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Durability and Generalization of Attribution-Based Feedback Following Failure: Effects on Expectations and Behavioral Persistence

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Abstract

Objective: This experiment investigated, following perceived failure, the immediate, long-term (i.e., durability), and cross-situational (i.e., generalization) effects of attribution-based feedback on expectations and behavioral persistence.

Design: We used a 3 x 2 (Group x Time) experimental design over seven weeks with attributions, expectations of success, and persistence as dependent measures.

Method: 49 novice participants were randomly assigned to one of three treatment (attributional feed- back) groups: (a) functional (i.e., controllable and unstable); (b) dysfunctional (i.e., uncontrollable and stable); or (c) no feedback. Testing involved three sessions, in which participants completed a total of five trials across two performance tasks (golf-putting and dart-throwing). In order to track whether the attributional manipulation conducted within the context of the golf-putting task in Session 2 would generalize to a new situation, participants performed a dart-throwing task in Session 3, and their scores were compared with those recorded at baseline (in Session 1).

Results: Analysis of pre- and post-intervention measures of attributions, expectations, and persistence revealed that the functional attributional feedback led to more personally controllable attributions following failure in a golf-putting task, together with increases in success expectations and persistence. In contrast, dysfunctional attributional feedback led to more personally uncontrollable and stable attributions following failure, together with lower success expectations and reduced persistence. These effects extended beyond the intervention period, were present up to four weeks post intervention, and were maintained even when participants performed a different (i.e., dart-throwing) task.

Conclusions: The findings demonstrate that attributional feedback effects are durable over time and generalize across situations.

Durability and Generalization of Attribution-Based Feedback Following Failure: Effects on Expectations and Behavioral Persistence

When athletes are encouraged to attribute their failures to controllable and unstable causes, they experience favourable cognitive, affective, motivational, and behavioral consequences (e.g., Le Foll, Rascle, & Higgins, 2008; Rascle, Le Foll, & Higgins, 2008). In contrast to those who make 'dysfunctional' attributions (i.e., attributions to uncontrollable and stable causes), those making 'functional' (i.e., controllable and unstable) attributions (a) have higher expectations of future success (Le Foll et al., 2008; Orbach, Singer, & Price, 1999; Rascle et al., 2008; Rudisill, 1989) and self-efficacy (Coffee, Rees, & Haslam, 2009; Coffee & Rees, 2011), (b) experience more motivating emotions (Le Foll et al., 2008; Orbach et al., 1999), (c) are more persistent (Le Foll et al., 2008; Johnson & Biddle, 1989; Rascle et al., 2008; Rudisill, 1989; Rudisill & Singer, 1988), and (d) perform more successfully (Coffee et al., 2009; Coffee & Rees, 2011; Orbach, Singer, & Murphey, 1997; Rudisill, 1989; Rudisill & Singer, 1988). Such findings appear to justify the recent resurgence of interest in attributions within sport psychology (e.g., see Rees, Ingledew, & Hardy, 2005). However, despite these promising effects, it has been suggested that a weakness of the studies is that they tend only to examine relatively short-term effects of attribution-based manipulations. The question thus arises as to whether these effects (a) last/endure, and (b) transfer to new situations. The present research addresses this question.

Recent research in higher education settings has demonstrated short-term (e.g., Higgins & LaPointe, 2012) and longer-term (enduring) effects of attribution-based feedback. For example, students receiving functional attributional feedback outperformed their non-attributional feedback counterparts in end-of-year final course grades (e.g., Hall, Perry, Chipperfield, Clifton, & Haynes, 2006; Hall et al., 2007; Haynes, Ruthig, Perry, Stupnisky, & Hall, 2006). One might

assume that such effects would be observed in sports settings, but to date, only immediate (short-term) effects of attributional feedback have been observed (e.g., in relation to changes in expectations, and/or persistence). Furthermore, there is little evidence that effects of attributional feedback might transfer (or generalize) to a new task/situation. In athletic achievement contexts, to our knowledge, only Orbach et al. (1999) have examined whether changes in attributions themselves might endure and/or generalize. They observed that changes in attributions were consistent up to three weeks post-intervention and generalized to a similar secondary task. Crucially, however, the latter research did not observe effects of those changes in attributions on assessments of behavior (e.g., persistence); changes in attributions did not lead to changes in behaviour, even in the short-term.

The objective of the present research was to examine whether attributional feedback manipulations would indeed lead to short- and long-term changes in expectations and persistence following perceived failure on a motor skill task, and whether effects would generalize to a new task situation. We focused on two principal attribution dimensions: controllability and stability (cf., Coffee & Rees, 2008; Rees et al., 2005). Controllability refers to whether a cause is perceived to be within (controllable) or beyond (uncontrollable) one's control; stability refers to whether a cause is considered as likely to recur (stable) or unlikely to recur (unstable). There were three key hypotheses: First, it was hypothesized that, following failure, functional (controllable and unstable) attributional feedback would lead to immediate (short-term) increases in expectations and persistence, and dysfunctional (uncontrollable and stable) attributional feedback would lead to decreases in expectations and persistence. Rascle et al. (2008) showed that it is possible to modify, in a functional or dysfunctional way, novice participants' attributions about perceived failure, expectations, and free-practice behaviors. The functional attributional feedback produced improvements in causal attributions about failure, as well as in success

expectations, and lower persistence after failure. In contrast, dysfunctional attributional feedback produced deterioration in causal attributions about failure, and lower success expectations, and persistence after failure. Le Foll et al. (2008) revealed similar results. Furthermore, Le Foll et al. (2008) showed that 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. Second, according to Orbach et al. (1999) and Hall et al. (2006) in higher education or sport settings, it was hypothesized that these changes in expectations and persistence would be maintained (would endure) four weeks after the manipulation when participants were faced with the same task. Finally, it was hypothesized that these changes in expectations and persistence would be maintained four weeks after the manipulation when participants were faced with a new task. Similar to teachers' expectations about lasting changes in their students' learning, coaches expect athletes' transformations/learning to be durable. However, in sports settings, intervention programs are often delivered in experimental conditions with a rigorous control of causes - controlled or manipulated by the experimenter - which could explain the size of observed effects. Thus, it is possible that the immediacy or vividness of the experimental situation produce short-term effects which disappear when subjects are no longer in the experimental context. The underlying question in the present study was to estimate the efficacy, over time, of an intervention to change athletes' cognitions and behaviours. Furthermore, like teachers, coaches expect athletes' transformations/learning to transfer to other domains or tasks. Thus, in the present study, another important question about attributional feedback following perceived failure was to examine the generalizability of intervention effects -- that is, whether an intervention effect would be powerful enough to produce an impact on a different task.

Method

Participants

Participants were 56 male students (M = 19.8 years, SD = 1.2), with no golf-putting and dart-throwing experience, from a University in the north-west of France.

Procedure

The experiment was approved by an institutional ethics committee, and students provided informed consent. Testing involved three sessions, in which participants completed a total of five trials across two performance tasks (golf-putting and dart-throwing).

In *Session 1* (in Week 1), the students were invited to a laboratory to complete a dart-throwing task, the results of which served as baseline assessments of expectations and persistence for comparison on the same task later in the experiment (in *Session 3* in Week 7). After the task was explained, all participants completed three familiarization throws (e.g., Le Foll et al., 2008; Rascle et al, 2008), followed by an assessed trial consisting of six throws (Trial 1). Following this trial, participants indicated whether they perceived their performance to be "rather like a success" or "rather like a failure", and they then completed a measure of their attributions and their expectations of success on a subsequent trial, before being provided with a "free-practice" period of two minutes (in reality, an assessment of persistence—see below under *Measures*). During the free-practice period, the experimenter stepped into an adjoining room and was out of sight. 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 but not that free-practice was being assessed. Participants could refuse to be filmed, although none chose this option. After completion of this session, participants were thanked for their participation and informed that they should return two weeks later to complete a golf-putting task.

In *Session 2* (in Week 3), the participants returned to the laboratory to complete the golf-putting task. After the task was explained to them, all participants completed three familiarization

putts, followed by an assessed trial consisting of six putts (Trial 2). Following this trial, participants indicated whether they perceived their performance to be "rather like a success" or "rather like a failure", and they then completed a measure of their attributions and their expectations of success on a subsequent trial, before being provided with a "free-practice" period of two minutes. Seven participants (three during Session 1, when they were not yet distributed across experimental groups, and four during Session 2, two participants of the no feedback group and one for functional attributional feedback and dysfunctional attributional feedback groups), perceived their performance to be "rather like a success". They were removed from the experiment at the end of their respective session. Data for 49 participants were obtained for statistical analysis, so that all participants in the present study perceived all their performances (in Session 1, 2 and 3) in the dart-throwing and putting tasks to be "rather like a failure".

An experimenter then provided participants with standardized feedback (based upon attributional theory), after they had been randomly assigned to one of three conditions: (a) a functional attributional feedback condition (FA, $N = 17$), (b) a dysfunctional attributional feedback condition (DA, $N = 16$), and (c) a no feedback (control) condition (NA, $N = 16$). For participants receiving functional attributional feedback, the experimenter stated the following:

> The causes of your performance in this putting task seem to reflect mostly personally controllable and unstable factors, such as your concentration, your effort, or the strategy you used to try to succeed in the task. As you know, you have personal 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 participants receiving dysfunctional attributional feedback, the experimenter stated the following:

> The causes of your performance in this putting task seem to reflect mostly personally

uncontrollable and stable factors such as the task difficulty for example. As you know, these kinds of factors are things you are not able to personally control and they don't change over time.

For participants in the control condition, the experimenter relayed general details regarding the task with no attributional information:

This task is composed of different skills that are needed to be a good golf player. The putting distance is approximately five meters away from the starting place.

Following the experimental manipulation, participants completed a further trial of six putts (Trial 3), indicated whether they perceived their performance to be "rather like a success" or "rather like a failure", and answered a measure of their attributions, and their expectations of success on a subsequent trial, before being provided with a "free-practice" period of two minutes. Participants were then thanked for their participation and informed that they should return four weeks later to complete the experiment.

Session 3 was designed to examine (a) whether any changes in participants' expectations and persistence observed in Session 2 using the golf-putting task would endure when faced with the same golf-putting task at the later Session 3—i.e., would remain the same when compared with post-manipulation scores from Session 2; and (b) whether any changes in participants' expectations and persistence observed in Session 2 using the golf-putting task would generalize to a different task (dart-throwing)—i.e., would result in different values for expectations and persistence when compared to the baseline assessments from Session 1.

Thus, in *Session 3* (in Week 7), participants returned to the laboratory, where they initially completed a trial of the golf-putting task (Trial 4). Following this trial, participants again indicated whether they perceived their performance to be "rather like a success" or "rather like a failure", and then completed a measure of their attributions and their expectations of success on a

subsequent trial, before being provided with a "free-practice" period of two minutes. Participants then completed a trial of the dart-throwing task (Trial 5), a measure of their attributions, and their expectations of success on a subsequent trial, before being provided with a "free-practice" period of two minutes. Participants were subsequently debriefed about the entire experiment and thanked for their time.

Measures

Causal attributions. The Echelle de Mesure des Attributions Causales (EMAC; Fontayne, Martin-Krumm, Buton, & Heuzé, 2003) was used to evaluate causal attributions. The EMAC is the validated French version of the Causal Dimension Scale II (CDSII; McAuley, Duncan, & Russell, 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 (three items), Personal Controllability (three items), Stability (three items), and External Control (three items) on 9-point Likert-type scales, from 1(Internal, Controllable, or Unstable) to 9 (External, Uncontrollable, or Stable). However, in the present study, the measured Personal Controllability and Stability dimensions were reverse-scored so that the higher the scores, the more the attributions are personally controllable and stable. In the present study, reliability coefficients were .83 and .82 for the EMAC Personal Controllability and Stability subscales, respectively.

Expectations of success. Participants indicated, on a scale from 0% to 100%, how well they expected to perform in their subsequent trial. The measure of success expectations is similar

to previous studies developed in motor behavior research (e.g., Le Foll et al., 2008; Orbach et al., 1999; Rascle et al., 2008; Rudisill, 1989; Rudisill & Singer, 1988).

Persistence. Persistence is the tendency to continue in a given direction in spite of difficulties. In other words, persistence is the refusal to give up, especially when faced with adversity (Bandura, 1986). Based on previous attributional research (e.g., Le Foll et al., 2006, 2008; Rascle et al., 2008), persistence was assessed by calculating the number of attempts that participants engaged in the putting or dart-throw tasks during a given free-time period of two minutes.

Dart-throwing performance. The dart-throwing task consisted of performing six dart-throws. The dartboard was 44.8 cm in diameter, hooked on the wall two meters away from the starting place. Each participant was informed that their performance would be calculated as the average, in metric, of the six distances between the place where the dart landed and the target (the centre of a 4 cm in diameter circle at the centre of the dartboard).

Golf-putting performance. The golf-putting task took place on a carpet and consisted of carrying out six putts successively. The target was a circle, 6 cm in diameter, drawn on the ground approximately five meters away from the starting place. Each participant was informed that their performance would be calculated as the mean, in metric, of the six distances between the place where the ball stopped and the target.

Results

The focus of the present study was the potential influence of attributional feedback on expectations of success and persistence. Thus, to enhance the internal validity of the experiment, it was important that participants' task performance did not significantly improve across trials, so that potential post-intervention changes in expectations and persistence could be attributed to the experimental manipulation and not changes in performance. Based on previous research (Le Foll

et al., 2008; Rascle et al., 2008), the tasks were designed in such a way that performance would not be expected to improve, and that participants would effectively experience failure. Performance in the golf-putting and dart-throwing tasks were each analyzed using a 3 (Group: FA, DA, NA) x 2 (Time: Pre, Post) ANOVA, with repeated measures on the last factor. There were no main effects or Group x Time interaction effects on performance for either task (*ps* > .14).

In *Session 1,* there was no evidence of group differences on personal controllability attributions, expectations of success, and persistence (*ps* > .50). However, there was a significant difference on the stability dimension, $F(2, 46) = 4.82$, $\eta^2 = .17$, $p < .01$, attributable to those assigned to the dysfunctional attributional (DA) group (prior to receiving their group attributional manipulation) indicating more *un*stable attributions than the functional attributional (FA) and control (NA) groups. Having generated these baseline data for the dart-throwing task, we return to these data later (see below under *Hypothesis 3 in Session 3*).

Hypothesis 1: Immediate Effects of Attributional Feedback

Means and standard deviations for all assessed variables across all trials are shown in Table 1. In addition, only significant differences for the follow up *t* tests with Bonferroni corrections are detailed.

Attributions. In Session 2, there was no evidence of group differences on personal controllability and stability *prior to* the attributional feedback, *Fs*(2,46) < 1.03, *p*s > .36. To examine whether our attribution-based feedback produced any immediate changes in attributions between the experimental groups over time, for each measure we used a 3 (Group: FA, DA, NA) x 2 (Time: Pre, Post) ANOVA, with repeated measures on the last factor. In relation to personal controllability, there was a main effect for group, $F(2, 46) = 5.79$, $\eta^2 = .20$, $p = .006$, and a group x time interaction, $F(2, 46) = 7.32$, $\eta^2 = .24$, $p = .002$. The time main effect was not significant (p =

.67). Compared to their pre-intervention baseline, the FA group's scores were more controllable, $p = .02$. Furthermore, following the intervention, the FA group attributed their performance to more personally controllable causes than the DA and the NA groups, $ps < .008$. In relation to stability, there were no main effects ($ps > .06$), but the group x time interaction was significant, $F(2, 46) = 4.72$, $\eta^2 = .17$, $p = .01$. Following the intervention, the DA group made more stable attributions compared to their pre-intervention baseline, $p = .03$. These results provide reasonable support that effects of the attributional manipulations were in the intended directions.

Expectations and Persistence. In Session 2, there was also no evidence of group differences on the main variables of interest, expectations and persistence, *prior to* the attributional feedback, $Fs(2,46) < 1.27$, $ps > .29$. To examine immediate changes in expectations and persistence between experimental groups over time, for each measure we used a 3 (Group: FA, DA, NA) x 2 (Time: Pre, Post) ANOVA, with repeated measures on the last factor. In relation to expectations, there was a main effect for time, $F(1, 46) = 11.11$, $\eta^2 = .20$, $p = .002$, and a significant group x time interaction, $F(2, 46) = 28.22$, $\eta^2 = .55$, $p < .001$. The group main effect was not significant ($p = .35$). Compared to their pre-intervention baseline, the FA group's expectation of success was higher after the intervention, $p < .001$. In contrast, compared to their pre-intervention baseline, the DA and NA groups had lower expectations of success after the intervention, $ps < .02$. Following the intervention, the FA had a higher expectation of success than the DA and NA groups, $ps < .03$.

In relation to persistence, there were no main effects ($ps > .16$), but the group x time interaction was significant, $F(2, 46) = 12.54$, $\eta^2 = .35$, $p < .001$. Compared to their pre-intervention baselines, the FA group's persistence was higher, $p = .04$, and the DA group's persistence was lower, $p = .01$. Following the intervention, the FA group demonstrated greater persistence than the DA group, $p = .02$.

Overall then, this set of results provides support for Hypothesis 1: Functional attributional feedback led to immediate (short-term) increases in expectations and persistence, and dysfunctional attributional feedback led to decreases in expectations and persistence.

Hypothesis 2: Longer-term (enduring) effects of attributional feedback

Attributions. To examine whether the Session 2 post-intervention group differences in attributions were maintained four weeks later in the Session 3 golf-putting task, we used a 3 (Group: FA, DA, NA) x 2 (Time: Session 2 (Post), Session 3) ANOVA, with repeated measures on the last factor. For personal controllability attributions, there was a group main effect, $F(2, 46) = 24.47$, $\eta^2 = .52$, $p < .001$, but no time main effect ($p > .59$), and no group x time interaction ($p > .60$). The FA group attributed their performance to more personally controllable causes than the DA and the NA groups, ps <.003. In addition, the DA group attributed their performance to more personally *un*controllable causes than the NA group, $p = .009$.

For stability attributions, there was a group main effect, $F(2, 46) = 5.41$, $\eta^2 = .19$, $p = .008$, but no time main effect ($p > .07$), and no group x time interaction ($p > .84$). The FA group attributed their performance to more *un*stable causes than the DA, $p = .003$.

Expectations and Persistence. In order to track whether the effects of the attributional manipulation conducted within the context of the golf-putting task would endure over time to the same task four weeks later, participants again performed the golf-putting task in Session 3, and their scores were compared with their Session 2 post-intervention scores. To examine expectations and persistence between experimental groups over sessions, for each measure we used a 3 (Group: FA, DA, NA) x 2 (Time: Session 2 (Post), Session 3) ANOVA, with repeated measures on the last factor. The analyses revealed no main effect of time for either measure (ps > .34), and no significant interaction of group and time for either measure (ps > .24). However, the group main effect was significant for expectations, $F(2, 46) = 11.00$, $\eta^2 = .32$, $p < .001$ and for

persistence $F(2, 46)= 6.84$, $\eta^2 = .23$, $p = .003$. The DA group had a lower expectation of success than the FA and NA groups, ps = .003 and .06 respectively. In terms of persistence, the FA group demonstrated greater persistence than the DA group, $p = .02$. In other words, the group differences remained regardless of the lapse in time (see Figures 1 and 2).

These results provide support for Hypothesis 2: Changes in expectations and persistence as a result of the attributional manipulations were maintained four weeks later when participants were faced with the same task.

Hypothesis 3: Cross-situational effects of attributional feedback

In order to track whether the effects of the attributional manipulation conducted within the context of the golf-putting task in Session 2 would generalize to a task in which no attributional feedback was delivered during Session 1, participants performed a dart-throwing task in Session 3, and their scores were compared with those recorded at baseline (in Session 1).

Attributions. To examine whether our attribution-based feedback in the golf-putting task produced any changes in attributions in the dart-throwing task between the experimental groups over time, for each measure we used a 3 (Group: FA, DA, NA) x 2 (Time: Session 1, Session 3) ANOVA, with repeated measures on the last factor. In relation to personal controllability, there were no main or interaction effects (ps $\geq .15$). In relation to stability, there were no main effects (ps $> .28$), but the group x time interaction was significant, $F(2, 46) = 12.05$, $\eta^2 = .17$, $p > .001$. During Session 3, the FA group made more *un*stable attributions compared to their Session 1 baseline, $p = .06$ In contrast, in Session 3, the DA group made more stable attributions compared to their Session 1 baseline, $p = .003$.

Because of the small sample size, there was a possibility that small but predicted effects may not be observable in an overall analysis. Thus, to examine more closely whether our attribution-based feedback in the golf-putting task was linked to any differences between the

experimental groups in the dart-throwing task (Session 3), for each measure we used one-way ANOVA (Group: FA, DA, NA) on Session 3 attribution scores. Consistent with the earlier received feedback, there was a group difference on personal controllability, $F(2,46) = 4.07$, $\eta 2 = .15$, $p = .02$, and on stability, $F(2,46) = 7.05$, $\eta 2\ 5 = .23$, $p = .002$. The FA group's scores in Session 3 were more personally controllable than the DA group's, $t(31) = -2.92$, $p = .02$, and the FA group's scores were more *un*stable than the DA and NA groups, $t(31) = -3.99$, $p = .003$, and $t(31) = -2.66$, $p = .03$ respectively)."

Expectations and Persistence. To examine changes in expectations and persistence between experimental groups over time, for each measure we used a 3 (Group: FA, DA, NA) x 2 (Time: Session 1, Session 3) ANOVA, with repeated measures on the last factor. In relation to expectations, there was a main effect for time, $F(1, 46) = 12.35$, $\eta^2 = .21$, $p < .01$, and a group x time interaction, $F(2, 46) = 6.22$, $\eta^2 = .21$, $p < .01$. The group main effect was not significant ($p > .10$). As shown in Figure 1, the DA group had significantly reduced expectations of success in Session 3 compared to Session 1, $p > .003$ The DA group also had a significantly lower expectation of success in Session 3 than the FA and NA groups, ps = .01 and .009 respectively.

In relation to persistence, there was a group x time interaction, $F(2, 46) = 8.28$, $\eta^2 = .27$, $p < .01$. The main effects were not significant (ps > .40). As shown in Figure 2, those in the FA group were the only ones to increase their persistence in Session 3 compared to their Session 1 baseline, $p = .002$. In Session 3, the FA group demonstrated significantly greater persistence than the DA group, $p = .003$.

These results provide support for Hypothesis 3: The changes in expectations and persistence as a result of the attributional manipulations conducted in the context of one task (golf-putting) were maintained in the context of a different task (dart-throwing).

Discussion

The aim of the present research was to examine the extent to which attributional feedback following failure would lead to immediate and more enduring changes in expectations of success and persistence in a motor task, and whether the expectations and persistence changes would transfer to a new motor task situation. In line with our hypotheses, the results demonstrated that for those encouraged to attribute failure to functional (controllable and unstable) attributions, levels of expectations and persistence significantly increased in the short-term, were maintained over time, and transferred to a new situation. In contrast, for those encouraged to attribute failure to dysfunctional (uncontrollable and stable) attributions, levels of expectations and persistence significantly decreased in the short-term, remained at this lower level over time, and also transferred to a new situation. For those in the control group, expectations decreased, but there was no significant change in persistence. Finally, following the manipulation, those in the functional attribution group had significantly greater expectations of success than the dysfunctional and control groups, and greater persistence than the dysfunctional group. Finally, it should be noted that the magnitude of the effect sizes is large on all of the dependent variables, suggesting that attributional feedback is a promising treatment for responding to sports failures.

Longer-term and cross-situational effects of attributional feedback

One of the major criticisms of the sport and exercise research on attributional feedback effects is that almost all studies focus on short-term cognitive, affective, or behavioral consequences of an intervention. But what are the long-term effects? As noted by Allen, Jones, and Sheffield (2009), “following the implementation of an attribution retraining program, should the athlete show a desirable attribution pattern, it would be unclear whether this change was due to the intervention or simply due to a natural shift in perceptions” (p. 462). In that perspective, the initial change (after the feedback) and maintenance (during Phase 3) is an important issue regarding the present study. To this end, we add to the existing research by demonstrating that the

group differences remained (in Session 3, for the golf-putting task) regardless of the lapse in time, meaning the effects endured.

A second important issue of the present study is that it allows for some relative conclusions regarding the cross-situational effects of attributional feedback. Participants generalized attributions, expectations, and persistence to a different situation. Those results are notable for two key methodological reasons. First, in contrast with the research of Orbach et al. (1999), we employed a comparison between pre- (Session 1) and post- (Session 3) intervention measures of attributions on the secondary task (i.e., the dart throwing task). Furthermore, tasks were different. Nevertheless, future research could address how the effects of the attributional feedback could be generalized across different tasks, not requiring similar skills.

In the present study, rather than infer success or failure solely based on subjects' "real" performance (objective performance), subjects' perceptions of their performance (subjective performance) was measured. This choice was based on previous research that showed that even an objective poor performance (such as 0 putts completed out of 10) may sometimes be perceived as a success (Le Foll et al., 2008). Nevertheless, a more "complex" measure of subjects' perceived performance would be an interesting question to pursue in a future study. For instance, would subjects who perceive their performance as a total failure be more resistant to functional feedback than subjects who perceive failure but also some elements of success?

Another question is whether or not girls are similarly impacted by the attributional feedback they receive? Participants in the present study were male only. However, because sport or physical education participation involves both males and females, and because gender differences are often found for activities stereotyped by gender role such as sport (Boiché, Plaza, Chalabaev, Guillet, & Sarrazin, in press), future research should investigate the maintenance and cross-situational effects of attributional feedback for females.

Investigating whether attributional feedback effects are (or are not) temporally durable and situationally generalizable is important for at least one key reason. In the present study, state attributions were assessed; that is, the attributions individuals make about a specific situation at a specific point in time. Another attributional approach to understanding behavioral persistence, and motivational and emotional deficits in general, is to examine another "level" of analysis of causal attributions called attributional style (Abramson, Seligman, & Teasdale, 1978; Struthers & Perry, 1996; Weiner, 1985). Attributional (or explanatory) style (AS) is a cognitive personality variable that reflects how people habitually explain the causes - positive or negative - of life events and outcomes (Abramson et al., 1978; Roesch & Weiner, 2001). AS for negative events has been shown to influence persistence (Le Foll et al., 2006) and performance (Gordon, 2008) in perceived failure situations. Because AS is more a cognitive trait concept than state-attributions, AS for negative events potentially could affect a large range of failure situations an individual might experience, especially in situations where people had no prior experience and then could not compare their failure with any similar preceding failure (Le Foll et al., 2006). Thus, missing information, these individuals likely would behave as they behave in general vis-à-vis a situation of failure; i.e. according to their AS. Fortunately, although AS is considered a cognitive trait, it is not immutable (Peterson & Park, 1998). Thus, it would be particularly relevant to investigate how to modify a dysfunctional AS for negative events. For example, some research has investigated how AS might be deliberately changed from dysfunctional (pessimistic) - to functional (optimistic) (e.g., Dieser & Ruddell, 2002; Jaycox, Reivich, Gillham, & Seligman, 1994; Struthers & Perry, 1996). However, one can assume that interventions focused on changing AS may not be efficient in terms of motivating subjects because such approaches are so time-consuming. On the other hand, for a practitioner (physical education teacher or coach), it is probably impossible to address attributional feedback for each failure and each pupil/athlete.

Interestingly, previous studies have demonstrated that one-shot attribution training interventions obtained similar positive results when compared to attribution training over multiple sessions (Wilson & Linville, 1982, 1985). Thus, even if a single-task attribution-retraining program could not fully change AS because AS is a cognitive trait that needs long-term intervention, an alternative might be to indirectly modify AS using a situation-specific attribution-retraining program, as in the present study, with the assumption that durable and cross-situational consistency changes in state-attributions could, if repeated with different tasks or skills, lead to a further change in AS.

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Table

Means (SDs) for Study Measures as a function of Session and Experimental Group

			Dart-Throwing Task			Golf-Putting Task		
Session		Measures	FA[1] group	DA[2] group	NA[3] group	FA[1] group	DA[2] group	NA[3] group
1 (Wk 1)		*Attributions*						
		PC[4]	6.80 (1.80)	6.27 (2.54)	6.56 (2.12)			
		Stability	4.24 (2.02)	2.62 (1.54)	4.17 (1.34)			
		Expectations	50.59 (15.99)	50.94 (18.28)	49.06 (13.93)			
		Persistence	7.71 (6.59)	10.50 (8.62)	10.63 (9.11)			
		Performance	9.17 (2.81)	9.54 (2.06)	9.14 (2.5)			
2 (Wk 3)	Pre	*Attributions*						
		PC[4]				6.35 (1.16)	6.17 (2.25)	6.25 (1.34)
		Stability				4.43 (1.83)	3.94 (2.01)	3.52 (1.61)
		Expectations				47.05 (12.63)	57.82 (30.49)	57.81 (21.21)
		Persistence				4.00 (2.55)	4.81 (3.29)	4.69 (3.63)
		Performance				54.14 (8.61)	55.81 (7.15)	52.33 (15.18)
	Post	*Attributions*						
		PC[4]				7.59 (1.42)	4.69 (1.99)	6.12 (1.54)
		Stability				3.82 (1.18)	5.29 (2.22)	4.35 (2.03)
		Expectations				61.53 (14.78)	32.50 (19.75)	46.56 (17.86)
		Persistence				5.53 (3.00)	2.38 (3.40)	4.19 (3.62)
		Performance				51.06 (13.04)	49.13 (11.41)	51.13 (13.03)
3 (Wk 7)		*Attributions*						
		PC[4]	7.43 (1.58)	5.81 (1.61)	6.19 (1.94)	7.41 (.85)	5.10 (1.07)	6.08 (.94)
		Stability	2.73 (1.17)	4.83 (1.81)	4.19 (1.91)	3.06 (1.25)	4.94 (1.81)	3.87 (2.03)
		Expectations	47.11 (13.32)	31.25 (16.07)	47.81 (12.91)	56.53 (16.30)	32.94 (17.26)	46.88 (15.26)
		Persistence	13.88 (6.80)	5.38 (6.05)	7.63 (9.01)	6.41 (2.40)	2.75 (2.77)	3.31 (3.22)
		Performance	9.10 (2.88)	8.98 (3.51)	10.33 (2.91)	51.23 (12.61)	56.17 (7.56)	54.63 (10.26)

Note. FA[1] = functional attributional feedback group; DA[2] = dysfunctional attributional feedback group; NA[3] = no attributional feedback group; PC[4] = personal controllability. In the Table, measured PC and stability dimensions scores were reversed so that the higher the scores (from 1 to 9), the more the attributions are personally controllable and stable. The attributional feedback was delivered for the golf-putting task during Session 2.

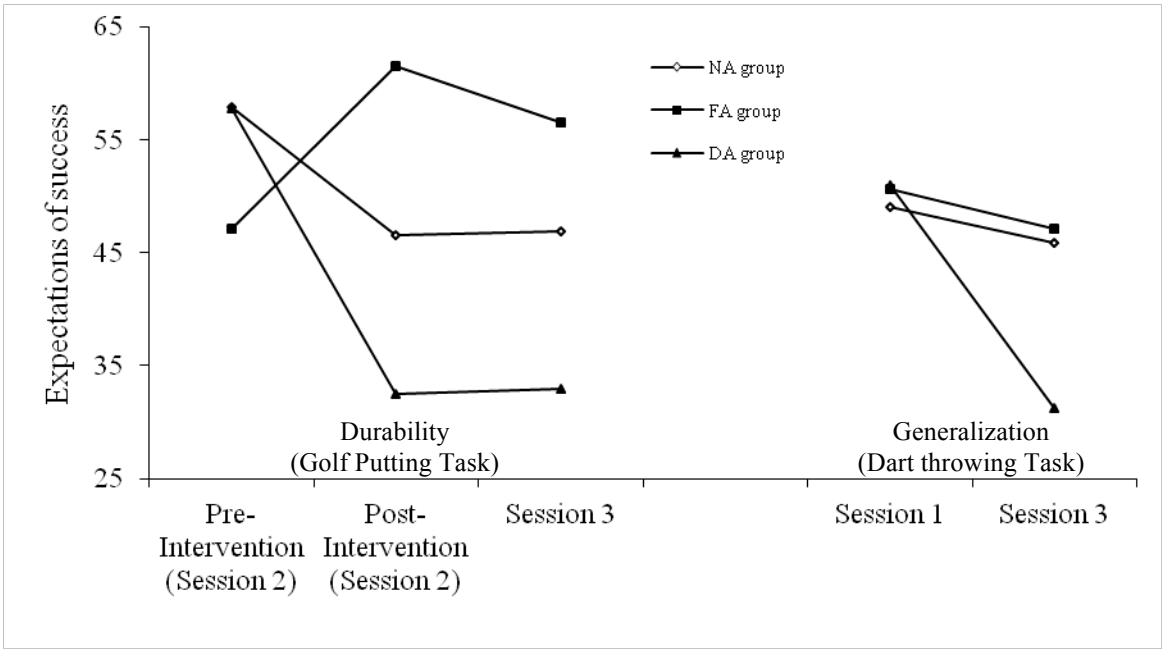

Figure 1. Durability and Generalization of Effects of Attributional Feedback on Expectations of Success

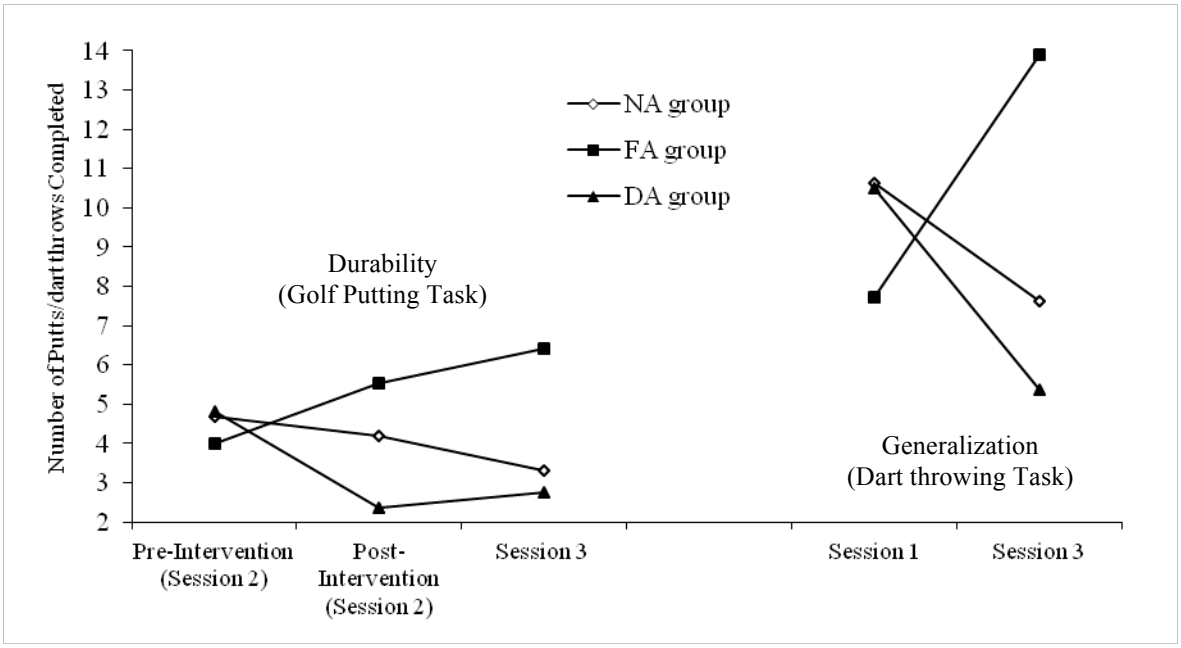

Figure 2. Durability and Generalization of Effects of Attributional Feedback on Persistence