Explanatory style and resilience after sports failure

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Abstract

Some athletes habitually explain bad events with causes that are stable in time and global in effect, and explain good events with causes that are unstable and specific. This *pessimistic explanatory style* constitutes a dispositional risk factor likely to lead to lower expectations of success, to increased anxiety, and to poor achievement. Sixty-two participants (mean age 14 years) performed a basketball dribbling trial and were given false feedback indicating that they had failed. Consistent with prediction, in a second trial, the optimistic participants ($N=22$) were less anxious (assessed by heart rate acceleration), more confident, and performed better than pessimistic participants ($N=20$). A third group with a *neutral explanatory style* ($N=20$) obtained scores which were between the two other groups.
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Why do some athletes rebound after failure, whereas others give up? What is the mechanism which explains why some athletes who have been seriously injured later become champions? Why do other athletes drop out of their sport following a setback? One key psychological factor influencing how athletes react to adversity may be *explanatory style* (see Buchanan & Seligman, 1995 for a review; Peterson, 1991; Peterson & Seligman, 1984).

Originally proposed in the context of the attributional reformulation of learned helplessness theory (Abramson, Seligman, & Teasdale, 1978), explanatory style reflects the way that people

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usually explain disparate bad or good events (e.g. Peterson, 2000; Peterson & Park, 1998; Peterson & Steen, 2002; Peterson & Vaidya, 2001). People who usually explain bad events by causes that are stable in time ("it's going to last forever"), global in effect ("it's going to undercut everything that I do"), and internal ("it's me") and who explain good events with unstable, specific, and external causes are said to have a *pessimistic* explanatory style. People with the opposite attributional pattern are said to have an *optimistic* explanatory style.[1]

Explanatory style has been extensively studied as a correlate of helplessness-related outcomes such as depression, illness, and failure in academic athletic and vocational realms. People with an optimistic explanatory style fare usually better than those with a pessimistic explanatory style (Peterson & Park, 1998). To our knowledge, only five studies have investigated the link between explanatory style and athletic performance. In a cross-sectional survey with 50 young elite tennis players, Prapavessis and Carron (1988) found that players presenting cognitive, motivational, and emotional maladaptive achievement patterns (evaluated by a questionnaire) gave ratings that were internal, persistent, and recurrent for explaining failure performances, and were judged by their coaches to be less persistent in their matches. Nevertheless the cross-sectional nature of the design makes the inference of causality difficult between the explanatory style and the maladaptive achievement patterns.

Two other studies using Content Analysis of Verbatim Explanation (CAVE; see Peterson & Park, 1998) were reported by Review and Reivich (1995). Baseball and basketball teams with a more optimistic explanatory style won more games in the target season, and performed significantly better in games following a loss than teams with a pessimistic explanatory style. Nevertheless because the CAVE technique measures explanatory style only in an indirect way, and as it employs retrospective data, this design cannot unambiguously support a causal association between explanatory style and athletic performance.

In prospective (study 1) and quasi-experimental (study 2) research with members of highly ranked US university swimming teams, Seligman, Nolen-Hoeksema, Thornton, and Thornton (1990) explored further the links between explanatory styles and sporting performance. Results showed that (1) explanatory style and coaches' judgements of swimmers' resilience after defeat predicted how many unexpectedly poor swims the team members would go on to show over the season (study 1), and (2) after a failure feedback given by their coach (i.e. a bad swim time), times on a second swim 30 min later were poorer for pessimistic, but not for optimistic swimmers (study 2).

This latter study was the first attempt to test recovery after failure as a function of the explanatory style, via a quasi-experimental design. However, to our knowledge it has not been replicated. The present experiment was designed to fill that gap, and had two primary aims. First, we wanted to extend the internal and external validity of the Seligman et al. study by (1) using ordinary high school students (instead of competitive swimmers) in order to test the generality of the former results on a less elite population, (2) comparing the optimistic and pessimistic pattern of outcomes with a more "neutral" explanatory profile, and (3) controlling several variables likely to influence athletic performance like ability, gender, perceived ability (e.g. Cury, Biddle, Sarrazin, & Famose, 1997) and importance to succeed (e.g. Reeve & Deci, 1996).

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[1] As explanatory style research has progressed and theory has been modified, the internality dimension has become of less interest (Peterson, 1991, 2000; Peterson & Steen, 2002) and less likely to be examined in empirical studies (e.g. Peterson & Vaidya, 2001; Peterson et al., 2001).

The second, and more important, aim of the present research was to more thoroughly examine the processes by which explanatory style affects performance following failure. According to the attributional reformulation (e.g. Abramson et al., 1978) explanatory style is not itself a direct cause but rather a "distal" dispositional risk factor for helplessness following failure (Peterson et al., 2001; Peterson & Steen, 2002). Several factors can be hypothesized as being the proximal causes of helplessness vs. recovery, even though research in this tradition has rarely looked at these mediating variables (Peterson & Steen, 2002). In the present research, we investigated the role of two potential mediator variables: success expectation and state anxiety.

Success expectation represents the perceived chances of performing well on the task. We expect that individuals with a pessimistic explanatory style will perform more poorly after a negative outcome than people with an optimistic explanatory style, because they attribute the failure to a stable cause (such as their own lack of ability) and come to expect that negative events will be pervasive and enduring (Helton, Dember, Warm, & Matthews, 2000). As a result, their expectation of success will be lowered, and will lead to poorer performance (Bandura, 1986).

Explanatory styles are not just a purely cognitive disposition concerning future events; they entail an emotional component as well. Several studies found that a pessimistic explanatory style correlated positively with anxiety (e.g. Helton et al., 2000; Mineka, Pury, & Luten, 1995). The feeling of a lack of control over the situations which are characteristic of the pessimistic profile can increase the perceived threat and in turn the individual's *state anxiety* (e.g. McGrath, 1970), which in turn will alter the availability of certain cognitive and physiological resources to performers (e.g. Parfitt, Hardy, & Pates, 1995).

To recapitulate, this study was patterned after the Seligman et al. (1990) swimming study in order to test resilience ability after failure in a motor task (basketball dribbling), as a function of explanatory style. We expected that after failure, pessimistic style leads (1) to lower expectations of success, (2) to more state anxiety (somatic arousal) and in turn, (3) to poorer achievement in the second test than an optimistic style, controlling for variables likely to influence motor performance such as ability, gender, perceived competence and importance to succeed. Lastly, we expected that a "neutral" explanatory style will obtain scores of expectation, anxiety and recovery located between the two other groups.

1. Method

1.1. Participants

Students ($N = 278$) from a suburban school near a large town in France, largely of high socio-economic status, volunteered to answer a questionnaire assessing explanatory style in sport at the beginning of the year. One month later, 62 of them were selected according to the procedure explained later. These 33 boys and 29 girls were 14 to 16 years old ($M = 14$ years, $S.D. = 0.76$) and had been practising basketball for at least 1 year as part of sport classes in the school. Participation was voluntary, but no pupil declined. Moreover, parental and school administrator permission was requested before starting the investigation.

1.2. Experimental task

Participants were requested to perform a basketball dribbling exercise. The course was made up of a series of obstacles that the performer had to negotiate while dribbling a basketball. The test consisted of two timed attempts interrupted with a rest and a training period.

1.3. Questionnaire measures

1.3.1. Explanatory style

Although explanatory style is conceptualized as a trait, some theorists (e.g. Cutrona, Russell, & Jones, 1985) have recommended a domain-specific assessment of this construct. Therefore, a sport-specific measure was used. Participants completed a modified French version of the Sport Attributional Style Scale (Hanrahan, Grove, & Hattie, 1989), called the Sport Explanatory Style Questionnaire (SESQ; Martin-Krumm, Sarrazin, Fontayne, & Famose, 2001). This self-report instrument consists of 10 hypothetical situations: five good outcomes (e.g. 'You perform very well in a competition' 'Your team-mates claim that you are a very good performer') and five bad outcomes. The positive and negative items were matched for content. Respondents are asked to imagine each event happening to them and to provide in writing the one major cause of this event, and then use seven-point bipolar scales in each case to rate the degree of stability and globality of the cause. Confirmatory factor analysis carried out on more than 600 teenagers provided strong support for the stable and global dimensions for both positive and negative events (Martin-Krumm et al., 2001). Satisfactory indices of reliability (i.e. internal consistency and test–retest correlation over 6 months) and concurrent validity (e.g. significant correlations with success expectations and procrastination in sport) were also found.

In the present sample, a composite score for explanations of bad events (CN) was obtained by averaging the participant's score on the stability + globality dimensions for the bad events ($\alpha = 0.75$). Similarly, a composite for good event explanations (CP) is acquired by averaging the respondent's score on the two dimensions for the good events ($\alpha = 0.71$). Finally, subtracting CN from CP yields a full scale score (CPMCN). The more this score is positive and high the more the participant is optimistic. By contrast, the more this score is negative and high the more the participant is pessimistic (see Peterson, 1991; Reivich, 1995, for a more detailed explanation).

1.3.2. Perceived basketball ability

To assess perceived basketball ability, a four-item questionnaire similar to the one developed by Nicholls and colleagues (e.g. Nicholls, Patashnick, & Nolen, 1985) was used (e.g. "When you play basketball and you compare yourself to most friends of your age, you feel. . ."). The answers are indicated on an 11-point scale anchored by "very bad" (1) and "very good" (11). In previous research conducted on teenagers (e.g. Cury et al., 1997), the questionnaire has shown good construct validity, internal consistency and predictive validity. In this study, the internal consistency was high ($\alpha = 0.88$); consequently the average was computed and used in subsequent analyses.

1.3.3. Success expectation and importance given to task success

Before each testing, participants rated two statements concerning their success expectation (i.e. "in the dribble circuit, what are your chances in 100 of performing a good time?"), and the value

which they assigned to the accomplishment of the course (i.e. "For you, to succeed in this course is something that is:"). Answers were given by placing a vertical line between the two endpoints of a 10 cm horizontal bar anchored by "0%" and "100%", and "little importance" and "very important", respectively for the two questions. These scales allow very accurate answers, by measuring the distance in millimeters between the left anchor and the mark carried out by the participant (Vallerand & Hess, 2001).

1.3.4. Perception of experimental manipulation

After the feedback of the first testing was given, participants completed a question assessing their perception of success vs. failure: "broadly, how do you consider your performance?" An answer was given by making a box between "rather a success" or "rather a failure".

1.3.5. State anxiety

In this study, anxiety was conceptualized as the cardiovascular reactivity to psychological stress, and more precisely by the increase in heart rate (HR). Several studies found that anxious people have greater cardiovascular responses (e.g. Smith, Limon, Gallo, & Ngu, 1996). The HR was recorded continuously with an ambulatory device (Polar XtrainerPlus; Polar Electro Oy, Kempele, Finland). The apparatus comprised a transmitter which was attached to a strap around the subject's chest and a receiver which was worn on his/her wrist. Data were transferred into a computer via the interface provided with the instrument. So that the HR elevation cannot be attributed to the physiological stress involved in the basketball dribbling exercise, the maximum heart rate preceding the beginning of the testing, with resting heart rate as the covariate, was retained as the anxiety indicator.

1.4. Procedure

Three experimental groups were created in using the percentile distribution of the CPMCN score, and by separating the boys from the girls to keep a balance between the sexes in each group. Participants in the upper tenth percentile were considered more optimistic in explanatory style ($M = 2.02$ and 1.83; $SD = 0.77$ and 0.43, respectively for 13 boys and 9 girls), while those in the lower tenth percentile were considered more pessimistic in explanatory style ($M = -0.83$ and -1.23; $SD = 0.29$ and 0.39, respectively for 10 boys and 10 girls); lastly, those close to the median were considered as neutral in explanatory style ($M = 0.30$; $SD = 0.08$ for 10 boys and 10 girls).

Each participant's test was carried out by an experimenter who was blind to the subject's explanatory style. Under the pretext of checking the students' health, the participants were given a cardio-frequency meter strapped on a belt (see earlier), and the heart rate was monitored continuously throughout the experiment. The experiment proceeded in three phases. In the first phase, participants were seated at a table and began a 10-min baseline, during which they could leaf through magazines while resting HR was taken. Next, they were invited to fill out a questionnaire intended to measure their perceived basketball ability. In the second phase, the experimenter presented the basketball dribbling circuit. The participant was told that this course was a test to classify individuals in relation to one another according to their technical level of dribbling from the time taken on the circuit. Fifteen minutes were allocated to the participants for training.

Next, they were invited to fill out another questionnaire that measured success expectation and the value assigned to finishing the course, and they completed a first timed attempt. Time taken

was not communicated to the participants, who instead were told: "You have not produced a very good time compared to the other pupils who have performed. But once that you have rested, you will have the possibility to train and test a second time." Participants were requested to rate their perceptions of the success/failure, success expectation and value which they assigned to the accomplishment of the course. Then they were allowed 5 min to prepare for Test 2. In the third phase, participants completed a second timed attempt. One week after the end of the study, a debriefing was conducted, and the full objectives of the investigation were explained.

2. Results

After the feedback from the first testing was given, two optimistic and one neutral participants did not perceive themselves as having failed. They were dropped from subsequent analyses.

Two sets of analyses were carried out to test the hypotheses. The first set focused on the changes of performance, expectations and state anxiety between the tests as a function of explanatory style controlling for gender. Because the importance of task success was unrelated to explanatory, gender, and performance ($rs < 0.22$, $P > 0.11$), it was excluded from subsequent analyses. The second set of analyses tested the mediating hypothesis (i.e. the process model) with simultaneous regression analyses, following the Judd and Kenny (1981) recommendations.

To test the hypothesis of a greater recovery after failure by the optimistic participants, a 3 (explanatory style) $\times$ 2 (gender) $\times$ 2 (testing) analysis of variance (ANOVA) was conducted, with repeated measures on the testing variable.[2] Results showed a significant explanatory style $\times$ testing interaction [$F(2, 53) = 4.35$, $P = 0.017$, $\eta^2 = 0.14$]. Contrast analyses revealed that progress in performance between the two tests was significant for the most optimistic [$F(1, 53) = 19.80$, $P < 0.001$, $\eta^2 = 0.27$; mean score progressed from 134.75s. to 129.21s.], was almost significant for the neutral [$F(1, 53) = 3.53$, $P = 0.066$, $\eta^2 = 0.06$; mean score progressed from 134.75s. to 129.21s.], and was not significant for the most pessimistic [$F(1, 53) = 0.10$, $P = 0.75$, $\eta^2 = 0.002$; mean scores remained stable between the two tests: 139.75s. and 139.35, respectively].

To test the hypothesis of a greater fall in success expectation after failure for the most pessimistic participants, a 3 (explanatory style) $\times$ 2 (gender) $\times$ 2 (expectancies) ANOVA was conducted, with repeated measures on the expectancies variable. Results showed a significant explanatory style $\times$ expectancies interaction [$F(2, 53) = 6.38$, $P = 0.003$, $\eta^2 = 0.19$]. Contrast analyses revealed that fall in success expectation between the two tests was significant for most pessimistic [$F(1, 53) = 40.36$, $P < 0.001$, $\eta^2 = 0.43$; mean score down from 51.20 to 26.90], for the neutral [$F(1, 53) = 12.87$, $P = 0.001$, $\eta^2 = 0.20$; mean score down from 56.32 to 42.22], and was not significant for the most optimistic [$F(1, 53) = 1.65$, $P = 0.20$, $\eta^2 = 0.03$; mean score remained relatively stable between the two tests: 55.70 and 50.76, respectively].

To test the hypothesis of a greater stress reactivity after failure from the pessimistic participants, a 3 (explanatory style) $\times$ 2 (gender) ANCOVA was conducted, with resting heart rate as the covariate. Results showed a main effect for explanatory style [$F(2, 52) = 4.47$, $P = 0.016$,

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[2] Analyses of covariance carried out on the three variables of interest, with perceived basketball ability as a covariate did not alter the explanatory style effect. In consequence, perceived basketball ability will not be discussed any more in the following paragraphs.

$\eta^2 = 0.15$]. Contrast analyses revealed that increase in heart rate reactivity before the second test was higher for the most pessimistic participants than the most optimistic participant [F (1, 52) = 8.50, $P = 0.005$, $\eta^2 = 0.14$; $Ms = 145.10$ vs. 132.40, respectively] or the neutral participants [F (1, 52) = 4.18, $P = 0.045$, $\eta^2 = 0.07$; $M = 135.90$]. No difference appeared between the last two groups [F (1, 52) = 0.76, $P = 0.39$, $\eta^2 = 0.001$].

To test the mediating hypothesis that the explanatory style would affect the recovery after failure through its effects on success expectation and state anxiety, controlling for perceived basketball ability and gender, we used regression-based path models. According to Judd and Kenny (1981), data fit a mediation model if (a) the independent variables significantly predict the outcome measure, (b) the independent variables significantly predict the hypothesized mediating variables, and (c) the mediators significantly predict the outcome measure when the effects of the independent variables are controlled.

To reduce the number of variables of the model while taking account of the initial ability, we used the percentage of progress between the two tests as a dependent variable. Moreover, only the participants with a pessimistic style (coded 1) and optimistic style (coded 2) were retained. Table 1 shows the zero-order correlations between all variables used in the process analysis. In a test of the first requirement of the process analysis, percentage of recovery was regressed onto explanatory style, gender, and perceived basketball ability. The effect of the three-term model was significant, $F(3, 36) = 3.71$, $P = 0.02$ ($R^2 = 0.24$), and individual effects emerged only for explanatory style, $F(1, 36) = 7.09$, $P = 0.012$ ($\beta = 0.44$). In a test of the second requirement, each possible mediator was regressed individually onto the same three-term predictor model plus one control variable: the success expectation before the first testing and the rest heart rate respectively for the success expectation model, and for the state anxiety model. In the success expectation regression, the effect of the four-term predictor model was significant overall, $F(4, 35) = 8.18$, $P < 0.001$ ($R^2 = 0.48$), and individual effects emerged for explanatory style, $F(1, 35) = 15.38$, $P < 0.001$ ($\beta = 0.55$), and success expectation before first testing, $F(1, 35) = 15.38$, $P = 0.02$ ($\beta = 0.38$). In the state anxiety regression, the effect of the four-term predictor model was significant overall, $F(4,$

Table 1
Intercorrelation matrix for predictors (variables 1 through 3), control variables (variables 4 and 5), possible mediators (variables 6 and 7), and the outcome measure of percentage of recovery (variable 8)

Variable		1	2	3	4	5	6	7	8
1.	Explanatory style[a]	–	0.05	0.47**	0.12	−0.23	0.57***	−0.45**	0.47**
2.	Gender[b]		–	0.30	0.45**	−0.35*	0.25	−0.11	−0.10
3.	Perceived ability			–	0.50***	−0.16	0.42**	−0.17	0.24
4.	Success expect 1				–	−0.19	0.45**	−0.27	0.04
5.	Rest heart rate					–	−0.19	0.29	0.11
6.	Success expect 2						–	−0.62***	0.57***
7.	State Anxiety							–	0.56***
8.	Percentage of rebound								–

[a] Pessimistic = 1, Optimistic = 2.
[b] Girl = 1, Boy = 2.
* $P < 0.05$.
** $P < 0.01$.
*** $P < 0.001$.

35) $= 2.89$, $P = 0.036$ ($R^2 = 0.25$), and individual effects emerged only for explanatory style, $F(1, 35) = 7.01$, $P = 0.012$ ($\beta = -0.45$). In the test of the final requirement, percentage of recovery was regressed onto the seven-term model (three predictors, two mediators and two control variables). Overall, the model was significant $F(7, 32) = 5.60$, $P < 0.001$ ($R^2 = 0.55$), with individual effects for success expectation, $F(1, 32) = 4.28$, $P = 0.047$ ($\beta = 0.38$), and state anxiety $F(1, 32) = 6.60$, $P = 0.02$ ($\beta = -0.41$). Fig. 1 shows the path model for these results.

3. Discussion

This study was designed to explore why some persons recover after failure in sports, whereas others give up. It is crucial to understand this phenomenon because an athlete's life—like that of anyone else—is filled with ups and downs, and the ability to recover after failure is an important part of resilience. One key psychological factor to be investigated is a personality variable: *explanatory style*.

First, in accordance with former studies in the field of sports (Prapavessis & Carron, 1988; Rettew & Reivich, 1995; Seligman et al., 1990), the results showed that participants with a more optimistic style performed better at the second test after a failure feedback, whereas those with a more pessimistic style did not improve. Those results extend the external validity of the former studies to a less elite population. Moreover, the internal validity of the study is strong insofar as these results were obtained by controlling variables likely to affect motor performance like initial ability, gender, perceived ability, and importance of success.

Secondly, the results showed that explanatory style also affected two other components, one cognitive and another affective in nature: success expectation and state anxiety. Participants with
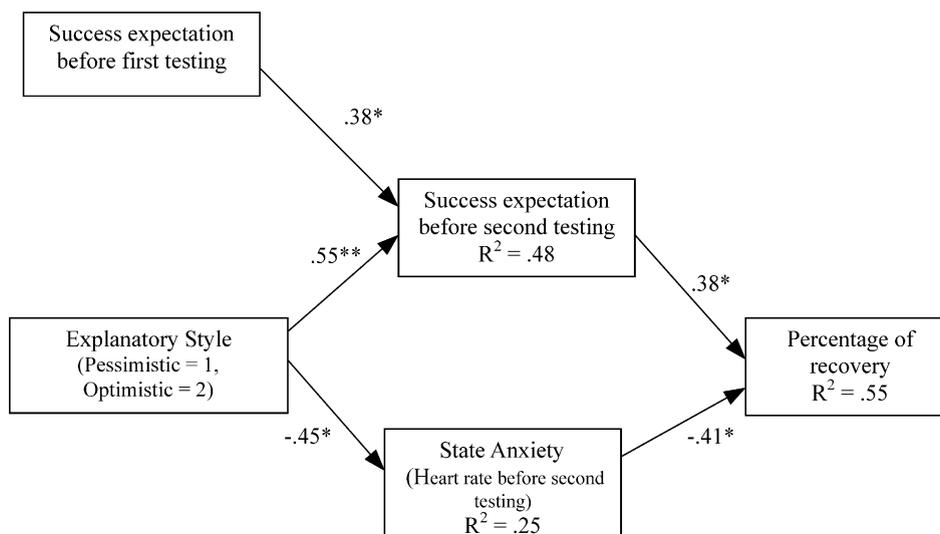

Fig. 1. Process model. Path values are standardized regression coefficients form the regression analyses. No influential variables and nonsignificant paths were deleted. *$P < 0.05$; **$P < 0.01$; $R^2 =$ percentage of explained variance of each variable.

the pessimistic style had a greater fall in success expectations after failure than the most optimistic; a result which is in keeping with certain former works showing that pessimism correlates negatively with expectations (Peterson & Vaidya, 2001). It is likely that individuals with a pessimistic explanatory style usually explain their lack of control over consequences with stable causes such as their own lack of ability and expect that negative events will be pervasive and enduring in their lives (Helton et al., 2000). This attributional pattern leads to a drop in expectation of success. By contrast, it is likely that individuals with an optimistic explanatory style usually explain failure with more unstable and contextual causes such as the use of a bad strategy or the lack of effort, which allows relatively consistent success expectations for the events to come.

In addition, the results showed that participants with the pessimistic style had greater stress reactivity (assessed by an increase in heart rate before the second testing) than the ones with the optimistic style; a result which is in keeping with certain former works showing that pessimism correlates positively with anxiety (e.g. Mineka et al., 1995; Helton et al., 2000; Jackson, Sellers, & Peterson, 2002). To explain the lack of control over bad events with stable and general causes can increase the perceived threat and in turn the level of anxiety. By contrast, to explain failure with more unstable and contextual causes can lead to the feeling of "keeping control" of the situation and to provoke less anxiety.

Neutral participants obtained scores which were between the two other groups for both performances, for success expectations and for state anxiety. In view of failure, optimistic explanatory style seems to be more adaptive than pessimistic explanatory style is, but also more adaptive than neutral explanatory style is. Optimistic explanatory style could lead to a better protection against adversity, whereas a pessimistic explanatory style could lead to intensify the failure's consequences (i.e. more decreased self-confidence and higher anxiety level).

The unique contribution of the results is the demonstration that the explanatory style effects on performance were mediated by expectancies and state anxiety. If explanatory style is presumed as being only a distal risk factor (Peterson et al., 2001; Peterson & Steen, 2002), to date only few studies (e.g. Peterson & Vaidya, 2001) investigated the role of potential mediators. In this study, pessimistic vs. optimistic predicted (1) positively success expectations and (2) negatively state anxiety, before the second testing. In turn, the more success expectations were high and state anxiety low, the better was the percentage of progress between the two tests. As a result, researchers working in the helplessness tradition should measure not only explanatory style and helplessness outcomes, but also expectations, and state anxiety level which seem to deserve attention, as well as other potential mediators, maybe like irrational thinking (e.g. Ziegler & Hawley, 2001).

Most of the previous studies dealt with the relationships between pathological population's explanatory style and behavioral, cognitive, and affective variables. The concern of this study was to observe how ordinary pupils behave when facing false failure feedback in a sport task, with regard to their explanatory style, mediators, and various variables of control. The results we obtained show that the explanatory style's construct is particularly heuristic for such a population. It could have a particular relevance in sports. Currently, most high level athletes have physical training, and often psychological training. Such results could pave the way to further studies which could emphasize the importance of explanatory style's role as a personality trait on sport performances after a poor showing, and have practical implications for the managerial staff.

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