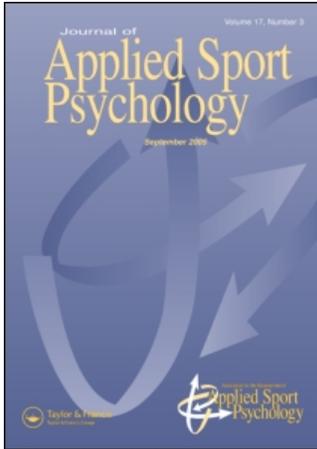


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Attributional Retraining Alters Novice Golfers' Free Practice Behavior

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This experiment examined the effects of a single attributional feedback on causal attributions, expectations, and free-practice with novice participants in a golf putting task during perceived failure. Participants were randomly assigned to one of the three treatment groups: (1) internal, controllable, unstable attributional feedback; (2) external, uncontrollable, stable attributional feedback; (3) nonattributional feedback. Participants completed four test trials consisting of six putts each. Each trial was followed by a free-time period of 2 minutes, a measure of expectations and free-practice. The results showed that it is possible to modify in a functional or dysfunctional way, (a) novice participants' attributions about perceived failure, (b) expectations, and (c) free-practice behaviors.

Attributions are specific causes such as effort, task difficulty, ability, or luck that are generated to explain an outcome, event, or behavior (Weiner, 1985). Causal attributions vary along a number of dimensions that are "intrinsic properties" of the cause, and it is the dimensions of attributions that play a key role in the motivation of behavior (e.g., Försterling, 1985; Weiner, 1985). Three empirically substantiated attributional dimensions are: (1) "Locus of causality" which refers to whether a cause is perceived to reside within (*internal*) or is *external* to the (target) person; (2) "Personal controllability" which refers to whether a cause is perceived to be within (*controllable*) or beyond (*uncontrollable*) the target person's control; and (3) "Stability" which refers to whether a cause is considered to be temporary (*unstable*) or longlasting (*stable*) (Weiner, 1985).

In achievement contexts, attributional research has focused on understanding the links between attributional dimensions and the improvement or deterioration of future performance (see Perry, Hall, & Ruthig, 2005, for a review). According to Weiner (1992), "if causal attributions do influence achievement strivings, then a change in attributions should produce a change in behaviour" (p. 264). "Attributional retraining" research has triggered numerous applications in sport and academic contexts aimed at modifying individuals' problem behaviors by modifying their causal attributions about successes and failures, with promising results (e.g., Biddle, Hanrahan, & Sellars, 2001; Miserandino, 1998; Orbach, Singer, & Murphey, 1997; Orbach, Singer, & Price, 1999; Sinnott & Biddle, 1998). For example, encouraging individuals to attribute their sports failures to internal, controllable, and unstable (ICU) causes resulted

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in improved performance, whereas encouraging individuals to attribute sports failures to external, uncontrollable, and stable (EUS) causes resulted in deterioration of performance (e.g., Miserandino, 1998; Orbach et al., 1999). Thus, ICU attributions are considered “functional” because they tend to produce improved performance, while EUS attributions are considered “dysfunctional” because they tend to produce decrements in performance (Rudisill, 1989; Rudisill & Singer, 1988).

Attributional retraining studies typically involve standardized feedback from an observer (usually the experimenter). These studies have used *multiple occurrences* of feedback in either one feedback session (e.g., Rudisill & Singer, 1988) or more than one feedback session (Orbach et al., 1997; 1999). However, none of these studies have examined the effects of a *single feedback occurrence*. Thus, it is unknown whether the observed effects of attributional retraining are due to the type of feedback itself or to an interaction of repetition and feedback-type. The aim of the present study was to examine whether a single occurrence of functional or dysfunctional attributional feedback would be sufficient to produce a change in novice golfers’ free-practice behavior. The present study focused on free-practice behavior because free-practice has not previously been investigated in attributional retraining studies in sports contexts. Performance has typically been the focus of these studies, although in everyday life free-practice typically precedes improvements in performance. Moreover, free-practice behavior is an indicator of personal interest in a sport whereas performance behavior carries no necessary connotation of underlying interest.

The present study measured the effects of a single occurrence of either functional (ICU) or dysfunctional (EUS) attributional feedback on novices’ causal attributions, expectations of success, and free-practice in a golf-putting task during perceived failure. It has been amply demonstrated that higher levels of persistence (e.g., free practice) under failure are linked to higher expectations of success (e.g., Bandura, 1986; Dweck & Leggett, 1988). Thus, it was anticipated that, after perceived failure at a new sport, ICU feedback would promote higher success expectancies and a higher amount of free-practice whereas EUS feedback would produce lower expectancies of success and a lower amount of free-practice.

METHOD

Participants

Forty-one male students ($M = 18.9$ years, $SD = 1.02$), all registered in 1st year at the University of Sport Sciences in the north of France, agreed to take part in the study. All participants were novices in golf putting.

Materials

Reliable pre-intervention and post-intervention measures of attributions, expectations, and free-practice, and an experimental design with standardized procedures were used to assess the effects of attributional feedback on the pre- and post-intervention differences within and between groups.

Causal Attributions

The Echelle de Mesure des Attributions Causales (EMAC; Fontayne, Martin-Krumm, Buton, & Heuzé, 2003) was used in this study to evaluate causal attributions. The EMAC is the validated French version of the Causal Dimension Scale 2 (CDS 2, McAuley, Duncan, & Russell, 1992) and its full description, use, and scoring are described elsewhere (e.g., Le Foll, Rasclé, & Higgins, 2006). In the present study, reliability coefficients (coefficient α 's) were

.82, .81, .85, and .83 for the EMAC Locus of causality (L), Personal Control (PC), Stability (S), and External Control (EC) scales, respectively.

Expectations of Success

Participants were asked to indicate on a scale from 0% to 100% how well they expected to perform on their next attempt at six putts.

Free-practice was assessed, for each participant, by adding the number of times a participant engaged in the putting task during a given free-time period of 2 minutes. During this period, the experimenter stepped into an adjoining room and was out of sight. To be able to observe, *a posteriori*, the activity of participants during the free-practice periods, a video camera filmed each participant's entire session in the laboratory. The participants were informed of the presence of the camera at the beginning of the study and were filmed throughout their entire experimental session (and not just during the free-practice period). Participants were not informed that free-practice was being measured/observed. As far as they were concerned, the free-practice period was just a "break" and the fact that the camera was on was incidental. The participants believed we were interested in viewing their performance during the putting trials, not their "break" behavior. The participants could refuse to be filmed. None used this option.

Performance was assessed, for each participant, as the average distance between the target and the ball across six putts (see *Putting Task* below). It was important to ensure that the participants would fail to significantly improve during the trials so that possible post-intervention modifications in cognitions and behavior could not be attributed to an increase in performance. *Performance* was analyzed using a 3×4 (Group \times Time) analysis of variance (ANOVA) with repeated measures on the last factor and did not reveal any significant change in putting performance during the investigation. There were no significant main effects or interactions.

Procedure

Participants were randomly assigned into one of three treatment groups: a nonattributional feedback group (NA group, $N = 13$), an internal/controllable/unstable feedback group (ICU group, $N = 14$), and an external/uncontrollable/stable feedback group (EUS group, $N = 14$). There were no differences between these three experimental groups on any of the dependent measures prior to the attributional feedback intervention. There was no evidence of treatment group differences on any of the dependent measures *prior to* the attributional feedback treatment: attribution dimensions, $R(6,72) = .82$, *n.s.*, expectancy of success, $F(2,38) = .08$, *n.s.*, and free-practice $F(2,38) = .33$, *n.s.*

Putting Task

The putting task took place on a carpet in a laboratory and consisted of carrying out six putts successively. The objective of each putt was to make the ball stop on the target if possible. The target was a circle (the "hole") two inches in diameter, drawn on the ground approximately five meters away from the starting place. As shown in Figure 1, participants completed four trials of six putts each (Trials 1, 2, 3, 4) interspersed with three 2-minute free-practice periods (Free-practice 1, 2, 3). Before and after each trial, the instruction to "try to achieve the best performance you can" was repeated to the participants. Causal attributions were assessed after the first (i.e., Attributions 1: pre-intervention) and the last trial (i.e., Attributions 2: post-intervention). Expectations of success were measured four times, once after each trial (Expectations 1, 2, 3, 4). The attributions and success expectancy measures taken after Trial 1

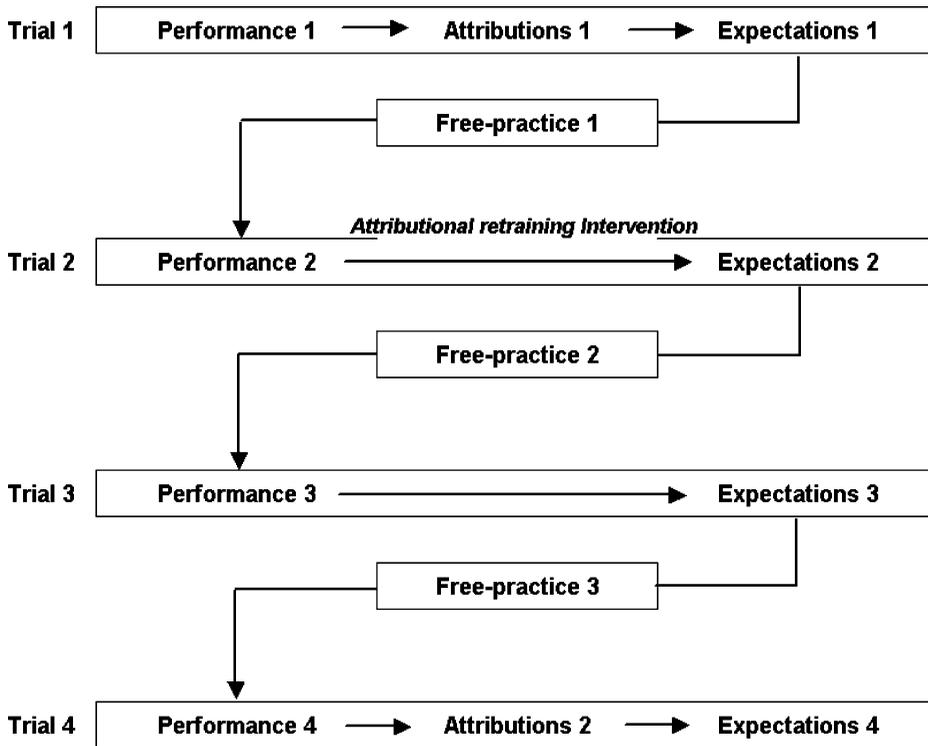


Figure 1. A schematic overview of the experimental procedure.

allowed the researchers to know how people were responding immediately after experiencing failure but before the influence of any attributional feedback. The first item on the EMAC asks participants on a binary rating scale whether they considered their performance on the task to be “*rather like a success*” or “*rather like a failure*”. Notably, all participants in the present study perceived their performance in the pretest putting task to be “*rather like a failure*”.

Attributional Feedback

The attributional feedback was delivered between the second and the third trial (see Figure 1). Each group was provided with standardized oral feedback by the experimenter. For the ICU group participants, the experimenter stated the following:

“The causes of your performance in this putting task seems to reflect mostly internal, controllable, and unstable factors, such as your concentration, effort, the strategy you used to try to succeed in the task, or other factors internal to you. As you know, you 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 EUS group participants, the experimenter stated the following:

“The causes of 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 NA groups received feedback that involved only general details regarding the task and no attributional information.

RESULTS

Significant univariate effects were followed up with contrast analysis and *t*-tests when necessary. 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.

Causal attributions were analyzed using a 3×2 (Group \times Time) multi-variate analysis of variance (MANOVA) with repeated measures on the last factor. The analyses revealed a significant Group \times Time interaction, $F(8,70) = 3.06$, $p < .005$, whereby significant differences were evidenced by a univariate *F* test for “locus of causality”, $F(2,38) = 8.88$, $\eta^2 = .31$, $p < .001$, “personal controllability”, $F(2,38) = 3.25$, $\eta^2 = .15$, $p < .05$, and “stability”, $F(2,38) = 4.85$, $\eta^2 = .20$, $p < .01$. As shown in Table 1, the ICU group attributed its performance to more internal causes after rather than before the attributional intervention, $t(13) = 3.76$, $\rho_{pb} = .72$, $p < .002$, while the EUS group attributed its performance to more external causes, $t(13) = -2.22$, $\rho_{pb} = .52$, $p < .04$, to less personally controllable causes, $t(13) = -2.18$, $\rho_{pb} = .51$, $p < .04$, and to more stable causes, $t(13) = 2.68$, $\rho_{pb} = .59$, $p < .02$, after rather than before the intervention. Moreover, the EUS group generated more external causes than the ICU group, $t(26) = 4.13$, $\rho_{pb} = .63$, $p < .001$, and the NA group, $t(25) = -1.85$,

Table 1
Means (and Standard Deviations) of Attributional Dimension Scores for the Three Treatment Groups After Trial 1 (Pre-Intervention) and Trial 4 (Post-Intervention)

	Attributional Feedback Group		
	ICU	EUS	NA
Attributions 1 (Pre-intervention)			
Locus of causality	3.12 (1.59)	2.95 (1.76)	3.64 (2.25)
Personal controllability	2.77 (0.71)	3.14 (2.36)	2.79 (1.15)
Stability	5.45 (1.72)	6.43 (1.99)	6.38 (1.77)
Attributions 2 (Post-intervention)			
Locus of causality	1.95 (0.71)	4.50 (2.19)	3.02 (1.86)
Personal controllability	2.43 (1.58)	4.74 (2.13)	3.51 (1.82)
Stability	6.10 (1.19)	5.05 (2.31)	5.69 (2.16)

Notes: NA = Non-Attributional feedback; ICU = Internal, Controllable, Unstable feedback; EUS = External, Uncontrollable, Stable feedback. On the EMAC = Echelle de Mesure des Attributions Causales lower scores on the Locus and Personal Controllability dimensions and higher scores on the Stability dimension represent more functional attributions.

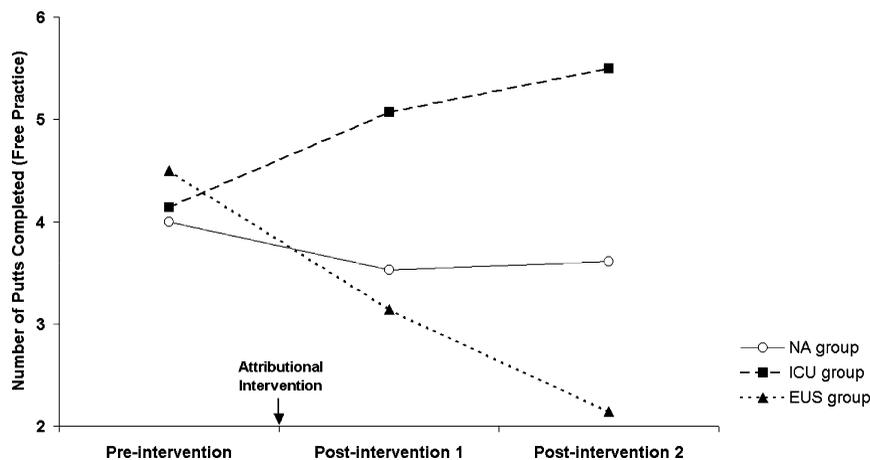


Figure 2. The interaction of Group (NA, ICU, EUS) and Time (Pre-intervention, Post-intervention 2, Post-intervention 3) on free practice in a putting task.

$\rho_{pb} = .35, p < .05$, and less personally controllable causes than ICU group, $t(26) = 3.26, \rho_{pb} = .54, p < .003$, after rather than before the intervention.

Expectations of success were analyzed using a 3×4 (Group \times Time) ANOVA with repeated measures on the last factor. The analysis revealed a significant Group \times Time interaction, $F(6,114) = 12.45, \eta^2 = .39, p < .001$. The ICU group had higher expectations of success after Trial 4 than after Trial 1, $MICU_{trial.1} = 47.5$ vs $MICU_{trial.4} = 60.7, t(13) = -5.32, \rho_{pb} = .82, p < .001$. In comparison, the EUS group had lower expectations of success after the attributional intervention than before it, $MEU_{trial.1} = 55.3$ vs $MEU_{trial.4} = 31.0, t(13) = 4.05, \rho_{pb} = .74, p < .001$. Moreover, after Trial 4 (i.e., post-intervention), the EUS group expected to perform less well in the future compared to the ICU group, $MEU_{trial.4} = 31.0$ vs $MICU_{trial.4} = 60.7, t(26) = -4.45, \rho_{pb} = .65, p < .001$, and to the NA group, $MEU_{trial.4} = 31.0$ vs $MNA_{trial.4} = 47.0, t(25) = 1.96, \rho_{pb} = .37, p < .05$.

Free-practice was analyzed using a 3×3 (Group \times Times) ANOVA with repeated measures on the last factor. The ANOVA revealed a significant Group \times Time interaction, $F(4,76) = 6.42, \eta^2 = .25, p < .001$. As shown in Figure 2, (i) the ICU group practiced significantly more after rather than before the intervention, $MICU_{period.1} = 4.14$ vs $MICU_{period.3} = 5.50, t(13) = -2.09, \rho_{pb} = .50, p < .05$, whereas (ii) the EUS group practiced significantly less after than before the intervention, $MEU_{period.1} = 4.50$ vs $MEU_{period.3} = 2.14, t(13) = 3.04, \rho_{pb} = .64, p < .01$. In addition, the ICU group practiced more than the EUS group during free-practice period 3, $t(26) = -2.67, \rho_{pb} = .46, p < .01$.

It should be noted that the magnitude of the effect sizes is substantial for the within- and between-subjects contrasts on all of the dependent measures.

DISCUSSION

The results of the present study corroborate and extend those of other investigations (e.g., Miserandino, 1998; Orbach et al., 1997, 1999) by showing that it is possible to modify the causal attributions of people in a direction consistent with the attributional feedback, even if the feedback occurs only once. After the attributional feedback, the ICU and EUS groups had

significantly altered their attributions, and differed significantly from one another in the types of causes they used for their putting failures. By comparison, the NA group remained unchanged in its attributions for failure during the experiment. The improvement or deterioration in expectancies and free-practice that occurred subsequent to the attributional feedback supports the idea that it is the change in participants' attributions that started a cascade of improvement or deterioration, as Weiner's (1985) theory suggests.

The novelty of the present findings is two-fold. First, they demonstrate that a single occurrence of functional or dysfunctional attributional feedback provided by an observer is sufficient to modify people's causal attributions and success expectancies. Second, they demonstrate that attributional feedback produced changes in free-practice behavior—a type of behavior that has not previously been examined in attribution retraining studies but that is an indicator of interest in an activity and a precursor of improvements (or deterioration) in performance. The finding that a simple attributional statement has such important effects on the cognitions and behaviors of novice golfers is underscored by the large effect sizes in our small sample of participants.

In many cases, people are confronted with new activities or situations in which they have no previous experience, such as pupils in physical education classes. The present study offers valuable information to trainers, coaches, or teachers in sport or physical activity contexts who are able to influence the causal attributions of novice learners when those attributions are inappropriate for, or detrimental to, achievement. For instance, a better understanding of the nature and impact of functional and dysfunctional attributions would allow teachers and coaches to help students or athletes who may be inclined to withdraw from an activity after repeated failure.

An interesting perspective for future research might be to compare the influence of a single attributional feedback occurrence on experienced versus novice participants. One might expect that, in comparison with experts in a sport, novices (lacking information about the possible causes that could produce a failure in a new activity or task) may be more influenced by a single attributional feedback statement from a teacher or coach.

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