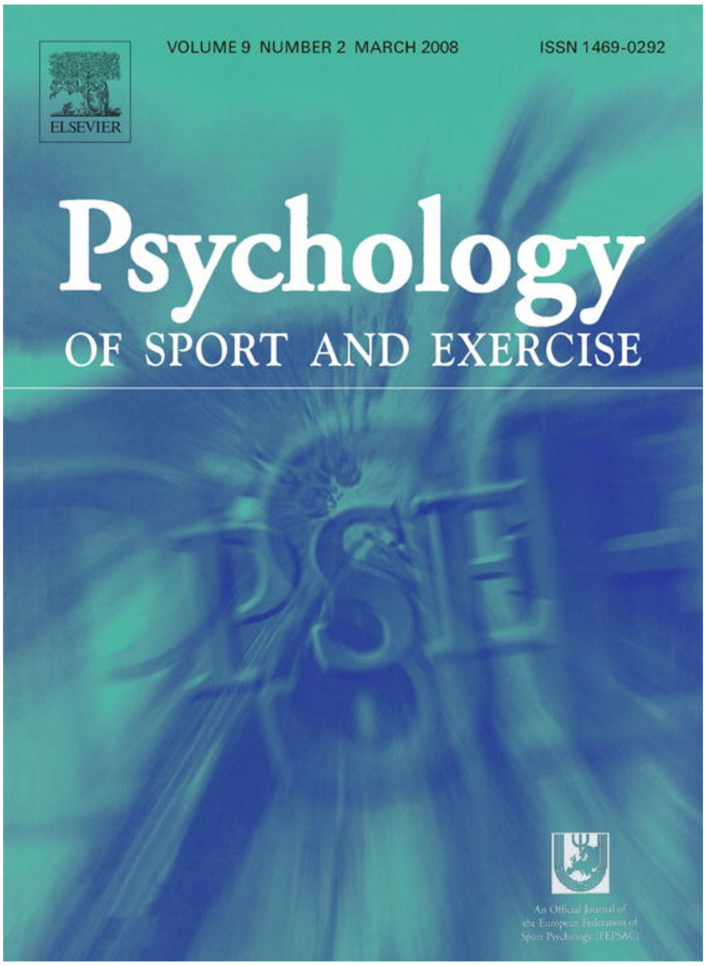
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Attributional feedback-induced changes in functional and dysfunctional attributions, expectations of success, hopefulness, and short-term persistence in a novel sport

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Abstract

Objective: This experiment investigated the influence of functional and dysfunctional attributional feedback on causal attributions, expectations of success, emotions, and short-term persistence during failure in a novel sport.
Methods: Thirty novice golfers who made either dysfunctional or functional attributions for failure in a pre-test were randomly assigned to one of three intervention groups: (1) functional (i.e., internal, controllable, and unstable) attributional feedback; (2) dysfunctional (i.e., external, uncontrollable, and stable) attributional feedback; or (3) non-attributional feedback. Participants completed four test trials (all involving failure) consisting of six putts each. The feedback was administered after the second test trial.
Results: Analysis of the pre- and post-intervention measures of attributions, expectations of success, affective reactions, and behavioral persistence revealed that the attributional feedback-induced changes related to the type of feedback. Functional attributional feedback produced improvements in causal attributions about failure, as well as in success expectations, hopefulness, and persistence after failure. In contrast, dysfunctional attributional feedback produced deterioration in causal attributions about failure, and lower success expectations, hopefulness, and persistence after failure. The effects of the attributional feedback overrode individuals' initial functional or dysfunctional attributions about failure; that is, improvement or deterioration depended on the type of feedback received rather than the initial attributions.

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Conclusions: The findings demonstrate that it is possible to change the persistence behavior of individuals in a novel athletic domain by changing the attributions they make about failure. The findings show that those in positions of giving attributional feedback to sports' novices (e.g., coaches) could produce cognitive, emotional, and behavioral improvements by using functional attributional feedback about failure.

Keywords: Attributional feedback; Functional/dysfunctional attributions; Short-term persistence; Psychomotor skills

Introduction

Social psychologists have been examining the role of causal attributions in motivation and emotion since Heider's (1944) initial work on phenomenal causality. One major reason for this focus is the large impact of causal attributions on achievement and performance (Weiner, 1985). Attributions are the specific causes people use to explain an outcome or a behavior. Causal attributions vary along a number of dimensions that are ''intrinsic properties'' of the cause emitted by the individual and include, for example, effort, task difficulty, ability, and luck (Weiner, 1985). Weiner's (1985) attributional theory of motivation and emotion postulates an ''attribution–affect–action motivational sequence, in which thoughts determine what we feel and feelings determine what we do'' (Weiner, 1980, p. 676). Weiner's (1985) theory stresses that causal attributions (a) are influenced by outcomes (e.g., victory or defeat in sport), and (b) have an effect on future behaviors, because they influence the choice, intensity, and persistence of behaviors.

The influence of causal attributions rests more in the dimensions underlying the causes than in the causes themselves. The ''locus of causality'' dimension (internal vs. external) relates to whether the cause is perceived to reside within or is external to the (target) person. ''Personal controllability'' (controllable vs. uncontrollable) is an attributional dimension in which causes for events are perceived to be either within or beyond the target person's control. ''Stability'' (stable/permanent vs. unstable/temporary) is a dimension that relates to the perceived temporal duration of the cause (e.g., Biddle & Hanrahan, 1998; McAuley, Duncan, & Russell, 1992; Weiner, 1985). In Weiner's theory, the causal dimensions exert an indirect influence on behavior through emotions. For example, internal attributions (''it's me'') produce stronger feelings of self-esteem for success and lower feelings of self-esteem for failure than do external attributions. In contrast, personally controllable reasons for a personal failure (''I didn't try hard enough'') produce feelings of guilt, while personally uncontrollable reasons for a personal failure (''I'm just no good at it'') produce feelings of shame (Weiner, 1985). The stability dimension influences a person's expectancy of future success, which then elicits emotions that influence behavior. For example, stable attributions for failure (e.g., low ability) result in reduced expectancies of future success at the task, which in turn elicits feelings of hopelessness about one's future outcomes. In contrast, unstable attributions for failure (e.g., a poor strategy or insufficient effort) allow expectancies of future success at the task to be retained, and those expectancies in turn elicit feelings of hopefulness about one's future outcomes.

Individuals who use internal, controllable, and unstable (ICU) causes (e.g., lack of effort) to explain a personal failure tend to experience positive motivational consequences (Weiner, 1985, 1992). ICU attributions for failure are ''functional'' because they increase persistence and, by extension, performance (which typically improves with practice) (Rudisill, 1989; Rudisill & Singer, 1988). Conversely, individuals who use internal, uncontrollable, and stable (IUS) causes (e.g., low ability) or external, uncontrollable, and stable (EUS) causes (e.g., high task difficulty) to explain a personal failure tend to experience negative motivational consequences. That is, IUS and EUS attributions are ''dysfunctional'' because they undermine persistence behavior and result in the withdrawing of activity, although external attributions for failure may also protect self-worth (Covington, 1984, 1992).

According to Weiner (1992), ''if causal attributions do influence achievement strivings, then a change in attributions should produce a change in behavior (see Försterling, 1985)'' (p. 264). Thus, causal attribution research has triggered numerous applications of attributional concepts to modify individuals' problem behaviors. Beneficial effects of attributional training programs have been demonstrated for sports performance (e.g., Le Foll, Rascle, & Coulomb-Cabagno, 2006; Miserandino, 1998; Rudisill, 1988, 1989; Sinnott & Biddle, 1998), academic performance (Perry & Penner, 1990; Van overwalle & De Metsenaere, 1990; Wilson & Linville, 1982, 1985), reading and literacy (Carr & Borkowski, 1989; Chan, 1996), depression (Dieser & Ruddell, 2002; Green-Emrich & Altmaier, 1991), learned helplessness (Aydin, 1988; Fowler & Peterson, 1981), and loneliness/shyness (Anderson, 1983; Struthers & Perry, 1996). There are numerous studies of the positive effects of attributional re-training programs with individuals who tend to attribute failures to ''dysfunctional'' causes (e.g., low ability; cf. Den Boer, Kok, Hospers, Gerards, & Strecher, 1991, for a review in clinical settings; Le Foll et al., 2006, for a review in sports settings; Wilson, Damiani, & Shelton, 2002, for a review in academic settings).

In the context of sport and exercise, attributional re-training programs have been shown to produce beneficial effects on all of the key variables in Weiner's (1985) theory: (1) causal attributions (Rudisill, 1988, 1989; Sinnott & Biddle, 1998), (2) expectations of future success (Orbach, Singer, & Price, 1999; Rudisill, 1988, 1989), (3) motivating emotions (Orbach et al., 1999), (4) persistence (Johnson & Biddle, 1989; Rudisill, 1989; Rudisill & Singer, 1988), and (5) performance (Miserandino, 1998; Orbach, Singer, & Murphey, 1997; Rudisill, 1988; Rudisill & Singer, 1988). With *causal attributions*, for example, Rudisill (1989) showed that, following attributional training, individuals who learned to explain performance failures with controllable and unstable factors (i.e., CU group) attributed their actual performance more to unstable factors than those who learned to explain performance failures with uncontrollable and stable factors (i.e., US group).

With respect to *expectations of success*, Rudisill (1989) demonstrated that after an attributional training intervention, individuals who received training in emitting ICU attributions for failure had higher expectations over all performance trials than those who had received training in emitting IUS attributions for failure. According to Rudisill (1989), expectations are maintained at an ''intermediate level'' when performance failure is attributed to an ICU cause. This conclusion has also been supported by Orbach et al. (1999) with tasks involving other sports motor skills.

Motivating emotions have been enhanced by attributional training in sports contexts (Biddle & Hill, 1992; Orbach et al., 1999). For example, Orbach et al. (1999) found that participants who received CU feedback about their performance experienced more positive emotions (i.e., were more hopeful and more encouraged) after the intervention than those who received US feedback.

Finally, *behavioral persistence*[1] in a sport or sport-related task has been improved by training in functional attributions (e.g., Johnson & Biddle, 1989; Rudisill & Singer, 1988). For example, in a

[1]Persistence is the tendency to continue in a given direction in spite of difficulties. In other words, persistence is endurance, or the refusal to give up, especially when faced with opposition (Bandura, 1986).

study on motor skills, Johnson and Biddle (1989) demonstrated that the least persistent individuals were those who had earlier been trained to attribute failures to task difficulty (EUS) and/or lack of ability (IUS). Conversely, those who were trained to attribute failures to a lack of effort (ICU) were most persistent. Further, in an experiment involving false failure feedback, Rudisill and Singer (1988) demonstrated that individuals who received CU attributional feedback persisted more after failure in a stabilometer task than did subjects who received US or non-attributional (NA) feedback. Thus, in the context of sport and exercise, attributional training has been used successfully to modify individuals' causal attributions for failure, expectations of future success, outcome-related emotions, and behavioral persistence. Training individuals to make functional attributions for a sports failure appears to have positive motivational and emotional consequences (Le Foll et al., 2006).

However, to infer a change in a measure (e.g., persistence) following an attributional feedback intervention, it is necessary to assess people on that measure prior to the intervention and to compare pre- and post-intervention scores. One major gap in the sport/exercise research on attributional training effects is that many studies report no data concerning a pre-intervention measure (e.g., Orbach et al., 1997, 1999; Rudisill, 1988, 1989). Although some studies (e.g., Rudisill, 1989) indicate a comparison was made between pre- and post-intervention measures, only the post-intervention results are reported. However, post-intervention comparisons between one or two intervention groups and a control group (i.e., between-group comparisons) do not provide an adequate assessment of any within-group changes produced by the attributional intervention (Perry, Hechter, Menec, & Weinberg, 1993). Thus, it is necessary to use reliable pre- and post-intervention measures of attributions, expectations, emotions, and persistence/performance, and an experimental design with standardized procedures to be able to assess the effects of an attributional program on the pre- and post-intervention differences within and between groups. In a laboratory experiment, attributional feedback is delivered using a standardized procedure that would make pre- and post-intervention comparisons within and between different intervention groups possible. A ''pre-test''/''post-test'' laboratory experiment was chosen for the present research. The laboratory simulation was a golf putting task.

Another major gap in the sport/exercise research on attributional training effects has to do with the experience level of individuals in a sport. Although people are often confronted with ''new'' contexts or opportunities for learning a sport, to our knowledge, novices to a sport (new learners) are rarely the subjects of research, and only one of the attributional training studies examined the full motivational sequence of cognitions, affects, and behaviors in novices in a sport (tennis; Orbach et al., 1999). Yet it is possible that people attribute successes and failures in novel tasks to different causes than successes and failures in familiar tasks (e.g., Zaccaro & Lowe, 1985). In contrast with experts, novices do not have elaborate knowledge of the novel domain. Such knowledge enables experts to recall sport-specific information in a more efficient manner than novices (Starkes, Allard, Lindley, & O'Reilly, 1994). Moreover, because novices tend to lack information about the possible causes which could produce a failure in a new activity, they may be more influenced by feedback delivered by an observer (e.g., a coach). Thus, the first purpose of the present study was to examine the effects of attributional feedback on sports novices' cognitions, affects, and behavior. Hypothesis 1 addressed what should happen to novices who, prior to the intervention, make dysfunctional attributions (i.e., EUS) for a performance failure in a novel task. *Prediction 1a*: If these individuals receive dysfunctional attributional feedback about a (subsequent) performance failure, that feedback should produce comparable or worse attributions about future performance failures, as well as comparable or lower expectancies for success, positive affects, and persistence in the sport. *Prediction 1b*: In contrast, functional attributional feedback (i.e., ICU) should produce improvement in attributions about future performance failures, as well as improvements in expectancies for success, positive affects, and persistence in the sport. In other words, each attributional intervention was predicted to produce a within-group effect: dysfunctional feedback about a failure was expected to produce comparable or worse cognitions, affects, and behavior over time, while functional feedback was expected to produce improved cognitions, affects, and behavior over time.

In addition to tracking change over time related to the intervention, to adequately compare intervention effects, it is necessary to compare intervention groups against a no-intervention control, under the following conditions: (a) the no-intervention control should produce no changes in any of the dependent variables over time; and (b) to detect intervention effects, there should be no differences between the intervention groups and the control group on any of the dependent variables prior to the intervention. Under these conditions, post-intervention comparisons between the means of the intervention groups and the control group will demonstrate any between-group effects of the intervention. Keeping in mind that Hypothesis 1 has to do with those sports novices who make dysfunctional attributions prior to an intervention, the expected between-group intervention effects were as follows: *Prediction 1c*: Compared to a control group, those who receive dysfunctional feedback (the intervention) were expected to show comparable or worse (1) attributions (since they already tend to make dysfunctional attributions for failure), (2) expectancies, (3) affects, and (4) persistence for subsequent failures; *Prediction 1d*: Compared to a control group, those who receive functional feedback were expected to show improvements in (1) attributions, (2) expectancies, (3) affects, and (4) persistence for subsequent failures. *Prediction 1e*: Lastly, while it was expected there would be no differences between the intervention groups prior to the intervention, after the intervention it was expected the dysfunctional and functional feedback groups would differ on all of the dependent variables (i.e., dysfunctional worse than functional).

A third major gap in the sport/exercise studies of attributional training effects has to do with the impact of attributional training on novices who, prior to the training, make functional attributions (i.e., ICU) for a performance failure in a novel task. If attributional training can modify attributions from dysfunctional causes to functional causes, is it also possible to change attributions from functional to dysfunctional causes? Just as achievement motivation and persistence are enhanced by inculcating functional attributions, achievement de-motivation and withdrawal may be produced by dysfunctional attributional feedback. For example, effective feedback would focus on ICU attributional factors such as: ''*Ok, you failed, you need to try harder*'' (low effort attribution). But some teachers or coaches may inadvertently undermine students' or athletes' motivation or persistence by using internal (or external), uncontrollable, and stable attributional feedback such as: ''*Ok, you failed; you're not very good at this are you*'' (low ability attribution). Although the feedback may be well intended—to motivate students/athletes—the resulting effect on an individual's behavior may be opposite to the intended one. To date, to our knowledge, no study has directly assessed the effects of attributional feedback on individuals who, prior to attributional training, attribute performance failure to functional causes (i.e., ICU), nor has any study we are aware of compared the relative impact of functional and dysfunctional attributional feedback on these individuals. Thus, this was the second purpose of the present study. Although there are no previous studies concerning the effects of attributional feedback on individuals who are initially functional in their attributions for failure, it is reasonable to hypothesize changes comparable to those who initially make dysfunctional attributions for task failure (unless the initial functional attributional tendency offers special protection of some kind). Hypothesis 2, then, addressed what should happen to sports novices who, prior to the intervention, make functional attributions for a performance failure in a novel task. *Prediction 2a*: If these individuals receive dysfunctional attributional feedback about a (subsequent) performance failure, that feedback was expected to produce deterioration of their attributions for future performance failures, as well as reductions in their expectancies for success, positive affects, and persistence in the sport. *Prediction 2b*: However, functional attributional feedback was expected to produce comparable or better attributions for future performance failures, as well as comparable or better expectancies for success, positive affects, and persistence in the sport. That is, each attributional intervention was predicted to produce a within-group effect: dysfunctional feedback about a failure was expected to produce worse cognitions, affects, and behavior over time, while functional feedback was expected to produce comparable or improved cognitions, affects, and behavior over time. Keeping in mind that Hypothesis 2 has to do with those sports novices who make functional attributions prior to an intervention, the expected between-group intervention effects were as follows: *Prediction 2c*: Compared to a control group, those who receive dysfunctional feedback were expected to show deterioration in their (1) attributions (2) expectancies, (3) affects, and (4) persistence for subsequent failures; *Prediction 2d*: Compared to a control group, those who receive functional feedback were expected to show comparable or better (1) attributions (since they already tend to make functional attributions for failure), (2) expectancies, (3) affects, and (4) persistence for subsequent failures. *Prediction 2e*: Lastly, while it was expected there would be no differences between the intervention groups prior to the intervention, after the intervention it was expected the dysfunctional and functional feedback groups would differ on all of the dependent variables (i.e., dysfunctional worse than functional).

Method

Overview of the experiment

This experiment investigated the influence of dysfunctional and functional attributional feedback on causal attributions, expectations of success, emotions, and short-term persistence during failure in a novel sport. Thirty novice golf students who made either dysfunctional or functional attributions for failure in a pre-test session were randomly assigned to one of three intervention groups: (1) dysfunctional (i.e., EUS) attributional feedback; (2) functional (i.e., ICU) attributional feedback; or (3) NA feedback. Participants completed four trials (all involving failure) consisting of six putts each. The feedback was administered after the second trial. The novices' causal attributions, expectations of success, emotions, and short-term persistence were measured before and after the attributional intervention in a pre-intervention/post-intervention design.

Participants

Students registered in 1st year classes at the University of Sport Sciences in France were asked in classroom settings to volunteer for the study. Forty-one students, 29 men ($M = 19$ years, $SD = 1.16$) and 12 women ($M = 18.6$ years, $SD = .79$), all agreed to take part in the study. All participants were novices in golf putting.

Materials

Inventories included measures for assessing causal attributions about performance, expectations of success, and affective reactions. Putting performance and short-term persistence were measured behaviorally.

State attributions. The Echelle de Mesure des Attributions Causales (EMAC; Fontayne, Martin-Krumm, Buton, & Heuzé, 2003) was used in this study to evaluate state attributions. The EMAC is the validated French version of the Causal Dimension Scale 2 (CDS 2; McAuley et al., 1992). First, for some particular event or task outcome, perception of success or failure is assessed on a binary rating scale that asks participants how they consider their performance: ‘‘*rather like a success*’’ vs. ‘‘*rather like a failure*.’’ Then, the EMAC asks the participant to write down what he or she thinks is a likely cause of his or her performance. After writing down a cause, a participant then rates the cause on 12 rating scales designed to measure four dimensions of causal attributions, Locus of causality (L, three items), Personal Control (PC, three items), Stability (S, three items), and External Control (EC, three items) on 9-point Likert-type scales, from 1 (*Internal, Controllable, or Unstable*) to 9 (*External, Uncontrollable, or Stable*). Thus, high scores on the EMAC reflect EUS attributions, which are considered ‘‘dysfunctional,’’ while low scores on the EMAC reflect ICU attributions, which are considered ‘‘functional.’’ Fontayne et al. (2003) reported reliability coefficients (coefficient α’s) of .83, .79, .79, and .82 for the EMAC L, PC, S, and EC scales, respectively. In the present study, reliability coefficients (coefficient α’s) were comparable at .82, .81, .85, and .83 for the EMAC L, PC, S, and EC[2] scales, respectively.

Expectations of success. Participants were asked to indicate, on a scale from 0% to 100%, how well they expected to perform in their next putting attempt. This measure of success expectations was similar to previous studies developed in motor behavior research (e.g., Biddle & Hill, 1992; Orbach et al., 1999; Rudisill, 1988, 1989; Rudisill & Singer, 1988).

Affective reactions. Participants were asked to indicate on a 9-point Likert-type scale how intensely they had experienced seven achievement-related emotions (i.e., hopefulness, encouragement, happiness, satisfaction, guilt, anger, and pride) as a function of their performance. Higher scores represented higher levels of each emotion. These feelings were selected based on past findings of relevant emotions in achievement and performance studies (Biddle & Hill, 1992; McAuley & Duncan, 1990; Orbach et al., 1999; Rudisill, 1988, 1989; Rudisill & Singer, 1988; Weiner, 1985).

Putting performance. On each putting trial, each participant was told she or he had six putts, and that she or he should try to achieve the best performance possible. ‘‘Best performance’’ was defined as the smallest distance between where the ball stopped and the target. The target was a

[2]Readers interested in the dimension of external controllability (not examined in the present study) may request further information from the first author.

point drawn on the ground to represent a golf hole. The putting distance was approximately 6 m. The participant was instructed to start each putt from the same spot ("starting place"). Each participant was informed that each trial score would be calculated as the average, in inches, of the six distances between the place where the ball stopped and the target (the hole).

Short-term persistence. Based on earlier attributional research (e.g., Le Foll et al., 2006), short-term persistence was assessed, a posteriori and for each participant, by adding the number of times a participant engaged in the putting task during a given free-time period of 2 min under the same conditions as the task experienced (i.e., an even distance, even starting place) (Gernigon & Fleurance, 1998; Johnson & Biddle, 1989—see Försterling (1985) for an overview of the cognitive attributional investigations). The 2-min free-time period is a similar length of time as that used by Rudisill (1988, 1989) and Rudisill and Singer (1988) and was chosen so that there would not be a time difference between the trial length and the free-time period. We assumed that a 2-min free period would produce an adequate measure of short-term persistence, compared with longer persistence (such as withdrawing or continuing a sport activity). As in the method used by Rudisill and Singer (1988), in the testing room, several sports magazines were left on the table where the participants completed the EMAC. The experimenter mentioned to each participant that s/he could do whatever s/he wanted during the free-time period: read the magazines, not practice, or practice their putting. Thus, in Session 2 described below, Trials 1, 2, and 3 were followed by a 2-min free period. At the end of the free period, the next trial of six putts took place under the same conditions as the preceding trial. Before and after the free-time period, the instruction to "try to achieve the best-performance you can" was repeated to the participants. During the free-time periods, the experimenter stepped into an adjoining room and was out of sight. In order to be able to observe, a posteriori, the activity of participants (i.e., persistence) during the free-time periods, a video camera filmed each participant's entire session in the laboratory. This technique has been used in other studies (e.g., Le Foll et al., 2006; Martin-Krumm, Sarrazin, Peterson, & Famose, 2003; Orbach et al., 1997, 1999; Rudisill, 1988). The participants were informed in advance of the presence and purpose of the video camera and could refuse to be filmed. None used this option.

Procedure

Testing involved two sessions. The first session was a pre-test that allowed the experimenters to create the six intervention groups. The second session involved the attributional intervention and occurred 3 days after the first session.

Session 1: Pre-test

Student participants were requested to volunteer to take part individually in a golf putting task in a laboratory. All of the student participants were naïve (i.e., had no experience with golf putting). Each participant was informed that the objective of the study was to examine how well novice participants would perform in a putting task. Each participant was told she or he had six putts, and that she or he should try to achieve the best performance they could on each putt. The participant was instructed to start each putt from the same spot ("starting place"). The putting distance was approximately 6 m. The distance was selected to ensure that the novice participants would fail to sink most of their putts even if the ball often passed close to the target "hole." It was important to ensure that the participants would fail to significantly improve during the pre-test experience so that possible post-intervention modifications in cognitions, affects, or behavior could not be attributed to an increase in performance during the pre-test.

Constitution of the intervention groups. After taking the six putts, each participant completed a pre-intervention EMAC questionnaire. The aim of the pre-test trial of six putts was to allow the participants to experience failure prior to completing the EMAC questionnaire, and without the influence of any attributional feedback. Notably, in completing the first item on the EMAC, all participants in the present study perceived their performance in the pre-test putting task to be ''*rather like a failure.*''

Correlations between the EMAC L, PC, and S scales were in the expected directions (L-PC .54, $p = .005$; L-S .27, $p = .08$; PC-S .08, $p > .10$), which is consistent with other studies that have used the EMAC (e.g., Fontayne et al., 2003). In studies that have used larger sample sizes, the EMAC L, PC, and S correlations were as follows: L-PC .58 ($p < .01$), L-S .37 ($p < .01$), PC-S .06 (n.s.) (Fontayne et al., 2003; Study 3, $N = 374$). A composite EMAC pre-test score was created for each participant by calculating the sum of the participant's ratings on the three attributional dimensions (L, PC, and S). A high composite EMAC score reflects EUS (or dysfunctional) attributions, while a low composite EMAC score reflects ICU (or functional) attributions.[3] Using a composite score to define the groups is reasonable given that the attributional feedback delivered to the participants in Session 2 (attributional intervention) included all three attributional dimensions (L, PC, and S) and did not focus on the specific effect for each dimension separately. As Perry et al. (1993) found, attributional feedback by coaches, teachers, parents, and others typically involves multiple attributional dimensions rather than only one dimension (Perry et al., 1993). Thus, participants were divided into ''dysfunctional'' (DYS) and ''functional'' (FUN) groups based on whether they were in the bottom half or top half of the composite EMAC pre-test score distribution, respectively. Specifically, the FUN group was comprised of those individuals scoring below the median of the composite EMAC score distribution, and the DYS group was comprised of those individuals scoring above the median of the composite EMAC score distribution.[4] In order to examine a more significant sample of participants with dysfunctional or functional pre-test attributions, we chose to take the 25% of participants closest to the median away from this investigation. Thus, 30 participants (15 DYS and 15 FUN; 22 men ($M = 18.8$ years, SD = 1.19) and 8 women ($M = 18.9$ years, SD = .83)) formed the sample used for the experiment and were distributed with the restriction that there were one or two women in each group. Table 1 shows the mean pre-test composite attribution scores (and standard deviations) for the six experimental groups.

[3]Because PC and S typically are uncorrelated in overall samples, it is not possible to justify the creation of a composite attribution score to create the DYS and FUN groups by using the correlations among the dimensions on the EMAC. The composite attribution score distribution reflects, at the extremes, the only two ''styles'' we were interested in the present study (EUS, who became the dysfunctional group, and ICU, who became the functional group). The sample for the experiment excluded the middle 25%, whose attributions are not simply ''average,'' but reflect a broad variety of attributional styles. With three causal dimensions, there are eight possible ways of attributing a cause (ICU, ICS, IUU, IUS, ECU, ECS, EUU, and EUS) on the EMAC. We created the composite attribution score and selected only the (extreme) high and low scorers because those individuals were the focus of the study, not because there were good statistical reasons to create the composite score.

[4]One participant scoring on the median was not asked to continue the investigation.

Design. The 15 participants in the DYS group were randomly assigned to one of three intervention groups: (1) ICU attributional feedback (DYS-ICU); (2) EUS attributional feedback (DYS-EUS); or (3) NA feedback (DYS-NA). The 15 FUN participants were also randomly assigned to one of the three intervention groups: (1) FUN-ICU, (2) FUN-EUS, or (3) FUN-NA. Thus, there were six experimental groups of five (5) participants each. The basic design was a 2 (Pre-Test Group: Dysfunctional, Functional) × 3 (Attributional Intervention: EUS, ICU, NA). Only the feedback variable is an experimental variable. As described below, each dependent variable (causal attributions, expectancies of success, affects (hopefulness and encouragement), performance, and persistence) was measured more than once. Thus, the complete experimental design, including repeated measures, was a 2 (*Pre-Test Group*: Dysfunctional, Functional) × 3 (*Attributional Intervention*: EUS, ICU, NA) × *N* (*Time*: Time of measurement).

Session 2: Overview (pre-, post-intervention)

Three days after Session 1, participants came back to the testing room and were tested individually. First, each participant was reminded of the aim of the task (same instructions as in Session 1). Next, participants completed four test trials, consisting of six putts each. The first and second putting trials were administered prior to the attributional feedback intervention, and after trial 1, pre-intervention affective reactions were assessed. The remaining two putting trials were performed following the experimental intervention. Success expectations were assessed after each trial. Following the last trial, participants completed a post-intervention EMAC, affect questionnaires, and were debriefed about the procedures and the purpose of the study.

Attributional feedback intervention. The respective interventions for the six groups emphasized different causal factors that influence performance in putting task. Each group was provided with standardized feedback by the experimenter (the first author). This kind of oral intervention has been used before and reflects many real-world situations (e.g., coaching, or managerial training), where such attributional feedback is routinely given (Orbach et al., 1997, 1999; Rudisill, 1988, 1989; Rudisill & Singer, 1988).

The instructions to DYS-ICU and FUN-ICU group members were: ‘‘*Your performance in this putting task seems to reflect mostly internal, controllable, and unstable factors, such as your concentration, effort, and/or the strategy you used to try to succeed in the task. As you know, you*

Table 1
Means (and standard deviations) of composite attributional scores for the six experimental groups

Treatment group	Pre-test group	
	Dysfunctional	Functional
EUS	14.20 (3.49)	6.53 (2.63)
ICU	12.87 (1.50)	8.13 (1.30)
NA	13.07 (1.83)	6.27 (2.36)
Total	13.38 (2.33)	6.97 (2.18)

Notes. NA = non-attributional feedback; ICU = internal, controllable, unstable feedback; EUS = external, uncontrollable, stable feedback.

have control over the effort you put into the task or the strategy you use, and the intensity of your effort or concentration might change over time.'' For the DYS-EUS and FUN-EUS group participants, the experimenter stated the following: ''*Your performance in this putting task seems to reflect mostly external, uncontrollable, and stable factors, such as the task difficulty or other factors external to you. As you know, these kinds of factors are things you are not able to control and they don't change over time*.'' The DYS-NA and FUN-NA groups received no attributional feedback and were provided with only general details regarding the task, such as that the task was composed of different skills that are needed to be a good golf player.

Ethical considerations

Several steps were taken to ensure that this experiment met APA ethical guidelines. First, we obtained institutional approval for this research protocol. Second, in order to record participants' behavior during this investigation, we obtained written (and informed) permission from all participants. Third, participants were partially debriefed immediately after their participation, but, after the investigation, all participants were called together in a classroom for full debriefing. The purposes of the study were explained to them, with a brief lesson about the attributional theory of motivation. It was also explained that the putting task was created to produce failure and that all feedback they received was standardized (i.e., that everyone in their intervention group heard exactly the same feedback). All hypotheses and results of the investigation were then presented. Thus, the connection was explained between functional causes and increases in expectations, motivating emotions, and short-term persistence, and between dysfunctional causes and decreases in cognitions, emotions, and behavior. After the full debriefing, participants who attributed their failure to functional causes in the pre-test and who received dysfunctional feedback (i.e., FUN-EUS group members) were asked to remain in the classroom in order to ensure that they completely understood the experimental protocol. Finally, all the findings revealed in this study are anonymous and were presented to all participants before beginning the writing of this manuscript.

Results

Participants' putting performance, short-term persistence, causal attributions, success expectations, and emotions were examined using repeated measures analyses of variance (ANOVA).[5] Significant effects were followed up with contrast analysis and *t*-tests when necessary (Howell, 2006; Keppel, 1991). Measures of effect size (partial eta-squared (η^2)) for univariate analyses, and population point biserial correlation (ρ_{pb}) coefficients for *t*-tests were also examined for all significant effects. Based on the criteria outlined by Kirk (1996), η^2 values of .010, .059, and .138, and ρ_{pb} values of .10, .24, and .37 were taken as corresponding to small, medium, and large effect sizes, respectively. The probability of Type I error was maintained at .05 for all analyses. All contrasts and *t*-tests were adjusted to control for inflation of the Type I error rate. Table 2 reports the means and standard deviations for the dependent variables at all measuring points in the pre-test and intervention groups.

[5]Non-significant *F*-test values may be obtained from the first author.

Table 2
Means (and standard deviations) for all pre-test and intervention groups at all measuring points for each of the dependent variables

Measure	Pre-test group	Treatment group	Session 1	Session 2			
			Pre-test	Pre-intervention		Post-intervention	
				Trial 1	Trial 2	Trial 3	Trial 4
Attributions	Functional (FUN)	EUS	6.53 (2.63)	—	—	—	17.53 (5.30)
		ICU	8.13 (1.30)	—	—	—	7.67 (3.14)
		NA	6.27 (2.36)	—	—	—	7.53 (3.26)
	Dysfunctional (DYS)	EUS	14.20 (3.49)	—		—	13.93 (1.96)
		ICU	12.87 (1.50)	—	—	—	9.47 (1.32)
		NA	13.07 (1.83)	—	—	—	13.20 (2.24)
Expectations	Functional (FUN)	EUS	—	76.00 (5.09)	55.00 (5.47)	44.00 (9.27)	38.00 (8.45)
		ICU	—	50.00 (3.16)	63.20 (4.09)	63.00 (5.38)	63.20 (5.18)
		NA	—	45.00 (12.44)	46.00 (12.78)	41.00 (13.26)	34.00 (9.80)
	Dysfunctional (DYS)	EUS	—	54.00 (13.54)	44.00 (11.22)	44.00 (10.29)	35.00 (8.21)
		ICU	—	53.00 (6.24)	56.00 (7.31)	60.00 (5.47)	63.00 (5.83)
		NA	—	66.00 (8.27)	70.00 (6.51)	57.00 (4.89)	57.00 (6.63)
Hopefulness	Functional (FUN)	EUS	—	6.40 (.97)	—	—	4.00 (1.00)
		ICU	—	5.80 (.86)	—	—	5.20 (.73)
		NA	—	2.80 (.58)	—	—	2.60 (.67)
	Dysfunctional (DYS)	EUS	—	5.60 (1.07)	—	—	3.60 (.74)
		ICU	—	4.20 (.58)	—	—	4.60 (1.02)
		NA	—	5.00 (.70)	—	—	4.20 (1.24)
Encouragement	Functional (FUN)	EUS	—	5.60 (.67)	—	—	3.20 (.80)
		ICU	—	4.40 (.74)	—	—	4.40 (.74)
		NA	—	3.60 (.60)	—	—	3.40 (.74)

	Dysfunctional (DYS)	EUS	—	4.60 (.81)	—	—	3.60 (.67)
		ICU	—	3.20 (.37)	—	—	3.80 (.66)
		NA	—	3.20 (.48)	—	—	4.20 (.96)
Performance	Functional (FUN)	EUS	—	53.92 (1.89)	53.96 (3.64)	46.48 (3.35)	49.14 (3.16)
		ICU	—	53.98 (2.61)	53.10 (4.57)	46.64 (5.24)	50.36 (3.52)
		NA	—	48.96 (5.21)	58.32 (3.54)	58.20 (5.80)	58.66 (5.93)
	Dysfunctional (DYS)	EUS	—	55.14 (2.54)	48.98 (4.07)	50.40 (2.92)	54.20 (5.20)
		ICU	—	61.72 (5.16)	58.40 (5.76)	54.00 (5.77)	53.13 (3.17)
		NA	—	65.18 (3.88)	53.38 (6.71)	50.90 (3.16)	52.64 (4.22)
Persistence	Functional (FUN)	EUS	—	6.20 (1.06)	3.80 (2.00)	3.40 (1.88)	—
		ICU	—	4.40 (1.16)	6.60 (.92)	7.00 (.94)	—
		NA	—	1.80 (1.35)	1.60 (1.47)	1.60 (1.11)	—
	Dysfunctional (DYS)	EUS	—	4.40 (1.86)	3.40 (1.72)	2.60 (1.60)	—
		ICU	—	4.80 (1.46)	4.60 (1.88)	5.00 (2.09)	—
		NA	—	5.20 (1.59)	4.80 (1.46)	5.20 (1.71)	—

Putting performance

Putting performance scores in session 2 from Trial 1 to Trial 4 of the experiment were calculated separately per trial as the average, in inches, of the six distances between the place where the ball stopped and the target (the hole). Putting performance was analyzed using a 2 (*Pre-Test Group*: DYS, FUN) × 3 (*Attributional Intervention*: EUS, ICU, NA) × 4 (*Time*: Pre-Intervention, Post-Intervention 1, Post-Intervention 2, Post-Intervention 3) ANOVA, with repeated measures on the last factor. The analysis did not reveal any significant change in putting performance during the investigation. There were no significant main effects or interactions.

Causal attributions

The composite scores measured by the EMAC were analyzed using a 2 (*Pre-Test Group*: DYS, FUN) × 3 (*Attributional Intervention*: EUS, ICU, NA) × 2 (*Time*: Pre-Intervention, Post-Intervention) ANOVA, with repeated measures on the last factor. As expected by our procedure used to constitute the functional and dysfunctional pre-test groups, the ANOVA revealed a significant Pre-Test Group main effect, $F(1,24) = 21.60$, $\eta^2 = .47$, $p < .001$, indicating that the DYS group generated more dysfunctional attributions prior to the attributional intervention than did the FUN group. There was also a significant Time main effect, $F(1,24) = 5.75$, $\eta^2 = .19$, $p = .025$, indicating that, overall, participants made more dysfunctional attributions after the intervention than before, which is not surprising given the nature of the task (i.e., participants could only fail). A significant Intervention main effect, $F(1,24) = 7.08$, $\eta^2 = .37$, $p = .004$, revealed the EUS feedback produced more dysfunctional attributions than either the ICU feedback or the NA feedback, all p's $< .05$.

A significant Pre-Test Group × Time interaction, $F(1,24) = 19.78$, $\eta^2 = .45$, $p < .001$, revealed that the DYS group's attributions did not change over time, but the FUN group's attributions became significantly more dysfunctional over time ($p < .01$). Moreover, there was a significant Intervention × Time interaction, $F(2,24) = 13.80$, $\eta^2 = .54$, $p < .001$, indicating that, after the intervention, the EUS feedback group generated more dysfunctional attributions than the ICU and NA feedback groups, all p's $< .01$.

Finally, there was a significant Pre-Test Group × Intervention × Time interaction, $F(2,24) = 7.37$, $\eta^2 = .381$, $p = .003$. Post-hoc decomposition of the interaction revealed that the attributional feedback intervention produced significant changes in participants' attributions, in a direction consistent with the feedback. First, however, it is important to note that both of the conditions for adequately comparing intervention effects outlined earlier were met: (a) for each of the Pre-Test Groups (DYS, FUN), the NA feedback (i.e., no-intervention control) produced no significant change in causal attributions over time, and (b) for each of the Pre-Test Groups, there were no differences in causal attributions between the intervention (EUS, ICU) or control (NA) groups prior to the intervention.

With respect to Hypothesis 1, as displayed in Fig. 1 (left side), the DYS-EUS group's attributions were the same before and after the intervention, which is consistent with *Prediction 1a*. Moreover, the DYS-ICU group attributed their performance to more functional causes after the attributional intervention than before the intervention, $\rho_{pb} = .98$, $p < .01$, which confirms *Prediction 1b*. Consistent with *Prediction 1c*, after the intervention, the attributions of the DYS-EUS group and the control group (DYS-NA) were comparable (i.e., not significantly different). Confirming *Prediction 1d*, after the intervention, the attributions of the DYS-ICU group were significantly more functional than the DYS-NA group's, $\rho_{pb} = .75$, $p < .05$. Finally, confirming *Prediction 1e*, after the intervention, DYS-ICU group attributed their performance to more functional causes than the DYS-EUS group, $\rho_{pb} = .83$, $p < .01$.

Turning to Hypothesis 2, as displayed in Fig. 1 (right side), the FUN-EUS group made significantly more dysfunctional attributions after the attributional intervention than before the intervention, $\rho_{pb} = .91$, $p < .01$, which confirms *Prediction 2a*. Moreover, the FUN-ICU group's attributions were the same before and after the intervention, which is consistent with *Prediction 2b*. Confirming *Prediction 2c*, after the intervention, the FUN-EUS group's attributions were significantly more dysfunctional than the control group's, $\rho_{pb} = .79$, $p < .05$. Consistent with *Prediction 2d*, after the intervention, the attributions of the FUN-ICU group and the control group were comparable (i.e., not significantly different). Finally, confirming *Prediction 2e*, after the intervention, the FUN-EUS group attributed their performance to more dysfunctional causes than the FUN-ICU group, $\rho_{pb} = .79$, $p < .05$. It should be noted that in confirming the predictions of Hypothesis 1 and Hypothesis 2, the effect sizes above are quite substantial.

Expectations of success

Expectations of success were analyzed using a 2 (*Pre-Test Group*: DYS, FUN) × 3 (*Attributional Intervention*: EUS, ICU, NA) × 4 (*Time*: Pre-Intervention, Post-Intervention 1, Post-Intervention

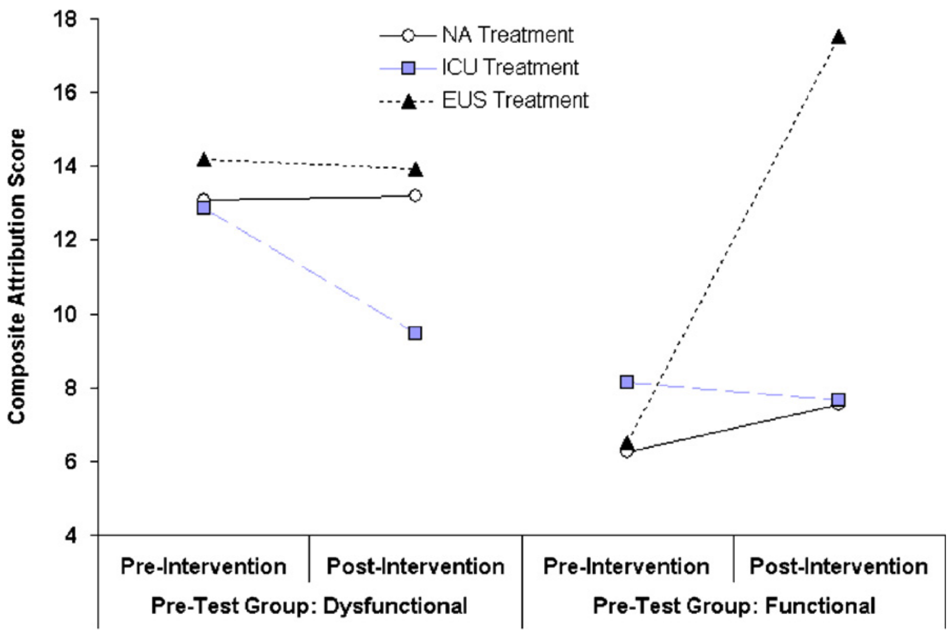

Fig. 1. The interaction of Pre-Test Group (DYS, FUN), Attributional Intervention (NA, ICU, EUS), and Time (Pre-Intervention, Post-Intervention) on composite (summed) causal attribution scores for perceived failure in a putting task. *Note*: Lower composite attribution scores represent more functional attributions and higher scores represent more dysfunctional attributions.

2, Post-Intervention 3) ANOVA, with repeated measures on the last factor. There was no Pre-Test Group main effect and there were no interactions with the Pre-Test Group. Further, it should be noted that both of the conditions for adequately comparing intervention effects were met: (a) the NA feedback produced no significant change in expectations over time, and (b) there were no significant differences in expectations between the intervention (EUS, ICU) or control (NA) groups prior to the intervention.

The analysis revealed a significant Time main effect, $F(6,72) = 6.22$, $\eta^2 = .21$, $p < .01$, indicating that, overall, participants' expectations were lower after the intervention than before, which is not surprising given that participants could only fail on each trial. In addition, there was a significant Intervention × Time interaction, $F(6,72) = 9.28$, $\eta^2 = .44$, $p < .001$. As shown in Fig. 2, the EUS feedback group had lower expectations of success after the attributional intervention than before, $\rho_{pb} = .78$, $p < .01$, which confirms *Predictions 1a and 2a*. Confirming *Predictions 1b and 2b*, the ICU feedback group had higher expectations of success after the attributional intervention than before, $\rho_{pb} = .86$, $p < .01$. Further, after the intervention, the EUS feedback group's expectations were lower but not significantly worse than the control group's, which is consistent with *Predictions 1c and 2c*. Also, after the intervention, the ICU feedback group had higher success expectations than the control group, $\rho_{pb} = .46$, $p < .05$, which confirms *Predictions 1d and 2d.* Lastly, after the intervention, the ICU feedback group had higher expectations of success than the EUS feedback group, $\rho_{pb} = .68$, $p < .01$, which confirms *Predictions 1e and 2e.*

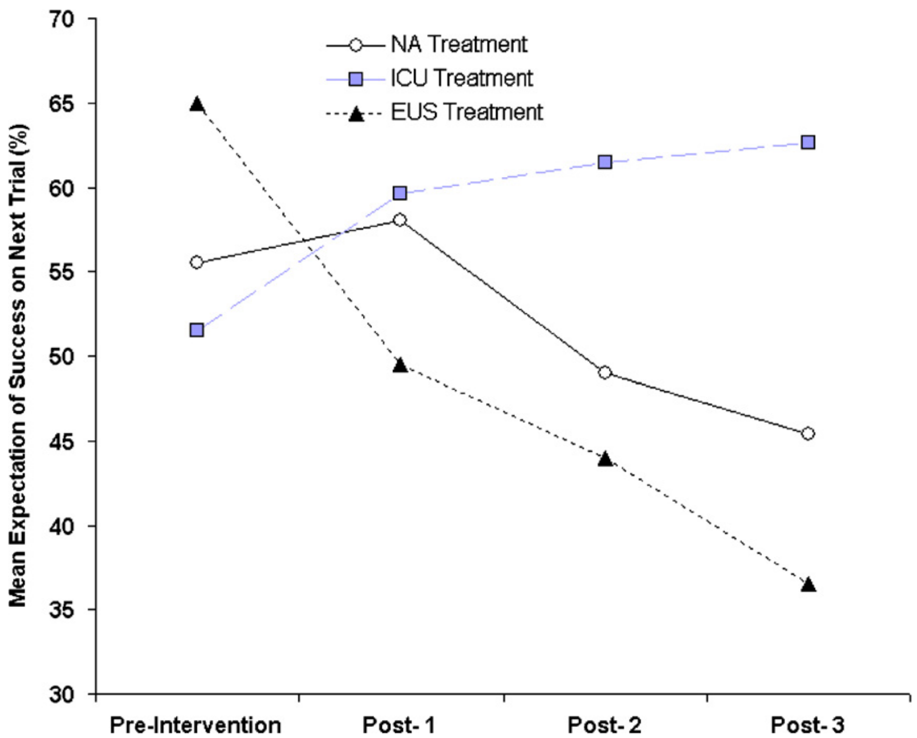

Fig. 2. The interaction of Attributional Intervention (NA, ICU, EUS) and Time (Pre-Intervention, Post-Intervention 1, Post-Intervention 2, Post-Intervention 3) on expectations of success in a putting task.

Emotions

As the hopefulness and encouragement scores were strongly correlated before the intervention ($r = .66$, $p < .001$) and after the intervention ($r = .67$, $p < .001$), the scores were averaged (within a time period) to form a composite affect score which was analyzed using a 2 (*Pre-Test Group*: DYS, FUN) × 3 (*Attributional Intervention*: EUS, ICU, NA) × 2 (*Time*: Pre-Intervention, Post-Intervention) ANOVA, with repeated measures on the last factor. There was no Pre-Test Group main effect and there were no interactions with the Pre-Test Group. Further, only one of the conditions for adequately comparing intervention effects was met: the NA feedback produced no change in affect over time. The second condition was not met as the EUS feedback group was significantly more hopeful/encouraged than the control group prior to the intervention, $p < .05$. No other pre-intervention differences were found.

The analysis revealed a significant Time main effect, $F(1,24) = 6.96$, $\eta^2 = .22$, $p = .014$, indicating that, overall, participants were less hopeful and encouraged after the intervention than before. There was also a significant Intervention × Time interaction, $F(2,24) = 7.55$, $\eta^2 = .39$, $p = .003$. As shown in Fig. 3, the EUS feedback group were less hopeful/encouraged after the attributional intervention than before, $\rho_{pb} = .80$, $p < .01$, which confirms *Predictions 1a and 2a.* No other significant differences were found.

Short-term persistence

Short-term persistence was analyzed using a 2 (*Pre-Test Group*: DYS, FUN) × 3 (*Attributional Intervention*: EUS, ICU, NA) × 3 (*Time*: Pre-Intervention, Post-Intervention 1, Post-Intervention 2) ANOVA, with repeated measures on the last factor. There was no Pre-Test Group main effect and there were no interactions with the Pre-Test Group. Both of the conditions for adequately comparing

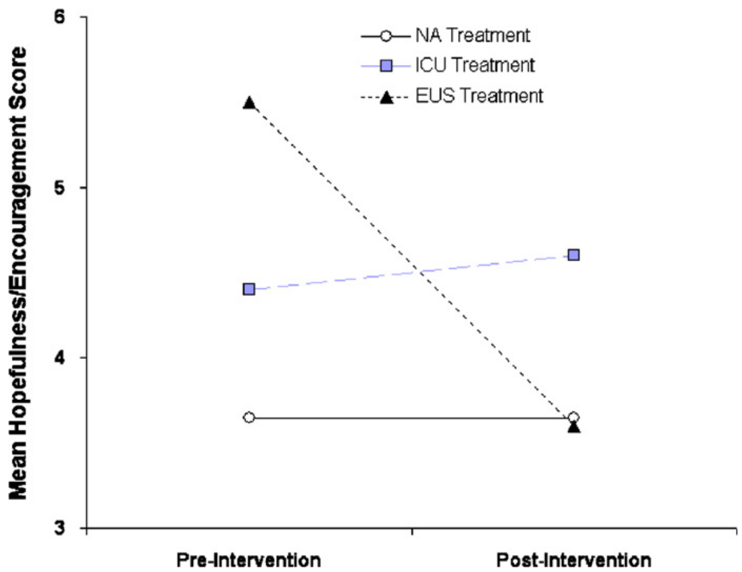

Fig. 3. The interaction of Attributional Intervention (NA, ICU, EUS) and Time (Pre-Intervention, Post-Intervention) on emotions (mean hopefulness/encouragement combined score) in a putting task.

intervention effects were met: (a) the NA feedback produced no significant change in persistence over time, and (b) there were no significant differences in persistence between the intervention (EUS, ICU) or control (NA) groups prior to the intervention.

The analysis revealed a significant Intervention × Time interaction, $F(4,48) = 4.93$, $\eta^2 = .29$, $p = .01$. There were no other significant interactions or main effects. As shown in Fig. 4, the EUS feedback group persisted less after the attributional intervention than before, $\rho_{pb} = .67$, $p < .05$, which confirms *Predictions 1a and 2a*. Confirming *Predictions 1b and 2b*, the ICU feedback group persisted more after the attributional intervention than before, $\rho_{pb} = .47$, $p = .07$ (one-tailed), although the difference just failed to reach significance at $p < .05$. Further, after the intervention, the EUS feedback group's persistence was lower but not significantly worse than the control group's, which is consistent with *Predictions 1c and 2c*. Also, after the intervention, the persistence of the ICU feedback group was higher than the control group, $\rho_{pb} = .34$, $p = .07$ (one-tailed), which is consistent with *Predictions 1d and 2d*. Lastly, after the intervention, the ICU feedback group persisted more than the EUS feedback group, $\rho_{pb} = .40$, $p = .04$ (one-tailed), which confirms *Predictions 1e and 2e*.

Discussion

If different attributions lead to different behavioral consequences, it should be possible to change the behavior of people by changing the attributions they make (Weiner, 1985). A good deal of research within this paradigm is focused on causal attributions about failure, and it is generally assumed that after failure, ICU attributions lead to "better" future behavior than EUS attributions. The present study examined the influence of attributional feedback on the

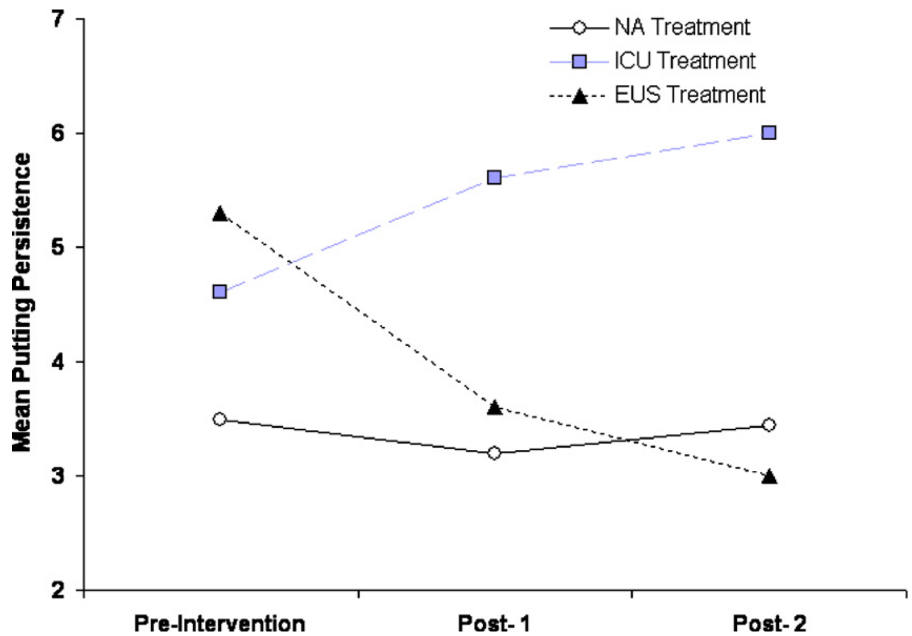

Fig. 4. The interaction of Attributional Intervention (NA, ICU, EUS) and Time (Pre-Intervention, Post-Intervention 1, Post-Intervention 2) on short-term persistence in a putting task.

attributions, expectancies of success, motivating emotions, and short-term persistence of individuals new to a sport. Prior to the intervention, half of the novices explained a failure in the new sport with dysfunctional causes, and half with functional causes. The results revealed that attributional feedback modified novices' attributions about failure, in a direction consistent with the feedback. Furthermore, the novices' expectations, emotions, and short-term persistence in the sport were modified as well.

The impact of dysfunctional attributional feedback

Dysfunctional attributional feedback (EUS) produced deterioration in golf novices' cognitions, affects, and behavior over time. Attributions, expectancies, positive affects (hopefulness, encouragement), and persistence were significantly worse after the dysfunctional attributional feedback than before the feedback. However, in terms of causal attributions, the deterioration over time occurred only in the group who tended to make functional attributions prior to the attributional intervention (i.e., the FUN-EUS group). The FUN-EUS group made significantly *less* functional attributions about performance failure after than before the intervention. Furthermore, after the intervention, the FUN-EUS group's attributions for failure were significantly worse than the attributions of a no-intervention control group (i.e., the FUN-NA group) whose attributions for failure remained functional (i.e., unchanged from pre- to post-intervention). These results indicate that it is possible to change the attributions of individuals from functional to dysfunctional causes.

In contrast, dysfunctional feedback had no effect on the group who tended to make dysfunctional attributions prior to the attributional intervention, (i.e., the DYS-EUS group). The DYS-EUS group's attributions about failure were just as dysfunctional after the intervention as before, but no worse. The DYS-EUS group's attributions were comparable to the attributions of a no-intervention control group (i.e., the DYS-NA group) whose attributions for failure remained *dys*functional (i.e., unchanged from pre- to post-intervention).

Overall, dysfunctional feedback about performance failure worsened golf novice's expectancies, positive affects, and short-term persistence, and was particularly damaging to the attributions of some, but not all, golf novices.

The impact of functional attributional feedback

Functional attributional feedback (ICU) produced improvements in golf novices' cognitions and behavior over time. Attributions, expectancies, and persistence were significantly better after the functional attributional feedback than before the feedback. However, in terms of causal attributions, the improvement over time occurred only in the group who tended to make *dys*functional attributions prior to the attributional intervention, (i.e., the DYS-ICU group). The DYS-ICU group made significantly *more* functional attributions about performance failure after than before the intervention. Furthermore, after the intervention, the DYS-ICU group's attributions for failure were significantly better than the attributions of a no-intervention control group (i.e., the DYS-NA group), whose attributions for failure remained *dys*functional (i.e., unchanged from pre- to post-intervention). Therefore, it can be concluded that the attributional intervention was successful for participants who initially emitted dysfunctional attributions after failure—it is possible to change the attributions of individuals from dysfunctional to functional causes.

In contrast, the functional feedback had no effect on the group who tended to make functional attributions prior to the attributional intervention, (i.e., the FUN-ICU group). The FUN-ICU group's attributions about failure were just as functional after the intervention as before, but showed no improvement. The FUN-ICU group's attributions were comparable to those of the no-intervention control group (i.e., the FUN-NA group) whose attributions for failure remained functional (i.e., unchanged from pre- to post-intervention).

Overall, functional feedback about performance failure improved golf novice's expectancies and short-term persistence, and was particularly beneficial to the attributions of some, but not all, golf novices.

Comparing dysfunctional and functional attributional feedback

After the intervention, the ICU feedback group's attributions, expectancies of success, and short-term persistence were significantly better than the EUS group's. That is, feedback focusing on ICU causes improved novices' attributions, expectancies, and persistence, while feedback focusing on EUS causes for failure worsened novices' attributions, expectancies, and persistence. These findings highlight the influence of mildly functional or dysfunctional attributional feedback in a novel sports setting, and are consistent with other attributional training studies conducted in education settings (e.g., Anderson, 1983; Andrews & Debus, 1978; Wilson & Linville, 1985) and with psychomotor skills (Medway & Venino, 1982; Orbach et al., 1999; Rudisill, 1989; Rudisill & Singer, 1988).

It is of interest to note that only the EUS feedback produced a change in affect scores over time. The EUS group became significantly less hopeful/encouraged after the intervention. The affective change produced by EUS feedback is consistent with a belief that the reason for failure is not under personal control (Weiner, 1985). In comparison, the ICU feedback had no impact on novice's emotions. The ICU group's level of hopefulness and encouragement remained unchanged—they were as hopeful and encouraged at the final testing as they had been at the initial testing. Many other studies have also found that EUS attributions for the failure resulted in debilitating affects under conditions of perceived failure (e.g., Biddle & Hill, 1992; McAuley, 1991, 1993; McAuley & Duncan, 1989). According to Weiner (1985), high expectations of success elicit higher hopefulness, optimism, or encouragement, and low expectations of success elicit lower levels of these emotions. In our study, the EUS participants showed decreases in success expectations over time, and had significantly lower expectancies than the ICU group at final testing. Thus, based on Weiner's theory, it is not surprising that the EUS participants experienced a decrease in hopefulness and encouragement.

Additional examination of the affect data revealed another possible reason for the differential impact of EUS and ICU feedback on emotions. All of the intervention groups were expected to show comparable levels of affect before the intervention, but for some reason, the EUS group was more positive (emotionally) than the control (NA) group prior to the intervention. It is important to note that the ICU and NA groups were not "negative" in hopefulness/encouragement before (or after) the intervention. That is, average scores for the ICU and NA groups were just above or below the mid-point of the affect scale (and did not change over time). Also, the difference between the EUS and ICU groups was not significant prior to the intervention, although it appears so. (The ICU and NA groups were comparable prior to and after the intervention.) Given the small sample size, the more positive affect of the EUS group prior to the intervention appears to be due to chance. Looking at the breakdown of scores by intervention group (and pre-test attribution group), there were just 2/10 individuals in the NA intervention group with scores on the affect measures at 6 or above on the 9-point scale. However, the ICU intervention group had 4/10 such high scorers and the EUS intervention group had 6/10 (4 of whom are also FUN subjects). Thus, by chance, many of the really hopeful/encouraged FUN subjects ended up in the EUS intervention condition. It is also the FUN-EUS group who experienced the largest deterioration in their attributions (and expectations; see below) over time. A larger sample size (see limitation below) would have allowed a better distribution of DYS and FUN participants within the intervention (EUS, ICU, NA) groups.

Perhaps the most notable difference between the attributional interventions is the size of the changes produced over time by the two types of feedback. While ICU feedback in general produced significant improvements in cognitions and persistence (but not emotions) over time, those improvements were moderate compared to the amount of deterioration in cognitions, emotions, and persistence produced by the EUS feedback over time. In the present investigation, the ICU participants showed small improvements in attributions (DYS-ICU group), expectancies, and persistence over time while the EUS participants showed a large deterioration in attributions (FUN-EUS group), expectancies, affects, and persistence over time. In the *attribution* data, it is the FUN-EUS group who showed the biggest change in their attributions for failure over time (significant deterioration: -11 points on average). The DYS-ICU group's gain in their causal attributions due to the ICU feedback was moderate (a significant improvement of $+3.4$ points on average)—offset by the nature of the task (i.e., they continued to fail). In the *expectations* data, the interaction of Pre-Test Group (i.e., FUN, DYS) $\times$ Intervention (EUS, ICU, NA) $\times$ Time (pre, post-intervention) was not significant, but it approached significance at $p = .15$. Notably, the FUN-EUS group's expectancies dropped on average by 38 points from pre- to post-intervention compared to the DYS-EUS group's 19-point average drop in expectations. The FUN-ICU and the DYS-ICU groups showed moderate gains in expectancies due to the ICU feedback (an average of $+12$ and $+10$ points, respectively), again, offset by the nature of the task (i.e., they continued to fail). Thus, for these reasons as well, it is not surprising that it was the EUS group's affect scores that were significantly changed (a significant decline after the intervention), and that the affect scores of the ICU group were unchanged. Had the improvements in attributions and expectations been stronger in the ICU group, improvements in affect scores most likely would have appeared.

Why did the EUS feedback have a stronger impact on cognitions, affects, and behavior than the ICU feedback? One possible explanation is that people pay more attention to EUS feedback (which focuses on uncontrollable causes) than to ICU feedback. There is ample evidence in social cognition to indicate that people pay greater attention to ‘‘negative’’ information than to positive (e.g., Anderson, 1965; Fiske, 1980; Fiske & Taylor, 1991; Hamilton & Zanna, 1974). Selective attention is a fundamental process that influences the appraising and encoding of information and is therefore linked to behavior choices (e.g., Mischel, 1973). If EUS feedback triggers greater selective attention and information processing than ICU feedback, this could explain its stronger impact on the training variables in the present study. Another possible explanation for the differential impact of EUS and ICU feedback has to do with the nature of the task. That is, in the present task, participants could only fail. The repeated performance failures may have made it salient to some participants that their strategies or efforts were irrelevant, despite the ICU feedback from the experimenter, and thereby watering down the benefits of ICU feedback. ICU feedback may be stronger in situations where novices are experiencing successes *and* failures in a novel sport. Future studies should focus on testing these possible explanations for the differential impact of EUS and ICU feedback.

Also, future studies should examine the impact of ICU and EUS feedback on DYS and FUN athletes, as well as novices, in order to determine whether novices are particularly sensitive to EUS feedback (relative to ICU feedback) or whether it is a more general phenomenon that EUS feedback produces greater deterioration than the improvement produced by ICU feedback. It is possible that greater experience with a sport would allow an athlete to benefit more from ICU feedback or perhaps show less deterioration after EUS feedback. A greater experience level in a sport means one has had multiple experiences of success and failure in the sport. Thus, athletes who have been in a sport for some time may be able to counter dysfunctional feedback about failure because their greater experience with success and failure outcomes makes it easier to bring to mind instances (under failure) where a change in strategy or effort paid off. Novices may be more affected by dysfunctional feedback because they have no experience of failure or success in the sport to draw upon and they therefore pay more attention to the (trainer's) feedback than do more experienced athletes.

Limitations and conclusions

One limitation of the present study was the focus on the population of individuals who, while learning a new sport, used either extremely dysfunctional (EUS) or extremely functional (ICU) attributions. Because of this focus, no conclusions can be drawn about novices who utilize other attributions to explain performance in a new sport. In future studies, novices with other pre-existing attributional tendencies should be examined. The present study was also limited by the relatively small sample size (six experimental conditions with $n = 5$ in each condition). The chance overweighting of positive participants in the EUS group indicates the kinds of problems that may follow from a small sample size. However, it is also true that, even with the small sample size in the present study, there was statistical support for the predicted attributional feedback effects, which highlights the large effect sizes.

In conclusion, this study investigated the effects of functional and dysfunctional attributional feedback on novices who, prior to the feedback, attributed a failure in the new sport either to dysfunctional or to functional causes. Future studies are needed to confirm the beneficial effect of functional attributional feedback and the stronger detrimental effect of dysfunctional attributional feedback on golf novice's attributions, expectancies, and short-term persistence. The results of this investigation offer valuable information to teachers and coaches, who are able to influence the causal attributions of learners in novel athletic domains when those attributions are detrimental to achievement. A better understanding of the nature and impact of functional and dysfunctional attributional feedback would allow teachers and coaches to help those who withdraw from activity in a novel athletic domain because of repeated failures, and more importantly, to avoid changing initial attributions of individuals from functional to dysfunctional causes by unsuitable feedback. In addition, attributions that may thwart the negative effects of perceived failure should be understood more clearly and promoted or fostered where required. Finally, one advantage of the methodology used in this study was that the attributional feedback was controlled and standardized by the experimenter. We think future controlled laboratory studies are needed to confirm and extend the present findings, but also that the present findings warrant further research outside the laboratory (in actual sports settings). Lastly, to conduct an ideal attributional intervention study, it is important to identify those participants who attribute their performance to dysfunctional or functional causes prior to an intervention. In failing to do this, it is difficult to conclude at the end of the study that an attribution intervention was successful. Our data provide a good starting point for the development of practical attributional feedback interventions for a variety of novel sport and exercise domains.

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