Nordin-Bates, Walker, & Redding, 2011). Extending the findings of Petrie et al. (2007), correlates of DEA were not the same for males and females, with fewer correlates identified for males. Overall, it seems important to continue identifying potential determinants of DEA for male dancers, and for dancers in styles other than ballet (see also Krentz & Warschburger, 2013).

In the study by Nordin-Bates, Walker et al. (2011), age was not predictive of DEA within the 10-18 year old sample. This contrasts with research indicating that in non-dance samples, the rate of DEA is positively related to age for girls (e.g., Gardner, Stark, Friedman & Jackson, 2000; Jones, Bennett, Olmsted, Lawson, & Rodin, 2001). However, this may not be the case for boys (Gardner et al., 2000). Discrepant findings like these suggest that studies should continue to examine predictors such as age in an effort to build a more conclusive

picture of their role as potential determinants of DEA. It would stand to reason that age can act as a positive predictor of DEA, given that older dancers may have been impacted by risk factors, in life but likely also in dance, for longer. At the same time, one might speculate that dancers can grow more realistic as they mature and settle into their post-pubertal bodies. For instance, they may realize that few bodies are "ideal" but that skills and experience can trump pre-pubescent looks, and thereby reduce their DEA symptoms. In sum, the potential role of age in predicting DEA is unclear yet potentially highly relevant, and we consequently chose to include it in our models.

Dance-specific training-related variables, including hours of training, dance experience and style, may also play a role in the development of DEA among dancers, simply because training intensely from a young age in a domain where being lighter and slimmer is often perceived to confer performance advantages may increase the risk of DEA (e.g., Sundgot-Borgen & Torstveit, 2004). Such intense training, alongside a focus on weight and shape, is typical of high-level dance, but perhaps less so in more modern styles as compared to classical ballet (e.g., Benn & Walters, 2001; Nordin-Bates, Walker et al., 2011; Tseng et al., 2007; van Staden, Myburgh, & Poggenpoel, 2009). However, these potential predictors of DEA have rarely been examined systematically. Hence, we also considered dance style, years of experience and training hours as potential predictors of DEA.

Intrapersonal Predictors of Disordered Eating Attitudes: Personality Variables

Other than demographic or training-related variables, key intrapersonal variables often related to DEA include the personality constructs perfectionism and self-esteem. Several studies in dance and sport have confirmed that there is a negative relationship between self-esteem and DEA (Berry & Howe, 2000; Engel et al., 2003; Petrie, Greenleaf, Reel, & Carter, 2009), and interventions focused on enhancing performers' self-esteem appear to help prevent DEA development for females (e.g., Martinsen et al., 2014; Piran,

1999). Yet although self-esteem and perfectionism are understood to be related constructs (e.g., Hall, Hill, & Appleton, 2012), research findings conflict as to their relative predictive power as regards DEA. For example, self-esteem predicted DEA in a study with athletes but perfectionism did not (Petrie et al., 2009), but the opposite was found in a study with dancers (Nordin-Bates, Walker et al., 2011). In the present study, we aimed to extend such cross-sectional findings to a larger sample using a longitudinal design. This is important for the design of future preventive efforts so that they may focus on the variable(s) that are most central to DEA development. As the effectiveness of such interventions depends on reliable evidence, traditional cross-sectional studies may be insufficient given that they often focus exclusively on between-person differences. By also examining within-person differences, a better understanding of associations between variables may be gained. That is, we can understand whether variation in an independent variable (e.g., perfectionism, self-esteem) is associated with variation in a dependent variable (e.g., DEA) *for each individual*.

In the wider literature perfectionism is considered to predict both the development and maintenance of DEA (e.g., Fairburn, Cooper, & Shafran, 2003; Forsberg & Lock, 2006), and has also been one of the most studied risk factors for DEA in the dance literature (e.g., de Bruin et al., 2009; Nordin-Bates, Walker et al., 2011; Penniment & Egan, 2011; Thomas et al., 2005). Despite this research attention, however, studies have often relied on unidimensional measures of what is now firmly established to be a multidimensional construct (Hall et al., 2012). Although authors have used different terms for the dimensions of perfectionism, there is growing consensus that *perfectionistic strivings* may be used as an umbrella term for highly purposeful striving toward particularly challenging personal goals (such as excellence or perfection), whereas *perfectionistic concerns* comprise cognitions such as doubts, concerns, and rumination as well as a very critical attitude regarding mistakes (Gotwals, Stoeber, Dunn, & Stoll, 2012; Hall et al., 2012; Hill et al., 2004; Stoeber, 2012).

Studies commonly find that perfectionistic concerns predict maladaptive outcomes (e.g., burnout, anxiety), but the consequences of perfectionistic strivings are less clear. For instance, some studies have found that perfectionistic strivings predict adaptive outcomes such as good performance and well-being (Stoeber, 2012). Other research suggests perfectionistic strivings to predict maladaptive outcomes, or to be unassociated with either adaptive or maladaptive constructs (Gotwals et al., 2012; Hall et al., 2012).

Studies into perfectionism and DEA reflect the typical findings, with all of the most recent studies having found that constructs akin to perfectionistic concerns predict DEA (Goodwin, Arcelus, Geach, & Meyer, 2014; Nordin-Bates, Walker, et al., 2011; Shanmugam & Davies, 2015). However, the perfectionistic strivings-DEA relationship remains unclear. No studies to date have examined the role of both perfectionistic strivings and concerns as predictors of DEA in a longitudinal design. It is important to do so, because each construct has the potential to impact on a dancer's eating attitudes. First, perfectionistic concerns involve worrying excessively and being highly self-critical. For a dancer, therefore, having high levels of perfectionistic concerns may involve thoughts such as "I worry that if I do not reduce my calorie intake, I will never be good enough to reach my performance goals", and lead to dietary restraint or purging (see e.g., Brannan, Petrie, Greenleaf, Reel, & Carter, 2009). It is also possible that conflating thinness and success ("thin is going to win"; e.g., Krentz & Warschburger, 2013) may contribute to DEA for a dancer for whom success is very important – that is, a dancer high in perfectionistic strivings.

As regards self-esteem, this could be expected to predict DEA negatively, as it likely exerts a protective effect. For instance, a dancer would be less likely to act on pressures to be thin if s/he does not feel that her entire self is defined by thinness or dance success (e.g., Brannan et al., 2009; Shanmugam, Jowett, & Meyer, 2013). Still, it can be noted that the relationship between self-esteem and DEA-related variables in the literature outside of sport

and dance is not entirely clear, and appears to differ between males and females (e.g., Furnham, Badmin, & Sneade, 2002). In the present study, we address a gap in the literature regarding potential sex differences in the predictive power of self-esteem and perfectionism via an investigation with young people in dance, a domain where perfectionistic tendencies are relatively commonplace (e.g., Nordin-Bates, Cumming, Aways, & Sharp, 2011).

Environmental Predictors of Disordered Eating Attitudes: the Dance Milieu

Many have argued that the dance environment is implicated in DEA development by being highly stressful, competitive and/or pressured (e.g., Benn & Walters, 2001; Thomas et al., 2005; Toro et al., 2009; van Staden et al., 2009). Later studies concluded that it is the learning experiences within the environment that matter (e.g., learning that thinness is important; Annus & Smith, 2009; Penniment & Egan, 2011; Toro et al., 2009). These studies, however, are difficult to compare due to the use of study-specific measures and varying conceptualizations of the dance environment. A theoretically grounded approach to explore the role of the learning environment is to adopt the lens of achievement goal theory (AGT; Ames, 1992). AGT concerns the extent to which dancers perceive their training context to be task- and/or ego-involving. A task-involving climate exists when individual improvement is highly valued, leading to an emphasis on self-referenced learning, collaborative learning, and equal valuing of all students. An ego-involving climate is said to be in evidence when objective success is valued most highly; in such a climate, teachers often give disproportionate recognition to talented students, encourage rivalries, and are more likely to punish mistakes (Ames, 1992; Newton, Duda, & Yin, 2000). The power of motivational climate perceptions to explain variability in a broad range of indices of well- and ill-being and healthful functioning has been supported in dance studies, just as in sport. Broadly speaking, perceptions of a task-involving climate have been associated with adaptive characteristics and well-being indicators (e.g., satisfaction of basic psychological needs and

197 positive affect; Quested & Duda, 2009; 2010) whereas perceptions of an ego-involving
198 climate have yielded more maladaptive correlates such as anxiety and aspects of
199 perfectionistic concerns (e.g., Carr & Wyon, 2003; Nordin-Bates, Quested, Walker, &
200 Redding, 2012).

201 Findings such as those highlighted above make conceptual sense, because outcomes
202 such as anxiety and concern over mistakes may well develop when competition is
203 emphasised and mistakes punished (i.e., the climate is ego-involving). Dancers may also do
204 whatever it takes to get ahead of their peers when rivalry and results are in focus. De Bruin,
205 Bakker, and Oudejans (2009) used the term "competitive thinness" to describe what may
206 result when such climates are perceived in aesthetic activities. In their study of female
207 dancers and gymnasts, these authors found that having a stronger ego-orientation, and lower
208 perceptions of a task-involving climate, were predictive of dieting frequency. Additional
209 positive correlates of ego-involving motivational climate perceptions were use of pathogenic
210 weight control methods (e.g., vomiting), weight-related pressure from peers and coaches, and
211 perfectionism. Self-esteem was negatively correlated with ego-involving motivational climate
212 perceptions. By contrast, perceptions of task-involving motivational climates were positively
213 correlated with self-esteem and negatively correlated with weight-related pressure from peers
214 and coaches. On the basis of these results, de Bruin et al. (2009) concluded that task-
215 involving climates could be considered to exert a protective effect on DEA development. In
216 the present study, we extend their cross-sectional findings by studying these relationships
217 with both males and females, over a period of two years, and in a larger sample of
218 performers, to see whether motivational climate perceptions have predictive utility beyond
219 that of the more well-researched intrapersonal DEA risk factors (i.e., demographics/training,
220 self-esteem, and perfectionism). Another reason for this analytical choice was to add clarity
221 regarding DEA risk factors: that is, if only intrapersonal variables were predictive then

222 interventions should presumably focus on individuals, while if environmental variables
223 predict DEA, such interventions could perhaps instead be aimed at dance teachers.
224 By using a longitudinal design, it was also possible to address whether changes in
225 predictor variables over time (i.e., changes in perfectionism and/or motivational climate
226 perceptions) would be associated with changes in DEA *within* an individual. To achieve our
227 aim, we studied dancers as part of a larger, multi-disciplinary talent development research
228 project with UK government-funded centres known as Centres for Advanced Training
229 (CATs; Aujla, Nordin-Bates, Redding & Jobbins, 2014). The CATs aim to provide high-
230 quality part-time dance training across England for young people with talent or "exceptional
231 potential". Importantly, the sample included dancers aged 10-18 years, spanning the critical
232 developmental period for DEA development (e.g., Gardner et al., 2000; Jones et al., 2001).
233 We are aware of only a small number of studies in sport (e.g., Krentz & Warschburger,
234 2013), and none in dance, that have tracked young people and their scores on DEA as well as
235 key potential predictor variables over time.
236 Potential predictors of DEA were selected based on previous research and AGT
237 (Ames, 1992), with the aim of examining the relative predictive power of a range of relevant
238 variables. More specifically, our aim was to examine whether intrapersonal factors (i.e.,
239 demographics and training variables including age, training hours, dance experience and
240 style; and personality constructs perfectionism and self-esteem) were predictive of DEA, and
241 whether environmental factors (i.e., perceptions of motivational climate) added significantly
242 to this prediction. As well as between-person differences, we were interested in investigating
243 whether varying levels of these predictors within an individual co-varied significantly with
244 changes in DEA, and whether predictors differed for males and females. It was hypothesized
245 that DEA would be positively predicted by (1) indicators of intense dance involvement such
246 as hours of training, and/or years of dance experience; (2) perfectionistic concerns; (3)

perceptions of an ego-involving motivational climate. We further hypothesized that DEA would be negatively predicted by (4) self-esteem, and (5) perceptions of a task-involving motivational climate. No specific hypotheses were formulated in relation to perfectionistic strivings, given the inconsistency of the research literature in this area. Generally, our hypotheses were created from the best available evidence. Yet, this evidence base is built mostly from studies with females. Thus, it was also hypothesized that (6) the significant predictors of DEA would differ for males and females. We made no more specific hypotheses regarding age or sex differences, however, given the limited and at times inconsistent previous research available to do so.

Methods

Participants

A total of 752 dancers completed identical packs of questionnaires at one or more time points; however, the analyses used required complete data in order for a particular time point to "count", reducing the effective sample size to 597 (see Table 1). All students enrolled at one of the eight participating CATs were invited to take part at each time point, however students entered and left the scheme throughout the research period. For more information on sample size, see Tables 1 and 2. Overall, females comprised 73.43% of the sample, and dancers ranged between 10 and 18 years of age. At the start of the project, the average age was 14.69 years (SD = 2.04) and the dancers had typically attended a CAT for a little over one year, although the standard deviation was large (M = 15.40 months, SD = 15.52). The dancers had taken part in some form of dance for an average of 8.86 years (SD = 3.73).

The eight CATs are located in UK cities and provide extra-curricular, high-level dance training for young people. One CAT focuses on ballet and five focus on contemporary dance; one offers training in either contemporary or South Asian styles, and one offers urban

and contemporary strands. However, all students take classes in more than one style. At time 1, self-report data indicated that dancers participated in weekly CAT training for an average of 8.81 hours (*SD* = 3.72), training in other dance schools for 5.49 hours (*SD* = 5.89), and undertook non-dance physical activity for 3.45 hours (*SD* = 3.28).

Measures

Demographics and Training Data. Participants were asked to note their sex, age, dance experience (months in CAT and years in dance) and training habits for various styles of dance and non-dance physical activities (hours per week in CAT, non-CAT dance schools, sport, exercise and other physical activities). Their primary dance style was inferred by their belonging to a CAT specializing in a particular style (contemporary, classical ballet, South Asian dance, or urban styles).

Disordered eating attitudes. To capture attitudes and behaviors related to disordered eating, we employed the Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982). The scale comprises 26 items falling into three subscales (Dieting, Bulimia and Food Preoccupation, and Oral Control), scored on a scale ranging from 0 (*never, rarely,* or *sometimes)* to 3 *(always)* where interim anchors are 1 *(often)* and 2 *(very often).* A score ≥ 20 is used as a clinical cut-off, beyond which dancers were referred for further investigation of suspected disordered eating (Garner et al., 1982). Validity and reliability information has been published for the EAT-26 (Garner et al., 1982). In the present study, not all items were internally consistent within their subscales. Only the Dieting subscale consistently yielded a good score (α = .82 - .86). To improve reliability, it was necessary to remove items 9 and 26 from the Bulimia and Food Preoccupation subscale, and items 2 and 19 from the Oral Control subscale, leaving four and five items, respectively. Following these changes, scores were more acceptable (α = .60 - .73 depending on time point). The percentage of dancers scoring above clinical cut-off was computed using all items; thereafter internally consistent subscales

were calculated and used to compute a total score for use in analyses. Use of only the main scale for analyses has a precedent in performance research, because the original factor structure of the EAT-26 has not consistently been replicated in such settings yet the measure remains one of the most frequently employed (Doninger, Enders, & Burnett, 2005; Krentz & Warschburger, 2011; Lane, Lane, & Matheson, 2004).

Perfectionism. To capture perfectionism, the Perfectionism Inventory (PI; Hill et al., 2004) was used. However, the scale was slightly amended for use in a dance context (see Nordin-Bates, Walker, et al., 2011). This dance-specific PI comprises 51 items and seven subscales, that were used as proxies for perfectionistic strivings (Striving for Excellence, Planfulness, High Standards for Others) and perfectionistic concerns (Concern over Mistakes, Need for Approval, Teacher Pressure, and Rumination), given that these are the dimensions of perfectionism currently most agreed upon as useful units of analysis (e.g., Gotwals et al., 2012; Stoeber, 2012). Items are rated on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The authors of the PI (Hill et al., 2004) published validity and reliability information for the scale. Although psychometric testing has not yet been performed for the dance-specific version of the PI, it is worth noting that Cronbach's alpha statistics are, at all time points, similarly high in the present study (α = .75 - .89) as they were in a previous study using the adapted scale (Nordin-Bates, Walker, et al., 2011).

Self-Esteem. To capture dancers' attitudes toward themselves, the Rosenberg self-esteem scale (RSES; Rosenberg, 1965) was used. The RSES comprises 10 items scored on a Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Half of the items are reverse-coded. Blascovich and Tomaka (1991) published support for the validity and reliability of the RSES and in the present study, internal reliability was very good (α = .82 - .87 depending on time point).

Motivational Climate. To capture motivational climate perceptions, the Perceived Motivational Climate in Sport Questionnaire – 2 (PMCSQ-2; Newton et al., 2000) was used. As for the PI, we used a version of the questionnaire that has been slightly modified for the dance context (see Quested & Duda, 2009, 2010). This 24-item version comprises five subscales capturing perceptions of a task-involving climate (i.e., a focus on Effort and Improvement, Cooperative Learning, and everybody having an Important Role in the group) and an ego-involving climate (i.e., there being Unequal Recognition based on ability, and Punishment for Mistakes). Items are scored on a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The authors of the PMCSQ-2 (Newton et al., 2000) published validity and reliability information for the scale, and the dance-specific version has been found adequate (Nordin-Bates et al., 2012; Quested & Duda, 2009; 2010). In the current study, internal reliability scores were generally good (α = .71 - .93) but the Cronbach's alpha for the subscale Punishment for Mistakes was improved by deletion of the item *"Dancers are afraid to make mistakes"* (α = .71 - .81 instead of .64 - .74).

Procedures

As part of a larger project, the present study acquired approval from a University ethical review board. Study information was provided and informed consent obtained from all dancers and from parents for participants under 16. Questionnaires were completed in group sessions led by at least one researcher, with a request that teachers should not be present. Questions were encouraged and anonymity clarified: specifically, dancers were assigned individual ID codes to enable matching of data over time, precluding the need for names on the questionnaires. The first data collection took place in winter 2008-2009 and the fifth in winter 2010-2011, with intermediate data collections being scheduled as close to every six months as possible.

Data Analysis

Data were first screened for inputting errors and normality. Not all variables were normally distributed; in particular, scores on the EAT-26 exhibited negative skew (1.98 - 2.91). However, this pattern is expected when a questionnaire for which normal, healthy responses yield a score of zero is used in a non-clinical population. Although most studies using the EAT-26 appear to use the "raw" data, we opted to log-10 transform scores, which improved the distribution (.14 - .33). Importantly, this was only an added precaution because multilevel modelling does not require variables to be univariate or multivariate normal; instead, it is the normal distribution of the residuals that is of importance (Rabe-Hesketh & Skrondal, 2008). This distribution was therefore inspected for the final models, post-analyses.

A combination of statistical methods was used to analyse the data. First, descriptive statistics were calculated using SPSS to gain an overview of the variables, including the levels (low/high) of various constructs (see Table 1). Our main study aim, to investigate whether a range of intrapersonal variables were predictive of DEA, and whether environmental variables contributed significantly to this prediction, was examined via multilevel modelling (MLM; Multilevel mixed-effects linear regression) using the procedure mixed in STATA 13.1 with a random intercept for individual. Approximately half of the total sample participated at more than one time point, but only a small proportion contributed complete data at all five time points over the two years. On average, both males and females contributed data at 1.8 time points; see Table 2 for details of the number of participants contributing complete data 1, 2, 3, 4 and 5 times.

Usefully, MLM can accommodate unbalanced datasets; that is, the method does not presume that all participants contribute to each time point in a longitudinal design, but rather makes use of all available data at each time point to form estimates (Rabe-Hesketh & Skrondal, 2008). Note, however, that participants whose data was incomplete at a specific time point were excluded from analyses of that time point. In order to investigate whether

between- as well as within- person changes in a predictor variable were associated with changes in DEA, we applied a procedure to separate between- and within- participant effects (Hoffman & Stawski, 2009; van de Pol & Wright, 2009). Each predictor was therefore person-mean centred resulting in (i) a time-invariant covariate that contains the person-specific mean and (ii) a time-varying predictor, that is calculated by subtracting the person mean from the original covariate. The time-constant person mean is used to capture whether individuals with scores on a predictor that are, on average, higher would also report different DEA scores compared to the wider sample (between-person effect). The time-varying predictor is used to address whether change in a predictor is associated with changed DEA scores, for each individual (within-person effect).

Separate models were run for females and males. In the first set of models, relationships between DEA and self-esteem, perfectionism, training hours (both between- and within-participant effects) were evaluated by entering them as predictors (fixed effects). In reality, individuals were nested within CATs. Due to the limited number (N = 8) of CATs, however, dummy variables were included in the fixed part of the model instead of using nested models. Using a CAT focusing on ballet as reference was a way of modelling any differences between CATs due to dance style, because most other CATs focus on contemporary dance (i.e., all non-ballet groups were compared to the ballet reference group). All analyses were adjusted for age at wave1, time, and dance experience. Dance experience was addressed using dummy variables for months in the CAT (< 1 year as reference; < 2 years; > 2 years) and years in any form of dance (< 6 years as reference; < 11 years; > 11 years). Categorization was preferred to using years of experience as continuous variables, because data were non-normally distributed. An autoregressive residual structure was chosen to account for the longitudinal setup.

Next, we added perceptions of the task- and ego- involving features of the motivational climate to the models in order to test whether these environmental variables significantly contributed to model fit. Comparisons of models 1 and 2 were conducted by fitting both models using maximum likelihood, and applying maximum likelihood testing. In addition, the model fit was evaluated using Akaike's Information Criterion (AIC; Akaike, 1974), which is a model fit criterion that penalizes for the loss of parsimony due to adding more parameters. A smaller AIC indicates a better model fit.

Results

Descriptive Statistics

In Table 1 means and standard deviations for variables are displayed for each time point, by sex. Dancers reported fairly high levels of self-esteem, moderate perfectionism, and generally low but varied levels of disordered eating attitudes. Between 1.75% and 7.94% of the sample scored above clinical cut-off on the EAT-26, depending on time point. Dancers reported their perceptions of the prevailing motivational climate as highly task-involving and low in ego-involving features.

Multilevel Modelling: Predicting Disordered Eating Attitudes

For females, the likelihood-ratio test indicated that model 2, which included the climate perception variables, did not improve model fit compared to model 1 (Likelihood ratio test: $chi^2(4) = 1.89$, $p = 0.76$; AIC for model 1 = 679.63; for model 2 = 685.74). Thus, in the case of females, the results of model 1, fitted with restricted maximum likelihood, are presented. As shown in Table 3, significant between-person effects for self-esteem ($z = -3.80$, $p < .01$), and perfectionistic concerns ($z = 4.72$, $p < .01$) indicate that DEA is, on average, higher when self-esteem is lower and perfectionistic concerns higher. Significant within-person effects indicated that when females report higher perfectionistic strivings ($z = 2.79$, p

< .01) or higher perfectionistic concerns (z = 3.04, p < .01) at one time point compared to their person-mean, they also display higher DEA scores at that time.

Contrastingly, for males, the likelihood-ratio test indicated that model 2 significantly improved model fit compared to model 1 (Likelihood ratio test: $chi^2(4) = 16.64$, $p < 0.01$; AIC for model 1 = 208.37; for model 2 = 199.73). Thus, the results of model 2, fitted with restricted maximum likelihood, are presented. As shown in Table 4, these results indicated only one similarity to the females: that higher levels of DEA are reported by dancers who also exhibit greater perfectionistic concerns (z = 2.68, p < .01). Male dancers who perceived their motivational climate to be more task-involving (z = 2.42, p < .05) or more ego-involving (z = 3.18, p < .01) than their peers also reported higher DEA scores. Finally, two dummy variables reached significance (z = -3.67 and -3.43, both p < .01). These dummies both represented CATs focused on contemporary dance training; thus, male students in these centres reported significantly lower DEA than males in the reference CAT, that was focused on classical ballet. No significant within-person predictors emerged for males.

Discussion

The aim of the current study was to examine intra- and environmental predictors of disordered eating attitudes (DEA) in a sample of young dancers, using data spanning five time points over two years. Both within- and between-person effects were examined. It emerged that the predictors differed for males and females, with only perfectionistic concerns being a common predictor of DEA for dancers of both sexes. For females, a model including only intrapersonal predictor variables provided a better fit to the data than a model that also included environmental aspects (motivational climate perceptions). Also, none of the demographic or training-related variables emerged as predictive. In contrast, a model including both intrapersonal (training- and personality-related) and environmental aspects

(motivational climate perceptions) provided the best fit to the data for males. Findings relevant to the specific predictor variables examined will now be discussed in turn.

We examined a range of demographic and training-related variables including age, dance experience and style, and training hours as potential predictors of DEA. Of all these variables, only dance style was predictive, and only for some males. Specifically, males in classical ballet training reported significantly higher DEA scores than males in two of the centres with contemporary dance training. Thus, our hypothesis relating to dance style was marginally supported. Sex was also a notable differentiating factor, with the separate models clearly demonstrating that predictors of DEA may differ for young males and females. This was as hypothesized, and extends our earlier cross-sectional work with an overlapping sample (Nordin-Bates, Walker, et al., 2011). It also highlights the importance of further research into DEA development among males, which is considerably behind that of females. For instance, it would be interesting to examine further the potential importance of dance style. It has previously been argued that classical ballet subculture in itself represents a risk factor for DEA (Neumärker et al., 1998; Toro et al., 2009); however, in those studies females were in focus. In doing so, it would also be important to specify clearly what it is about classical ballet which conveys risk.

Beyond sex and dance style, even the non-significant findings regarding demographic and training-related variables may be worthy of discussion. For instance, the dance and physical activity habits of these young people did not appear to constitute risk factors for DEA, as we initially hypothesized. That is, dancers in a range of styles, including females in classical dance who had over 10 years of dance experience and reported intense involvement in both dance and other forms of physical activity, were no more likely to report symptoms of DEA than dancers in modern, urban and South Asian styles who reported only a few months or years of dance experience and who participated only a few hours weekly. As such, it

appears that intense involvement in dance is not necessarily a causal risk factor for DEA, and we agree with authors such as Annus and Smith (2009) and Anderson, Petrie, and Neumann (2012) that it is the perceived body and appearance related pressures in an environment – rather than just participation – which is likely to be important.

Specifically regarding age, we found that within the 10-18 age range studied, younger and older dancers appeared equally likely to exhibit DEA. Previous literature is inconsistent as regards age; for instance, Jones et al. (2001) found age to predict DEA in a sample of females aged 12-18, and Gardner et al. (2000) found that age predicted DEA for girls, but not boys, in a sample aged 6-14. In light of such inconsistencies, consideration of the role of age should be a focus in future studies of DEA. In particular, age may be confounded with other potential DEA predictors such as pubertal development, and it may be hypothesized that for girls, pubertal developments are perceived as less desirable for a dance career (e.g., development of breasts and rounding of hips) than they are for boys (who typically develop greater muscularity). A second consideration is that age might be related to DEA in a non-linear fashion, and thus require other analysis methods than those used here; for instance, age might positively predict DEA up to a point (e.g., around puberty), after which it predicts DEA negatively (e.g., as a consequence of maturing). It may also be that the age range studied here was too narrow, and that a wider band around each side of puberty would reveal different effects. Whatever the case, the current results suggest that dance educators should be mindful of signs of DEA among dancers as young as 10, even if they are rare.

Both self-esteem and perfectionism emerged as additional intrapersonal DEA predictors, yet in differing ways; as such, the findings both aligned with and contradicted our stated hypotheses. Specifically for females, perfectionistic concerns acted as both a between- and within-person predictor, whereas self-esteem was a between-person predictor and perfectionistic strivings a within-person predictor. For males, only perfectionistic concerns

493 emerged as significant among the personality-related predictors, and did so only at the
494 between-person level. These findings extend previous literature where the relative predictive
495 powers of self-esteem and perfectionism have been unclear (Nordin-Bates, Walker, et al.,
496 2011; Petrie et al., 2009), and suggest that both may be considered concurrent risk factors, or
497 warning signs, of DEA for females. Findings also cast some doubt on whether even the
498 successful interventions published in this area, which typically focus on enhancing self-
499 esteem (e.g., Martinsen et al., 2014; Piran, 1999), are likely to be equally effective for males,
500 given that self-esteem was not a significant predictor of DEA for them. Non-sport literature
501 similarly suggests that the role of self-esteem in DEA is complex and varies by sex (e.g.,
502 Furnham et al., 2002); clearly, further research into this intriguing issue is warranted.

503 Our findings also suggest that interventions targeting DEA may benefit from
504 inclusion of material (e.g., information, exercises, or other therapeutic content) concerning
505 perfectionism. In particular, such material should consider the differences between
506 perfectionistic strivings and concerns, and the extent to which it is possible to strive for
507 perfection without worrying unduly when it is not reached. Indeed, such a programme may be
508 more universally appropriate, given that perfectionistic concerns was the only DEA predictor
509 that was common to both sexes. To date, we are not aware of any such programs in dance or
510 sport. In a school setting, however, an eight-lesson intervention targeting perfectionism has
511 been found to reduce eating disorder risk, especially for high-risk participants (Wilksch,
512 Durbridge, & Wade, 2008).

513 The findings relating to perfectionism also add to the growing literature indicating
514 that perfectionistic concerns are typically associated with maladaptive outcomes, and to the
515 more inconsistent literature regarding perfectionistic strivings (Gotwals et al., 2012; Hall et
516 al., 2012; Stoeber, 2012). Even though it has been found that perfectionistic strivings are
517 variously associated with adaptive, maladaptive, and null findings, this evidence is primarily

based on between-person comparisons from cross-sectional studies. By analyzing both between- and within-person effects, it emerged that for female dancers, having higher perfectionistic strivings than others was not associated with DEA, yet dancers reported more DEA during periods when they reported an increased striving for perfection, in comparison to themselves. Though using a different analytical approach, this finding is similar to that of Krentz and Warschburger (2013), who found that the desire to be leaner to improve sports performance was predictive of disordered eating one year later.

It is noteworthy that increases in *both* perfectionistic strivings and concerns were within-person predictors of changes in DEA among females. This finding contrasts with suggestions that perfectionistic strivings may only be maladaptive when accompanied by concerns (Stoeber, 2012). Instead, our results are more aligned with the view that even "positive" forms of perfectionism may ultimately be founded on an unhealthy and pressured form of motivation (e.g., Hall et al., 2012). The results are also in line with research suggesting that athletes may develop DEA as part of a striving for performance enhancement, following maladaptive cognitions and beliefs such as "thin is going to win" (Krentz & Warschburger, 2013). Worth considering here are also findings from Boone, Soenens, Vansteenkiste and Braet (2012), who experimentally induced participants to higher personal standards (akin to perfectionistic strivings), a combination of personal standards and evaluative concerns (akin to perfectionistic concerns), or non-perfectionism. It was found that for both perfectionism groups, DEA symptoms (restraint and bingeing) were elevated during a 24-hour period after the induction procedure. The authors concluded that perfectionism is a causal risk factor for DEA.

Findings suggest that identifying *why* and *how* performers increase their perfectionistic tendencies is of paramount importance. In the present study, there were far greater between- than within-person differences, supporting general psychology literature that

perfectionism is a largely stable personality construct (e.g., Rice & Aldea, 2006). However, recent research indicates that perceptions of the motivational climate as task-involving may heighten dancers' perfectionistic strivings over a six-month time period (Nordin-Bates, Hill, Cumming, Aujla, & Redding, 2014). Future research might consider whether particularly stressful times, such as performance seasons or assessment periods, are associated with increased perfectionism for dance and sport performers, and the potential impact on outcomes such as DEA. In education, Sassaroli and Ruggiero (2005) have demonstrated that stress can indeed bring out an association between predisposing factors such as perfectionism and disordered eating symptoms.

Many have suggested that the behaviours of teachers or other aspects of the dance environment are implicated in DEA development (Ackard et al., 2004; Annus & Smith, 2009; Benn & Walters, 2001; de Bruin et al., 2009; Penniment & Egan, 2011; Thomas et al., 2005; Toro et al., 2009; van Staden et al., 2009). However, none of these studies had confirmed the existence of such a relationship using a theory-driven, longitudinal design. We opted to use a conceptualization of environmental influence based in AGT (Ames, 1992), and captured dancers' perceptions of the prevailing motivational climate. Contrary to suggestions based in correlational work (de Bruin et al., 2009) and to our hypothesizing, it was found that no additional predictive power was afforded by including these variables in our analytical model for females. Similarly, Krentz and Warschburger (2013) found that social pressure did not reach significance as a predictor of disordered eating in their longitudinal study with aesthetic athletes; however, sample size did not allow distinction between males and females in their analyses.

In our analyses environmental variables, in the form of motivational climate perceptions, did significantly predict DEA for males. First, we noted that male dancers who perceived their learning environment to be more ego-involving also reported greater DEA

568 which is in line with previous theorizing and research using AGT (e.g., de Bruin et al., 2009),
569 and confirmed our hypothesis. Indeed, it stands to reason that if mistakes are punished or
570 teachers treat students unequally, dancers may resort to extreme measures to get seen and get
571 ahead. Previous studies have also shown males to be lower in task orientation (e.g., Duda,
572 Olson, & Templin, 1991), and to perceive their environment as more ego-involving than
573 females (e.g., Miller, Roberts, & Ommundsen, 2004). This may suggest that ego-involving
574 cues in the dance environment are more salient for males, and hence, their attitudes towards
575 DE may be more readily influenced, if DE is perceived as a potential method to outperform
576 others. Females on the other hand, may be somewhat buffered from the impact of ego-
577 involving motivational climate cues upon DEAs on account of a typically stronger task
578 orientation. This interpretation is speculative, however, and worthy of future research
579 attention.

580 Quite contrary to the theoretically aligned findings for ego-involving climates, and
581 therefore also disconfirming our hypothesis, was the discovery that male dancers who
582 perceived their learning environment to be more task-involving also reported greater DEA.
583 As such, this finding requires some discussion. One potential explanation relates to the
584 conceptualization and measurement of motivational climates. Specifically, we note that
585 within the PMCSQ-2 (Newton et al., 2000), aspects of task-involving climates are captured
586 via items such as “dancers feel successful when they improve” and “dancers are encouraged
587 to work on their weaknesses”. Although they appear mostly benign (and very common), it
588 might be that an excessive focus on progress and/or weakness is troublesome – especially for
589 perfectionists who have low tolerance for others pointing out what they cannot do. Thus,
590 though surely not the purpose of the PMCSQ-2, it remains possible that teachers who
591 publically point out students’ mistakes and flaws become rated as highly task-involving even
592 if their behaviours are felt to be pressurising.

Carr and Wyon (2003) gave a similar interpretation following their result that dancers' task-involving climate perceptions positively predicted worry, speculating that "*It may be that when factors such as personal improvement are highly emphasized then individuals begin to develop a tendency to over-concern themselves with their ability to consistently improve and demonstrate personal progression, resulting in debilitating worries*." (p. 112). Although the present study revealed no significant positive correlations between task-involving climate perceptions and either perfectionistic strivings or concerns at the bivariate level, such basic analyses may not be adequate in detecting relationships between these constructs. Indeed, the above noted study by Nordin-Bates et al. (2014), derived from the same cohort as the present study, found that task-involving climate perceptions predicted increases in perfectionistic strivings over time. In that same study, more perfectionistically concerned dancers perceived their motivational climate as becoming more ego-involving and less task-involving than their less perfectionistic peers (see also Penniment & Egan, 2011).

In sum, the present way to capture potential environmental impacts on DEA may not be ideal. Future work is required to establish whether other conceptualizations or measurement approaches to teacher or peer behaviors, motivational climates, or other environmental aspects are better suited to understanding how performance environments may contribute to, or prevent, DEA development. One promising approach is based in self-determination theory (Ryan & Deci, 2000) and focuses on the study of controlling leadership; in fact, one cross-sectional study has demonstrated significant relationships between perceptions of controlling coach behaviours, psychological need thwarting, and DEA in sport (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011).

The relative stability of many of the study variables across time highlights one of the difficulties inherent in studying disordered eating development. Further longitudinal work,

ideally over longer time scales, is clearly warranted; moreover, qualitative enquiry can aid a deeper understanding (Papathomas & Lavallee, 2012). Other limitations of the present study are also worth noting. First, only a small sub-set of dancers provided complete data at all five time points, despite the study spanning two years and five data collections, with highly committed dance centres who went out of their way to clear schedules for data collections. The limited number of participants across all time points was partly alleviated, however, by use of a statistical method that uses all available data points to model results; as such, we believe that the relatively large sample size and longitudinal nature of the work, which allowed examination of both between- and within-person effects, could be considered strengths. At the same time, the choice to consider between- and within-person effects led us to avoid examining potential moderator effects. It can be noted that such effects have been demonstrated in studies examining between-person differences in disordered eating (e.g., Brannan et al., 2009), and this line of research certainly warrants extension.

In line with much previous literature in related domains, we used the EAT-26 (Garner et al., 1982); however, this was not originally developed for use with children and use of a child-specific scale (e.g., the ChEAT; Maloney, McGuire, & Daniels, 1988) may have been preferable for our youngest participants. The questionnaires used were as relevant and dance-specific as possible and in the present study their psychometric properties were supported. However there are still no validated measures developed specifically for the domain of dance targeting our variables of interest and this necessitated the use of slightly amended measures. Further measure development in the domain of dance is warranted. At the same time, extending our work into sport would be a valuable endeavor. In particular, there is a need for further research into the predictors of DEA among, for instance, male athletes in aesthetic sports such that future prevention efforts can be built on good-quality evidence regarding which variables are most suitable as intervention targets.

Conclusion

In the present study, young dancers' attitudes relating to disordered eating (DEA) were studied, and DEA predictors were found to differ between males and females. Only perfectionistic concerns emerged as a common predictor variable for both sexes. For male dancers, additional significant predictors included perceptions of the motivational climate as task- and/or ego-involving. It was also noted that male dancers in a centre focused on classical ballet reported higher DEA scores than their peers in two of the centres focusing on contemporary dance. All of these predictors operated at the between-person level. For females, additional predictors emerged at both the between-person (self-esteem) and within-person levels (perfectionistic strivings and concerns). That is, when female dancers experienced heightened perfectionistic strivings and concerns in comparison to themselves, they also reported higher DEA scores. These findings extend literature regarding the (mal)adaptiveness of perfectionistic strivings. We also call for further theoretically grounded investigations into how learning environments may be related to DEA, given that our findings both concurred with and opposed theoretical reasoning based in Achievement Goal Theory. This would enable environmental risk factors to be better understood and managed. Additionally, our findings imply that dance teachers and sport coaches should not be given undue responsibility or critique as regards their role in performers' disordered eating development, when individual dispositions may be more suitable targets for intervention. Finally, future intervention efforts may need to be designed with different foci for males and females.

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Table 1. *Means, Standard Deviations and Sample Sizes for Key Study Variables Across Time*

Variables		Time 1 *M (SD)*		Time 2 *M (SD)*		Time 3 *M (SD)*		Time 4 *M (SD)*		Time 5 *M (SD)*	
		Female N =149	Male N =43	Female N =124	Male N =56	Female N =162	Male N =55	Female N =157	Male N =64	Female N =213	Male N =73
Eating Attitudes Test - 26	Total	5.29 (6.70)	5.26 (9.39)	5.91 (6.75)	4.41 (7.23)	5.12 (6.35)	3.55 (5.74)	6.06 (8.25)	3.55 (6.72)	5.10 (6.61)	3.56 (5.58)
	% Scoring above Cutoff	7.29 %	7.59%	7.74%	5.48%	7.94%	4.35%	7.23%	5.68%	5.65%	1.75%
Perfectionism Inventory	Perfectionistic Strivings	9.29 (1.66)	9.37 (1.90)	9.05 (1.49)	9.23 (1.99)	8.91 (1.57)	8.61 (1.60)	8.96 (1.61)	8.78 (1.62)	8.90 (1.53)	8.63 (1.80)
	Perfectionistic Concerns	11.20 (2.87)	11.54 (2.74)	10.97 (2.69)	11.30 (2.79)	10.96 (2.68)	10.70 (3.05)	11.29 (10.35)	10.35 (3.04)	10.96 (2.59)	10.81 (3.04)
Self-Esteem Scale		30.32 (3.85)	31.33 (3.43)	30.32 (4.58)	31.30 (4.92)	30.72 (4.35)	31.18 (4.75)	29.69 (4.69)	32.02 (4.29)	30.30 (4.61)	31.37 (4.17)
PMCSQ-2	Task-Involving	4.30 (.46)	4.30 (.54)	4.31 (.46)	4.28 (.47)	4.34 (.43)	4.27 (.45)	4.32 (.51)	4.34 (.52)	4.31 (.44)	4.24 (.57)
	Ego-Involving	2.02 (.71)	2.00 (.75)	2.15 (.71)	2.37 (.81)	2.16 (.66)	2.12 (.70)	2.26 (.68)	2.15 (.73)	2.17 (.74)	2.27 (.75)

Note: These descriptive statistics have been generated from the sample of 597 dancers who contributed data to the multilevel models, with one exception: prevalence rates (% dancers scoring above cutoff for the EAT-26) were calculated from the entire sample of 752 dancers. This was felt to give a more truthful representation because percentages are highly influenced by sample size, and there were relatively small numbers of males at some time points. Scores range from 0-3 (EAT-26), 1-4 (Self-esteem scale) 1-5 (Perfectionism Inventory, PMCSQ-2). Data for the EAT-26 is in raw form, because these are more readily interpreted than the log-transformed scores used in analyses. For the Perfectionism Inventory, scores represent the summed averages of three (perfectionistic strivings) and four (perfectionistic concerns) subscales. PMCSQ-2 is Perceived Motivational Climate in Sport Questionnaire – 2.

Table 2. *Number of participants providing complete data at 1-5 time points.*

Data points	Females		Males	
	N	Frequency	N	Frequency
1	227	51.83%	82	51.57%
2	105	23.97%	40	25.16%
3	68	15.53%	23	14.47%
4	26	5.94%	10	6.29%
5	12	2.74%	4	2.52%
Total	438	100%	159	100%

Note. These data points represent data having been collected in any order, so that a person contributing data at, for instance, two time points may have done so at time points 1 and 2, 2 and 3, or indeed any combination, including having done so at non-consecutive times.

882 Table 3. *Estimates Obtained from Multilevel Model Predicting Disordered Eating Attitudes*
883 *for Females*

Fixed Part		Estimates			
		Coefficient	SE	z	*p*
Time		-.001	.011	-0.86	0.39
Age at time 1		-.014	.013	-1.13	0.26
Dummy variables	< 12 months in CAT	-.066	.061	-1.08	0.28
	12-24 months in CAT	-.021	.005	0.45	0.67
	<6 years in dance	.048	.060	0.80	0.43
	6-11 years in dance	.014	.044	-0.32	0.75
	CAT centres				ns*
Training hours weekly	Between-person	.003	.005	0.62	0.53
	Within-person	.002	.004	0.45	0.65
Perfectionism	Strivings, between-person	.013	.016	.85	.40
	Strivings, within-person	.048	.017	2.79	< 0.01
	Concerns, between-person	.049	.010	4.72	< 0.01
	Concerns, within-person	.035	.011	3.04	< 0.01
Self-Esteem	Between-person	-.021	.005	-3.80	< 0.01
	Within-person	-.005	.006	-0.86	.39
Intercept		.724	.286		
Standard Deviation of Random Effects					
Intercept		.076	.016		
Residual: AR(1)		.411	.099		
Var(e)		.094	.014		
Overall					
Log-likelihood		-378.60		Observations	805
				Individuals	438
Multilevel vs. linear regression		$\chi^2 = 193.84$, $p < .01$			

884 *Note*. *Because complete reporting on 7 dummy variables is highly space-consuming, the
885 results of these calculations have been omitted. However, none were significant.

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Table 4. *Estimates Obtained from Multilevel Model Predicting Disordered Eating Attitudes for Males*

Fixed Part		Estimates			
		Coefficient	SE	z	*p*
Time		-.008	.017	-0.44	0.66
Age at time 1		.003	.018	0.19	0.85
Dummy variables	< 12 months in CAT	.004	.092	0.05	0.96
	12-24 months in CAT	-.114	.072	-1.59	0.11
	<6 years in dance	.023	.078	0.30	0.77
	6-11 years in dance	.071	.078	0.91	0.36
	Contemporary centre 1*	-.523	.142	-3.67	< 0.01
	Contemporary centre 2*	-.398	.116	-3.43	< 0.01
Training hours weekly	Between-person	-.008	.006	-1.33	0.18
	Within-person	.001	.006	0.12	0.90
Perfectionism	Strivings, between-person	-.000	.023	-.00	0.99
	Strivings, within-person	.022	.023	0.92	0.36
	Concerns, between-person	.041	.015	2.68	< 0.01
	Concerns, within-person	.013	.017	0.77	0.44
Self-Esteem	Between-person	-.014	.009	-1.66	0.10
	Within-person	.002	.009	0.20	0.84
Motivational Climate	Task, between- person	.169	.070	2.42	< 0.05
	Task, within-person	.052	.063	0.83	0.41
	Ego, between-person	.166	.052	3.18	< 0.01
	Ego, within-person	-.075	.048	-1.57	0.12
Intercept		-.395	.482		
Standard Deviation of Random Effects					
Intercept		.067	.021		
Residual: AR(1)		.307	.174		
Var(e)		.067	.016		
Overall					
Log-likelihood		-134.81		Observations	291
				Individuals	159
Multilevel vs. linear regression		$\chi^2 = 54.33$, $p < .01$			

Note. *Because complete reporting on 7 dummy variables is highly space-consuming, only the significant results of these calculations have been included. For motivational climate, "task" denotes task-involving climate perceptions and "ego" denotes ego-involving climate perceptions.