The Effect of Personal Goals, Self-Efficacy, and Self-Satisfaction on Injury Rehabilitation

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This study examined the effect of goal setting on injury rehabilitation, specifically, differences in personal goal setting, self-efficacy, self-satisfaction, and performance between injured and noninjured subjects. Two experimental groups (32 women with knee injuries and 29 noninjured women) and one control group (n = 30) were used. Subjects performed four trials of a knee extension task on an isokinetic dynamometer. Prior to the third and fourth trials, subjects in the experimental groups set personal goals and completed self-efficacy and self-satisfaction scales. There were significant performance improvements for the two experimental groups; correlation coefficients between self-efficacy, self-satisfaction, goal setting, and performance were significant at the .001 level. Personal goal setting was affected by level of ability and in turn had a direct effect on performance. Self-efficacy and self-satisfaction were affected by ability or performance but had no significant effect on personal goals or performance. The findings indicate that personal goal setting might be an important determinant for performance improvement in injury rehabilitation programs.

The genesis of injuries is undoubtedly a complex, multifactor equation that may involve the athlete's physical and psychological state, the athlete's skill level, training conditions, the coach's expertise, and many other variables (13). One interactional theoretical model of factors involved in athletic injury (1) combines cognitive, physiological, attentional, behavioral, interpersonal, social, and stress history variables that may influence injury occurrence and prevention. A recent study (5) indicated that cognitive appraisal models may be useful for understanding how athletes adjust psychologically to their injuries and how emotional reactions to sport injury may influence adherence to rehabilitation programs.

A number of recommendations have been advanced in textbooks (9, 16) for the application of psychological principles to recovery from athletic injury. Athletic trainers feel that a wide variety of psychological skills and strategies are important for the athlete to completely recover from injury (20). The following factors have been identified in the literature as contributing to healing from illness...
and injury: positive attitudes, stress control, social support, goal setting, positive self-talk, mental imagery, locus of control, life events, and self-concept (10, 13). Just as goal setting is important for high-level achievement in other areas, it is an important first step in initiating positive action toward recovery (10). Specifically, goal setting has been recommended for motivating the rehabilitation behavior of injured athletes (7, 8, 10, 17, 19, 20).

Goal setting facilitates performance by focusing and directing the attention of the subject, enhancing persistence, and promoting the development of new strategies for improving performance. It has been shown that specific, difficult, and challenging goals lead to higher levels of task performance than easy goals, no goals, or goals focused on "doing your best." However, goals do not affect performance in isolation. Rather, they function in conjunction with other psychological variables such as self-efficacy expectations, self-satisfaction, and ability. Studies have shown that self-efficacy, ability, personal goal setting, self-satisfaction, and goal level positively affect performance (3, 4, 6, 15). Self-efficacy is defined as one's expectation to successfully perform a specific behavior required to produce a certain outcome (2). Locke and Latham indicated that highly efficacious individuals set challenging personal goals, whereas inefficacious individuals set more modest goals (14). Individuals set goals on the basis on how confident they feel about achieving these goals. Self-satisfaction is a factor that points to the discrepancies created by what individuals do and what they aspire to achieve. The influence of self-satisfaction on goal setting models also has been examined (3, 6, 14), and it has been found that the higher an individual's self-dissatisfaction with a standard performance, the greater the subsequent intensification of effort (3).

Researchers (6, 15) have observed that assigned goals affect an individual's self-efficacy expectations and personal goals, which in turn influence performance. The relation of assigned goals to performance is mediated by an individual's self-efficacy expectations and personal goals. Ability affects self-efficacy expectations or personal goals. A relevant study in a sport and exercise environment (18) indicated that perceived self-efficacy, self-satisfaction, and levels of past performance influence personal goal setting. Furthermore, the mediating role of personal goal setting between self-efficacy and performance was supported.

The purpose of the present study was to examine the effects of goals, perceived self-efficacy, ability, and self-satisfaction on the performances of subjects undergoing injury rehabilitation. It was hypothesized that high self-set goals, strong perceived self-efficacy, self-satisfaction, and ability enhance performance levels of injured subjects.

**Method**

**Design and Procedure**

A total sample of 91 females (university students who were university or recreational athletes) agreed to participate in the experiment. Their ages ranged from 18 to 24 years ($M = 22.0, SD = 2.31$). Three groups were used. The first experimental group consisted of 32 females with knee injuries. These were individuals who had had knee arthroscopic surgery during the previous 6 months, whose physicians recommended quadriceps strengthening, and whose physical examinations revealed no effusion or range of motion deficits. Quadriceps femoris muscle weakness was
observed in all individuals due to prolonged inhibition of muscle activity. The second experimental group consisted of 29 noninjured women. The third group, which was used as the control group, consisted also of noninjured women (n = 30); subjects in this group performed four trials without setting any goals and were instructed to do their best. Also, this group performed without completing self-efficacy and self-satisfaction scales, since these scales influence the subjects to set goals.

A Cybex 6000 isokinetic dynamometer was used to measure knee extension. Knee extension was tested with the subjects in a seated position. The angular velocity was 240°/s. In each trial, the subjects performed four repetitions at 100% of perceived maximum effort. The greatest amount of extension measured during the four repetitions was used as the performance score. The warm-up for all subjects consisted of 10 min on an ergometric bicycle followed by 10 knee extension repetitions (for the warm-up repetitions, subjects were told to not try too hard). A pilot study with 30 students (who did not participate in the experiment later) determined the range of performance used to construct the self-efficacy and self-satisfaction scales.

Each subject completed a total of four trials. After a 10-min warm-up, they performed the first two trials. The mean scores on these two trials, computed in newtons, served as a measure of the ability variable. A 10-min rest period was then given to enable the subjects to recover from fatigue. Subjects were informed about their performance and completed the self-efficacy expectations and self-satisfaction scales. Afterward, they set a personal goal for the next trial. Following the assessment of psychological variables, the third trial was performed. At the conclusion of the third trial, there was another 10-min rest interval during which subjects were informed about their performance. Their self-efficacy and self-satisfaction were assessed, a new personal goal was set, and the fourth trial was performed.

Measures

**Self-Efficacy Expectations.** Subjects were asked to record the performance levels that they expected to achieve, using 14 levels from 30 to 160 N. The format was comparable to that used in other studies of goal setting (3, 15). For example, subjects were asked to respond to the following statement: “In this specific test on the Cybex instrument, I can achieve a performance of 30 N” (yes/no). Then subjects answered the question, “How certain you are?” using a 10-point scale where 1 = uncertain and 10 = certain. Cronbach’s alpha values for these scales were .90 and .92 for the two trials, respectively.

**Self-Satisfaction.** Subjects were asked to indicate how satisfied they would be if they achieved a performance of 30 to 160 N. Responses were given for 14 performance levels on a 7-point scale ranging from 1 = extremely dissatisfied to 7 = extremely satisfied. Cronbach’s alpha values for these scales were .80 and .81 for the two trials, respectively.

**Performance.** The scores that subjects achieved during the third and fourth trials were used as Performance 1 and Performance 2 variables, respectively. Ability was indicated by the mean scores of the first two trials. During the first trial, the two experimental groups did their best without having any feedback about their performance. During the second trial, subjects did their best while receiving accurate feedback about their performance. Feedback was provided via the Cybex dynamometer, which presents performance data for each repetition on a computer.
screen. Data are presented in several types of diagrams, with scores presented in newtons at the top of the diagrams. Subjects were instructed to focus their attention on the computer screen during their trials. During the third and fourth trials, subjects performed after setting personal goals; they also had feedback during these trials. Finally, the subjects in the control group performed without having performance feedback (i.e., the control subjects did not see the computer screen).

Statistical Analysis

Descriptive statistics (means and standard deviations) were calculated for the variables measured in the study. Correlation coefficients were computed to examine relations between the variables. One-way ANOVA was used to determine if a significant difference existed between groups on baseline performance. ANOVA with repeated measures on the last factor was used to examine differences between groups across trials. Finally, the LISREL VI statistical package (12) was employed to examine the network of relationships between the examined variables. Significance was set at $p < .01$.

Results

Group Differences

Table 1 presents means and standard deviations of all the examined variables for the three groups. To determine if there was any initial difference among the three groups, one-way ANOVA was conducted on the baseline performance. Results indicated no significant between-group differences ($p = .12$), and thus the performance data were analyzed by a $3 \times 3$ (Group $\times$ Trials) ANOVA with repeated

Table 1  Means and Standard Deviations for Performance, Personal Goals, Ability, Self-Satisfaction, and Self-Efficacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 ($n = 32$)</th>
<th>Group 2 ($n = 29$)</th>
<th>Group 3 ($n = 30$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>1. Ability (Trials 1 &amp; 2)</td>
<td>73.36</td>
<td>21.1</td>
<td>79.05</td>
</tr>
<tr>
<td>2. Goal 1</td>
<td>84.87</td>
<td>24.8</td>
<td>92.14</td>
</tr>
<tr>
<td>3. Self-efficacy 1</td>
<td>69.55</td>
<td>23.7</td>
<td>71.14</td>
</tr>
<tr>
<td>4. Self-satisfaction 1</td>
<td>68.64</td>
<td>19.0</td>
<td>70.55</td>
</tr>
<tr>
<td>5. Performance 1 (Trial 3)</td>
<td>82.16</td>
<td>23.6</td>
<td>86.03</td>
</tr>
<tr>
<td>6. Goal 2</td>
<td>87.38</td>
<td>23.5</td>
<td>91.24</td>
</tr>
<tr>
<td>7. Self-efficacy 2</td>
<td>73.85</td>
<td>21.0</td>
<td>73.76</td>
</tr>
<tr>
<td>8. Self-satisfaction 2</td>
<td>80.45</td>
<td>25.3</td>
<td>80.10</td>
</tr>
<tr>
<td>9. Performance 2 (Trial 4)</td>
<td>86.18</td>
<td>25.6</td>
<td>90.79</td>
</tr>
</tbody>
</table>

Note. Group 1, injured with personal goals; Group 2, noninjured with personal goals; Group 3, control.
measures on the last factor (the first two trials were computed and analyzed as one). Results indicated a significant trial main effect (Hotteling criterion = 1.19, $p < .001$). Univariate ANOVA revealed a significant main effect for groups on the second ($F = 29.57, p < .001$) and third ($F = 48.93, p < .001$) trials. The two goal-setting groups (injured and noninjured) performed better than did the control group. Figure 1 presents the performance scores among the three groups on the three trials.

Follow-up $t$-test analyses between injured and noninjured groups indicated no differences on personal goals or on self-efficacy and self-satisfaction scales ($p > .25$). Paired $t$-test analyses indicated that performance improved significantly from Trial 1 to Trials 2 and 3 for the injury group ($t = 6.45$ and $t = 7.34, p < .001$, respectively). There were similar results for the noninjured group between Trial 1 and Trials 2 and 3 ($t = 6.26$ and $t = 9.53, p < .001$). Finally, the performance level for the control group was reduced significantly from Trial 1 to Trial 2 ($t = 3.2, p < .001$) and from Trial 1 to Trial 3 ($t = 5.17, p < .001$). The correlation matrix among the examined variables is presented in Table 2. All the correlation coefficients between goal setting, self-efficacy, self-satisfaction, and performance were significant at the .001 level.

**Structural Equation Modeling**

Since there were no differences between the two experimental groups, structural equation modeling analysis was used for all subjects in these two groups ($n = 61$). The LISREL VI statistical package (12) was employed to examine the network of relationships between the variables. Figure 2 presents the structural coefficients for the model. In this model, self-efficacy 1 affected self-satisfaction 1 and self-efficacy 2. Paths from self-efficacy and self-satisfaction to performance were eliminated because they did not contribute to the fit of the model. The satisfaction 1 variable affected only satisfaction 2. The contribution of ability and performance 1

![Figure 1 — Performance scores of the three groups across trials.](image-url)
Table 2  Intercorrelations for Performance, Personal Goals, Ability, Self-Satisfaction, and Self-Efficacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>1. Ability (Trials 1 &amp; 2)</td>
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<td></td>
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<td></td>
<td>.95</td>
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<td>2. Goal 1</td>
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<td>3. Self-efficacy 1</td>
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<td>.74</td>
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<td>4. Self-satisfaction 1</td>
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<td>.75</td>
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<tr>
<td>5. Performance 1 (Trial 3)</td>
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<td>.93</td>
<td>.73</td>
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<tr>
<td>6. Goal 2</td>
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<td></td>
<td>.93</td>
<td>.72</td>
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<tr>
<td>7. Self-efficacy 2</td>
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<td></td>
<td>.76</td>
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<td>8. Self-satisfaction 2</td>
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<td></td>
<td>.74</td>
<td>.66</td>
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<tr>
<td>9. Performance 2 (Trial 4)</td>
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<td></td>
<td>.91</td>
<td>.70</td>
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</tbody>
</table>

Note. All correlations are significant at the .001 level.

Figure 2 — Levels of self-efficacy expectations and performance in injured and noninjured subjects.

to personal goals, self-efficacy, and self satisfaction was significant ($p < .01$) for the two stages of the experiment. The effects of personal goals on performance were also significant ($p < .01$) in both stages of the experiment. The goodness of fit index and the adjusted goodness of fit index for this model, as provided by LISREL, were 0.927 and 0.794, respectively, indicating an acceptable fit. The mean square residual was .029, which is also considered satisfactory.
Discussion

The results of the present study indicate significant performance improvements \((p < .001)\) for the groups that set personal goals, indicating the importance of personal goal setting for the noninjured subjects as well as for the injured ones. Furthermore, these results suggest the importance of goal setting in injury rehabilitation programs. In this study, under the goal-setting conditions, the injured subjects responded in the same manner as the noninjured ones. However, the control group, consisting of noninjured subjects, showed reduced performance from trial to trial because those subjects performed under the “do your best” condition. The control subjects did not see the computer screen; according to goal-setting theory (14), when subjects with general goals such as “do your best” receive specific feedback, they are encouraged to set specific goals. This happens because feedback is a way of making explicit what it means to do one’s best, and because the challenge of improvement is exciting.

Self-efficacy and self-satisfaction variables correlated with performance \((p < .001)\). The more confident and satisfied the subjects in the two experimental groups were, the higher were their personal goals, and this in turn influenced their performance. Performance under the goal-setting conditions increased significantly \((p < .001)\) not only for the noninjured subjects but also for the injured ones. Also, in both groups, self-efficacy and self-satisfaction correlated \((p < .001)\) with performance and goal setting, indicating that the more confident and satisfied subjects set higher personal goals and performed better.

The subjects who set the highest personal goals achieved the highest performance in all trials. Also, the subjects with higher levels of self-efficacy had higher levels of performance. These results are similar for the injured and noninjured subjects (see Figure 3). The variability between self-satisfaction and performance was similar for the injured and noninjured subjects as well.

At the first stage of the structural equation analysis, self-efficacy and self-satisfaction were modeled to mediate the effect of ability on personal goal setting, which in turn influenced performance 1. It was also hypothesized that performance 1 would affect subsequent self-efficacy and self-satisfaction and that they in turn would influence both personal goal setting and performance 2. However, the indexes of fit provided by LISREL were not satisfactory. The modification indexes provided by the LISREL program suggested ways to improve the model. The proposed model of the structural equation analysis indicated that personal goal setting was affected by level of ability, and in turn this directly affected performance. The findings of the present study suggest that in both conditions, goal setting was affected by previous performance. Previous researchers (11) have discussed the impact of perceptions of ability on self-regulatory factors and motor skill acquisition. The structural equation analysis in the present study indicated that ability was the strongest regulator of performance.

The data further indicated that self-efficacy was also affected by previous performance but had no effect on personal goals or performance. The weak contribution of self-efficacy to the fit of the model may have been caused by the high effects of ability. This finding is consistent with previous work (18) that applied the same model to swimming performance. Considering the role of self-satisfaction in goal setting, the results of the present study indicated that self-satisfaction and performance were not related. This finding is consistent with a previous study.
Figure 3 — Path diagram of the estimated structural model. Path coefficients greater than .25 are significant at $p < .01$. 

GOF=.972
AGOF=.794
(6) in which college students performed mathematics problems or worked on a complex game simulation. Several models were tested, and self-satisfaction added little to the prediction of performance (6). The analysis in the present study provides consistent support for the main effect of ability and personal goal setting on performance. Furthermore, these results are consistent with the findings of researchers (3, 15, 18) who found that ability is a key determinant of self-efficacy, self-satisfaction, and performance. These studies also indicated that personal goal setting is a mediator between ability and performance.

Based on the findings of the present study, as well as the work of previous researchers, personal goal setting appears to be a significant determinant of performance in injury rehabilitation programs. It seems that the specific variables play a central mediating role in the motivation of individuals who are in rehabilitation. Personal goal setting combined with strategies that increase self-efficacy may help athletes decrease recovery time.

It is well known that injuries negatively influence an athlete’s confidence. The fear of reinjury or of delayed recovery can be problematic for the athlete as well as the athletic trainer. It has been observed (10) that “fast healers” are generally less fearful or less concerned about reinjury compared to “slow healers.” It appears that the use of goal setting is helpful for injured athletes. The present study showed that injured athletes who used goal setting behaved in a manner similar to noninjured subjects. Furthermore, it appears that goal setting may be an appropriate technique to help athletes overcome their fears, increase their effort, and build their confidence.

Additional studies are needed to examine goal setting in the rehabilitation process in conjunction with relevant techniques that are suggested by researchers. Future studies should explore the paths between performance, goal setting, and self-efficacy in injury rehabilitation.

References