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The Effects of a Mental Skills Training Package on Equestrians

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The present study examined the effectiveness of a mental skills training (MST) package employing relaxation, imagery, goal setting, and self-talk (strategies for improving performance and perceptions through cognitive-somatic techniques) on equestrian performance. A stratified random sample of 17 competitive collegiate horseback riders participated in this study: 8 received MST and 9 were controls. Riders' goal orientation was also assessed and used to determine if there might be a relationship with performance change over time. Assessment of participants via performance in 2 horse shows revealed no interaction effect for group by time in either flat or show-jumping performance, but there was a significant main effect of time for performance improvement. Riders demonstrated a dominant mastery-approach goal orientation as hypothesized, but no significant correlations with performance change emerged. Findings do not rule out MST as a possible performance enhancing technique, but more research is needed to assess nomothetic MST package effects.

Mental skills training (MST) has been shown to be an effective strategy for improving athlete performance and perceptions in a wide variety of sports and settings through the use of cognitive-somatic techniques. Those techniques include mental imagery, goal setting, and variations of self-talk, all developed to increase athlete performance competency when applied either singly or as an MST package. For example, Shambrook and Bull (1996) found that mental-imagery practice was able to improve free-throw consistency for a basketball player in a single-participant, multiple-baseline study. Positive self-talk has elicited performance-enhancing effects in water polo (Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004) and dart throwing (Van Raalte & Brewer, 1995). Goal setting was found to be beneficial for American football linebackers on correct positioning, successful tackling, and halting the opposition's progress (Ward & Carnes, 2002). It is clear that single-skill interventions can improve performance in a range of sports; however, individual differences in participants might limit the responsiveness to single-skill interventions. For instance, only one athlete out of four in the Shambrook and Bull study actually showed improved consistency over the course of the intervention, thereby limiting the generalization of findings. Thus, although it might be feasible

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to serially test the effectiveness of single mental skills techniques on individual athletes, this is largely impractical for group administration in terms of resource and time management. Combining these skills into an MST package might provide some advantages.

As a result, single psychological skills have been combined into multimodal MST packages in team situations in which they might reach the largest number of individuals, aid in team bonding, and be modified at any time to accommodate individual differences among athletes (Gregg, Hrycaiko, Mactavish, & Martin, 2004). Multimodal interventions have generally applied several mental skills concurrently, such as imagery and self-talk (e.g., Palmer, 1992) or centering and self-talk (e.g., Rogerson & Hrycaiko, 2002). Patrick and Hrycaiko (1998) demonstrated that a psychological skills training program consisting of relaxation, imagery rehearsal, self-talk, and goal setting was effective at improving the running performance of endurance athletes. Hanrahan (1995) reported that with wheelchair athletes, the skills of imagery, positive self-talk, and controlling problem situations had the most impact on performance out of a range of self-reported skills (e.g., goal setting, arousal control, concentration and attention-development skills, self-confidence, imagery, self-talk, competition preparation, and problem-situation control). Furthermore, such MST packages, when combined with regular physical training, have demonstrated a high rate of success in sport (Patrick & Hrycaiko; Thelwell & Greenlees, 2001; Thelwell & Maynard, 2003).

The overall success of MST packages for a variety of athletes lends support to their general effectiveness. For example, Wanlin, Hrycaiko, Martin, and Mahon (1997) found an MST package to be beneficial for speed skaters to improve racing times and decrease the amount of off-task behaviors. Gymnasium triathlon athletes also experienced improved performance during time trials and an increased usage of mental skills (Thelwell & Greenlees, 2001). Moreover, researchers have found MST to be effective with both elite and novice athletes with intellectual disabilities (Gorely, Jobling, & Lewis, 2002; Gregg et al., 2004). Despite these varied sport settings, there are no published experiments (known to the authors) that investigated the benefits of an MST program in the realm of equestrian sport.

Research on equestrian athletes has revealed the unique demands of their sport. Meyers, Bourgeois, LeUnes, and Murray (1999) found that when compared with athletes performing without an animal partner (e.g., professional tennis players, competitive rock climbers, Olympic weight lifters), riders reported a higher psychological skills response as measured by the Psychological Skills Inventory for Sport (PSIS; Mahoney, Gabriel, & Perkins, 1987) and were employing more psychological strategies than their traditional athlete counterparts. In terms of psychological skills among elite and subelite riders, however, Myers et al. (1999) found that "the more successful athletes possessed higher anxiety management and concentration skills than less-successful peers" (p. 405). Similar findings have been previously reported among traditional and nontraditional competitive athletes (e.g., Mahoney, 1989; Meyers, LeUnes, & Bourgeois, 1996; Myers, Sterling, Bourgeois, Treadwell, & LeUnes, 1994). It follows that equestrians, like any other athlete, should benefit from an MST program that delivers a highly organized, systematic, sport-specific approach to psychological skills management, with the aim of improving competitive success.

Naturally, the design of any effective MST program will address the specific demands of a sport. Recent research (Rogerson & Hrycaiko, 2002) confirms that the use of mental skills might go so far as to be position and situation specific within a single sport. Taylor (1995) has developed a model for the preparation of sport-specific mental strategies that combines a complete understanding of an athlete's needs, a thorough knowledge of the sport-specific demands, a method of information integration (to identify the most pertinent psychological factors that will affect performance), and finally, the development of an effective mental-preparation strategy for a competitive athlete. Using Taylor's framework, and keeping in mind the role of an equitation rider, the skills of relaxation, mental imagery, goal setting, and self-talk were deemed the most appropriate for an MST program involving equestrians for several reasons.

Horseback riding has been shown to be an anxiety-producing sport (Tenenbaum, Lloyd, Pretty, & Hanin, 2002), and relaxation procedures that diminish anxiety levels and increase perception of control were anticipated to be of value for equestrians. Tacón, Caldera, and Ronaghan (2004) found that anxiety levels decreased from pre- to posttest in female participants with the application of a relaxation program and that there was a significant perceptual shift toward an internal locus of control. Two of the more commonly used relaxation methods are progressive muscle relaxation (PMR; Jacobson, 1938), which incorporates a series of sequential muscle contractions and relaxations, and centering, a strategy for brief, specific breathing patterns to lower one's perception of center of gravity and increase the control of anxiety through attentional focus (Hardy & Fazey, 1990). It was anticipated that equestrian athletes would benefit from a program that stressed in-depth practice of PMR on their own (after guided instruction) and the use of the more condensed relaxation technique of centering in the performance situation (whether for training or competition).

The inclusion of mental-imagery practice was deemed advantageous because of its coupled effects with relaxation. Weinberg, Seabourne, and Jackson (1981) provided support for the visuo-motor behavior rehearsal model (VMBR; Suinn, 1984), which incorporates the elements of PMR, mental practice, and imagery. Participants receiving the VMBR treatment had significantly better performance scores than the imagery-only or attention-control groups. It might be that the combination of relaxation strategies and mental imagery work together to lower anxiety, promote task-relevant cognition, and, possibly, enhance motor-skill performance, which would benefit equestrian athletes.

Self-talk, a technique used to combat negative and task-irrelevant thoughts, was the third element in the MST package used in the present experiment. Dugdale and Eklund (2002) have shown that the incidence of task-irrelevant thought increases under high-cognitive-load situations, such as horse shows at which competitors must be aware of the show schedule, their own performance, and that of their mount. According to Wegner (1994), when an attempt is made to control one's thoughts, an ironic monitoring process, "an unconscious, automatic search for the mental contents signaling the failure to achieve the desired state" (Dugdale & Eklund, p. 307), occurs that propagates worry. Attempts to bring negative task-irrelevant thoughts (e.g., *what if* statements) under control usually backfire on the athlete. As a reactive strategy against this, the application of cue words has been

shown to be effective in suppressing task-irrelevant thoughts and refocusing one's concentration (Dugdale & Eklund).

Furthermore, Dugdale and Eklund (2002) discovered that when participants were instructed to pay no attention to the umpires during various clips of Australian Rules Football, those employing a cue word along with suppression found images of umpires to be less salient than those in the suppression-only group. In addition to cue words, Hatzigeorgiadis et al. (2004) found that positive self-statements led to a decrease in interfering thoughts. They also determined that performance on a precision water polo task improved significantly for the group employing instructional self-talk, and performance on a power task improved significantly for the group employing motivational self-talk. Therefore, self-talk—in many forms—is beneficial in neutralizing negative and task-irrelevant thoughts and could be of further benefit in combination with relaxation and mental imagery.

Task-relevant thoughts can be further facilitated with the application of a goal-setting routine. Goal setting is a psychological method of enhancing one's perception of control and increasing intrinsic motivation. It can be of great benefit because it simultaneously addresses an immediate plan for action (short-term goals) and sets challenging performance targets (long-term goals) that motivate and allow athletes to assess their progress (Locke & Latham, 1985). In terms of constructing ambitious yet realistic outcomes, Burton (1989) stressed the importance of maintaining a balance between outcome (i.e., personal achievement), performance (i.e., comparison with others), and process goals (i.e., how to get there). Indeed, Barron and Harackiewicz (2001) showed that both mastery and performance goals were beneficial for success in a learning task, thereby lending support for the multiple-goal theory.

Individuals' dispositional goal orientation has long been a topic of interest, initially for understanding motivation for learning in the classroom (Ames, 1992) and more recently for understanding athlete learning and skill development. Assessment tools such as the Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda & Nicholls, 1992) were developed to measure athletes' goal orientations to find the link between goal orientation and success in sport. Until recently, ego goals had been thought to be detrimental to performance because of the overemphasis on winning and de-emphasis on personal skill achievement. Achievement goal orientation, or a person's motives for exhibiting achievement behavior (Pintrich & Schunk, 2002), was initially divided into two categories: mastery (task) and performance (ego) goal orientation (Ames). More recent research (Elliot & McGregor, 2001), however, has argued for not only a mastery-performance dimension but also an approach-avoidance dimension. The new paradigm is a four-category system with mastery-approach (motivation to advance one's skills and to learn for the sake of learning), mastery-avoidance (motivation to avoid misinterpreting new information and avoid tasks that are perceived to be difficult), performance-approach (a desire to demonstrate superior ability compared with others), and performance-avoidance (motivation that extends from a desire to avoid being the worst) scales. With equestrian athletes, Adamson (2004) found a strong task (mastery) goal orientation, along with a low ego (performance) goal orientation; however, her work did not include this new four-category system. With respect to this new measure, there is a gap in the literature exploring goal orientation and its relationship to equestrian athlete performance.

The primary aim of this study was to look at the effects of an MST program on equestrian performance over time. For this investigation, an MST package developed by Patrick and Hrycaiko (1998) was adapted and applied to competitive collegiate horseback riders, following Thelwell and Greenlees' (2001) intervention. It was hypothesized that there would be a significant improvement in the intervention participants' (those receiving MST) horse-show performance on the flat and over fences as compared with a control group that received no training. The secondary aim of this study was to assess the goal orientations of collegiate horseback riders at the beginning of the study with the intention of determining whether performance (over time) might be predicted from type of goal orientation. It was hypothesized that riders with a mastery-approach orientation would demonstrate a greater improvement in performance than riders with other goal orientations.

Method

Participants

Seventeen female competitive collegiate horseback riders participated in this study, ranging in age from 18 to 25 years, with a mean age of 19.41 years (SD = 1.54). Participants were recruited from a university riding club at the beginning of the spring semester. Participation was voluntary, but encouraged with food incentives (i.e., a free meal). The study was conducted in accordance with the American Psychological Association's ethical guidelines.

The study was composed of an intervention group (n = 8), which received a regimen of MST, and a control group (n = 9), for which no explicit training was given. The decision was made to not include a placebo control group because of the limited number of eligible participants. Groups represented a stratified random sample composed of Open (n = 4; intervention = 2, control = 2), Intermediate (n = 5; intervention = 3, control = 2), Novice (n = 5; intervention = 2, control = 3), and Walk-trot-canter (WTC; n = 3; intervention = 2, control = 1) riders. Riders were classified according to Intercollegiate Horse Show Association riding categories, which are based on riding competency and horse show experience, with Open being the most experienced or elite category and WTC representing the category for beginner-level competitive riders.

Materials

Demographic Survey. Participants completed a demographic survey documenting their age, current riding level, how often they rode per week, familiarity with sport psychology, and experience in using mental skills in a sport setting.

Achievement Goal Questionnaire. The Achievement Goal Questionnaire (AGQ; Elliot & McGregor, 2001) consists of 12 value statements pertaining to goal orientation that are evaluated on a 7-point Likert-type scale from 1 (*not at all true of me*) to 7 (*very true of me*). Items represent the four dimensions of goal orientation: mastery approach (three items; e.g., "I want to learn as much as possible from these lessons"), mastery avoidance (three items; e.g., "Sometimes I'm afraid that I may not understand the content of the lesson as thoroughly as

I'd like"), performance approach (three items; e.g., "It is important for me to do better than other riders"), and performance avoidance (three items; e.g., "My fear of performing poorly in these lessons is often what motivates me"). The AGQ was adapted from its previous classroom-based question format by the substitution of horseback riding terms for educational terms (e.g., *riding lesson* for *class*, *riders* for *students*). Exploratory- and confirmatory-factor analyses support the four-factor achievement-goal construct, and internal consistency and validity has been demonstrated previously for this instrument (Elliot & McGregor, 2001). In the present study, the AGQ showed acceptable internal reliability for the performance-approach (Cronbach's $\alpha = .85$), mastery-avoidance ($\alpha = .91$), mastery-approach ($\alpha = .60$), and performance-avoidance ($\alpha = .93$) scales. Multicollinearity between scale categories was .47 and lower, with the highest correlation being between performance and mastery avoidance.

Mental Skills Assessment Questionnaire. The Mental Skills Assessment Questionnaire (MSAQ; Patrick & Hrycaiko, 1998) is an eight-item worksheet (yes/no answer format) with two questions pertaining to goal setting (e.g., "Did you set any goals [personal or performance] prior to and/or during your ride?"), two questions for relaxation (e.g., "Did you perform a relaxation technique prior to and/or during your ride?"), two for imagery (e.g., "Did you use imagery prior to and/or during your ride?"), and two for self-talk (e.g., "Did you use positive self-talk or coping self-statements prior to and/or during the ride?"). The questionnaire was modified from its original endurance-running focus to include sport-specific terms relating to horseback riding (e.g., *ride* substituted for *run*). Although the MSAQ is not a validated instrument, it has been used previously in the research, serving mainly as a checklist to remind and engage intervention participants with the four taught mental skills (Thelwell & Greenlees, 2001; Thelwell & Maynard, 2003). Following these earlier interpretations, the percentage of mental skills reported on the questionnaire (i.e., the proportion of *yes* responses) was calculated to monitor the use of mental skills over time.

Social Validation Questionnaire. A social validation questionnaire developed by Thelwell and Greenlees (2001) was administered to "assess participant reactions to treatment procedures and experimental outcomes" (p. 134). Using a 7-point Likert-type scale (1 = *not at all useful* and 7 = *extremely useful*), intervention participants were asked to rate the importance of the changes they experienced, the significance of any changes, their satisfaction with MST, and the usefulness of the program. In addition, participants were given an open-ended question ("If, from your perceptions, the procedure has contributed to enhancing/hindering your performance, can you state why you perceive this to be the case?") to determine particular reasons for why the intervention was or was not successful.

Procedure

All participants were assessed in a preliminary horse show to obtain baseline performance measures for both the treatment and control groups. Before the first horse show, all participants completed the AGQ and the initial MSAQ. Participants attended a second horse show 4 weeks later to determine performance change over time. During the 4-week interim between horse shows, the intervention group

received MST and the control group received no training in mental skills use, though all riders attended their regular riding lessons twice a week. At the conclusion of the second horse show, intervention participants were given a SVQ to complete anonymously. With all forms and questionnaires, riders were instructed to complete them on their own and place them in a designated envelope before leaving the barn that day. The researcher was present in the barn area during both horse show competitions and haphazardly present during lesson times.

Intervention. The core intervention closely paralleled one outlined by Patrick and Hrycaiko (1998, pp. 298–299) and involved the skills of relaxation, mental imagery, self-talk, and goal setting. The four mental-skill components were taught in an initial 2-hr session modified expressly for equestrians and followed up by weekly half-hour sessions. Relaxation, mental imagery, self-talk, and goal setting were taught as individual skills serving to combat particular problems, and then they were integrated by applying them to real-world riding scenarios.

For relaxation training, a three-pronged approach was taught using PMR, breathing strategies, and centering. PMR training was used to physically reduce muscle tension and train the participant to effectively recognize the feeling of relaxation and gain an awareness of tension levels (Bull, Albinson, & Shambrook, 1996). Participants were instructed to use breathing strategies (Hogg, 1995) for relaxation purposes during actual performances. Another technique, centering, teaches participants to relocate their consciousness from their mind to their center of gravity. It has been shown to aid in the promotion of task-relevant thoughts and in the development of a game plan (Hardy & Fazey, 1990). It allows participants to use relaxation skills during their sport activity and is particularly suited to a preperformance routine (e.g., while tacking up a horse before a lesson or competition).

Mental imagery involved teaching participants how to visualize competition-specific events in vivid, realistic, controlled detail. A routine for developing a competition-specific imagery script was taught involving integral imagery components (Cohn, 1990; Driskell, Copper, & Moran, 1994). This involves visualizing both in real time and slow motion, using vividness and controllability, imagining competition mastery, incorporating all the senses, and visualizing the successful execution of one's skills. Together, these elements constituted the framework for imagery practice. Mental imagery has practical applications because it increases the efficiency of the unconscious processes surrounding motor-skill execution and trains the mind for optimal psychological arousal and attentiveness for performance (Cohn).

Positive self-talk was used to combat negative and task-irrelevant thoughts. One of the major factors disrupting attentional focus and hindering performance is the invasion of task-irrelevant thoughts, as detected by semiconscious ironic monitoring by the individual (for a discussion of ironic processing theory see Wegner, 1994). It has been shown that specific forms of self-talk, including the application of a cue word (Dugdale & Eklund, 2002) whenever the inappropriate thought arrives, are successful in refocusing attention to the task at hand. In this instance, a negative thought would prompt the remembrance of a cue word, thereby initiating a reactive strategy for task completion. Participants were also taught how to turn negative self-statements into positive ones to act as a sort of constructive criticism.

Finally, goal setting involved helping the participant to set long-term (competitive) and short-term (daily) goals, while balancing among outcome,

performance, and process goals. Furthermore, following the example set by Thelwell and Greenlees (2001), riders were encouraged to set SMART goals—goals that are *specific, measurable, attainable, realistic,* and *timely*. Riders developed and reassessed their goals at the weekly intervention sessions.

Sessions were both instructive and collaborative, with riders discussing mental skills use in their everyday riding with the researcher. In addition to the core weekly sessions, riders in the intervention group completed a MSAQ (Patrick & Hrycaiko, 1998) twice a week after their required lessons to ensure their continued engagement with MST.

Performance Assessment. Riding performance was assessed in the format of two horse shows over the course of the study that were rated by two separate judges and are henceforth referred to as Show 1 (baseline) and Show 2 (change measure). Participants' hunt seat equitation performances on the flat and over fences were scored via a standardized 100-point scale, with a score in the 70s being considered a commendable ride. Equitation competition was selected because judges' evaluations are contingent solely on the riders (e.g., correctness of position, jumping form), irrespective of their mount. For instance, a rider would not be penalized for riding a horse with less than perfect conformation or gait.

The primary aim of this study was to determine whether riders who received MST would show a significant change in performance over time compared with a control group. Two 2-way mixed factorial designs were employed to look at group by time effects, one for flat performance and the other for jumping performance. Effect size (partial eta squared, η^2) was calculated for the results in order to increase the accuracy of the interpretation. The secondary aim of this study was to determine riders' goal orientations and deduce whether these exhibited a relationship to performance change. A Pearson product–moment correlation was used to measure the relationship between goal orientation and performance change. A confidence (α) level of .05 was used for all statistical tests.

Results

It was predicted that performance improvement would be greater for the intervention group compared with the control group. This hypothesis was not supported. A 2 (control or intervention group) × 2 (time) mixed ANOVA did not reveal a significant interaction effect for flat performance, $F(1, 15) = 1.055$, $p = .321$, $\eta^2 = .066$. Nor did a 2 (control or intervention group) × 2 (time) mixed ANOVA show a significant interaction effect for fence performance, $F(1, 11) = .018$, $p = .896$, $\eta^2 = .002$. There was a significant main effect of time both for improved flat scores ($F[1, 15] = 4.588$, $p = .049$, $\eta^2 = .234$), as well as for improved fence scores ($F[1, 11] = 26.150$, $p < .01$, $\eta^2 = .704$). No significant main effect of group was found, however, for flat or fence performance ($p > .05$). Thus, although both groups experienced a significant improvement in their flat and fence performances over the course of the season, this was to a similar degree (see Figure 1). Readers should be cautious in interpreting these results because of the small sample size and low observed power.

Likewise, the percentage of mental skills employed by both groups followed a similar pattern. The intervention group increased their mental skills use from 44% at Show 1 to 63% at Show 2. The control group similarly increased their mental skills use from 33% at Show 1 to 59% at Show 2. Using a paired samples

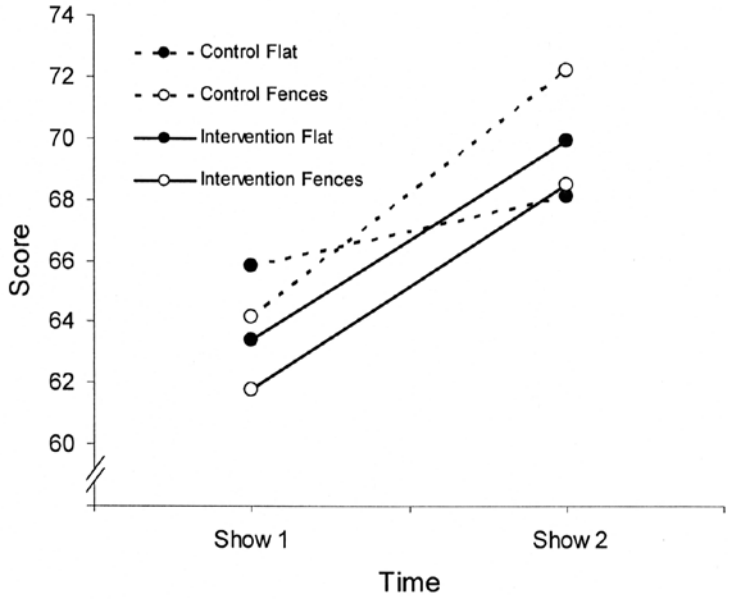

Figure 1 — Mean flat and fence performance scores over time (4-week interim) for intervention ($n = 8$) and control ($n = 9$) groups. Participants' hunt seat equitation performances were scored via a standardized 100-point scale, with a score in the 70s being considered a commendable ride.

t test, we found no significant difference between the two groups concerning the increase in percentage of mental skills employed over time, $t(14) = .248$, $p > .05$. In addition, Pearson product–moment correlations were conducted across both groups for mental skills use and performance improvement to determine if the groups used mental skills to similar effects, but no significant correlations were found for either group.

The second hypothesis was that all riders would score highest on mastery-approach goal orientation on the AGQ and that this would exhibit a positive correlation with performance improvement. Results showed that riders in both the intervention and control groups scored highest ($M = 6.29$, $SD = .70$ and $M = 6.37$, $SD = .54$, respectively) on mastery-approach goal orientation as predicted (see Figure 2). A performance-approach orientation received the second-highest score for both groups, but the third-highest scores were mastery avoidance for the intervention group and performance avoidance for the control group. All subscales differed significantly from one another, $F(3, 15) = 19.186$, $p < .01$. A paired samples *t* test revealed that riders scored significantly higher on approach dimensions, $t(16) = 5.23$, $p < .001$, and a post hoc LSD test on a repeated measures ANOVA found no significant variation in subscale by group ($p > .05$).

Although riders scored highest on mastery-approach goal orientation dimensions, no significant correlation between mastery-approach goals and performance change (across all groups) was found. Indeed, no significant correlations among any of the four subscales and performance change were observed.

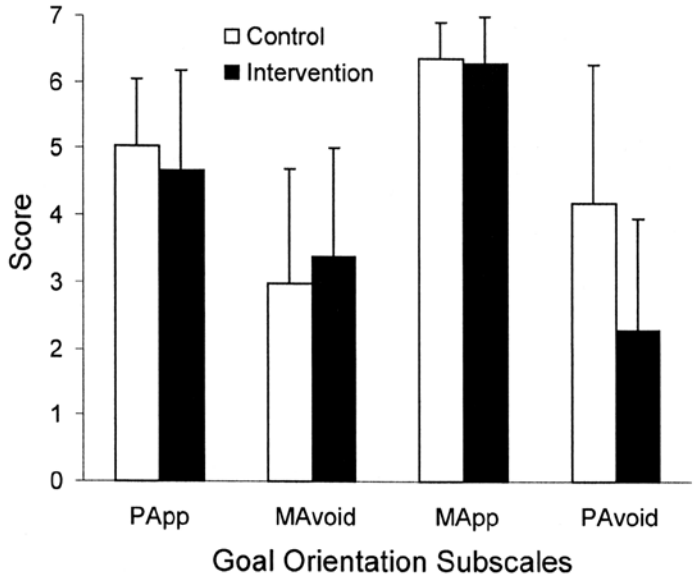

Figure 2 — Goal orientation distribution *M* (+ *SD*) across groups for the four subscales: performance approach (PApp), mastery avoidance (MAvoid), mastery approach (MApp), and performance avoidance (PAvoid). Scores on the AGQ were evaluated with a 7-point Likert-type scale (1 = *not at all true of me*, 7 = *very true of me*).

Overall, retrospective reports of intervention usefulness, perceived performance improvement, and satisfaction were favorable. Riders in the treatment group overwhelmingly found the intervention to be helpful. Ratings on the four scales regarding perceived performance improvement and satisfaction were consistent with previous findings (e.g., Gorely et al., 2002; Thelwell & Greenlees, 2001). It was frequently indicated from the open-response question that riders experienced more positive thoughts with an improved concentration or focus.

Discussion

The primary aim of this study was to examine the effects of an MST package on equestrian athletes' performance. All riders improved over the course of the season; however, the comparable increase in riding performance between the intervention and control groups confounds the conclusion that improvement in the intervention group was solely because of MST effects. This is the first psychological-skills training program incorporating the skills of relaxation, mental imagery, self-talk, and goal setting (known to the authors) to be implemented among competitive collegiate horseback riders, and the results call for continued MST research in equestrian and other nontraditional sports.

It was expected that although both groups would experience an improvement in performance over the course of the athletic season, the intervention group, with

the help of MST, would demonstrate a significantly greater improvement than the control group. The results are not conclusive, and it appears that contamination was the most likely source of this discrepancy.

Sources for contamination include conversation with fellow riders in the intervention group (although participants were instructed not to), inadvertent MST from coaches, or familiarity with sport psychology through college courses. This was confirmed by self-reports on the MSAQ administered at Show 2, indicating that, compared with the intervention group, control-group participants were employing mental skills to a similar degree by the end of the study. Although the MSAQ is not a validated measure, it is an approach used previously in the literature (Thelwell & Greenlees, 2001; Thelwell & Maynard, 2003) that indicates the level of mental skills use among participants.

Furthermore, it could be that the initial MSAQ (which all participants completed before the first competition) prompted individuals' awareness and use of mental skills in both groups. Two previous studies (Meyers et al., 1996, 1999) involving equestrian participants have demonstrated that riders already employ some psychological strategies, although they might not be aware of the fact. Dressage riders, show jumpers, and rodeo riders have been reported as exhibiting psychological skill responses such as anxiety management, concentration, and self-confidence, without the application of a formal MST program beforehand. Thus, although physical training effects were expected to emerge over the course of the season, the use of mental skills cannot be ruled out as a possible factor in the observed performance improvement of the intervention or control group.

Contamination from the teaching practices of riding instructors might have played a role in mediating mental skills usage among all of the participants in this study. To preserve the integrity of the study, the teaching styles of the instructors were not manipulated nor were they given much information on the true nature of the experiment. Because of the nature of horseback riding, and sport in general, instructors might have inadvertently taught mental skills, such as coping strategies, or introduced cue words such as *relax*. Although representing a potential confound for the present study, the practical implications of such contamination can be interpreted in a positive light. Because it seems that some psychological skills might already be taught in equestrian training programs, full integration of an MST package into equestrian sport should be a seamless endeavor in the future.

The literature suggests that a key element in MST effectiveness might be the intensity with which the program is implemented. All four components of the MST program—relaxation, imagery, self-talk, and goal setting—are skills that, like any other, require practice for proficiency. Imagery ability, for example, a skill so crucial that some researchers contend that it can predict performance (Hall & Martin, 1997), has been shown to improve significantly with practice (Rodgers, Hall, & Buckolz, 1991) and to significantly correlate with motor-skill performance (Annett, 1995). Intensive MST programs might provide the hours of practiced study necessary for observable performance gains. The best method of implementing these critical hours is not conclusive, however. The present study was an attempt to take the scheduling elements of previously successful MST programs and implement them in a real-world situation—delivering MST alongside an established sport program to students with limited time resources.

The secondary aim of this study was to investigate collegiate equestrians' goal orientations and determine whether this exhibited any relationship with performance over time. Results supported the hypothesis that riders would score highest on the mastery-approach dimension. The goal-orientation finding is consistent with previous research (Adamson, 2004) and expands our knowledge by singling out approach motivation as the primary initiator of task mastery behavior in equestrians. No relationship was found, however, between performance improvement and goal orientation.

Past research indicates that the incorporation of both mastery and performance goals (employing a multiple-goal perspective) might be more beneficial than either type alone (Barron & Harackiewicz, 2001). The lack of any significant relationship between participants' goal orientation and performance (which showed overall improvement regardless) suggests that particular goal orientation might not be such an important mediating factor in horseback-riding efficacy (Barron & Harackiewicz). In the future, research should focus on other intervening variables that might contribute to performance enhancement.

There are limitations to this study, one of which was sample size; a larger sample and the inclusion of a placebo group might have led to more conclusive results. One reason for the small number of participants was simply that the number of equestrians at this college was limited. Although other university equestrians could have been included, the decision was made to keep study variables as controlled as possible (e.g., exposure to particular coach philosophy, consistency in lessons, and judging). Certainly, this is a matter for future investigation. Previous studies have used single-subject multiple-baseline designs (Thelwell & Greenlees, 2001), whereas this research intervened with a larger sample in an attempt to produce the performance effects for which MST programs are generally acknowledged (Kendall, Hrycaiko, Martin, & Kendall, 1990; Patrick & Hrycaiko, 1989).

The present study is a timely one in the advent of an increased focus on the mind in both equestrian sports and athletics in general. An MST package that incorporates the elements of relaxation, mental imagery, self-talk, and goal setting shows promise for further application in the field of equestrian sport. Results suggest that equestrians might have particular mental skills requirements different from other sports that do not involve an animal partner. This study attempted to address the issues set forth by Thelwell and Greenlees, namely their call for a nomothetic group design and an investigation into the program's effectiveness in an ecologically valid domain (i.e., real competition). By replicating and extending their study into the largely unstudied sport of horseback riding and by including measures for achievement goal orientation, this report has made progress in the understanding of how (and why) athletes respond to MST.

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