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Achievement goals and perceived ability predict investment in learning a sport task

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Background. Contemporary views on motivation suggest that expectancy-value and social-cognitive perspectives can shed light on the important issue of student motivation. Aims. To test the predictive value of achievement goals on the investment in learning a sport task. Two studies investigated whether investment in learning is affected by achievement goals and perceived ability. Samples. Study 1: 75 school pupils selected from an initial sample of 212. Study 2: 99 pupils selected from 400. Selection was based on motivation and perceived ability scores from questionnaires. Pupils were aged 13–15 years and attended schools in northern France.

Methods. In Study 1 pupils prepared themselves for a sport task with a five-minute period of training after first failure. Results. Study 1 showed that those who were ego-involved with a low perceived ability had a weaker investment in the training situation than those ego-involved with a high perceived ability, or those task-involved regardless of their perceived ability. Ego-involved pupils used an attributional bias to minimise the effect of effort on performance. Study 2 confirmed these results by underlining the motivational deficits of ego involvement for those with a low perceived ability.

Conclusions. Pupils with high ego involvement in a sport task and low perceived ability show motivational deficits which manifest themselves in less time spent on practising a task. A social-cognitive and expectancy-value perspective appears to be valid for the study of motivational processes in school physical education.

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behaviours by focusing on the way that the pupil interprets information from the task and raises particular reasons for the results of his or her actions. One of the most important theoretical contributions of this approach is the understanding of learning behaviours in the capacity of the theory to demonstrate the links between attributions for performance and expectations for future performance. This is founded on a causal chain initiated by the preferred goal pursued by the individual.

Numerous authors defend the idea of relationships between the nature of accomplishment (i.e., task involvement vs. ego involvement) and attributions (Ames, 1992a; Ames & Archer, 1988; Butler, 1987, 1992; Elliott & Dweck, 1988; Jagaciak & Nicholls, 1984, 1987; Nicholls, 1989, 1992). Generally, the studies indicate that when an individual is ego involved, they are more likely to attribute performance to ability, and more so if the actual result confirms expectations. One who has a low perceived ability expects to fail and to appear incompetent in normatively difficult tasks. A failure, therefore, confirms one’s fears and the individual attributes this result to a lack of ability.

On the other hand, an unexpected success should be attributed to chance. If the individual has confidence, they will attribute their success to their high level of competence, and find an external cause (e.g., bad luck) to explain a failure. In attribution theory, ability is considered to be an internal cause and one that is stable and uncontrollable (Graham, 1991; Weiner, 1986). Consequently, when the individual attributes a result to a stable cause like ability, they consider that in an identical situation the same causes should produce the same effects. Therefore, attributing a failure to a stable cause (low ability) should contribute to reduced future expectations of success. Convinced of their incapacity to change, the person is likely to try less hard, be less persevering, or give up.

Effort is the principal cause put forward to explain a result when task involved. When they attribute to unstable causes such as effort, the future expectation of success depends on factors which they think are capable of modifying the result (e.g., a more important effort; a change in the strategy used to solve the problem), or which the environment can give to the person (e.g., the help and advice of a teacher or friend). Confronted with failure the individual should persist in the task by increasing effort or by searching for supplementary information to change the strategy. Encountering success should reinforce convictions concerning the virtue of effort and the individual should be more persistent.

The attributional approach allows us to explain ego involved protective strategies which influence subsequent behaviours. An ego involved individual who anticipates the demonstration of low competence can decide to reduce effort during the task so that the subsequent result can be attributed to insufficient effort investment rather than lack of competence (Covington, 1985; Covington & Omelich, 1979; Pyszczynski & Greenberg, 1983). They can also falsify the objective reasons for performance (attributational bias) by allocating low effort to performance. In this way, an individual who has failed can suggest a lack of effort to avoid the association of failure with low ability, and one who has succeeded can increase their own value by minimising their investment in effort (Harris & Snyder, 1986; Thill, 1993; Tice, 1991).

The purpose of this research, therefore, is to test the predictive value of achievement goals theory in the investment in the learning of a sport task. To our knowledge, few studies have tried to show the influence of achievement goals and perceived ability on the investment in learning in a sport context. However, investment in a learning activity is considered a behavioural indicator of perseverance (Miller, 1986; Miller & Horn, 1990;
Radzisz, 1990), and volitional effort (Jagacinski & Nicholls, 1984, 1990), and constitutes a particularly important estimate of learning motivation (Ames, 1992a; 1992b; Dweck, 1986; Elliott & Dweck, 1988; Heyman & Dweck, 1992; Nicholls, 1989). Consequently, with reference to the theoretical frameworks discussed, we investigated whether task- and ego-involved school pupils demonstrate stronger investment in learning compared to those who are ego-involved and with low perceived ability.

Study 1

The main objective of this study was to test the predictive value of achievement goals, in combination with perceived ability, on the time in which the individual prepares for a test, referred to as ‘investment in learning’.

Method

The study was structured according to a 2 x 2 design of achievement goal (task involvement, ego orientation) x perceived ability (high, low). Dependent variables consisted of the time devoted to prepare for the test (investment in learning), the perception of situationally-induced motivational goals, attributed effort during test preparation, and the importance given to task accomplishment.

Sample

Fifty-seven French males, aged 12–15 years (mean=14.1, SD=0.81) were selected from 212 college pupils according to two questionnaires appraising their dispositional motivational profile (i.e., task orientation and ego orientation), and their perceived competence level in basketball (i.e., high, low). This procedure allowed for the formation of four experimental groups:

1. a high ego orientation, low task orientation and low perceived ability group (N=13)
2. a high ego orientation, low task orientation and high perceived ability group (N=15)
3. a low ego orientation, high task orientation and low perceived ability group (N=15)
4. a low ego orientation, high task orientation and high perceived ability group (N=14).

To form these groups, we used percentile scores for each subscale of the motivational orientation questionnaire. Pupils were classified as high in one orientation when they were situated in the highest third part of the distribution, and low when they were situated in the lowest third. For perceived ability, pupils were classified as high when their mean score was greater than 6, the scale midpoint, while low ability was indicated by a score of less than or equal to 6.

Experimental task

The pupils were requested to perform a ball dribbling exercise in basketball. The course was made up of a series of obstacles that the performer had to negotiate while dribbling a basketball. The test consisted of a timed attempt and was preceded by a five-minute period for training. Participation was voluntary, but no pupil declined. Informed consent was obtained from the pupils and, since testing took place in normal school time, their teachers as well.

Measures

Motivational orientation. Dispositional task and ego achievement goals were assessed by the Perception of Success in Sport Questionnaire (PSSQ) developed by Durand, Cury, Sarrasin & Fanose (1996). This is a French version of the Perception of Success Questionnaire of Roberts & Balague (1991). The questionnaire invites the participant to recall moments during which they experienced a strong feeling of success in sport. Six items represent task orientation (e.g., ‘I progress after having made a big effort’), and six items represent an ego orientation (e.g., ‘I am the best’). Answers are given on five-point scales anchored by ‘don’t agree at all’ (1) and ‘agree completely’ (5). In the present study, the alpha internal consistency coefficient (Cronbach, 1951) of both the task orientation subscale (alpha=0.78) and the ego orientation subscale (alpha=0.85) were high. Moreover, the two subscales were independent (r=−0.05, p>0.05), as predicted from prior research (Duda, 1992).

Perceived basketball ability. The Specific Perceived Ability Questionnaire (SPAQ), developed by Fanose, Sarrasin & Cury (1994), was used to assess perceived ability level in a particular sporting activity (in this case basketball). The instrument comprises four items which were developed from the subscale used by Nicholls, Patashnick & Nolen (1985) (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, the SPAQ has shown good construct validity, internal consistency and test-retest reliability. Evidence relative to concurrent validity and predictive validity of the questionnaire have also been established (Fanose et al., 1995; Sarrasin et al., 1995). In this study, the internal consistency was high (alpha=0.86).

Investment in learning. To assess this construct, the time taken by pupils to prepare for the test was recorded without the pupils’ knowledge. Finding an excuse, the experimenter left the pupil on his own for five minutes with the instruction that there was a possibility to train on the course in order to prepare for the test, if the pupil so desired. During that period, the pupil was observed secretly from a room adjoining the test room, and the time spent on the circuit was recorded. At the end of the five-minute period, the experimenter reappeared and continued with the experimental procedure as announced at the outset of the experiment.

Situationally-induced motivational goal, attributed effort, and importance given to task success. After testing, pupils rated two statements symbolising a task involved context (i.e., ‘In your opinion, we can say that the purpose of this experience is to test a learning method to progress in dribbling’, and an ego-involved context (i.e., ‘In your opinion, the purpose of this experience is to rate each of the participants against each other in relation to their dribble technical level’). Ratings were made on a scale from ‘don’t agree at all’ (1) to ‘agree completely’ (5).

In addition, pupils rated two statements concerning effort attributed to his performance (i.e., ‘In your view, to prepare for this test, how much effort did you make?’), rated on a scale from ‘very little’ to ‘very much’, and the value which the pupil assigns to the accomplishment of the course (i.e., ‘For you, to succeed in this course is something that is …’). This was rated on a scale from ‘little importance’ to ‘very important’. The pupils answered these questions by placing a vertical line between the two extremities of a 30 cm horizontal bar. Each end corresponds to an expression (e.g., ‘don’t agree at all’) which allows
the individual to position himself in relation to the question asked. Before each passage, the pupil was allowed practice on a series of examples in the presence of the experimenter.

Procedure

The pupils were tested individually and the experiment took place as follows:

Circuit presentation and induction to the motivational context. In the first phase, the experimenter presented orally, and through an active demonstration, the basketball dribbling circuit. The pupil was also placed in a condition conforming to his motivational profile to guarantee the viability of the goal (i.e., a pupil from the high ego orientation/low task orientation group was placed in a context inducing ego involvement and is named ‘ego involvement-low perceived ability’ or ‘ego involvement-high perceived ability’). A pupil from the low ego orientation/high task orientation group was placed in a context inducing task involvement and is named ‘task involvement-low perceived ability’ or ‘task involvement-high perceived ability’. In the context inducing ego involvement, the pupil is told that this situation is a test to classify individuals in relation to one another according to their technical level of dribbling from the time taken on the circuit. The stated objective was to locate the 30 best dribblers within a group of 60 selected pupils among the school sample. The teenager was filmed on video, and told at the end of the test series that all the participants could view the names of those selected and discarded.

In a context inducing task involvement, we indicated to the pupil that the purpose of the experiment was to test the teaching quality of a circuit for use in the learning of basketball at school. The aim of the individual was to check whether he could quickly improve his dribbling.

First test and goal to reach. The pupil made his first timed attempt to ensure his understanding of the task. Time was noted by the experimenter but no feedback was given. Then, the experimenter suggested that the pupil should reach a goal. In the context inducing ego involvement, the experimenter announced, with reference to an established schedule relating to teenagers’ performances from other schools, that the pupil must not take more than 2 minutes 30 seconds if he wanted to have a good chance of forming part of the selected group of pupils of his own age. In the context inducing a task involvement, the experimenter told the pupil that significant progress is obtained if he achieves a time of 2:30, which represented an improvement of 20 per cent compared to his established time during pre-test.

Measurement of perception of the situational goal, value attributed to the task, and investment in learning. The pupil was called upon to evaluate his perception of the goal induced by the context and the value which he attributed to the task. Next, he was allowed five minutes to prepare for the test during which he was observed secretly, as outlined earlier.

Feedback and measurement of attributed effort. After practice, the pupil was given information on his performance. The feedback formulation was identical for both conditions, but dependent on his perceived ability level. The pupils with low perceived ability received negative feedback: ‘Your time is greater than 2:30’, the pupils with high perceived ability received positive feedback: ‘Your time is less than 2:30’.

Ethical considerations and debriefing. Given that unobtrusive observation took place, careful consideration was given to ethical issues in the conduct of this study. Unobtrusive observation was deemed safe and acceptable given that the activities observed were normal activities used on a daily basis in physical education lessons. Secondly, and in accordance with the British Psychological Society’s Code of Conduct, observation was deemed acceptable given that the pupils could expect, during the normal school day, to be observed by visitors as well as other members of the school community.

However, given the sensitive nature of unobtrusive observation, debriefing took place at a post-study meeting with the pupils, teachers and parents. Full information about the nature of the study was given and questions were taken freely.

Results

Data analysis revealed unequal variance between the experimental groups concerning the importance given to the task (Harley’s Fmax=8.74; p=0.004), the perception of ego involvement induced by the context (Harley’s Fmax=6.51; p=0.01), and the perception of task involvement induced by the context (Harley’s Fmax=11.14; p=0.005). This was not the case for the time devoted to the test preparation, neither for the effort attributed. Kruskal-Wallis ANOVA by ranks showed a significant effect of induced goal on the ego involvement perception induced by the context (H(1, N=57)=38.89; p<0.001), and on the task involvement perception induced by the context (H(1, N=57)=29.62; p=0.001). The pupils confronted with a context inducing an ego involvement perceived this motivational dimension more strongly (N=28, S of ranks=120.5) than the pupils placed in a context inducing a task involvement (N=29, S of ranks=451.5). The pupils confronted with a context inducing a task involvement perceived this motivational dimension more strongly (N=29, S of ranks=180.5) than the pupils placed in a context inducing an ego involvement (N=28, S of ranks=472.5). These results confirm the validity of the motivation induction.

Effects on the importance attached to the task

Kruskal-Wallis ANOVA by ranks did not show any significant effect (H(1, N=57)=1.77; p=0.182) for the goal on the importance attached to task accomplishment. However, a strong effect was shown for perceived ability (H(1, N=57)=23.758; p<0.001). Consequently, pupils who perceived themselves to be incompetent achieved less value to the task (N=28, S of ranks=508.5) than those who had high perceived ability (N=29, S of ranks=144.5). Mann-Whitney U test showed: (a) that the ego involved-low perceived ability group attached significantly less importance to the task than all other experimental groups (all p<0.001); (b) that the task involved-low perceived ability group had lower task value than the task involved-high perceived ability group (p=0.034) and the ego involved-high perceived ability group (p=0.002); (c) that the task involved-high perceived ability and the ego involved-high perceived ability groups valued the tasks equally.

Effects on investment in learning and attributed effort

A MANOVA conducted on time taken for practice (investment in learning) and attributed effort revealed a significant multivariate effect of goal (F(2,52)=20.06, lambda=0.514, p<0.0001), and perceived ability (F(2,52)=11.19, lambda=0.699, p=0.0009), and an interaction between the two independent variables (IVs) (F(2,52)=3.94, lambda=0.868, p=0.055). An ANOVA in investment in learning confirmed the previous results by highlighting: (a) a main effect for goal (F(1,53)=26.30, p=0.0001) and for perceived ability (F(1,53)=20.24, p=0.0002), and (b) an interaction effect between the two IVs (F(1,53)=4.49, p=0.039). Newman-Keuls tests show that the ego involvement-low ability group spent less time preparing for the test than the other three groups (see Table 1).
Investment in a sport task

Table 1. Means (M) and standard deviations (SD) for investment in learning and effort attributions in Study 1

<table>
<thead>
<tr>
<th></th>
<th>Ego involvement</th>
<th>Task involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low perceived ability (N=15)</td>
<td>High perceived ability (N=15)</td>
</tr>
<tr>
<td>Measures</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Investment in learning (secs)</td>
<td>155.07</td>
<td>49.92</td>
</tr>
<tr>
<td>Effort attributions</td>
<td>13.12</td>
<td>5.02</td>
</tr>
</tbody>
</table>

ANOVA on attributed effort showed a main effect for goal (F(1,53)=17.48, p<.0001), but no for perceived ability (F(1,53)=1.79, p>.165), and there was no significant interaction (F(1,53)=3.21, p>.05).

The motivational goal, therefore, influenced investment in learning and the effort assigned to prepare for the test. Task involved pupils reported more effort and attributed their performance more to effort than ego involved pupils. Moreover, pupils identified as low in perceived ability invested less in test preparation than high perceived ability pupils. The origin of the variation in investment in learning is more related to the specific position of the ego involvement-low perceived ability group in relation with the three other groups (see Table 1). As far as attributed effort is concerned, the source of the variation is more generally due to the goal (F(1,52)=15.21, p<.0001), for the ego involvement condition, and M=20.21 (N=29), for the task involvement condition.

Relationship between investment in learning and attributions

We attempted to highlight the mechanism of attributional bias from a simple linear regression computation between investment in learning and attributed effort over the different groups. The results in Table 2 show:

(a) for ego involvement-low perceived ability and ego involvement-high perceived ability groups the correlation between investment in learning and attributed effort is negative. For these pupils, the higher the investment in the test preparation the less effort is attributed subsequently to the result.

(b) in the task involvement-low perceived ability group, the more the pupils spent time in preparing for their test the more they related their performance to the importance of effort.

Table 2. Linear regressions between investment in learning and effort attributions in Study 1

<table>
<thead>
<tr>
<th>Goal/perceived ability</th>
<th>N</th>
<th>r</th>
<th>r²</th>
<th>F, pc</th>
</tr>
</thead>
<tbody>
<tr>
<td>ego_low</td>
<td>15</td>
<td>-0.57</td>
<td>0.32</td>
<td>8.38, .02</td>
</tr>
<tr>
<td>ego_high</td>
<td>15</td>
<td>-0.53</td>
<td>0.28</td>
<td>5.21, 04</td>
</tr>
<tr>
<td>taskflow</td>
<td>15</td>
<td>-0.57</td>
<td>0.31</td>
<td>5.85, .03</td>
</tr>
<tr>
<td>task/high</td>
<td>14</td>
<td>-0.10</td>
<td>0.01</td>
<td>2.45, .14</td>
</tr>
</tbody>
</table>

Discussion

Overall, the results agree with the theoretical framework developed earlier and show the predictive value of achievement goals in investment in learning and on attributional bias. The study points out that the status given to the test determines the investment the pupil puts into its preparation. Facing a normatively average task, an ego involved pupil with a low perceived ability anticipates demonstrating incompetence. Effectively, failure on a task at such a level of difficulty conforms to low ability, the more so if the effort expended to obtain the result is high (Sagasti & Nicholls, 1984, 1987). Therefore, the pupil is likely to attempt to disengage himself emotionally from a painful situation by discrediting the task, and putting in less effort than pupils in other groups.

Pupils from the ego involvement-high ability group anticipated their demonstration of normative competence to be above average and they highly valued a situation which allowed them to attain their motivational goals. Consequently, they put in effort to achieve their aims. The pupils who were task involved, however, tried hard whatever their level of perceived ability. The goal prescribed by the experimenter was perceived positively, consequently the pupil could look forward to progress and mastery of the task independently of his initial perceived competence. Also, the task was better valued by pupils high in perceived ability compared to those who had less confidence in their abilities.

The results show that attributed effort depends principally on the nature of the achievement. Whatever their level of perceived ability, the task involved pupils spent greater effort in preparing for the test than ego involved pupils. This result is in agreement with one of the fundamental constructs of achievement goals theory which argues for a strong relationship between the nature of the achievement goal and attributional thinking (Ames, 1992; Butler, 1992; Duda, 1992; Heyman & Dweck, 1992; Nicholls, 1989, 1992; Roberts, 1992). Providing feedback in accordance with their perceived ability level reinforced the two groups of ego involved pupils in their forecast and helped attribute the result to ability rather than effort.

The regression analysis between investment in learning and attributed effort suggests that the pupils use effort attributions for different ends. The pupils who were ego involved tended to minimise the consequences of their investment. This mechanism is extensively described by self-worth theory but not yet verified in the motor learning domain (Harris & Snyder, 1986; Thill, 1993; Tice, 1991). These pupils may distort their answers by attributing their poor performance to low effort. In this way, failure is assigned to a lack of effort and hence may act as a form of self-esteem protection. Alternatively, the more energy devoted to preparing for the test, the more the pupils who are task involved attribute their result to their own effort. In this psychological state, failure does not threaten the self-esteem of individuals as it is considered a part of the learning process. The attributional bias observed mainly concerned pupils who were ego involved and who use this to avoid being deprecated in the eyes of others.

Study 2

The purpose of this study was to confirm the predictive value of achievement goals specifically for the perseverance of pupils after failure. This should allow us to study the mediating role played by the pupil's success expectation when confronted with failure.

With reference to the attributional model, it is suggested that the attributions made by the pupils for their failure are linked to their motivational goal and that it contributes to the expectation of future success and subsequent investment in the task.
Investment in learning a sport task

Method

In parallel with Study 1, this study involves a goal (task involvement, ego involvement) x perceived ability (high, low) design. The dependent variables consist of the perception of the motivational goal induced by the context, success expectation formulated after a prior failure, and the time devoted to prepare for a test (investment in learning) following test failure.

Sample

Male French school pupils (N=99), aged 13–15 years (mean=13.8, SD=0.78), were selected from 400 pupils according to their motivational profile and their perceived ability level in basketball. By using a similar procedure as that outlined in Study 1, we created four groups: a high ego orientation/low task orientation and low perceived ability group (N=23); a high ego orientation/low task and high perceived ability group (N=20); a low ego orientation/high task orientation and low perceived ability group (N=25); and a low ego orientation/high task orientation and high perceived ability group (N=25).

Task

The basketball dribbling task was identical to that used in Study 1. Participation was voluntary, but no pupil declined. Informed consent was obtained from the pupils and, since testing took place in normal school time, their teachers as well.

Measures

Motivational orientation, perceived ability in basketball and perception of the motivational goal induced by the context. These variables were measured by tools and procedures as outlined for Study 1. For the PSSQ, the internal consistency of the task orientation subscale (α=75) and ego orientation subscale (α=89) were satisfactory. Moreover, as in Study 1, the two subscales were independent (r=0.06, p>0.05). The SPAQ also had good internal consistency (α=79).

Success expectation. Pupils determined their success expectation (i.e., “In the dribble circuit, I think I have a good chance of success”: don’t agree at all vs. agree completely) and followed procedures identical to those in Study 1.

Procedure

The selected pupils were tested individually in the following way:

Circuit presentation and motivational climate induction. The circuit presentation and the allocation of the pupils followed an identical procedure to that in Study 1. Moreover, in the context which induced an ego involvement, we told the pupils that the purpose of the experience was to locate the 50 best dribblers within a group of 100 pupils selected from the school population. In the context inducing task involvement, the experimenter stressed the importance of good concentration and doing one’s best.

Negative feedback and goal to reach. The pupils completed a first timed attempt to ensure that the task was understood. Following the first test, the experimenter commented negatively on the pupil’s performance then proposed a temporary goal for him to reach. In a context inducing ego involvement, the pupil was told: “You have not produced a very good time compared to the other pupils who have performed.” Then the pupil is told that with reference to an established scale relating to the performance of teenagers in other schools, he must be quicker than 2 minutes 30 seconds if he wants to stand a good chance of rating above average for his own age.

Results

The initial analyses showed significant variances between the four comparison groups for all dependent variables. A 2 x 2 (goal x perceived ability) MANOVA conducted on all dependent variables revealed main effects for goal (F(1,91)=86.13, lambda=.207, p<0.0001), and perceived ability (F(1,91)=10.135, lambda=.694, p<0.0001), as well as an interaction between the two IVs (F(1,91)=6.519, lambda=.779, p<0.0002). Pupils placed in a context inducing ego involvement (M=24.52, SD=4.38) perceived the situation as more ego involving (F(1,91)=22.126, p<0.0001) than pupils induced into task involvement (M=11.12, SD=3.14). Similarly, the pupils placed in a context inducing task involvement (M=22.2, SD=3.58) perceived greater task involvement (F(1,91)=54.28, p<0.0001) than those induced into ego involvement (M=15.79, SD=5.94). These results confirm the validity of the motivational induction, which was also observed in Study 1.

Effects on success expectation

The results showed an interaction (F(1,91)=9.26, p<0.03) between goals and perceived ability. Post-hoc Newman-Keuls test showed that ego involved pupils with low perceived ability expressed lower success expectations than the other groups (see Table 3). In addition, the pupils high in perceived ability expressed higher success expectations (M=23.28, SD=4.77, F(1,91)=21.76, p<0.001) than pupils low in perceived ability (M=18.43, SD=6.22).

Table 3. Means (M) and standard deviations (SD) for investment in learning and success expectations after failure (Study 2)

<table>
<thead>
<tr>
<th></th>
<th>Ego involvement</th>
<th>Task involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low perceived ability (N=25)</td>
<td>High perceived ability (N=25)</td>
</tr>
<tr>
<td>Measures</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Investment in learning (secs)</td>
<td>147.78</td>
<td>65.04</td>
</tr>
<tr>
<td>Success expectation</td>
<td>15.85</td>
<td>5.06</td>
</tr>
</tbody>
</table>
Effects on investment in learning
A significant interaction (F(1,95)=10.34, p<.002) between goal and perceived ability was shown on the amount of time invested in learning. Post-hoc Newman-Keuls test revealed that the ego involvement-low perceived ability group spent less time in the task after receiving a negative comment than the other groups (see Table 3). Pupils placed in a context inducing task involvement persisted longer (M=245.7, SD=50.06; F(1,95)=22.76, p<.0001) than pupils placed in a context inducing ego involvement (M=194.94, SD=75.28). Similarly, pupils high in perceived ability (M=245.19, SD=53.21) spent more time on the task (F(1,95)=22.19, p<.0001) than low perceived ability pupils (M=194.42, SD=83.72).

A structural equation modelling analysis
To test the links between the dependent variables, and to specify likely causal pathways, a structural equation modelling analysis was conducted. This test a hypothesised model against the data observed. Three paths and one mediation were specified. A negative path from ego involvement to expectation, a positive path from task involvement to expectation, and a positive path from expectation to investment in learning were hypothesised from prior research (see correlation matrix in Table 4).

Table 4. Intercorrelations between perceived ego involvement, perceived task involvement, success expectations, and investment in learning (Study 2).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. perceived ego involvement</td>
<td>-.56***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. perceived task involvement</td>
<td>-.49***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. success expectations</td>
<td>.32**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. investment in learning</td>
<td>.53***</td>
<td>.28**</td>
<td>-.66***</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01  ***p<.001

The structural equation modelling analysis was performed using LISREL VIII (Joreskog & Sorbom, 1993) and showed that the specified model (model 1) did not fit the observed data particularly well. The chi² was highly significant, thus rejecting the null hypothesis, and shows a difference between real observations and the proposed model. Additional indices confirm this observation: chi²/df, ratio is much greater than 2 and the Adjusted Goodness of Fit Index (AGFI) is relatively low (see Table 5, model 1). However, modification indices provided by LISREL suggested adding a direct path from ego involvement perception to investments in learning. The new model (model 2) includes this new prediction and the indices of fit are substantially improved (see Table 5). Model 2 appears to be a good fit to the observed data (see Figure 1).

Table 5. Indices of fit for the structural equation models tested in Study 2.

<table>
<thead>
<tr>
<th>Indices of fit</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi squared</td>
<td>13.76</td>
<td>1.09</td>
</tr>
<tr>
<td>DF</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>chi²/df ratio</td>
<td>.001</td>
<td>.001</td>
</tr>
<tr>
<td>GFI</td>
<td>.68</td>
<td>.99</td>
</tr>
<tr>
<td>AGFI</td>
<td>.98</td>
<td>.95</td>
</tr>
<tr>
<td>RMSR</td>
<td>.078</td>
<td>.019</td>
</tr>
</tbody>
</table>

Discussion
The results generally conform to our assumptions. The pupils high in ego involvement and low in perceived ability had lower success expectations than the other groups, and persevered less on the task. This confirms Study 1 and underlines the psychological weakness of pupils placed in such a motivational state. The present study also highlights the reactions of pupils to failure. The nature of accomplishment determines the status given to the failure (Ames & Archer, 1988) and the type of attributions given (Ames, 1992a; Elliott & Dweck, 1988; Graham, 1991; Nicholls, 1989). The pupils from the ego involvement group perceived ability group attributed their failure to ability and gave themselves little chance to solve a task of normatively average difficulty. This seemed to urge them to quit a training situation early. Conversely, an initial failure did not affect the pupils with high ego involvement-high perceived ability who attribute this preliminary result to external causes (Nicholls, 1989). In consequence, they remained engaged in the task and prepared actively for the test.

The pupils who were task involved had a very different interpretation of their encountered failure. The nature of the feedback seemed to reinforce attributing their failure to lack of effort and concentration. These pupils were confronted with a task commensurate with their competence, consequently, whatever their initial perceived ability level, the pupils from these two groups formed high success expectations, hence they remained engaged in mastering the task.
Investment in a sport task

The interpretation of the structural equation model confirms these results. In particular, the results clearly show the predictive value of the perception of an ego involvement induced by the context. This variable negatively predicts the expectation of success and investment in practicing the task. In agreement with the theoretical framework discussed, failure induces a deteriorating action on learning investment when ego involvement is perceived as strong. This can be explained in two ways. First, this goal tends to reduce success expectations and consequently the investment in learning for the less confident pupils. This is likely to be due to attributing their failure to a stable cause, such as low ability (Graham, 1991; Winer, 1966). Second, ego involvement perception reduces the investment in learning of the pupils by a direct causal path. This observation confirms earlier data which suggests that the perception of ego involvement induced by the context is positively related to attitudes and behaviours maladaptive for learning (Ames & Archer, 1988; Biddle et al., 1995; Curry et al., 1996). For some pupils, in particular for those ego involved with low perceived ability, an initial failure associated with a new normative evaluation of ability may create negative emotion for the individual, thus reducing his investment in the task.

Finally, the results point out the predictive value of success expectation for subsequent perseverance. The more an individual thinks of succeeding, the more he perseveres at the task. This is conceptually consistent with achievement motivation theories (Elliot & Dweck, 1988; Nicholls, 1989) and expectancy-value theories.

General discussion and conclusions

The results from the two studies are consistent with the theoretical frameworks used and confirm the hypotheses concerning investment in learning. The data confirm that pupils who are ego involved and have low confidence in their capacities engage a negative attitude and resist practice. The preferential goal pursued by the individual, and the success expectations he has for himself, induces investment in the task and influences progress.

A cognitive approach to motivation allows us to examine psychological mechanisms which provide this theory with high explanatory and predictive value. As Elliot & Dweck (1988) emphasize, "... each of the achievement goals is different from different "programs" with different commands, decision rules, and inference rules, and hence, with different cognitive, affective and behavioral consequences. Each goal, in a sense, creates and organizes its own world - each evoking different thoughts and emotions and calling forth different behaviors" (p. 11).

When an individual is ego involved, the attractiveness and accessibility of a task are dependent on perceived ability and on the normative difficulty of the task. The causes of performance are then attributed more ability to (Graham, 1991). The perception of success requires the demonstration of superior ability, either by obtaining a better result than others or by establishing an identical result with lower effort (Covington, 1985; Jagacinski & Nicholls, 1984). Conversely, failure intervenes when performance confirms an inferior ability compared to others or by an identical result to others in spite of greater effort. Consequently, in such a motivational state, the level of perceived ability induces important consequences for the individual's self-worth (Covington & Omelich, 1979) and investment over time on the task.

When the individual is task involved, the attractiveness and accessibility of the task depends only on the subjective probability of success, and a good performance is generally explained by effort. The individual perceives his performance as a success or a failure if he observes or does not observe progress and mastery of the task due to the effort exerted. This motivational state is not dependent on perceived ability and induces long-term investment in the task. As Ames (1992a) says: 'Central to a mastery goal is a belief that effort and outcome covary, and this is the attributional belief pattern that maintains achievement-directed behavior over time' (p. 262).

The data reported by the two studies support the validity of achievement goals theory for investment in the learning of a sport task, and bring ecological validity to this achievement motivation perspective.

References

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