

## ARTICLE

## The effects of self-administered attributional retraining for dancers: A pilot study

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## Abstract

Intervention studies in sport indicate that attributional training can enhance performance, expectations for future success, resilience, and optimism. However, no such studies have examined its effects in dance. This study investigates the effects of a self-administered attributional training program for dancers. A total of 32 university-level dancers participated in the study and were randomly assigned to an immediate training group (ITG;  $n = 16$ ) or a delayed training group (DTG;  $n = 16$ ). Participants completed a battery of tests pre- and post-intervention, including the Sport Attributional Style Scale–Short Form, Positive and Negative Affect Schedule, and Consistency in Dance Performance Scale. The intervention was delivered via cognitive-behavioral bibliotherapy using a 19-day training manual. The manual aimed to help dancers develop more functional attributions and more optimistic thoughts regarding their dancing and self-perception. The ITG received the manual and was given one month to complete it, whereas the DTG was informed they would receive the manual after one month. Once each group had completed the manual, the same battery of tests was administered. Statistical analyses indicated a trend toward more functional attributions post-intervention, although this did not reach statistical significance. Post-intervention, the ITG reported significantly greater positive affect, and the DTG reported significantly lower negative affect. The ITG group also demonstrated significantly greater consistency in dance performance following the intervention. Participant feedback suggested that the manual was largely helpful, although modifications were recommended. Overall, bibliotherapy shows promise as an intervention for dancers, improving affective responses and aspects of wellbeing. Future research should replicate this study with a larger sample of dancers.

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## 1. Introduction

Research literature documenting the challenges faced by dancers is well-established. Dancers are exposed to a range of stressors, including a high physical workload,<sup>1</sup> aesthetic pressures around body weight and shape,<sup>2</sup> high injury rates,<sup>3</sup> and financial and job insecurity.<sup>4</sup>

Compared to non-dancer control groups, dancers report significantly higher levels of anxiety,<sup>5,6</sup> depression,<sup>7</sup> eating disorders,<sup>8</sup> and perfectionism,<sup>6,9</sup> and lower levels of self-esteem.<sup>5,10,11</sup> On the other hand, there are numerous reports of the positive aspects of dancing. Dancers are highly passionate about their art and derive a great deal of joy from it,<sup>12,13</sup> reporting high scores on measures of personal growth and purpose in life.<sup>14</sup> Dance provides opportunities to experience flow,<sup>15</sup> express inner thoughts and feelings through movement,<sup>16</sup> contribute to diverse communities,<sup>13</sup> and engage in socialization, collaboration, and performance with like-minded peers.<sup>12</sup>

The various rewards and challenges that dancers encounter in their training and careers suggest that the next pertinent step for researchers in the field is to begin testing interventions to target the documented stressors and/or facilitate the positive aspects of the dance experience.<sup>17</sup> However, only a limited number of psychological intervention studies have been conducted in dance, focusing on areas such as eating disorders,<sup>18</sup> injury prevention via psychological coping skills,<sup>19,20</sup> and imagery training.<sup>21,22</sup> While these studies have produced promising results, far more research is needed to establish the impact of psychological interventions for dancers. This is a worthy pursuit as cognitive-based training, and interventions have been used in sport to enhance athlete performance and wellbeing for decades.<sup>23</sup>

Given that the most successful athletes adopt mental skills and strategies in particular ways that help them succeed,<sup>24,25</sup> sport researchers have focused on the cognitive processes that can enhance or undermine performance. The cognitive strategies that take place immediately following a performance error appear especially critical, because these processes effectively predict the success of future performances.<sup>26-28</sup> Such cognitive strategies may be of particular importance in dance, given the technical precision required by many genres. Explanatory styles, which are an individual's habitual way of interpreting different events, have been used to predict how an athlete will respond to errors.<sup>26-28</sup> The attributions people make to explain positive and negative outcomes are associated with an optimistic or pessimistic explanatory style.<sup>28</sup>

The three major elements that determine explanatory style are internality, stability, and globality.<sup>29,30</sup> Internality refers to whether a person attributes outcomes to internal or external causes. Individuals who internalize events place the consequences of all outcomes on themselves, whereas individuals who externalize events hold other people or circumstances responsible for outcomes.<sup>29</sup> Stability refers to whether a person perceives an outcome as temporary

(unstable) or permanent (stable).<sup>31</sup> Globality refers to whether an individual attributes outcomes to global or specific factors.<sup>31</sup> Global attributions affect all areas of an individual's life, whereas specific attributions affect only the immediate area impacted by the outcome. Attributions affect emotional reactions to events as well as expectations of future success or failure.<sup>32</sup> They also determine if an individual will have a pessimistic or optimistic explanatory style: an individual with a pessimistic explanatory style will attribute negative outcomes to internal, stable, and global causes and positive outcomes to external, unstable, and specific causes. Conversely, an individual with an optimistic explanatory style will attribute negative outcomes to external, unstable, and specific causes and positive outcomes to internal stable, and global causes. These are often referred to as functional attributions.<sup>29</sup> More recently, attributions relating to controllability (controllable vs. uncontrollable)<sup>33</sup> and intentionality (intentional vs. unintentional)<sup>34</sup> have been explored in the sport psychology literature. However, these additional dimensions have not been universally adopted; for example, conceptual overlaps between internality and controllability have been identified.<sup>35,36</sup>

While researchers have yet to examine attributions among dancers, sport psychology studies have supported the basic tenets of attribution theories. For example, athletes tend to cite internal, stable, and controllable attributions more often for successful performances than for less successful ones.<sup>37</sup> Athletes with more optimistic explanatory styles also recover more readily after a failure than those with pessimistic explanatory styles,<sup>27,28</sup> indicating that attribution training may be useful in helping athletes "bounce back" from failure.<sup>28,38</sup> Accordingly, intervention studies using attribution retraining have tended to focus on modifying attributions for failure. For example, learning to attribute failure to unstable and controllable causes can enhance performance,<sup>39,40</sup> expectations for future success,<sup>41,42</sup> and persistence,<sup>41</sup> while developing a more optimistic explanatory style can enhance confidence and resilience following adversity.<sup>43</sup>

Early attribution theory posited that attributions may have affective consequences, such as feelings of pride, hopefulness, shame, and guilt.<sup>44</sup> There is some support for this; for instance, positive emotions have been associated with the dimensions of internality, stability, and controllability in relation to successful performances.<sup>42,45-47</sup> However, there is little consistency regarding the emotional outcomes of different causal attributions, suggesting that this area warrants further investigation.<sup>32,47,48</sup> Overall, sport research presents a convincing case for the utility of attributional retraining to develop optimistic explanatory

styles, which may enhance both performance and, potentially, the experience of positive emotions. This pilot study aims to explore the effects of attributional retraining among a group of university-level dancers using a cognitive-based intervention.

Cognitive therapy has been identified as a useful method for changing attributions and pessimistic thought patterns in both mainstream and athletic populations.<sup>31</sup> Cognitive therapy is based on three major assumptions: (i) Cognitive activity can affect behavior, (ii) cognitive activity can be altered, and (iii) cognitive change can facilitate desired behavioral change.<sup>49</sup> The central premise of cognitive therapy is to change dysfunctional thought patterns into more adaptive beliefs.<sup>50</sup>

Cognitive-based interventions are often used to enhance athletic performance.<sup>23</sup> These interventions focus on improving the psychological skills of athletes to enhance their performance and/or wellbeing. Previous research has utilized an extensive range of cognitive-behavioral strategies, including goal-setting, imagery or mental rehearsal, relaxation training, stress management, cognitive restructuring, or a combination of these techniques.<sup>51</sup>

Cognitive restructuring is of particular interest in this study, as it can be used to change the way individuals interpret positive and negative events, thereby altering pessimistic cognitions and producing more optimistic explanatory styles.<sup>50</sup> Attributional retraining is based on the assumption that it is possible to alter an individual's responses to failure by modifying their attributions.<sup>26</sup> This study first investigates whether attributional retraining can support dancers in attributing negative events to external, unstable, and specific causes, and second examines whether changes in attributions increase the experience of positive emotions and reduce the experience of negative ones.

There are numerous means for administering cognitive therapy techniques, with self-administered approaches such as bibliotherapy gaining increased prominence. Cognitive bibliotherapy can be defined as a standardized treatment provided to an individual in the form of a book that is taken home and worked through with minimal or no contact with a therapist.<sup>52</sup> The self-administered booklet describes in sufficient detail both the concepts of cognitive therapy and the goal of the treatment. Despite some debate over the lack of a traditional therapist–patient relationship,<sup>52</sup> meta-analyses have confirmed both the clinical and statistical significance of bibliotherapy among individuals with depression or anxiety.<sup>53,54</sup> Accordingly, the dancers' perceptions of their consistency in performance over time were captured alongside more objective measures

of positive and negative affect.

The majority of bibliotherapy literature has focused on depression and anxiety within the general population, but there is clear potential for this type of intervention to be employed in domains such as dance. Indeed, the flexibility of bibliotherapy may be particularly attractive as an intervention for dancers, whose training, rehearsal, and performance schedules may make scheduling regular in-person therapy or counselling sessions challenging. Therefore, the aims of the current study are two-fold: (i) to investigate whether dancers can change their attributions using cognitive bibliotherapy; and (ii) to examine whether bibliotherapy had any additional effects on dancers' mood and perceptions of their dance performance. There is a clear interest in assessing the extent to which cognitions affect performance, but while some sport studies have assessed changes in performance following attributional retraining,<sup>39</sup> dance performance tends to be assessed subjectively. Accordingly, the dancers' perceptions of their consistency in performance over time were captured alongside more objective measures of positive and negative affect.

## 2. Methods

### 2.1. Study participants

A total of 32 university students majoring in dance (female = 29, male = 3), aged  $19.21 \pm 1.04$  years, participated in the study. Participants identified as White ( $n = 25$ ), Black ( $n = 3$ ), Hispanic ( $n = 2$ ), Asian ( $n = 1$ ), or mixed race ( $n = 1$ ). They reported a dance experience of  $13.91 \pm 3.64$  years, predominantly beginning their training with ballet, either alone or in combination with other dance forms such as jazz and tap. The majority of dancers were in their freshman year (37.5%), with 28.1% in sophomore year, and 25% and 9.4% in their junior and senior years, respectively. At the time of the study, participants were enrolled in university classes in ballet, modern, and jazz. When asked about their desire to pursue a professional dance career, 20 participants indicated "yes," three indicated "no," and nine responded that they "did not know."

Participants were recruited from the university dance department via flyers posted in dance facilities and brief presentations delivered by the first author to dance class groups. Dance teachers were also asked to inform their classes about the research. The study was approved by a university ethics board and complied with APA ethical standards. Participants provided informed consent prior to participation and were assured that their data were entirely anonymous and treated confidentially, and that they could withdraw from the study at any time.

## 2.2. Measures

### 2.2.1. The Sport Attributional Style Scale–Short Form

The Sport Attributional Style Scale–Short Form (SASS-SF)<sup>34</sup> is a self-report measure of an individual's attributional style in sport-specific situations, comprising 10 hypothetical scenarios—five positive and five negative. In the present study, the wording of these scenarios was modified, replacing sport terminology with dance terminology. Participants were asked to generate a cause (attribution) for each event and answer six questions about that cause. The six questions assessed three attributional dimensions of internality, stability, and globality. Although the SASS-SF also includes two specific athletic attributions (intentionality and controllability), these were not included in the current study due to concerns regarding conceptual overlap, particularly between controllability and internality.<sup>55</sup> Composite scores for the three dimensions were created for positive and negative events by summing the relevant items. Higher ratings indicate more internal, stable, and global attributions, whereas lower scores indicate more external, unstable, and specific attributions. Internal reliability was poor in six instances across the three time points, and item deletion would not have increased  $\alpha$  above 0.70 in three of these instances. However, low Cronbach's  $\alpha$  is not unusual for scales with 10 items or fewer.<sup>56</sup> Internal reliability was otherwise good across most time points ( $\alpha = 0.71$ – $0.89$ ).

### 2.2.2. Positive and Negative Affect Schedule (PANAS)

The Positive and Negative Affect Schedule (PANAS)<sup>57</sup> is a self-report measure of an individual's emotional state during the past week. It consists of two 10-item subscales measuring positive affect and negative affect. Respondents rated each adjective on a five-point Likert scale ranging from 1 (slightly or not at all) to 5 (extremely), indicating the extent to which they had felt emotion during the past week. The scale demonstrated good internal reliability at all time points ( $\alpha = 0.69$ – $0.89$ ).

### 2.2.3. Consistency in Dance Performance Scale

A short scale (Consistency in Dance Performance Scale [CIDPS]) was created to assess the dancers' perceptions of their own performance. The scale consists of six hypothetical scenarios measuring how consistent dancers perceived their recent performances to be, both in class and on stage. An example item for class performance was: "When you make a mistake at the beginning of a combination, how consistent is your dancing during the rest of the combination?" An example item for stage performance was: "How would you rate your performance in your last dance performance?" Items were scored on a

scale ranging from 1 (not at all consistent) to 7 (completely consistent). Scores were averaged to create a composite variable for analyses. Internal reliability was acceptable at Time 1 ( $\alpha = 0.66$ ), and good at both Time 2 ( $\alpha = 0.84$ ) and Time 3 ( $\alpha = 0.89$ ).

### 2.2.4. Feedback survey

Once each group had completed the attributional training, they were invited to provide feedback on the manual via an open-ended survey. Participants were asked to specify, for how many days out of 19, they had (i) read the manual and (ii) completed the exercises. If the manual had not been completed, participants were asked to explain the reason. Participants were also asked whether they had found the manual useful and to provide justification. They were invited to describe what they liked and disliked about the manual and to suggest any changes. Out of 32 participants, 24 completed the feedback survey, including 16 from the immediate training group (ITG) and eight from the delayed training group (DTG).

## 2.3. Training material: Attributional retraining manual

An attributional retraining manual was created as the cognitive-behavioral bibliotherapy intervention. The manual was adapted from one produced for an unpublished study on attributional retraining among gymnasts. In that study, gymnasts reported increased optimism and positive affect following the intervention, suggesting its potential applicability to other artist-athlete populations, such as dancers. The manual consists of 19 daily lessons, each including training goals, real-life scenarios, and assignments reworded with terminology appropriate for dancers.

The manual is organized into three sections. The first section introduces and defines the dimensions of explanatory styles. Its primary focus is for participants to recognize daily challenges and the negative automatic thoughts that may follow. Practice scenarios are included to aid understanding. The second section teaches dancers how to challenge their negative thoughts and change their attributions. Participants are instructed to record challenges encountered during the day and consciously work through the thoughts and beliefs arising from these incidents. The third section reviews all material and addresses the appropriate use of optimism and pessimism, demonstrating how these strategies benefit participants in everyday life. Journaling assignments are incorporated throughout the 19 days to help dancers apply their new knowledge to real-world situations.

## 2.4. Procedure

At Time 1 (Figure 1), all participants completed the SASS-SF, PANAS, and CIDPS. Participants were then randomly assigned to the ITG ( $n = 16$ ) or DTG ( $n = 16$ ). The ITG received the training manual and was informed that they had approximately four weeks to complete it. Research assistants familiar with the study and attribution theory periodically contacted participants in both groups during this period to address questions or concerns. At Time 2, following the four-week period, all participants completed the battery of questionnaires for a second time (SASS-SF, PANAS, and CIDPS).

After completion of the Time 2 questionnaires, the DTG received the training manual and was informed that they had approximately four weeks to complete it. During this period, research assistants again made periodic phone calls, but only to participants in the DTG. At Time 3, following the four-week period, all participants were invited to complete the final battery of questionnaires. Completion rates were lower at Time 3, with 12 participants from the ITG and 10 participants from the DTG returning the questionnaires.

Employing three time points enabled assessment of the training manual's effectiveness across two separate participant groups, while allowing the DTG to serve as a control for the ITG between Times 1 and 2.

## 2.5. Statistical analysis

Data were analyzed using SPSS version 29.0.2.0 (IBM Corp., USA), with statistical significance set at  $p < 0.05$ . Prior to analysis, data were assessed for multicollinearity using a correlation matrix, homogeneity of variance using Box's  $M$ , linear relationships using linear regression, outliers using box plots and Mahalanobis distance, and normality using visual analysis inspection of Q-Q plots, scatter plots, and Shapiro-Wilk tests. Descriptive statistics

were calculated for all primary outcomes and participant characteristics.

A repeated-measures multivariate analysis of variance was used to assess group differences between the ITG and DTG from Time 1 to Time 2. For significant interactions, follow-up analyses of variance were conducted. Paired  $t$ -tests were used to assess changes in the DTG between Time 2 and Time 3. Participants in the DTG with incomplete data ( $n = 6$ ) between Time 2 and Time 3 were excluded from the analyses. Effect sizes for significant outcomes were calculated using Cohen's  $d$  to quantify the magnitude of observed effects.

Feedback survey responses were analyzed as follows: the number of days participants had read and completed the manual was averaged, and the range was calculated. Responses to open-ended questions about the manual's efficacy, and suggestions for improvement were content analyzed by identifying themes and coding them into categories.

## 3. Results

### 3.1. Multivariate analysis of variance

#### 3.1.1. The Sport Attributional Style Scale–Short Form

The analysis revealed no significant time-group interaction for the SASS-SF ( $F[6, 25] = 1.56, p = 0.20$ , Wilks'  $\lambda = 0.73$ , partial  $\eta^2 = 0.27$ ). However, inspection of the means (Table 1) suggested trends in the expected direction for the ITG, indicating that participants' attributions may have become more functional following the intervention. Although these changes did not reach statistical significance, they provide preliminary evidence that the intervention manual may have a modest effect on attributional styles.

#### 3.1.2. Positive and Negative Affect Schedule

The time-group interaction for the PANAS was marginally

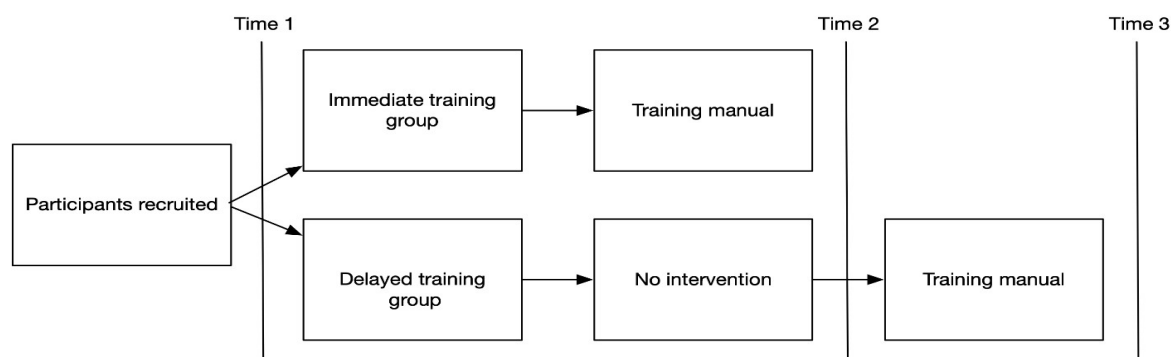


Figure 1. Schematic illustration of the study procedure

significant ( $F[2, 29] = 3.23, p = 0.05$ , Wilks'  $\lambda = 0.82$ , partial  $\eta^2 = 0.18$ ). Follow-up ANOVAs revealed a significant difference between groups on the positive affect subscale ( $F[1, 30] = 4.57, p = 0.04$ , partial  $\eta^2 = 0.13$ ), whereas no significant difference was observed on the negative affect subscale ( $F[1, 30] = 3.24, p = 0.08$ , partial  $\eta^2 = 0.10$ ).

### 3.1.3. Consistency in Dance Performance Scale

The multivariate model for the CIDPS was significant ( $F[1, 30] = 11.07, p = 0.002$ , Wilks'  $\lambda = 0.73$ , partial  $\eta^2 = 0.27$ ). However, follow-up univariate tests did not reach significance ( $F[1, 30] = 1.92, p = 0.18$ , partial  $\eta^2 = 0.06$ ).

### 3.2. Paired-sample *t*-tests

Paired-sample *t*-tests were conducted to assess changes over time between Time 2 and Time 3 for the DTG. The analysis revealed that only the negative affect subscale of the PANAS changed significantly ( $t[9] = 2.39, p = 0.04$ ). Mean scores for the DTG decreased from  $25.90 \pm 7.14$  at Time 2 to  $20.40 \pm 5.21$  at Time 3.

In addition to the reduction in negative affect, mean scores for the DTG during their intervention period

(Time 2 to Time 3) trended in the expected direction for other variables (Table 2), partially confirming the results observed in the ITG. However, an exception was observed in the SASS-SF: internality and stability for positive events decreased between Time 2 and Time 3. The small sample size at Time 3 should be considered when interpreting these findings.

### 3.3. Feedback survey results

Analysis of reported completion rates revealed that participants read the manual for an average of  $14.61 \pm 5.57$  days (range: 5–19 days) and completed an average of  $12.61 \pm 4.86$  days (range: 5–19). Thus, participants generally read over half of the manual but did not complete the final portion. From day 15 onward, the manual shifts from combined information and practice exercises to practice exercises only. These findings suggest that participants found the earlier sections of the manual (days 1–14) more valuable, likely due to the inclusion of detailed explanations.

Lower compliance after day 15 may also be explained by participant difficulties: eight participants reported struggling to identify sufficient adverse situations (inside

**Table 1. Means and standard deviations for all measures at Time 1 and 2 by group**

Outcome measure	Dimension	Immediate training group		Delayed training group	
		Time 1	Time 2	Time 1	Time 2
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
SASS-SF					
	Internality	27.44 (3.35)	28.56 (3.87)	28.25 (2.82)	29.13 (3.03)
Positive	Stability	26.00 (3.45)	28.13 (3.50)	28.69 (3.24)	29.19 (3.47)
	Globality	24.06 (4.99)	25.00 (3.97)	23.81 (5.83)	21.44 (6.23)
	Internality	27.00 (3.20)	24.81 (4.26)	26.75 (3.89)	27.06 (4.02)
Negative	Stability	25.31 (4.74)	22.75 (5.13)	26.81 (4.23)	25.94 (5.22)
	Globality	21.75 (6.04)	20.94 (4.58)	21.13 (5.85)	20.69 (4.79)
PANAS					
Positive	-	34.56 (6.81)	38.69 (5.65)	33.81 (7.61)	31.19 (6.64)
Negative	-	23.56 (4.59)	22.50 (5.47)	27.00 (7.22)	25.56 (7.68)
CIDPS	-	4.82 (0.91)	5.53 (0.83)	4.92 (0.58)	4.74 (0.86)

Abbreviations: CIDPS: Consistency in Dance Performance; PANAS: Positive and Negative Affect Schedule; SASS-SF: Sport Attributional Style Scale–Short Form; SD: Standard deviation.

Table 2. Means and standard deviations for all measures at Time 2 and Time 3 for the delayed intervention group

Outcome measure	Dimension	Time 2	Time 3
		Mean (SD)	Mean (SD)
SASS-SF			
	Internality	29.60 (3.20)	28.80 (5.14)
Positive	Stability	28.80 (3.46)	25.80 (6.43)
	Globality	22.40 (5.58)	22.10 (7.97)
	Internality	27.90 (4.82)	25.00 (5.91)
Negative	Stability	24.60 (5.23)	21.10 (7.70)
	Globality	20.40 (4.97)	18.20 (5.67)
PANAS			
Positive	-	33.40 (6.54)	36.20 (5.87)
Negative	-	25.90 (7.14)	20.40 (5.21)
CIDPS	-	4.48 (0.92)	4.82 (0.96)

Abbreviations: CIDPS: Consistency in Dance Performance; PANAS: Positive and Negative Affect Schedule; SASS-SF: Sport Attributional Style Scale–Short Form; SD: Standard deviation.

or outside of dance) to complete the exercises, and one participant noted a lack of enjoyment in practicing. The relative safety, comfort, and predictable routine of dance training may have limited the availability of adverse situations for practice, an unexpected outcome that should be considered in revisions of the manual. Additionally, 11 participants reported being too busy or forgetting to complete the manual, suggesting that more reminders from the research team could improve adherence.

Regarding perceived usefulness, 19 of the 24 participants who returned the feedback survey reported that the intervention was useful, with two responding “no” and two responding “somewhat.” The two participants who did not find the intervention useful stated that they “already think like that” (i.e., more optimistically). Conversely, one participant who rated the intervention as “somewhat useful” indicated a desire for more extensive work on the topic.

Participants who found the manual useful provided several justifications. Many reported learning new and engaging information about thinking styles. As one dancer explained, “It was very informative and a great training tool. I learned a lot about myself and habits.” Participants became more aware of their thinking styles, the origins of pessimism, and its effects. One dancer commented, “I

really didn’t realize some of the negative thoughts that I had about my performance in dance.”

The dancers were also able to apply this learning in practice, with many reporting increased positive thoughts and reduced negative ones. They learned “how to think in other ways,” which helped them feel more confident and optimistic. One dancer noted, “It is starting to work. I feel better about my dancing,” while another described having “a better attitude toward dance now.” Several participants provided examples of applying the techniques in real situations, including coping with emotions during injury recovery or using them onstage. For example, one dancer explained, “During a performance, I caught myself in negative patterns of thought. I implemented the ABCDE and distraction techniques to get myself focused again.”

Many participants also valued the modality of the intervention, appreciating the reading format and the clear, organized structure. They reported that the flexible approach enabled them to work at their own pace and apply learning directly to practice. However, some participants reported that the intervention was “too demanding,” involving excessive reading, writing, and exercises, and expressed a preference for a more interactive approach. Additionally, one participant found the terminology challenging, another struggled to relate to some example

scenarios, and a third felt that the manual emphasized pessimism more than optimism.

#### 4. Discussion

The aims of this pilot study were twofold: first, to investigate whether dancers could modify their attributions through cognitive bibliotherapy, and second, to determine whether bibliotherapy influences dancers' positive and negative affect, as well as their self-perceptions of dance performance. A sample of university-level dancers completed a 19-day cognitive bibliotherapy manual designed to promote more functional attributional styles. To the authors' knowledge, this is the first study to investigate attributional retraining in a dancer population. Overall, the findings suggest that bibliotherapy may facilitate shifts toward more optimistic explanatory styles and improve mood.

No significant changes were observed in SASS-SF scores for either the ITG or DTG post-intervention. However, inspection of mean scores in the ITG indicated directional changes across internality, stability, and globality, suggesting movement toward more optimistic and less pessimistic explanatory styles. Specifically, dancers in the ITG showed a pattern of attributing positive events to internal, stable, and global causes, and negative events to external, unstable, and specific causes following the intervention. Although these trends did not reach statistical significance, they are consistent with previous sport-based intervention studies demonstrating improvements in functional attributions following attributional retraining.<sup>39-41,43</sup>

Similarly, although no significant changes in SASS-SF scores were observed over time in the DTG, most scores shifted in the expected direction post-intervention. However, internality and stability for positive events decreased at Time 3, although these changes were not statistically significant. Internality refers to whether an individual attributes outcomes to internal or external causes<sup>[29]</sup>; thus, a decrease in internality for positive events suggests that dancers in the DTG increasingly attributed positive outcomes to external factors, such as other people or situational circumstances. Stability refers to whether an individual perceives outcomes as temporary or permanent<sup>[31]</sup>; therefore, a decrease in stability suggests that positive events were perceived as more temporary.

The reasons for these decreases remain unclear and are based on a small subset of DTG participants. Given the limited sample size, firm conclusions cannot be drawn. Rather than speculating about potential explanations, future research should replicate the study with a larger sample to examine these patterns more rigorously.

Taken together, although SASS-SF scores did not

change sufficiently to achieve statistical significance, the overall directional trends suggest limited but potentially meaningful intervention effects. These findings should be interpreted with caution; nevertheless, the observed patterns support the need for further investigation in this area.

Regarding dancers' mood, the ITG demonstrated a significant increase in positive affect post-intervention, suggesting that modifying attributions may increase the frequency of emotions such as enthusiasm, determination, and inspiration. The effect size was large, indicating practical relevance for dancers' mood and aligning with previous sport-based intervention studies.<sup>41-43</sup>

No significant change was observed for negative affect in the ITG, although mean scores decreased modestly between Time 1 and Time 2. In contrast, the DTG showed a significant decrease in negative affect post-intervention, while positive affect demonstrated a non-significant upward trend. Together, these findings support the notion that attributional retraining can influence emotional experiences. However, the slight inconsistency between ITG and DTG outcomes underscores the need for further research examining the relationship between attributional style and affect<sup>32,47,48</sup>

The final outcome measure was dancers' self-perceived consistency of performance in both class and on stage. Analyses revealed that scores increased significantly in the ITG post-intervention, while the DTG demonstrated a non-significant upward trend. A more optimistic explanatory style may enhance perceived performance consistency because dancers learn to respond to errors in a less pessimistic and more balanced manner. They may ruminate less on mistakes, feel more confident about future performances, and persist longer in challenging tasks, which could ultimately contribute to performance improvement.<sup>39,41-43</sup>

Dancers adopting less pessimistic explanatory styles may also evaluate themselves and their abilities less harshly, generating more realistic interpretations for adversity that support perceptions of consistent performance. Furthermore, reduced negative responses to performance errors may facilitate quicker recovery from perceived failures.<sup>28,38</sup>

Although performance consistency was not measured objectively, these findings are encouraging given the established role of cognitions in shaping behavior and affect, both of which influence performance outcomes.<sup>49</sup> For example, optimism is associated with task-oriented coping strategies, such as planning and increased effort, among adolescent athletes.<sup>58</sup>



Overall, the findings from this study suggest that a cognitive bibliotherapy intervention designed to enhance functional attributions can yield several beneficial outcomes. Importantly, the dancers' feedback about the manual supports these findings. The majority of participants who returned the feedback survey reported that they found the manual useful. These dancers explained that they liked learning about the theory, but also learning about themselves, their own thinking habits and styles, and then being able to use the techniques to modify them. Although some participants would have preferred a more interactive approach, many of the dancers reported enjoying the bibliotherapy modality and appreciated the day-by-day, flexible approach. Interestingly, two dancers did not find it useful because they already believed themselves to be quite optimistic in their attributional styles. This suggests that screening for existing levels of optimism might be useful in future trials to ensure the intervention is targeting dancers who would benefit from it the most.

Useful information also emerged from the dancers' self-reported completion rates. On average, the participants read or completed over half of the manual but did not complete the final portion, which comprised practice exercises only. This was either because the dancers were too busy and forgot to complete the manual, or because they lacked sufficient adverse situations to complete the practice exercises. It is intriguing to consider whether higher completion rates might have resulted in more statistically significant changes in pre- and post-intervention scores. The dancers' feedback offers valuable directions for future revisions of the manual, including: reducing the length of the manual; offering more varied example scenarios for participants to use for practice if they have insufficient adverse scenarios to draw on from their own lives; incorporating a greater balance between positive and negative example scenarios; and providing more reminders to complete the manual.

Collectively, these findings suggest that the manual was valuable for the majority of the participants. Attributional retraining could be applied in a range of settings across the dance industry, helping dancers to respond to errors, failure, and adversity in more positive and realistic ways. This may be particularly helpful for dancers in their final stages of training or recent graduates, helping them manage the challenges and setbacks they are likely to experience as they navigate their early careers.<sup>14</sup> Moreover, bibliotherapy may be effective as an intervention tool for dancers with busy and unpredictable schedules because it can be engaged with in flexible and autonomous ways. It could also prove beneficial for dancers who are unable to access or afford formal mental health and wellbeing services.

#### 4.1. Limitations

The current study was a pilot project and is therefore limited

by its small sample size, which may have contributed to inconsistencies in findings across the two groups. Additionally, as noted above, not all dancers completed the full 19-day training program. Feedback suggested that this was partly due to their busy schedules. The university organizes four main performances annually—two in the fall and two in the spring. Consequently, regardless of when participants began the manual, most were either rehearsing for or performing in a show during the intervention period, in addition to maintaining their academic commitments.

Future studies could collaborate with training institutions and professional companies to identify less intensive periods within the training or performance calendar, thereby allowing dancers to dedicate greater time and attention to the intervention. Finally, given the analytical approach adopted, causal inferences cannot be made. It cannot be determined whether engagement with the manual or changes in attributional style were responsible for the observed changes in positive and negative affect, as other unmeasured factors may have influenced these results.

However, the findings indicated largely positive change following engagement with the manual, some of which reached statistical significance. Accordingly, further research is warranted to evaluate the intervention in a larger sample. Future research should continue to examine the potential of attributional retraining to enhance both performance and psychological wellbeing among dancers using larger and more diverse samples (e.g., with respect to ethnicity, dance genre, age, and level of participation). Researchers are also encouraged to explore a broader range of outcome measures, such as objective performance and alternative assessments of affect, to further clarify the extent to which attributional styles influence emotional experience. Finally, future studies could adopt statistical approaches that directly test whether changes in attributions predict changes in other outcome variables.

## 5. Conclusion

This study indicates that an attributional retraining intervention delivered through bibliotherapy may enhance positive affect, reduce negative affect, and improve dancers' perceptions of their performance. Furthermore, although changes in attributional style did not reach statistical significance, the observed trends suggest movement toward more functional attributions. These findings were supported by participant feedback, with the majority reporting that the manual was useful and providing examples of how it helped them manage negative thoughts. Overall, cognitive bibliotherapy shows promise as an effective intervention approach for dancers. The dancers'

notable eagerness to participate suggests a demand for this type of psychological skills training. Accordingly, the study highlights the need for continued research on attribution theories as they apply to dancers, along with the use of these and other psychological interventions within dance settings.

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## Conflict of interest

The authors declare they have no competing interests.

## Author contributions

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## Ethics approval and consent to participate

The study received ethical approval from the University of Alabama Institutional Review Board (IRB: 05-OR-026). Informed consent was obtained from all participants involved in the study.

## Consent for publication

Written informed consent to publish this article was obtained from all participants involved in the study. However, participants have not given consent for data sharing.

## Availability of data

The raw data presented in this study are available upon request from the corresponding author. The data are not publicly available due to ethical and privacy concerns: participants have not given consent for the data to be shared publicly.

## Further disclosure

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