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5
6 **Longitudinal Examination of the Relationship Between Perfectionism and Motivational**
7 **Climate in Dance**

8
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Abstract

The present study examined the relationship between dance-related perfectionism and perceptions of motivational climate in dance over time. In doing so, three possibilities were tested: (a) perfectionism affects perceptions of the motivational climate, (b) perceptions of the motivational climate affect perfectionism, and (c) the relationship is reciprocal. Two-hundred and seventy-one young dancers ($M = 14.21$ years old, $SD = 1.96$) from UK Centres for Advanced Training completed questionnaires twice, approximately six months apart. Cross-lagged analysis indicated that perfectionistic concerns led to increased perceptions of an ego-involving climate and decreased perceptions of a task-involving climate over time. In addition, perceptions of a task-involving climate led to increased perfectionistic strivings over time. The findings suggest that perfectionistic concerns may colour perceptions of training/performing environments so that mistakes are deemed unacceptable and only superior performance is valued. They also suggest that perceptions of a task-involving climate in training/performing environments may encourage striving for excellence and perfection without promoting excessive concerns regarding their attainment.

A longitudinal examination of the relationship between perfectionism and motivational climate in dance

Research examining perfectionism in dance is scarce. However, dancers are an interesting population in which to study perfectionism for several reasons. First, dance is a popular physical activity and is rated second only to football (soccer) as the most common physical activity in UK schools (Quick, Dalziel, Thornton & Rayner, 2008). Second, media reports, as well as anecdotal and qualitative evidence, frequently describe dancers as perfectionists (e.g., van Staden, Myburgh & Poggenpoel, 2009). Finally, the notion that pursuing perfection is necessary in dance is pervasive (e.g., Mainwaring, 2009), but as performance criteria are typically subjective, what constitutes “perfect performance” is particularly vague. This means that perfectionistic dancers are reliant on ambiguous external judgments and are especially vulnerable to a sense of doubt regarding performance standards.

Perfectionism is typically considered to be a personality trait or disposition that exerts its influence in domains of personal significance (such as dance). It is broadly defined as a combination of perfectionistic strivings and perfectionistic concerns. Perfectionistic strivings capture aspects of perfectionism which reflect the pursuit of perfection and setting of exceedingly high standards. Perfectionistic concerns capture aspects of perfectionism that reflect concerns over performance, evaluative fears about others, and negative reactions to imperfection (Stoeber, 2011). The two broad dimensions manifest in a number of discreet sub-dimensions evident across multiple measures of perfectionism (see Enns & Cox, 2002, for a review). These include close proxies of the broad dimensions such as striving for excellence (the tendency to pursue perfect results and high standards) and concern over mistakes (the tendency to experience distress or anxiety over making a mistake) (Hill et al., 2004).

1 A small number of studies have examined perfectionism when manifested in dance.
2 The first noteworthy finding is that there is evidence that dancers report higher levels of
3 perfectionism in comparison to non-dancers (e.g., Montanari & Zietkiewicz, 2000). The
4 second noteworthy finding is that while perfectionistic strivings appear unproblematic, when
5 dancers exhibit perfectionistic concerns either independently or in combination with
6 perfectionistic strivings, they are likely to experience a range of difficulties. For example,
7 Nordin-Bates, Cumming, Aways and Sharp (2011) recently found that higher levels of both
8 perfectionistic concerns and strivings among dancers were associated with more debilitating
9 imagery (e.g., imagining oneself performing poorly), higher anxiety in relation to performing,
10 and lower self-confidence. Perfectionistic concerns are also positively related to adverse
11 physical symptoms (e.g., headaches, coughing, and sore muscles) and emotional difficulties
12 (e.g., negative affect and social physique anxiety) among dancers (Cumming & Duda, 2012).
13 In some cases this includes more insidious outcomes such as disordered eating (e.g., Anshel,
14 2004; Nordin-Bates, Walker, & Redding, 2011; Thomas, Keel, & Heatherton, 2005).

15 In examining the effects of perfectionism, some researchers have considered its
16 influence alongside other motivation-related factors including perceptions of the motivational
17 climate (Lemyre, Hall, & Roberts, 2008; Ommundsen, Roberts, Lemyre, & Miller, 2005). The
18 motivational climate represents perceptions of the type of environment or psychological
19 atmosphere in which one trains and performs (e.g., Ames, 1992; Nicholls, 1984). Within
20 achievement goal theory, it is posited that two main motivational climates exist (Ames, 1992).
21 A task-involving motivational climate manifests when performers are encouraged to improve
22 on their own performance standards, effort is recognised, mistakes are seen as part of the
23 learning process, and everyone's contribution is considered important. An ego-involving
24 motivational climate is evident when performers are encouraged to outdo their peers, rivalry
25 and favouritism is evident, and mistakes are punished. Research examining the motivational

1 climate has shown it to be a predictor of a range of important outcomes in sport and exercise
2 (see Harwood, Spray, & Keegan, 2008, for a review). While fewer studies exist in dance,
3 similar relationships have been observed, with a task-involving climate more conducive to
4 dancer performance and well-being than an ego-involving climate (e.g., Nordin-Bates et al.,
5 2012; Quested & Duda, 2009, 2010).

6 To date three studies have examined the relationship between perceptions of the
7 motivational climate and perfectionism. These have produced consistent findings. In two
8 studies of senior and junior elite athletes, Lemyre et al (2008) and Ommundsen et al (2005)
9 both found sub-dimensions of perfectionistic concerns (concern over mistakes and doubts
10 about action), or a combination of sub-dimensions, to be positively related to an ego-
11 involving climate and negatively related to a task-involving climate. Similarly, both studies
12 found a sub-dimension of perfectionistic strivings (personal standards) to be positively related
13 to an ego-involving climate and to be unrelated with a task-involving climate. In the only
14 study to examine this relationship in dancers, Carr and Wyon (2003) found a similar pattern
15 of relationships. Sub-dimensions of perfectionistic concerns (concern over mistakes and
16 doubts about action) were positively related to an ego-involving climate and negatively
17 related to a task-involving climate, whereas a sub-dimension of perfectionistic strivings
18 (personal standards) were positively related to an ego-involving climate and unrelated to a
19 task-involving climate.

20 While these studies indicate that perfectionism and perceptions of the motivational
21 climate are related, the causal direction of this relationship is not clear. Ommundsen and
22 colleagues (Ommundsen et al., 2005) and Lemyre and colleagues (Lemyre et al., 2008)
23 considered perfectionism and motivational climate to be part of a collection of important
24 predictors of outcomes in sport, without signalling the direction of the relationship between
25 them. However, Carr and Wyon (2003) proposed the possibility that the motivational climate

1 may be a social-environmental factor influential in the development of perfectionism. In
2 support of this possibility, Carr and Wyon (2003) found that sub-dimensions of perfectionistic
3 concerns (concern over mistakes and doubts about action) and perfectionistic strivings
4 (personal standards) were predicted by elements of a task-involving climate (important role
5 for all and emphasis on effort and learning) and elements of an ego-involving climate
6 (punishment for mistakes). As was acknowledged by Carr and Wyon (2003), however,
7 because their study (like the other two) was cross-sectional, causal inference was not possible.
8 The causal direction tested in their study was an assumption, rather than consequence, of their
9 analyses.

10 As the three studies to date have limited value in identifying the causal direction of the
11 relationship between perfectionism and motivational climate, the current study sought to
12 examine their relationship in a longitudinal manner. In doing so, the study introduces the
13 temporal ordering necessary to establish causal precedence between them (Taris, 2000). In
14 this regard, there are three possibilities, (a) perfectionism affects perceptions of the
15 motivational climate, (b) perceptions of the motivational climate affects perfectionism, and (c)
16 the relationship is reciprocal. These three possibilities are considered below.

17 The possibility that dance-related perfectionism influences perceptions of the
18 motivational climate they encounter in dance is based on the well-established association
19 between personality and the manner in which social environments are construed. This is
20 evident in research that has found perfectionism to predict perceptions of the relationships
21 with others (e.g., Stoeber, 2012) and behaviours that shape immediate social environments
22 such as interpersonal coping strategies (e.g., Haring, Hewitt, & Flett, 2003). In this regard, the
23 influence of perfectionistic concerns is especially evident in research. For example, in
24 Ommundsen et al's (2005) study perfectionistic concerns were related to higher conflict,
25 lower companionship, and lower acceptance among teammates (with perfectionistic strivings

1 largely unrelated). Based on this research, and the studies that have examined the
2 perfectionism-motivational climate relationship, it is possible that dance-related perfectionism
3 (perfectionistic concerns, in particular) may shape perceptions and behaviours within
4 training/performance environments in dance so that an ego-involving climate is considered
5 more salient and a task-involving climate more inconspicuous.

6 The opposing view that perceptions of the motivational climate in dance influences
7 dance-related perfectionism is based on the notion that perfectionism develops, at least in
8 part, in response to social practices. As described by Flett, Hewitt, Oliver, and Macdonald
9 (2002), there are a number of pathways through which perfectionism develops, including
10 social expectation (whereby perfectionism develops as it is thought to be required) and social
11 learning (whereby perfectionism develops through imitation). Research is supportive of the
12 notion that these processes can explain transmission of perfectionism from parents to their
13 children (e.g., Appleton, Hall, & Hill, 2010; Enns, Cox, & Clara, 2002) and it is probable that
14 these processes also operate within training/performing environments for young dancers. This
15 is alluded to by Carr and Wyon (2003) who argued that prolonged exposure to social
16 environments where mistakes are not tolerated or only superior performers are valued (an
17 ego-involving climate) may contribute to the internalisation of the features of perfectionistic
18 concerns, whereas social environments where mistakes are embraced and emphasis is placed
19 on effort and personal mastery (task-involving climate) may contribute to lower features of
20 perfectionistic concerns. Consequently, it is possible that over time perceptions of an ego-
21 involving climate in dance may contribute to the development of greater dance-related
22 perfectionistic concerns, and possibly perfectionistic strivings, and a task-involving climate
23 may contribute to lower dance-related perfectionistic concerns and higher perfectionistic
24 strivings.

1 were recruited as part of a larger project with UK Centres for Advanced Training (CAT)
2 examining talent development (Redding, Nordin-Bates, & Walker, 2011). CATs are
3 nationwide government-funded talent development programmes aimed at providing high-
4 quality part-time dance training in a range of styles to young people aged 10 to 18 years. Of 8
5 CATs, 7 focus on contemporary (modern) dance. One specializes in ballet and 2 have
6 additional specialised strands for urban or South Asian dance styles in parallel with
7 contemporary dance. Participants had spent an average of 7.91 ($SD = 3.46$) years in dance
8 overall and attended a CAT for an average of 12.22 months ($SD = 11.82$). On average, they
9 danced 7.59 hours weekly ($SD = 2.75$) in their CAT and most also danced in other dance
10 schools ($M = 4.99$ h/week, $SD = 4.39$).

11 **Procedures**

12 Ethical approval from an institutional review board was obtained prior to conducting
13 the study. Informed consent was obtained from participants as well as from parents of dancers
14 under 16 years of age. As part of the larger project, dancers completed measures of
15 perfectionism and motivational climate at two time points. Time 1 was in winter 2009 and
16 Time 2 in summer 2010, with intervals between data collection being approximately 6
17 months. Participants completed questionnaires in groups at their CAT. At least one researcher
18 was present to answer questions. Students were asked to complete the questionnaires
19 individually. Teachers were asked not to be present. To enable data matching over time
20 without the need for names on questionnaires, ID code lists were used.

21 **Measures**

22 **Perfectionism.** Two subscales from the Perfectionism Inventory (PI; Hill et al., 2004)
23 were used to measure dimensions of perfectionism. Striving for excellence (the tendency to
24 pursue perfect results and high standards) was used as a proxy for perfectionistic strivings (6-
25 items; 'I must achieve excellence in everything I do') and concerns over mistakes (the

1 tendency to experience distress or anxiety over making a mistake) was used as a proxy for
2 perfectionistic concerns (8-items; 'I am particularly embarrassed by failure'). These subscales
3 are highly correlated with their respective broad dimensions of perfectionism ($r = .80$ and
4 $.86$). To increase domain-specificity the instructions were altered to focus on dance ("Please
5 think about your life around dance when answering these questions, not your life in general")
6 and minor amendments were made to the items to focus on dance (see Nordin-Bates,
7 Cumming, et al., 2011). This is consistent with research that suggests the predictive ability of
8 perfectionism may be enhanced if assessed at domain level (e.g., Dunn, Craft, Causgrove
9 Dunn, & Gotwals, 2011). Dancers responded to items on a Likert scale ranging from 1
10 (*Strongly Disagree*) to 5 (*Strongly Agree*). Scores were calculated as an average of their
11 respective items. Evidence to support the validity and reliability of the original inventory has
12 been provided by Hill et al. (2004).

13 **Motivational climate.** An adapted Perceived Motivational Climate in Sport
14 Questionnaire - 2 (PMCSQ-2; Newton, Duda, & Yin, 2000) was used to capture climate
15 perceptions. The questionnaire includes subscales that when combined capture an ego-
16 involving climate (ego; unequal recognition and punishment for mistakes - "The teachers have
17 their own favourites.") and a task-involving climate (task; effort and improvement,
18 cooperative learning, and important role for all - "The teachers emphasise always trying your
19 best."). Again, the scale was amended so that the initial instructions and items focused on
20 dance. One subscale (intra-team rivalry) was also removed as it was not considered applicable
21 to dance (see Quested & Duda, 2009, 2010). The scale includes 24 items scored on a five-
22 point Likert scale ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Scores were
23 calculated as an average of their respective items. The original scale has established validity
24 and reliability for athletes of similar age to the dancers in this study (Newton et al., 2000) and

1 the psychometric properties of the adapted PMCSQ-2 were supported in recent dance research
2 (Quested & Duda, 2010).

3 **Results**

4 **Preliminary analyses**

5 Data were screened for inputting errors, outliers and normality prior to the main
6 analysis (see Tabachnick & Fidell, 2007, for full details of this procedure). Three univariate
7 outliers ($z > 3.29$) and 3 multivariate outliers (Mahalanobis distance greater than $\chi^2_{[8]} =$
8 26.13) were removed prior to further analyses. Descriptive statistics and bivariate correlations
9 between the variables are displayed in Table 1. Dancers generally reported moderate
10 perfectionism scores and perceived their climates to be highly task-involving and not
11 particularly ego-involving. Both perfectionism and motivational climate scores were similar
12 at Times 1 and 2. In terms of their bivariate relationships, perfectionism scores displayed
13 moderate and large relationships with each other and themselves within and across time.
14 Similar relationships, although to a lesser degree, were observed for perceptions of the
15 motivational climate.

16 **Cross-lagged panel analysis**

17 To examine whether perfectionism (strivings and concerns) predicted longitudinal
18 changes in perceptions of the motivational climate (task- and ego-involving), or vice versa,
19 cross-lagged panel analysis was conducted (Cook & Campbell, 1979). Cross-lagged models
20 include three components. The first component is synchronous correlations - the relationship
21 between variables within each time point (e.g., motivational climate at Time 1 and
22 perfectionism at Time 1). These indicate the size and direction of cross-sectional relationships
23 between variables (captured by correlations between variables or error/residual terms within
24 each time point). The second component is autocorrelations - the relationship among the same
25 variables over time (e.g., perfectionism at Time 1 and Time 2). These provide an indication of

1 stability across time. The third component is the cross-lagged correlations – the relationship
2 between one variable on another over time (e.g., motivational climate at Time 1 and
3 perfectionism at Time 2 plus perfectionism at Time 1 and motivational climate at Time 2).
4 With autocorrelations and synchronous correlations in place, interpretation of cross-lagged
5 correlations indicates the proportion of change in one variable uniquely explained by the other
6 (viz. cross-lagged effects). In doing so, cross-lagged effects provide a test of the plausibility
7 of two alternative directional causal hypotheses (i.e., perfectionism causes change in
8 perceptions of the motivational climate vs. perceptions of the motivational climate causes
9 change in perfectionism; see Kenny & Harackiewicz, 1979).

10 The cross-lagged analysis was conducted using measured variables and full
11 information maximum likelihood estimation (AMOS 19.0; Arbuckle, 2010). Fit indices and
12 conventional criteria for assessment of adequate model fit were used for evaluation:
13 Comparative Fit Index (CFI) > .90, Tucker-Lewis Index (TLI) > .90, Root Mean Square Error
14 of Approximation (RMSEA) < .08 (Hu & Bentler, 1999). This provided an opportunity to test
15 five competing models stipulating different relationships between perfectionism and
16 motivational climate perceptions (see Zacher & de Lange, 2011, for a recent example of this
17 approach). The first model (M1) included synchronous correlations and autocorrelations but
18 no cross-lagged correlations. This model provided a baseline for comparison with subsequent
19 models. Subsequent models (M2 to M5) included various combinations of cross-lagged
20 correlations. The second model (M2) included cross-lagged correlations between perceptions
21 of the motivational climate at Time 1 and perfectionism at Time 2 only. The third model (M3)
22 included the reverse - cross-lagged correlations between perfectionism at Time 1 and
23 perceptions of the motivational climate at Time 2 only. The fourth model (M4) included all
24 cross-lagged correlations constrained to be equal; that is, cross-lagged correlations were
25 stipulated to operate in tandem to an equal degree. The final model (M5) included all cross-

1 lagged correlations unconstrained. Chi-square difference tests compared the fit between these
2 nested models.

3 **Cross-lagged effects of perfectionism and motivational climate.** The results of the
4 analyses are displayed in Table 2.

5 Model 1 provided adequate fit for the observed data. It also indicated high stability of
6 perfectionism (perfectionistic strivings $\beta = .60$ and perfectionistic concerns $\beta = .70$, $ps < .01$)
7 and moderate stability of perceptions of the motivational climate (task-involving climate $\beta =$
8 $.55$ and ego-involving climate $\beta = .49$, $ps < .01$).

9 Model 2 provided some support for the influence of perfectionism on perceptions of
10 the motivational climate over time, with the cross-lagged effect of perfectionistic concerns on
11 perceptions of an ego-involving climate ($\beta = .16$, $p < .01$) and on a task-involving climate ($\beta =$
12 $-.13$, $p < .05$) being statistically significant. No other cross-lagged effects in this model were
13 statistically significant (perfectionistic strivings to task-involving climate $\beta = -.03$, and
14 perfectionistic strivings to ego-involving climate $\beta = .08$, both $ps > .05$). This model provided
15 a significantly improved fit in comparison to Model 1.

16 Model 3 provided some support for the influence of perceptions of the motivational
17 climate on perfectionism over time, with the cross-lagged effect of a task-involving climate
18 on perfectionistic strivings being statistically significant ($\beta = .14$, $p < .01$). No other cross-
19 lagged effects in this model were significant (task-involving climate to perfectionistic
20 concerns $\beta = -.01$, ego-involving climate to perfectionistic strivings $\beta = .07$, and ego-
21 involving climate to perfectionistic concerns $\beta = .07$, all $ps > .05$). Like Model 2, this model
22 provided a significantly improved fit in comparison to Model 1.

23 The causal predominance of dimensions of perfectionism versus perceptions of the
24 motivational climate was tested by comparing Model 4 to Model 5 (and Model 5 to all other
25 models). A chi-square difference test indicated that Model 5 provided better fit in comparison

1 to Model 4, indicating that the cross-lagged effects are not equivalent. Model 5 also provided
2 significantly improved fit in comparison to Model 1 and Model 3, and marginally significant
3 improved fit in comparison to Model 2 ($p = .053$). As a result of these comparisons, Model 5
4 was considered to be the model that best fit the observed data. Model 5 supported the causal
5 predominance of perfectionistic concerns over perceptions of an ego-involving climate and
6 task-involving climate. It also supported the causal predominance of a task-involving climate
7 over perfectionistic strivings. No other significant cross-lagged effects were observed. The
8 final full cross-lagged model (M5) is displayed in Figure 1.

9 **Discussion**

10 In the current study the relationship between dance-related perfectionism and
11 perceptions of the motivational climate in dance was examined over time. Three possibilities
12 were tested: (a) perfectionism affects perceptions of the motivational climate, (b) perceptions
13 of the motivational climate affect perfectionism, and (c) the relationship is reciprocal. With
14 regards to the possible influence of perfectionism on motivational climate, as expected,
15 perfectionistic concerns were found to predict higher perceptions of an ego-involving climate
16 and lower perceptions of a task-involving climate. In addition, as expected, perfectionistic
17 strivings were unrelated to perceptions of a task-involving climate. Contrary to what was
18 hypothesised, perfectionistic strivings did not predict perceptions of an ego-involving climate.
19 With regards to the possible influence of perceptions of the motivational climate on
20 perfectionism, as expected, a task-involving climate was found to predict higher
21 perfectionistic strivings. However, an ego-involving climate did not predict either
22 perfectionistic concerns or strivings, and a task-involving climate did not predict
23 perfectionistic concerns. Overall, the findings provide most support for possibility (c) – a
24 reciprocal relationship between dance-related perfectionism and perceptions of the
25 motivational climate in dance.

1 In the current study perfectionistic concerns was assessed using concern over
2 mistakes. The core feature of this sub-dimension of perfectionism is an extreme aversion to
3 mistakes but more broadly it reflects a self-evaluative tendency to consider mistakes to lead to
4 the loss of respect of others (Frost et al., 1990). It is easy to envisage how when exhibited by
5 dancers this mind-set may contribute to the view that mistakes should be avoided at all costs
6 and are a source of disapproval from instructors. By extension, as a further consequence of
7 this mind-set peers who give superior performances with fewer mistakes (as opposed to those
8 who are simply improving) are likely to be viewed as having greater value in this setting (as
9 opposed to sharing an equally important status with others). In this way perfectionistic
10 concerns may increase sensitivity to salient cues embedded in the social environment so that
11 over time young dancers come to view the training/performing environment in dance in an
12 increasingly ego-involving and decreasingly task-involving manner.

13 The influence of perfectionistic strivings was relatively muted by comparison.
14 Examination of bivariate relationships from previous research in dance and sport has provided
15 evidence that perfectionistic strivings are positively related to perceptions of an ego-involving
16 climate (Carr & Wyon, 2003; Lemyre et al., 2008; Ommundsen et al., 2005). In the current
17 study there was some partial evidence of this relationship within and across each time point.
18 However, no cross-lagged effects were found. In re-considering the role of perfectionistic
19 strivings, examination of only its unique effects indicates that when perfectionistic concerns
20 are controlled perfectionistic strivings may have little association with an ego-involving
21 climate (although one would also expect a positive correlation with a task-involving climate
22 that was not evident here; see Gotwals, Stoeber, Dunn, & Otto, 2012). Overall, in comparison
23 to cognitive-evaluative dimensions of perfectionism (i.e., perfectionistic concerns), the
24 behavioural act of striving (and any unique elements of the cognitive style captured by
25 perfectionistic strivings) plays an inconclusive (perhaps negligible) role in shaping

1 perceptions of the training/performance environment in dance. As this was the first study to
2 test the relationship between perfectionism and perceptions of the achievement climate over
3 time, additional research is necessary in order to confirm or refute this possibility (by re-
4 examining these relationships over shorter, similar, and longer periods of time, for instance).

5 Some influence of the motivational climate on perfectionism was evident.

6 Specifically, a task-involving climate was found to predict higher levels of perfectionistic
7 strivings across the 6 month period. This is an especially noteworthy finding because it is the
8 first time the influence of the social environment created in a specific achievement domain on
9 perfectionism expressed in that domain has been illustrated over time. In context of current
10 understanding of the origins of perfectionism, this finding can be understood as part of the
11 social pathways thought to explain its development (see Flett et al., 2002). This includes the
12 possibility that dance-related perfectionistic strivings develops as a direct response to overt
13 behaviours of instructors who signal that constant striving, personal improvement, and
14 mastery is expected in order to be successful in dance (cf. Mainwaring, 2009). Equally,
15 increasing dance-related perfectionistic strivings may be the result of imitation of the
16 achievement behaviours and commitment to striving for excellence and perfection young
17 dancers observe in instructors and peers over time. A note of caution is required, however.
18 This is because there was evidence of ‘overfit’ in the final model (M5) (TLI exceeded 1.00
19 and fit indices with confidence intervals that included zero) and the fit of the improvement in
20 fit was only marginally significant in comparison to a model that assumed the influence of
21 motivational climate on perfectionism to be zero. Therefore, the possibility that perceptions of
22 a task-involving climate influences perfectionistic striving over time is best considered
23 tentatively.

24 No influence of the motivational climate on perfectionistic concerns was evident. It
25 may be that because of the greater stability displayed by perfectionistic concerns, the

1 motivational climate was unlikely to influence changes in this dimension of perfectionism. In
2 this case other aspects of specific achievement contexts may also have little influence over the
3 development of this more entrenched feature of perfectionism. Alternatively, it may be that
4 the information captured by this particular conceptualisation of motivational climate (cues
5 that emphasise task-involvement and ego-involvement) was not especially important in the
6 development of perfectionistic concerns but other information might well be (e.g., cues that
7 emphasise approach and avoidance tendencies). In light of this possibility, researchers are
8 encouraged to use other conceptualisations of motivational climate to examine the influence
9 of training/performance environments on perfectionism as manifested in dance (and other
10 domains). In the meantime, it appears that promoting a task-involving climate in dance may
11 have the benefit of encouraging the pursuit of excellence and perfection without promoting
12 excessive concerns regarding their attainment.

13 Unlike perceptions of a task-involving climate, perceptions of an ego-involving
14 climate did not predict either perfectionistic concerns or strivings over time. It was initially
15 hypothesised that an ego-involving climate would contribute to the development of dancers'
16 perfectionistic concerns and strivings because this would reinforce the notion that mistakes
17 are not tolerated and only superior performances are acceptable in training/performing
18 environments in dance (Carr & Wyon, 2003). In support of this possibility previous research
19 has found an ego-involving climate to be positively related to perfectionistic strivings and
20 concerns (e.g., Lemyre et al., 2008; Ommundsen et al., 2005) and elements of an ego-
21 involving climate to predict sub-dimensions of perfectionistic concerns (Carr & Wyon, 2003).
22 However, the current findings were inconclusive with regards to the role perceptions of an
23 ego-involving climate play in the development of perfectionistic strivings in junior dancers
24 over time. Rather, the findings suggested that the causal direction may flow in the opposite
25 direction to that suggested in previous research (i.e., perfectionistic concerns impact

1 perceptions of an ego-involving climate and not the reverse). Again, further longitudinal
2 research is required to confirm or refute this possibility.

3 *Limitations and other future directions*

4 The current study had a number of noteworthy limitations. Firstly, dance offers a
5 unique environment in which to examine perfectionism. Therefore, it is possible that the
6 relationships observed in dance may not generalise to other contexts (e.g., sport, education,
7 and music). Secondly, there was some evidence of ‘overfit’ of the final model. This can
8 sometimes indicate that models may not fully replicate in other samples. Although this
9 concern is somewhat ameliorated here as the ‘overfit’ was not a result of ad-hoc, exploratory
10 changes to the model (as is often the case), further tests of this model in other samples of
11 dancers is necessary (the path from task-involving climate to perfectionistic striving, in
12 particular). Thirdly, developmental processes pertaining to perfectionism and perceptions of
13 the motivational climate are the backdrop of the current study. Examination of age-related
14 differences in these variables and moderation by age would offer further insight into the
15 perfectionism-climate relationship. Fourthly, in the absence of control and explanatory
16 variables in the current study, future studies will need to test alternative causal pathways (e.g.,
17 through dispositional achievement goals) that might account for the current findings. This
18 includes discounting the possibility that the observed relationships are the results of non-
19 specific variance associated with the context as both perfectionism and motivational climate
20 were measured in a domain-specific manner. Finally, the current study adopted self-report
21 measures to assess both perfectionism and motivational climate. Recent advances toward
22 more in-depth (Smith, Fry, Ethington, & Li, 2005) and objective (Morgan, Sproule, Weigand
23 & Carpenter, 2005) assessments of motivational climate, and use of other-report measures of
24 perfectionism (Flett, Besser, & Hewitt, 2005), provide valuable alternative means of verifying
25 the observed relationships.

1 *Conclusion*

2 The current study has begun to disentangle the causal relationship between
3 perfectionism and perceptions of the motivational climate. Dancers with higher perfectionistic
4 concerns are prone to experiencing training/performing environments in their dance studios as
5 more ego-involving and less task-involving over time. In addition, there was some tentative
6 evidence that greater perceptions of a task-involving climate contribute to higher levels of
7 perfectionistic strivings over time. Consequently, the relationship between the two
8 motivation-related factors is best considered reciprocal with perfectionism colouring
9 perceptions of the motivational climate and, in turn, the motivation climate potentially
10 reinforcing the achievement behaviour associated with perfectionism.

11

References

- 1
- 2 Ames, C. (1992). Achievement goals and the classroom motivational climate. In J. Meece &
3 D. Schunk (Eds.), *Students' perceptions in the classroom: Causes and consequences*
4 (pp. 327–348). Hillsdale, NJ: Erlbaum.
- 5 Anshel, M. H. (2004). Sources of disordered eating patterns between ballet dancers and non-
6 dancers. *Journal of Sport Behavior*, 27, 115-133.
- 7 Appleton, P. R., Hall, H. K., & Hill, A. P. (2010). Family patterns of perfectionism: An
8 examination of elite junior athletes and their parents. *Psychology of Sport and*
9 *Exercise*, 11, 363-371. DOI: 10.1016/j.psychsport.2010.04.005
- 10 Arbuckle, J. L. (2010). Amos (Version 19.0.0) [computer program]. Chicago: SPSS.
- 11 Caspi, A. (1998). Personality development across the life course. In W. Damon, & N.
12 Eisenberg (Eds.), *Handbook of child Psychology: Social, emotional and personality*
13 *development* (Vol. 3, pp. 311-388). New York: Wiley.
- 14 Caspi, A., & Roberts, B. W. (1999). Personality continuity and change across the life course.
15 In L. Pervin, & O. P. John (Eds.), *Handbook of personality psychology: Theory and*
16 *research* (2nd ed., pp. 300-326). New York: Guilford.
- 17 Carr, S., & Wyon, M. (2003). The impact of motivational climate on dance students'
18 achievement goals, trait anxiety, and perfectionism. *Journal of Dance Medicine and*
19 *Science*, 7, 105–114.
- 20 Cook, T. D. & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues for*
21 *field settings*. Boston: Houghton Mifflin.
- 22 Cumming, J., & Duda, J. L. (2012). Profiles of perfectionism, body-related concerns, and
23 indicators of psychological health in vocational dance students: An investigation of the
24 2 x 2 model of perfectionism. *Psychology of Sport and Exercise*. 13, 729-738. DOI:
25 10.1037/10458-002

- 1 Dunn, J. G. H., Craft, J., Causgrove Dunn, J., & Gotwals, J.K. (2011). Comparing a domain-
2 specific and global measure of perfectionism in competitive female figure skaters.
3 *Journal of Sport Behavior*, 34, 25-46.
- 4 Enns, M. W. & Cox, B. J. (2002). The nature and assessment of perfectionism: A critical
5 analysis. In G. L. Flett & P. L. Hewitt (Eds.), *Perfectionism: Theory, research, and*
6 *treatment* (pp. 33-62). Washington, DC: American Psychological Association. DOI:
7 10.1037/10458-000
- 8 Enns, M. W., Cox, B. J., & Clara, I. (2002). Adaptive and maladaptive perfectionism:
9 developmental origins and association with depression proneness. *Personality and*
10 *individual differences*, 33, 921-935. DOI: 10.1016/S0191-8869%2801%2900202-1
- 11 Flett, A., Besser, P. Hewitt, P. (2005). Perfectionism, ego defence styles, and depression: A
12 comparison of self-reports versus informant ratings. *Journal of Personality*, 73, 1355–
13 1396. DOI: 10.1111/j.1467-6494.2005.00352.x
- 14 Gotwals, J. K., Stoeber, J., Dunn, J. G. H., & Stoll, O. (2012). Are perfectionistic strivings in
15 sport adaptive? A systematic review of confirmatory, contradictory, and mixed
16 evidence. *Canadian Psychology*, 53, 263-279. DOI: 10.1037/a0030288
- 17 Haring, M., Hewitt, P. L., & Flett, G. L. (2003). Perfectionism, coping, and quality of intimate
18 relationships. *Journal of Marriage and Family*, 65, 143-158. DOI: 10.1111/j.1741-
19 3737.2003.00143.x
- 20 Harwood, C., Spray, C. M., & Keegan, R. (2008). Achievement goal theories in sport. In T. S.
21 Horn (Ed.), *Advances in sport psychology*. (3rd ed., pp. 157–185). Champaign, IL:
22 Human Kinetics.
- 23 Hill, R. W., Huelsmann, T. J., Furr, M., Kibler, J., Vicente, B. B., & Kennedy, C. (2004). A
24 new measure of perfectionism: The Perfectionism inventory. *Journal of personality*
25 *assessment*, 82, 80-91. DOI: 10.1207/s15327752jpa8201_13

- 1 Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indices in covariance structure analysis:
2 Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.
3 DOI: 10.1080/10705519909540118
- 4 Kenny, D. A. & Harackiewicz, J. M. (1979). Cross-lagged panel correlation: Practice and
5 promise. *Journal of Applied Psychology*, *64*, 372-379. DOI: 10.1037/0021-
6 9010.64.4.372
- 7 Lemyre, P-N., Hall, H. K., & Roberts, G. C. (2008). A social cognitive approach to burnout in
8 elite athletes. *Scandinavian Journal of Medicine and Science in Sports*, *18*, 221–234.
9 DOI: 10.1111/j.1600-0838.2007.00671.x
- 10 Mainwaring, L. M. (2009). Working with perfection. In K. F. Hays (Ed.), *Performance*
11 *Psychology in Action. A casebook for working with athletes, performing artists,*
12 *business leaders and professionals in high risk occupations* (pp. 139-159).
13 Washington DC: American Psychological Association. DOI: 10.1037/11876-007
- 14 Montanari, A. & Zietkiewicz, E. A. (2000). Adolescent South African ballet dancers. *South*
15 *African Journal of Psychology*, *30*, 31-35. DOI: 10.1177/008124630003000204
- 16 Morgan, K., Sproule, J., Weigand, D., & Carpenter, P. (2005). A computer-based
17 observational assessment of the teaching behaviours that influence motivational
18 climate in Physical Education. *Physical Education and Sport Pedagogy*, *10*, 83-105.
19 DOI: 10.1080/1740898042000334926
- 20 Newton, M., Duda, J. L., & Yin, Z. (2000). Examination of the psychometric properties of the
21 Perceived Motivational Climate in Sport Questionnaire-2 in a sample of female
22 athletes. *Journal of Sport Sciences*, *18*, 275–290. DOI: 10.1080/026404100365018
- 23 Nicholls, J. G. (1984). Achievement motivation: conceptions of ability, subjective experience,
24 task choice, and performance. *Psychological Review*, *91*, 328–346. DOI:
25 10.1037/0033-295X.91.3.328

- 1 Nordin-Bates, S. M., Cumming, J., Aways, D., & Sharp, L. (2011). Imagining yourself
2 dancing to perfection? Correlates of perfectionism among ballet and contemporary
3 dancers. *Journal of Clinical Sport Psychology*, 5, 58-76.
- 4 Nordin- Bates, S. M., Walker, I. J., & Redding, E. (2011). Correlates of disordered eating
5 attitudes among male and female young talented dancers: Findings from the UK
6 Centres for Advanced Training. *Eating Disorders*, 19, 1-23. DOI:
7 10.1080/10640266.2011.564976
- 8 Ommundsen, G. C., Roberts, G. C., Lemyre, P-N., & Miller, B. W. (2005). Peer relationships
9 in adolescent competitive soccer: Associations to perceived motivational climate,
10 achievement goals and perfectionism. *Journal of Sports Sciences*, 23, 977-989. DOI:
11 10.1080/02640410500127975
- 12 Quested, E., & Duda, J. L. (2009). Perceptions of the motivational climate, need satisfaction,
13 and indices of well- and ill-being among hip hop dancers. *Journal of Dance Medicine
14 and Science*, 13, 10–19.
- 15 Quested, E., & Duda, J. L. (2010). Exploring the social-environmental determinants of well-
16 and ill-being in dancers: A test of basic needs theory. *Journal of Sport and Exercise
17 Psychology*, 32, 39–60.
- 18 Quick, S., Dalziel, D., Thornton, A., & Rayner, S. (2008). *School sports survey 2007/2008*.
19 Department for Children, Schools and Families. Retrieved from:
20 www.education.gov.uk/publications/eOrderingDownload/DCSF-RW063.pdf
- 21 Smith, S. L. Fry, M. D. Ethington, C. A. & Li, Y. (2005). The effect of female athletes'
22 perceptions of their coaches' behaviors on their perceptions of the motivational
23 climate. *Journal of Applied Sport Psychology*, 17, 170-177. DOI:
24 10.1080/10413200590932470

1 Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion,
2 motivation, and performance. *International Review of Sport and Exercise Psychology*,
3 4, 128-145. DOI: 10.1080/1750984x.2011.604789

4 Stoeber, J. (2012). Dyadic perfectionism in romantic relationships: Predicting relationship
5 satisfaction and longterm commitment. *Personality and Individual Differences*, 53,
6 300-305. DOI: 10.1016/j.paid.2012.04.002

7 Tabachnick, B. G., and Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston:
8 Allyn and Bacon.

9 Taris, T. W. (2000). *A primer in longitudinal data analysis*. London: Sage.

10 Thomas, J. J., Keel, P. K., & Heatherton, T. F. (2005). Disordered eating attitudes and
11 behaviors in ballet students: examination of environmental and individual risk factors.
12 *International Journal of Eating Disorders*, 38, 263–268. DOI: 10.1002/eat.20185

13 van Staden, A., Myburgh, C. P. H., & Poggenpoel, M. (2009). A psycho-educational model to
14 enhance the self-development and mental health of classical dancers. *Journal of Dance*
15 *Medicine & Science*, 13, 20-28.

16 Zacher, H. & de Lange, A. H. (2011). Relations between chronic regulatory focus and future
17 time perspective: Results of a cross-lagged structural equation model. *Personality and*
18 *Individual Differences*, 50, 1255–1260. DOI: 10.1016/j.paid.2011.02.020

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1 Table 1 *Descriptive statistics and bivariate correlations*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
Perfectionism: Time 1										
1) Strivings	3.35	0.73	$\alpha = .86$							
2) Concerns	2.18	0.79	.43**	$\alpha = .94$						
Perfectionism: Time 2										
3) Strivings	3.38	0.72	.62**	.20**	$\alpha = .86$					
4) Concerns	2.24	0.85	.34**	.71**	.38**	$\alpha = .95$				
Climate Perceptions: Time 1										
5) Task	4.38	0.41	.04	-.20**	.14*	-.17*	$\alpha = .90$			
6) Ego	2.04	0.62	.21**	.41**	.11	.36**	-.38**	$\alpha = .88$		
Climate Perceptions: Time 2										
7) Task	4.32	0.47	-.06	-.24**	-.02	-.27**	.56**	-.26**	$\alpha = .88$	
8) Ego	2.19	0.67	.26**	.36**	.35**	.45**	-.21**	.50**	-.49**	$\alpha = .88$

2 Note. * $p < .05$, ** $p < .01$. All *M* and *SD* values are reported on a Likert scale 1 to 5. Cronbach's α area displayed on the diagonal.

3

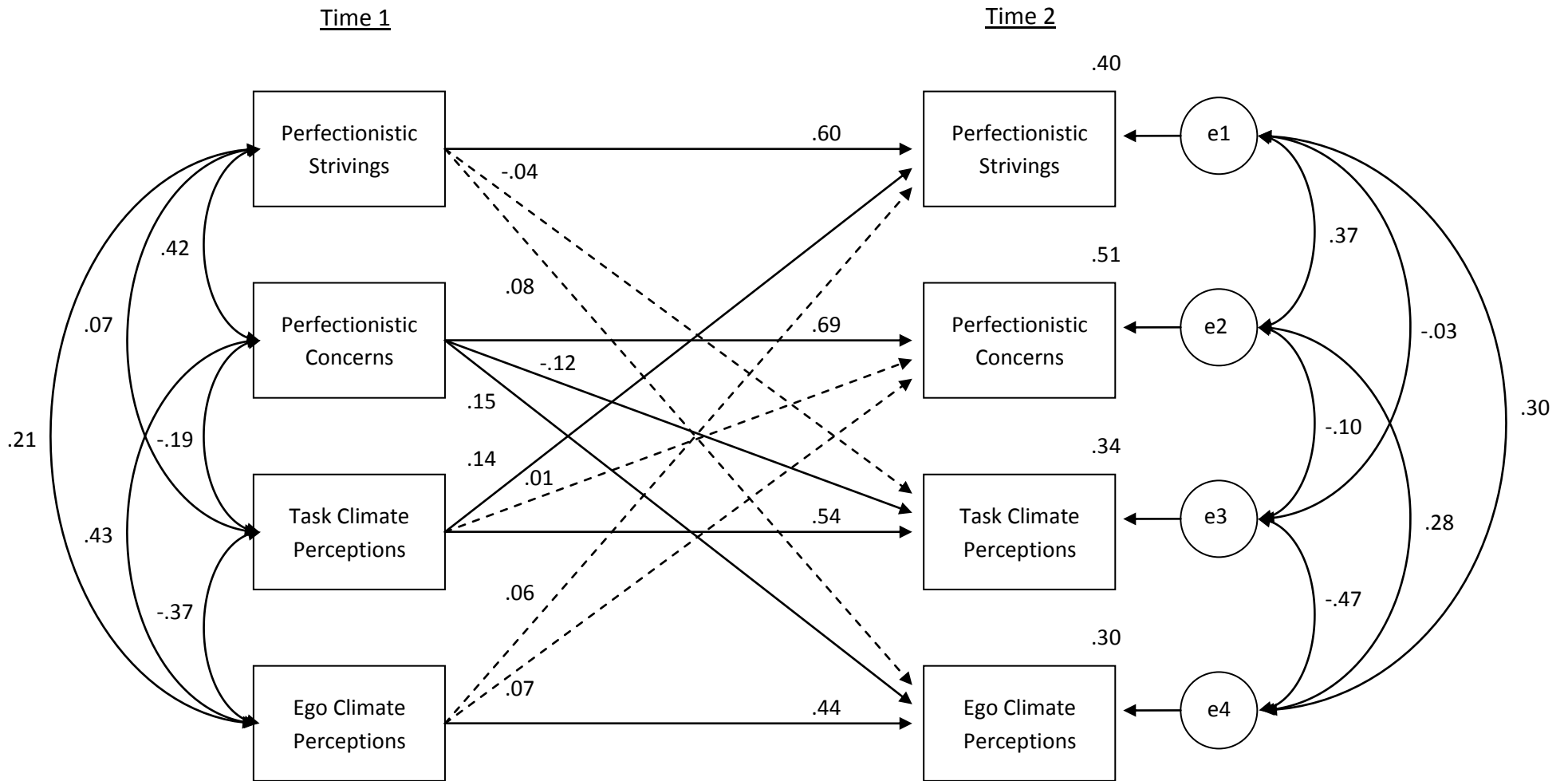
1 Table 2 *Fit indices and model comparisons for cross-lagged analysis*

Model	χ^2	df	CFI	TLI	RMSEA (95% CI)		$\Delta\chi^2$	Δdf
M1: Stability coefficients only	26.42*	12	.98	.94	.07 (.03 to .10)			
M2: Perfectionism cross-lagged effects only	11.35	8	1.00	.98	.04 (.00 to .09)	M1 vs M2	15.07**	4
M3: Motivational climate cross-lagged effects only	16.08*	8	.99	.95	.06 (.01 to .11)	M1 vs M3	10.34*	4
M4: All cross-lagged effects (constrained equal)	25.42**	11	.98	.94	.07 (.03 to .11)	M1 vs M4	1.00	1
M5: All cross-lagged effects (unconstrained)	2.02	4	1.00	1.00†	.00 (.00 to .07)	M1 vs M5	24.40**	8
						M2 vs M5	9.33	4
						M3 vs M5	14.06**	4
						M4 vs M5	23.39**	7

2 *Note.* * $p < .05$, ** $p < .01$. M1-M5 denotes the five different models tested, df denotes degrees of freedom, CFI stands for Comparative Fit Index,
 3 TLI for Tucker-Lewis Index, and RMSEA for Root Mean Square Error of Approximation. † As TLI is a non-normed index it can exceed 1 and in
 4 this instance it was 1.02. However, when this is the case it is conventional to report it as 1.00 (McDonald & Ho, 2002).

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Figure 1 Cross-lagged model with standardized coefficients (M5). Dashed lines depict non-significant pathways ($p < .05$). Correlations among predictor variables and error terms are free to vary.



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