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THE RELATIONSHIP BETWEEN PROBLEM-SOLVING SKILLS & FACTORS THAT INTERFERE WITH PERFORMANCE IN THE WORLD'S ELITE CIRCUS ARTISTS

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ABSTRACT

Although common lore suggests mental skills are critical to circus performance, there is a paucity of research examining psychological factors in circus artists. In this study, the investigators evaluate the relationship between problem-solving skills and factors affecting performance in 109 circus artists representing 7 shows in Cirque du Soleil and one student cohort in the National Circus School of Montreal, Québec. These circus organizations are known around the globe as model programs. As hypothesized, problem-solving skills involving the ability to dissociate from problems and focus on preferred goal-based solutions (as opposed to rumination on past events) were predictive of functional thoughts and a relaxed state of mind during shows. Also as expected, Cirque du Soleil artists tended to demonstrate better problem-solving abilities and lower dysfunctional thoughts and stress in both training and show contexts when compared with National Circus School artists. Problem-solving skills involving the ability to utilize resources and personal strengths were not associated with dysfunctional thoughts and stressors influencing circus performance during shows or training. Recommendations are discussed in light of the findings, including the need to develop and experimentally evaluate problem-solving skills in circus populations.

THE RELATIONSHIP BETWEEN PROBLEM-SOLVING SKILLS AND FACTORS ASSOCIATED WITH PERFORMANCE IN THE WORLD'S ELITE CIRCUS ARTISTS

Problem-solving is a specific cognitive-behavioral process that may be utilized to increase the likelihood of selecting the most effective solution when obstacles are present (D'Zurilla & Goldfried, 1971). This procedure has been used for goal achievement (Cavanagh & Grant, 2010), and includes (1) defining the problem, (2) brainstorming solutions without critique, (3) evaluating the pros and cons of generated alternatives, and (4) implementing the best available option (Nezu, Nezu, & D'Zurilla, 2007). Problem-solving skills have been found to enhance psychological well-being through partial mediation of stress (Chang, D'Zurilla, & Sanna, 2009). For instance, problem-solving appears to reduce debilitating cognitions (Lam & Cheng, 1998), and facilitates adaptive cognitive reactions to stress (Misra & McKean, 2000). Consequently, the development of problem-solving skills is important to daily living (Bell & D'Zurilla, 2009).

Individuals who possess effective problem-solving skills tend to utilize greater problem-focused coping mechanisms and brainstorm more alternative solutions when facing negative circumstances, as compared with individuals who lack problem-solving skills (MacNair & Elliott, 1992). Problem-solving skills also appear to have a positive effect in reducing mental and physiological syndromes, including anxiety, depression, executive dysfunction, conduct disorder, substance disorders, and low back pain and obesity (see Becker-Weidman, Jacobs, Reinecke, Silva, & March, 2010; Korstjens et al., 2011; Malouff, Thorsteinsson, & Schutte,

2007). High self-perception of problem-solving abilities is associated with lower stress and fewer physical health problems (Largo-Wight, Peterson, & Chen, 2005).

The demanding nature of elite amateur and professional sport is well documented (Donohue et al., 2014; Mellalieu, Neil, Hanton, & Fletcher, 2009). Therefore, problem-solving skills may be particularly beneficial to athletes and artists because this skill is associated with better performance in managing stressors across multiple domains. For instance, problem-solving skills are associated with better academic performance and strong study habits (Elliott, Godshall, Shrout, & Witty, 1990), and the use of problem-solving coping strategies (e.g., imagery, effort expenditure, thought control, logical analysis) in athletes is associated with constructs related to improved athletic performance (Crust, 2007), such as "mental toughness" (Nicholls, Polman, Levy, & Backhouse, 2008). Experienced athletes tend to use more problem-focused strategies, and are better able to screen out emotionally laden responses to environmental stressors, as compared with inexperienced athletes (Macquet & Skalej, 2015). Therefore, problem-solving skills may assist athletes in coping with a variety of performance-relevant stressors, ultimately enhancing their performance.

Both athletes and non-athletes transition into circus (Ménard & Hallé, 2014), necessitating physical and mental adjustments to novel routines and reliance upon cultures and creative brainstorming, and leading professionals to report problem-solving skills are an important tool in this population (Filho, Aubertin, & Petiot, 2016). With the exception of a few studies that focus on injuries in circus artists (e.g., Hamilton, Meeuwisse, Emery, Steele, & Shrier, 2011; Wanke, McCormack, Koch, Wanke, & Groneberg, 2012) and studies that present qualitative data specific to performance (Filho et al., 2016), there is a conspicuous absence of data-informed literature specific to performance in circus artists, including psychological factors impacting performance in circus. Thus, lacking scientific research, circus practitioners, artists and administrators have relied upon research from associated fields (i.e., sport) and clinical lore passed down across generations to understand and manage stressors and dysfunctional thoughts.

As a first step in understanding performance in circus, Filho and colleagues (2016) compiled self-reported performance-related stressors that artists experienced in circus. In their systematic assessment of testimonials, aerial acts most frequently endorsed fear of injury, whereas clowns felt social pressure from the audience. Pain control was the largest source of stress for contortionists, and jugglers experienced risk of overtraining and fear of failure. The investigators concluded that the psychological components of circus specialties vary, and that sport psychology techniques may be applicable to all circus concentrations. This systematic assembly of testimonials provides a context in which to understand performance applications and suggests performance research is warranted in circus.

Along these lines, Cirque du Soleil (CdS) and the National Circus School (NCS; also known as École Nationale de Cirque) in Montréal, Québec (QC) are exceptional backdrops by which to establish scientific study of psychological factors in circus. These organizations are highly regarded within the world of circus (Filho et al., 2016; Munro, 2014). Indeed, CdS changed the face of this performance industry and now serves as a standard for circus arts (Rantisi, 2014), with approximately 4,000 employees worldwide and annual revenues surpassing $900 million and growing (Cirque du Soleil, 2015).

With such a diverse cast, both in abilities and countries of origin, CdS utilizes physical and multicultural diversities to enhance the show experience. This organization also provides numerous resources, including physical therapists, strength and conditioning coaches, and nutritionists to facilitate artist success (Isaacson, 2007; Ménard & Hallé, 2014). Artists often arrive before shows or artistic training to receive these specialized services to prevent and treat injury and improve strength. They also rehearse acts (often with other artists and specialized coaches) prior to performing up to 2 shows per night. Given these

rigorous training schedules, integrated treatment teams, including psychology, appear to be necessary to prevent burnout and injury while facilitating artist performance and well-being.

CdS employs artists from diverse training programs, including NCS. In this prestigious college for circus art (see Rantisi & Leslie, 2013), students spend up to 12 hours each day refining their physical and artistic abilities while being intimately trained by experienced disciplinary and art teachers. Students attend traditional courses in a classroom setting to learn a variety of art forms, such as clowning, acrobatics, and theater performance. Once NCS artists choose their preferred circus act, they are assisted by specialized coaches and peers. An entire year of training is focused on a final performance to highlight art knowledge and performance growth, and the training and show experiences for these artists are often much different from the show experience of CdS artists.

The present investigation will extend examination of problem-solving skills to circus artists, a population that has been reported to experience high levels of stress due to their daily participation in dangerous activities (Filho et al., 2016). In the present study it was hypothesized that CdS artists would demonstrate higher levels of problem-solving skills and lower levels of dysfunctional thoughts and stress as compared with NCS artists. The study was also aimed at determining the association between problem-solving skills and factors that are associated with training and show performance in the CdS artists and NCS students. It was hypothesized that problem-solving skills would be associated with, and predictive of, dysfunctional thoughts and stressors that have been found to interfere with circus training and show performance.

METHOD

PARTICIPANTS

Participants were 109 artists from seven CdS shows in Las Vegas, NV, and Montreal, QC (n = 88), and one cohort of student artists from NCS in Montreal, QC (n = 21). All artists volunteered to participate in the study, were at least 18 years of age, and were employed or enrolled in CdS or NCS, respectfully, at the time of data collection. Table 1 depicts demographic information of CdS, NCS, and combined samples.

RECRUITMENT PROCEDURE

CdS and NCS administrators announced the initiation of a voluntary study led by a research team in university located in the southwest United States. Artists were then invited to attend a meeting within their respective program facilities to learn more about the study. In this meeting, researchers made a formal study announcement and all artists who expressed interest completed informed consent and baseline assessment measures. Following seven meetings with CdS shows at their respective theaters and one meeting with NCS across a 40-day period, a total of 109 artists enrolled in the study and completed the assessment measures with the understanding that their individual scores would be de-identified and remain confidential. All procedures were approved by the university's Institutional Review Board for the Protection of Human Subjects.

MEASURES

Instrumentation. Following informed consent, participants completed a basic demographic survey and a comprehensive battery of assessments. The assessments occurred in small groups at the respective program facilities over the course of two months.

Solution Focused Inventory (SFI). The SFI (Grant et al., 2012) is a 12-item measure used to assess solution-focused thinking among three subscales: Problem Disengagement, Goal Orientation, and Resource Activation. Problem Disengagement involves the ability to dissociate from problems by focusing on the preferred solution (e.g., "I tend to spend more time analyzing my problems than working on possible solutions"). Goal Orientation concerns the ability to focus on potential optimal outcomes as opposed to rumination on past events, problems, or failures (e.g., "I imagine my goals and then work towards them"). Lastly, Resource Activation involves an ability to identify and utilize resources to solve problems (e.g., "Most people are more resilient than they realize"). Participants rate the extent to which they agree with each statement using a six-point Likert response scale (1 = Strongly Disagree; 6 = Strongly Agree). In the original study, SFI demonstrated good test-retest reliability over a 16-week period (0.84) and good internal consistency (Cronbach's α = .84; Grant et al., 2012). In the current sample, internal consistency of SFI Total was .77. Cronbach's alpha values for the Problem Disengagement, Goal Orientation, and Resource Activation subscales were .74, .84, and .66, respectively.

Sport Interference Checklist (SIC). The SIC (Donohue, Silver, Dickens, Covassin, & Lancer, 2007) is a 26-item measure validated to assess cognitive and behavioral factors that interfere with athletic performance in both training (Problems in Sport Training Scale, PSTS; Cronbach's α = .91) and competition (Problems in Sport Competition Scale, PSCS; Cronbach's α = .92). The original psychometric validation of the SIC yielded four factors in the PSTS, including Dysfunctional Thoughts and Stress, Academic Problems, Injury Concerns and Poor Team Relationships, and six factors in the PSCS, including Dysfunctional Thoughts and Stress, Academic and Adjustment Problems, Lack of Motivation, Overly Confident/Critical, Injury Concerns, and Pain Intolerance. Each item is rated on a 7-point Likert scale indicating the extent to which each item interferes with performance in each respective domain (1 = Never; 7 = Always). The present study focused on the PSTS and PSCS Dysfunctional Thoughts and Stress subscales (e.g., "Negative thoughts about personal performance," "Difficulty thinking positively once negative thoughts have occurred") to isolate cognitive aspects influencing performance. Circus-specific modifications were

performed to be more consistent with circus culture, including: (1) rewording two items that made reference to teammates to reflect members of the circus environment, (2) revising three items that focused on sport performance to reflect circus performance, (3) changing one item that was relevant to grade point average to reflect activities that more broadly referenced personal advancement, and (4) changing the scale names (PSTS to Training, PSCS to Shows). Thus, PSTS data in the current study is referred to as Dysfunctional Thoughts and Stress in Training, and PSCS data in the current study is referred to as Dysfunctional Thoughts and Stress in Shows. In the current sample, internal consistency of the Dysfunctional Thoughts and Stress subscales in Training (Cronbach's α = .84) and Shows (Cronbach's α = .85) were good.

DATA ANALYSIS

Statistical Package for Social Sciences (SPSS) version 21.0 was utilized in data analysis. To assist in understanding the sample under study, NCS and CdS participants were compared on demographic variables utilizing a two-tailed independent samples t-test for age and Chi square tests for gender, ethnicity, and companion status.

Independent samples t-tests were utilized to test the hypothesis that CdS participants would demonstrate higher scores on each of the SFI subscales (i.e. Problem Disengagement, Goal Orientation, Resource Activation) and less Dysfunctional Thoughts and Stress interfering with performance in both Shows and Training contexts, as compared with NCS participants.

To examine the hypothesis that SFI subscale scores were significantly associated with Dysfunctional Thoughts and Stress in both Training and Competition, Pearson product correlations were

used. In addition, a linear regression analysis was performed to test the hypothesis that problem-solving skills (via subscales of the SFI) would predict Dysfunctional Thoughts and Stress in Training and Shows (SFI subscales are independent variables, Dysfunctional Thoughts and Stress in Training and Shows are dependent variables).

RESULTS

Demographic Comparison between NCS and CdS Participants

A series of two-tailed independent samples t-tests and Chi square tests were performed to determine if participants from CdS and NCS differed in age, gender, ethnicity and intimate partner status. These results indicated that participants differed significantly in age (M = 20.57, SD = 2.2), $t(107) = -6.46$, $p < .001$, and intimate partner status, $X2(2, N = 109) = 8.10$, $p = .017$.

Comparison of Problem-Solving and Dysfunctional Thoughts and Stress across Artists

The means, standard deviations, and results of independent samples t-tests comparing circus artist level (NCS, CdS) on Problem-Solving (SFI) and Dysfunctional Thoughts and Stress in Training and Shows are presented in Table 2. A series of one-tailed, independent samples t-tests was conducted to test the hypothesis that CdS artists would demonstrate higher levels of problem-solving skills as assessed in the three subscales of the SFI (i.e., Problem Disengagement, Goal Orientation, and Resource Activation), and less Dysfunctional Thoughts and Stress negatively impacting performance in both Show and Training contexts, as compared with NCS artists. As indicated in Table 2, CdS artists evidenced significantly higher scores on all subscales on the SFI and significantly lower scores on the Dysfunctional Thoughts and Stress subscales in Training and Show contexts.

Association between Problem-Solving and Dysfunctional Thoughts and Stress

Associations among SFI subscales and dysfunctional thoughts and stress in training and show contexts were analyzed using the Pearson correlation analysis technique (see Table 3). There was a significant positive relationship between Dysfunctional Thoughts and Stress in Training and in Shows (r = .69, p < .01). As expected, results demonstrated a significant negative relationship between Problem Disengagement strategies and Dysfunctional Thoughts and Stress in Training (r = -.54, p < .01) and in Shows (r = -.42, p < .01). Goal Orientation was significantly negatively associated with Dysfunctional Thoughts and Stress in Shows (r = -.26, p < .01), but not in Training. The SFI Resource Activation problem-solving strategy was not significantly correlated with Dysfunctional Thoughts and Stress in Training or Shows (ps. > .05). The SFI Resource Activation subscale was excluded from the following regression analyses due to inadequate internal consistency (Cronbach's α = .66). Results of Pearson product analyses are presented in Table 3.

Predicting Dysfunctional Thoughts and Stress from Problem-Solving

A multiple regression analysis was used to test the hypothesis that Goal Orientation and Problem Disengagement problem-solving strategies would predict Dysfunctional Thoughts and Stress in both Training and Shows. Problem Disengagement and Goal Orientation strategies explained 30% of the variance in Dysfunctional Thoughts and Stress in Training (R^2 = .30, F(2,105) = 21.97, p < .001) and 21% of the variance in Shows (R^2 = .21, F(2,105) = 13.98, p < .001). Only Problem Disengagement was a significant predictor of Dysfunctional Thoughts and Stress in Training (β = -.54, p < .001). However, both Problem Disengagement (β = -.39, p < .001) and Goal Orientation (β = -.18, p = .05) were significant predictors of Dysfunctional Thoughts and Stress in Shows.

DISCUSSION

Problem-solving is a vital skill necessary for optimum performance in most aspects of life (Bell & D'Zurilla, 2009). The ability to competently and efficiently address problems appears to be critical in circus to assist in reducing the wide range of stressors artists experience (Filho et al., 2016). Thus, the present study examined the relationship between problem-solving skills and factors that interfere with circus performance of CdS artists and NCS student artists. There were three primary foci in the current study: (1) comparing experienced (CdS) and inexperienced (NCS) circus artists in their problem-solving skills and dysfunctional thoughts and stress in training and shows, (2) understanding the relationship between problem-solving skills and factors interfering with circus training, (3) understanding the relationship between problem-solving skills and factors interfering with circus shows. It was hypothesized that problem-solving abilities and functional thoughts would be better in CdS artists compared to NCS artists, and that problem-solving skills would be negatively associated with dysfunctional thoughts and stressors that interfere with performance in both training and shows. Lastly, problem-solving skills were hypothesized to predict performance-related thoughts and stress perceived to interfere with performance, both in training and shows.

The first hypothesis that CdS artists would demonstrate stronger problem-solving skills was supported in that CdS artists evidenced better problem-solving skills with regards to Problem Disengagement, Goal Orientation, and Resource Activation domains compared to NCS artists. Similarly, CdS artist performance was less impacted by dysfunctional thoughts and stress in training and show contexts when compared to NCS artists. This finding appears to be consistent with prior literature indicating that more experienced athletes, as compared with less experienced athletes, tend to use problem-focused strategies (Macquet & Skalej, 2015).

The second hypothesis, that problem-solving skills would be associated with dysfunctional thoughts and stress in training and show contexts, was partially supported. Both the ability to disengage from problems and the ability to focus on potential goals were associated with lower levels of negative thinking in both training and in shows. The ability to identify and utilize resources and personal strengths to solve problems was not associated with dysfunctional thoughts in either training or show domains. Although this result should be interpreted with caution, as the problem-solving resources scale demonstrated poor internal consistency in the current sample, it may be that utilizing resources in circus (e.g., performance support personnel, weight room, materials) may be somewhat incompatible with perceived reliance on personal strengths. For instance, artists with a high degree of self-reliance may find resources within the organization to be unnecessary. It may also be that in the current sample of artists, the ability to identify and utilize resources was less critical due to a wide range of resources, like personnel, available to circus artists (Ménard & Hallé, 2014) or because the existing resources are simply unrelated to dysfunctional thoughts and stressors associated with circus performance.

The third hypothesis, that problem-solving skills (e.g., problem disengagement and goal orientation) could predict dysfunctional thoughts in training and shows, was also partially supported. In a regression analysis, the combination of Problem Disengagement and Goal Orientation significantly predicted Dysfunctional Thoughts and Stress in both Training and Show contexts. Problem Disengagement was the strongest predictor of Dysfunctional thoughts and Stress in Training and Shows. Goal orientation problem-solving skill was also a significant predictor of negative Dysfunctional Thoughts and Stress in Shows, but not in Training.

Collectively, these findings suggest more experience in circus may be associated with enhanced problem-solving skills, although causality cannot be inferred. For instance, it is possible that circus art experience builds problem-solving skills, or that artists who achieve successful careers in CdS have existing problem-solving skills. Nevertheless, these findings suggest a relationship between problem-solving skills and functional thoughts, and that outcome research is warranted to assist in determining if circus training and/or show performance can be enhanced with problem-solving skills training.

These results indicate circus artists experience different performance demands across training and shows with regards to problem-solving skills. Often the focus of training is improvement and effort, whereas competitions tends to be more goal-oriented (Amiot, Gaudreau, & Blanchard, 2004; Munroe-Chandler, Hall, & Weinberg, 2004). In circus populations in particular, show contexts involve audience pressure (Filho et al., 2016) and are likely focused on the goal of an optimal outcome (particularly in the case of NCS students, who may interpret shows within the context of their circus examinations). Thus, in circus artists, similar to athletes (Jackson & Roberts, 1992), a process-oriented approach may be more relevant for training, indicating less focus on performance outcomes in this context. This may explain the lack of association with the Goal Orientation subscale in training. Therefore, it may be beneficial for practitioners working within this population to address problem disengagement problem-solving skills across both show and training contexts, and goal-oriented problem-solving skills in shows only.

It is important for performance psychology professionals to learn strategies to assist performance optimization and adaptability to difficult circus scenarios. Given that problem disengagement and goal orientation problem-solving skills were found to be associated with fewer Dysfunctional Thoughts and Stressors in Show performance, the empirical development of problem-solving interventions for circus artists appears to be justified. Indeed, problem-solving may be utilized in a wide range of applications given that artists from various disciplines experience unique performance-related stressors (Filho et al., 2016). Although the results of this study have not empirically tested problem-solving intervention programming, it is likely that problem-solving skills training, widely accepted within the clinical psychology field, could offer a relatively simple and

cost-effective strategy to assist well-being and work productivity of artists within the entertainment industry. This can be achieved by engaging artists into the 4-step problem-solving process, including (1) defining the problem, (2) brainstorming solutions without critique, (3) evaluating the pros and cons of generated alternatives, and (4) implementing the best available option (Nezu et al., 2007). Adaptations to fit the culture of circus are inherent in the problem-solving process, as artists have autonomy to choose the problem at hand and generate their own solutions. The model is also consistent with the creative process of artistry, as the professional initially facilitates solution generation without critique.

Findings from the present study suggest that problem-solving skills may impact the performance of circus artists. The present study results also provide a foundation in which to consider factors that may impact performance in circus artists. With a growing emphasis on evidence-supported interventions, further research is warranted to examine problem-solving in circus artists.

REFERENCES

Amiot, C. E., Gaudreau, P., & Blanchard, C. M. (2004). Self-determination, coping, and goal attainment in sport. *Journal of Sport & Exercise Psychology, 26*(3), 396-411.

Becker-Weidman, E. G., Jacobs, R. H., Reinecke, M. A., Silva, S. G., & March, J. S. (2010). Social problem-solving among adolescents treated for depression. *Behaviour Research & Therapy, 48*(1), 11-18. doi:10.1016/j.brat.2009.08.006

Bell, A. C., & D'Zurilla, T. J. (2009). The influence of social problem-solving ability on the relationship between daily stress and adjustment. *Cognitive Therapy and Research, 33(5),* 439-448.

Cavanagh, M., & Grant, A. M. (2010). The solution-focused coaching approach to coaching. In E. Cox, T. Bachkirova, & D. Clutterbuck (Eds.), *Sage Handbook of Coaching, London, UK: Sage.*

Chang, E. C., D'Zurilla, T. J., & Sanna, L. J. (2009). Social problem solving as a mediator of the link between stress and psychological well-being in middle-adulthood. *Cognitive Therapy and Research, 33*(1), 33-49.

Cirque du Soleil. (2015). Cirque du Soleil at a Glance. [PDF document]. Retrieved from https://www.cirquedusoleil.com/en/~/media/press/PDF/cds/cirque-du-soleil-at-glance.pdf

Crust, L. (2007). Mental toughness in sport: A review. *International Journal of Sport and Exercise Psychology, 5*(3), 270-290.

Donohue, B., Silver, N. C., Dickens, Y., Covassin, T., & Lancer, K. (2007). Development and psychometric evaluation of the sport interference checklist. *Behavior Modification, 31*, 937-957.

Donohue, B., Chow, G. M., Pitts, M., Loughran, T., Schubert, K. N., Gavrilova, Y., & Allen, D. N. (2014). Piloting a family-supported approach to concurrently optimize mental health and sport performance in athletes. *Clinical Case Studies,14*(3), 159-177.

D'Zurilla, T. J., & Goldfried, M. R. (1971). Problem solving and behavior modification. *Journal of Abnormal Psychology, 78*(1), 107-126.

Elliott, T. R., Godshall, F., Shrout, J. R., & Witty, T. E. (1990). Problem-solving appraisal, self-reported study habits, and performance of academically at-risk college students. *Journal of Counseling Psychology, 37*(2), 203-207.

Filho, E., Aubertin, P., & Petiot, B. (2016). The making of expert performers at Cirque du Soleil and the National Circus School: A performance enhancement outlook. *Journal of Sport Psychology in Action, 7,* 1-12.

Grant, A. M., Cavanagh, M. J., Kleitman, S., Spence, G., Lakota, M., & Yu, N. (2012). Development and validation of the Solution-Focused Inventory. *Journal of Positive Psychology, 7*(4), 334-348.

Hamilton, G. M., Meeuwisse, W. H., Emery, C. A., Steele, R. J., & Shrier, I. (2011). Past injury as a risk factor: An illustrative example where appearances are deceiving. *American Journal of Epidemiology, 173*(8), 941-948.

Isaacson, A. (2007). PTs: Behind the Fantasy of Cirque du Soleil. PT: *Magazine of Physical Therapy, 15*(3), 48-51.

Jackson, S. A., & Roberts, G. C. (1992). Positive performance states of athletes: Toward a conceptual understanding of peak performance. *The Sport Psychologist, 6*(2), 156-171.

Korstjens, I., Mesters, I., May, A. M., van Weert, E., van den Hout., J. H., Ros, W., . . . van den Bourne, B. (2011). Effects of cancer rehabilitation on problem-solving, anxiety and depression: A RCT comparing physical and cognitive-behavioural training versus physical training. *Psychology & Health, 26*, 63-82. doi:10.1080/08870441003611569

Lam, D., & Cheng, L. (1998). Cognitive behavior therapy approach to disputing automatic thoughts: A two-stage model. *Journal of Advanced Nursing, 27,* 1143-1150.

Largo-Wight, E., Peterson, P. M., & Chen, W. W. (2005). Perceived problem solving, stress, and health among college students. *American Journal of Health Behavior, 29,* 360-370.

MacNair, R. R., & Elliott, T. R. (1992). Self-perceived problem-solving ability, stress appraisal, and coping over time. *Journal of Research in Personality, 26,* 150-164.

Macquet, A., & Skalej, V. (2005). Time management in elite sports: How do elite athletes manage time under fatigue and stress conditions? *Journal of Occupational and Organizational Psychology, 88*(2), 341-363.

Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2007). The efficacy of problem solving therapy in reducing mental and physical health problems: A meta-analysis. *Clinical Psychology Review, 27*(1), 46-57.

Mellalieu, S. D., Neil, R., Hanton, S., & Fletcher, D. (2009). Competition stress in sport performers: Stressors experienced in the competition environment. *Journal of Sports Sciences, 27*(7), 729-744.

Ménard, J. F., & Hallé, M. (2014). Circus also needs performance psychology: Facts and realities of consulting at Cirque du Soleil. In J. G. Cremades, L. S. Tashman, J. G. Cremades, L. S. Tashman (Eds.) , Becoming a sport, exercise, and performance psychology professional: A global perspective (pp. 127-134). *New York, NY, US: Psychology Press.*

Misra, R., & McKean, M. (2000). College students' academic stress and its relation to their anxiety, time management, and leisure satisfaction. *American Journal of Health Studies, 16*(1), 41.

Munro, D. (2014). Injury patterns and rates amongst students at the National Institute of Circus Arts: An observational study. *Medical Problems of Performing Artists, 29*(4), 235-240.

Munroe-Chandler, K. J., Hall, C. R., & Weinberg, R. S. (2004). A Qualitative Analysis of the Types of Goals Athletes Set in Training and Competition. *Journal of Sport Behavior, 27(1), 58-74.*

Nezu, A. M., Nezu, C. M., & D'Zurilla, T. J. (2007). Solving life's problems: A 5-step guide to enhanced well-being. *New York: Springer Publishing Co.*

Nicholls, A. R., Polman, R. C. J., Levy, A. R., & Backhouse, S. H. (2008). Mental toughness, optimism, pessimism, and coping among athletes. *Personality and Individual Differences, 44,* 1182-1192.

Rantisi, N. M. (2014). Circus in action: Exploring the role of a translation zone in the Cirque du Soleil's creative practices. *Economic Geography, 91*(2), 147-164.

Rantisi, N., & Leslie, D. (2013). The role of local intermediates in the evolution of Montreal's circus arts cluster: The case of the Ecole Nationale de Cirque. *Regional Studies.*

Wanke, E. M., McCormack, M., Koch, F., Wanke, A., & Groneberg, D. A. (2012). Acute injuries in student circus artists with regard to gender specific differences. *Asian Journal of Sports Medicine, 3*(3), 153-160.

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Table 1: Participant Demographics

ITEM	NCS (N=21)	CDS (N=88)	TOTAL SAMPLE (N=109)
Age in Years: Mean (Standard Deviation)	20.57 (2.20)	30.44 (6.86)	28.45 (7.30)
Gender: Frequency (%)			
Male	10 (47.62)	58 (65.91)	67 (61.5)
Female	11 (52.38)	30 (34.09)	42 (38.5)
Ethnicity: Frequency (%)			
White/Caucasian	17 (80.95)	50 (56.82)	67 (61.57)
Black/African-American	1 (4.76)	9 (10.23)	10 (9.17)
Asian/Asian American	0 (0)	2 (2.27)	2 (1.83)
Hispanic/Latino	0 (0)	13 (14.77)	13 (11.93)
Pacific Islander	0 (0)	1 (1.14)	1 (.92)
Other (multiple or not listed)	3 (14.29)	13 (14.77)	16 (14.68)
Intimate Partner Status: Frequency (%)			
Single	20 (95.24)	57 (64.77)	77 (70.64)
Married	0 (0)	23 (26.14)	23 (21.10)
Cohabitating	1 (4.76)	8 (9.09)	9 (8.26)

Note. NCS = National Circus School, CdS = Cirque du Soleil

TABLE 2: Mean, Standard Deviations, and Independent t-tests Comparing Circus Artist Level (NCS, CdS) on Problem-Solving Skills and Dysfunctional Thoughts and Stress in Training and Shows

MEASURE	NCS	CDS (N=88)	TOTAL SAMPLE (N=109)	t	df	p
	M (SD)	M (SD)	M (SD)			
SFI Problem Disengagement	13.85 (4.03)	17.28 (4.20)	16.64 (4.34)	-3.32	106	.001**
SFI Goal Orientation	15.53 (4.38)	19.13 (3.65)	18.48 (4.01)	-3.84	106	< .001**
SFI Resource Activation	17.50(4.81)	19.42 (3.48)	19.09 (3.81)	-2.07	106	.04*
SFI Total	46.88 (9.40)	55.84 (7.58)	54.18 (8.64)	-4.56	106	< .001**
Dysfunctional Thoughts and Stress in Training	3.73 (.97)	2.71 (1.11)	2.92 (1.16)	3.90	107	< .001**
Dysfunctional Thoughts and Stress in Shows	2.97 (1.07)	2.40 (.94)	2.52 (.99)	2.43	107	.02*

Note. NCS = National Circus School, CdS = Cirque du Soleil

TABLE 3: Correlations between Solution Focused Inventory (SFI) Subscale Scores and Dysfunctional Thoughts and Stress in Training and Shows Subscales, Including Internal Consistency (Cronbach's α) of These Scales (N = 109)

MEASURE	1	2	3	4	5
1 SFI Problem Disengagement	-				
2 SFI Goal Orientation	.20*	-			
3 SFI Resource Activation	.09	.48**	-		
4 Dysfunctional Thoughts & Stress in Training	-.54**	-.13	-.02	-	
5 Dysfunctional Thoughts & Stress in Shows	-.42**	-.26**	.01	.69**	-
Cronbach's Alpha	.74	.84	.66	.84	.85

*Note. *p < .05; **p < .01.*