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Rehabilitation Following a Sports Injury: Do the Motives of Athlete and Athletic Therapist Matter?

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Abstract

***Background:** Previous studies indicate motivation is an important consideration impacting return-to-sport following injury. Little is known about the role played by athletes' perceptions of the clinician's motives for providing treatment during rehabilitation.*

***Objectives:**The aim of this study was to address the following question: Do the motives expressed by an injured athlete for entering treatment, plus an athletic therapist's motives for providing treatment, matter when rehabilitating a sports injury?*

***Methods:** Athletes (N = 97; M_{age} = 20.2±1.9 years; 55.7% female) were randomized to one of four groups which manipulated the salience of intrinsic/extrinsic motives reported by an injured athlete for entering treatment plus an athletic therapist for providing treatment. Dropout and effort put into rehabilitating the injury were measured using a questionnaire at post-test only.*

***Results:** Multivariate analysis of variance indicated statistical differences (p< .05) between the groups. Post-hoc (Bonferroni) analyses indicated less dropout and more effort were evident when the athlete and athletic therapist engaged in rehabilitating an injury for intrinsic as opposed to extrinsic reasons. Mixed support was evident for the mitigating role of an intrinsically motivated athletic therapist providing treatment to an extrinsically motivated athlete.*

***Discussion:** Overall, the results of this study reinforce the importance of understanding the motivational basis for seeking and providing treatment in sports therapy contexts, as well as, the potential role of an athletic therapist's motives in optimizing treatment processes and outcomes.*

Keywords: *Self-Determination Theory, Intrinsic/Extrinsic Motives, Return-to-Sport, Psychology of Injury, Rehabilitation Psychology, Athletic Therapy.*

Introduction

It is commonly accepted that injury is a central feature of sport. This lay view is supported by research documenting the prevalence of injury rates at various levels of recreational and competitive sport [1-3]. While the etiology of sports-related injuries is diverse, often involving complex interactions between personal dispositions (e.g., genetics, etc.) and situational factors (e.g., trauma, etc.), it is widely acknowledged that rehabilitation post-injury can aid injured athletes in returning to sport [4].

Adherence – namely the extent to which athletes follow a prescribed course of treatment post-injury [5] - is an important factor which impacts the success of rehabilitation programs for injured athletes [6-7]. Brewer [5] notes that adherence to rehabilitation programs following a sports injury can be demanding. This is hardly surprising given that most rehabilitation plans use a multifaceted approach comprised of clinical treatments (e.g., electrical muscle stimulation, etc.), behavioral modification (e.g., rest, etc.), and/or home-based interventions (e.g., cryotherapy, etc.). Further considerations such as the nature and severity of the injury, length of the rehabilitation plan, and location for treatment (e.g., clinical versus home-based settings, etc.) may all impact the degree to which injured athletes ultimately adhere to a program of rehabilitation therapy. Brewer [5] indicates that adherence to planned treatment by injured athletes is often poor with rates as low as 40 percent reported in previous studies. This 'adherence' paradox has resulted in calls to identify factors that promote (or deter) the likelihood of adherent behavior displayed by injured athletes entering rehabilitation (see Brewer [5] for details).

One factor that may play an important role in adherence during rehabilitating from a sports injury is motivation. This is hardly surprising given that motives – or the reasons that energize behavior [8] – have been linked within Self-Determination Theory (SDT) to various persistence behaviors across diverse contexts (e.g., sport, education, pharmacotherapy, etc.; see Ryan & Deci [8] for a review). Within SDT, Ryan and Deci [8] make a central distinction between controlled and autonomous motives. Controlled motives regulate behavior using external pressures (e.g., surveillance, etc.) or intrapsychic contingencies (e.g., shame, etc.). In contrast, behaviors motivated for autonomous reasons often rely on personal choice or enjoyment to regulate action [8]. Intrinsic motivation – or engaging in activity for its own sake – is the prototypical form of autonomous motivation proposed within SDT [8].

The practical merit of distinguishing controlled from autonomous motives taken within SDT is linked to the evidence favoring more beneficial patterns of behavior that stem from autonomous reasons for action [8]. Previous studies focused on rehabilitation following a sports injury largely support Ryan and Deci's [8] contentions. For example, autonomous motives predicted higher rates of adherence to physiotherapists' recommendations following knee surgery where as controlled motives predicted lower rates [9]. Collectively, these findings imply that SDT may be a useful framework to advance the study of motives in sports therapy contexts focused on rehabilitation.

Closer examination of studies that have investigated motives to adhere to a rehabilitation plan following a sports injury makes it apparent that at least two areas seem worthy of further scrutiny. First, previous studies in this area have relied extensively on non-experimental research designs [10]. Such approaches have limited internal validity given the lack of experimental manipulation and randomization to groups that characterize non-experimental research designs [11]. Second, existing studies have not examined the role afforded the injured athlete's perception of the clinician's motives for providing treatment during rehabilitation. A line of research initiated by Wild and colleagues has shown that learning behaviors [12], clinical outcomes in substance abuse therapy [13], and physical education behaviors [14] can all be influenced by the motives emitted by one person (e.g., teacher, etc.) and 'experienced' as an interpersonal cue-to-action by another person (e.g., student, etc.). To date, it remains unclear if a clinician's motives for providing treatment to an injured athlete impacts the nature and scope of adherence behaviors needed to rehabilitate a sports injury.

Grounded in SDT [8] and previous studies by Wild and colleagues [12-14], the aim of this investigation was to address the following question: Do the motives expressed by an injured athlete for entering treatment, plus an athletic therapist's motives for providing treatment, matter when rehabilitating a sports injury? To address this question, this study examined the role of motives displayed by the injured athlete combined with those expressed by an athletic therapist on dropout and effort invested into rehabilitating a sports injury. Consistent with SDT [8] and previous research [12-13], it was hypothesized that lower dropout rates plus greater effort invested to rehabilitate an injury would be evident when the athlete and the athletic therapist where intrinsically motivated. It was further hypothesized that elevated dropout and less effort to rehabilitate would be displayed when both the athlete and the athletic therapist engaged only for extrinsic reasons. Finally, consistent with Wild et al. [13], it was hypothesized

that an intrinsically motivated athletic therapist could mitigate the effects on dropout and effort displayed by an athlete entering treatment for a sports injury only for extrinsic reasons.

Materials and Methods

Participants

Ninety-seven athletes aged 17.0 to 26.0 years (*M* = 20.2±1.9 years; 55.7% female) took part in this study. Participants competed in sport for an average of 12.6±3.9 years at the following levels: (1) National team (6.5%), (2) University sport (26.1%), (3) Representative sport (44.2%), and (4) Recreational sport (24.2%). Most of the sample (70.1%) reported at least one previous injury forcing an absence from sport. Various approaches to treating sports injuries were reported by this sample (see Table 1 for details).

Table 1. *Descriptive profile of sample organized by experimental groups*

	Group 1	Group 2	Group 3	Group 4
Variables	M(±SD) or %	M(±SD) or %	M(±SD) or %	M(±SD) or %
Demographics				
Age	20.8±1.6	20.4±2.0	20.1±2.2	20.2±1.9
Male	44.0%	50.0%	39.1%	44.0%
Female	56.0%	50.0%	60.9%	56.0%
Sport History				
Years in Sport	12.3±4.3	12.4±4.7	11.9±4.4	13.7±2.4
Injury History				
Ligament Injury	26.3%	31.6%	26.7%	33.3%
Fracture	21.1%	5.3%	26.7%	20.0%
Concussion	0.0%	15.8%	6.7%	0.0%
Other	52.6%	47.4%	40.0%	40.7%
Treatment History				
Physical Therapy	42.6%	63.2%	83.3%	55.6%
Chiropractic	14.3%	26.2%	0.0%	11.1%
Massage Therapy	33.3%	5.3%	16.7%	27.8%
Surgery	4.8%	5.3%	0.0%	5.6%

Note: See the section entitled 'Experimental Stimulus' for details concerning group assignment reported in this table.

Study Design

This study used a randomized experimental (post-test only) research design [11] with non-probability sampling [15].

Data Collection

All study protocols/procedures were reviewed and cleared by a Research Ethics Board (REB) prior to any contact with study participants (REB File No. #15-008). Upon entering the lab, every aspect of this research study was explained on a case-by-case basis to each participant by the principal investigator using standardized instructions to minimize between-subjects effects based on data collection. Informed consent was secured before exposure to any experimental procedures used in this study. Participants were randomly assigned to 1 of 4 experimental conditions in which they were asked to read a script describing a hypothetical conversation between Chris (injured athlete) and Allison (athletic therapist) twice while vividly imaging as many details of the conversation as possible. After reading the assigned script, each participant was directed to a computer terminal to complete a questionnaireusing an encrypted website. Details of the questionnaire used in this study are described in the Instrumentation section. After providing data, each participant was given a chance to ask questions of the principal investigator, thanked for their involvement in this study, and given details concerning the follow-up protocol used to request and obtain a copy of the study results.

Experimental Stimulus

Four scripts were used as the independent variables across experimental conditions in this study. Each script contained a vignette portraying a hypothetical conversation between an injured athlete (Chris) and the athletic therapist (Allison) working at the clinic where Chris was undergoing rehabilitation for his/her sports injury. Each script began with a set of standardized instructions reminding participants of the study purpose then asking each participant to read a short vignette detailing the conversation between Chris and Allison. The content of each script was manipulated across experimental conditions as follows: (a) Group 1-Athlete: Intrinsically Motivated/Athletic Therapist: Intrinsically Motivated, (b) Group 2-Athlete: Extrinsically Motivated/ Athletic Therapist: Extrinsically Motivated, (c) Group 3-Athlete: Intrinsically Motivated/Athletic Therapist: Extrinsically Motivated, and (d) Group 4-Athlete: Extrinsically Motivated/ Athletic Therapist: Intrinsically Motivated. Previous sport injury research has used comparable stimuli to test intervention effects in controlled settings [4].

Instrumentation

Each participant completed a self-report questionnaire comprised of the following sections: (a) Demographics, (b) Manipulation Check, and (c) Treatment Processes/ Outcomes. The items comprising each of these sections are described in brief within the next section.

Demographics

Items assessing personal characteristics (e.g., age, etc.), history of sport participation (e.g., level of competition, etc.), and injury history (e.g., type, etc.) were queried.

Manipulation Check

Four items were used to verify the effectiveness of the experimental stimulus. The manipulation check items used in this study were as follows: (a) Athlete: Extrinsically Motivated (Item: "Chris is going to treatment because he feels pressure to…"); (b) Athlete: Intrinsically Motivated (Item: "Chris is going to treatment because he really wants to…"); (c)Athletic Therapist: Extrinsically Motivated (Item: "The therapist is treating Chris because of the money she earns…"); (d) Athletic Therapist: Intrinsically Motivated (Item: "The therapist is treating Chris because she is genuinely interested in helping…"). The items were modified fromWild et al. [13]. Each item was accompanied by a 7-point Likert scale with verbal anchors fixed to 1 = 'Strongly Disagree', 4 = 'Neutral', and 7 = 'Strongly Agree'.

Treatment Processes/Outcomes

A single item was used to measure effort and dropout which served as markers of adherence specific to treatment following a sports injury. The items used in this study were as follows: (a) Effort (Item: "Chris will probably put a lot of effort into getting better in athletic therapy…"), and (b) Dropout (Item: "Chris will probably drop out of athletic therapy before it is over…"). Each item was accompanied by a 7-point Likert scale with verbal anchors fixed to 1 = 'Strongly Disagree', 4 = 'Neutral', and 7 = 'Strongly Agree'.

Data Analyses

First, data were screened for out-of-range responses and missing values. Second, Analyses of Variance (ANOVA) were conducted on select demographic variables to evaluate the randomization protocol used in this study. Third, a Multivariate Analysis of Variance (MANOVA) was conducted using group assignment and the manipulation check items to verify the utility of the experimental stimulus. Third, a separateMANOVA was calculated to test the effects of group assignment on dropout and effort put into rehabilitation by the athlete whilst undergoing treatmentfor a sports injury.

Results

No out-of-range responses or missing data were evident on any item used for the manipulation check or to assess dropout. Missing data was evident on the item measuring effort put forth during rehabilitation following a sports injury. Joint consideration of Little's [16] test (χ^2 = 0.1, df = 1, p = 0.8) plus the overall amount of missing data on this item (1.0%) implied these data may be missing at random. An estimated value was generated then imputed to replace the missing value(s) using an expectation maximization algorithm.

Separate one-way ANOVA's provided no evidence of statistical differences across experimental conditions based on group assignment for the following variables: (a) Age ($F_{3,93}$= 0.1, p = 0.9), (b) Years in sport ($F_{3,93}$= 0.8, p = 0.5). MANOVA supported the viability of the experimental stimulus with multivariate effects attributed to groups noted onscores for the

manipulation check items (Pillai's Trace = 1.5; *df* = 12, 276; *p*< .01; partial η^2 = 0.5; See Table 2 for means and *SD*'s per experimental group). Vignettes presenting the athlete as intrinsically/extrinsically motivated to enter treatment scored higher on the corresponding manipulation check item. The same pattern was evident for the manipulation of the athletic therapist's motives for treating the injured athlete.

Table 2. *Results of manipulation check*

Item Abbreviations	Group 1	Group 2	Group 3	Group 4
Athlete: Intrinsically Motivated	6.6±0.9	2.2±1.4	6.7±0.6	1.0±0.9
Athlete: Extrinsically Motivated	2.0±1.1	5.9±0.9	2.0±1.4	5.7±1.1
Athletic Therapist: Intrinsically Motivated	6.5±0.6	4.3±1.7	3.7±1.9	6.4±1.3
Athletic Therapist: Extrinsically Motivated	1.8±0.9	4.5±1.9	4.7±1.8	1.4±0.5

Note. See the section entitled 'Experimental Stimulus' for details concerning group assignment reported in this table.

Results of the MANOVA testing the effects of group assignment on dropout and effort as dependent variables produced a significant multivariate effect (Wilks Λ = 0.5; *df* = 6, 184; *p*< .01; partial η^2 = 0.3). Table 3 displays the means and standard deviations for dependent variables across experimental groups. Univariate follow-up analyses indicated statistical differences (*p*< .05) were evident between - groups for both dropout (*F* = 4.5, *df* = 3, partial η^2 = 0.2) and effort put into rehabilitation following a sports injury (*F* = 35.7, *df* = 3, partial η^2 = 0.6). With regards to dropout, post-hoc (Bonferroni) tests indicated statistically lower scores in Group 1 compared to Group 2 (*p* = .04), as well as, Group 3 compared to Group 2 (*p* = .01). With regards to effort invested to rehabilitate a sports injury, post-hoc (Bonferroni) tests indicated statistically higher scores exhibited by Group 1 compared to Group 2 and Group 4 (both *p*'s < .01), as well as, statistically lower scores for Group 2 compared to Group 3 and Group 4 (both *p*'s < .01). No other statistical differences were evident between groups for either dependent variable.

Table 3. *Results of experimental manipulation on dropout and effort*

Dependent variables	Group 1	Group 2	Group 3	Group 4
Dropout from Treatment	2.2±1.3	3.3±1.6	2.0±1.1	2.9±1.6
Effort in Treatment	6.7±0.5	3.9±1.5	6.5±0.7	4.4±1.6

Note.See the section entitled 'Experimental Stimulus' for details concerning group assignment reported in this table.

Discussion

The purpose of this study was to determine the role played by an injured athletes' motives for entering treatment, plus the athletic therapists' motives for overseeing therapy during rehabilitation, on adherence to a treatment plan. This study used a randomized experimental (post-test only) research design plus a vignette-based manipulation to evaluate the differential effects of intrinsic/extrinsic motives displayed by an injured athlete combined with the athletic therapist overseeing rehabilitation. Grounded in SDT [8], and previous studies focused on rehabilitation [13], we evaluated the contention that intrinsic (more so than extrinsic) motives displayed by the athlete plus the athletic therapist would produce the lowest rates of dropout from treatment and the highest degree of effort invested into rehabilitation by an injured athlete. Overall, the results of this study provide ongoing support for a major tenet of SDT [8], namely that intrinsic compared to extrinsic motives yield more adaptive patterns of behavior.

Adherence during rehabilitation will partially impact success in returning to sport following injury yet this behavior is a vexing challenge for clinicians working with injured athletes [5]. Our main findings (see Table 3) corroborate previous studies [13] and SDT [8] insofar as they demonstrate that optimal adherence behaviors in a sports therapy context stem from intrinsic not extrinsically motivated action.

Lower dropout and greater effort were displayed when injured athletes and athletic therapists engaged in the rehabilitation process due to personal choice or a

genuine interest in helping people recover (both intrinsic reasons) as opposed to financial gains or a desire to alleviate external pressures (both extrinsic reasons).

It is equally apparent that the highest dropout rates plus the least effort put into rehabilitating a sports injury emerged when extrinsic reasons motivated the actions of both the injured athlete and the athletic therapist. Overall, these findings extend the work of Wild et al. [13] to a different cohort (i.e., injured athletes) operating in a unique setting (i.e., sports therapy clinics) yet reinforce a major assertion set forth by Ryan and Deci [8]within SDT – namely, that optimal persistence behaviors ensue when people engage for autonomous reasons instead of feeling compelled to act based on external contingencies or self-imposed pressures. Based on these findings, it may be prudent for clinicians working with injured athletes to evaluate the reasons for entering, as well as providing, treatment to maximize the likelihood of persistence with a rehabilitation plan.

Closer inspection of the results from this study imply that athletes who enter treatment following a sports injury as a function of personal choice alone seem less susceptible to the athletic therapist's motives for providing treatment at least in terms of adherence. This assertion is wholly aligned with Wild et al.'s [13] findings in the context of substance abuse therapy. On the contrary, athletes pressured into rehabilitating a sports injury – perhaps due to the coercive influence of a coach or the pressure of 'playing hurt' – put forth more effort when the clinician approaches the treatment plan out of genuine interest to help the athlete recover not the pursuit of financial gains alone. Stated differently, the results of this study provide evidence that the motives displayed by an athletic therapist may have implications for optimizing adherence behavior when an injured athlete is extrinsically motivated to attend a sports therapy clinic for rehabilitation. Identifying the processes that produce these effects for select markers of adherence – namely effort invested in rehabilitation but not actual dropout – remain an area ripe for additional research.

Several limitations of this study warrant consideration together with future directions to advance this line of sports injury research. First, this study relied exclusively on self-report data provided by a heterogenous sample of athletes recruited using non-probability (purposive) methods that limit external validity. Second, the use of vignette-based scripts potentially limits the ecological validity of the results. Finally, the use of a multiple groups (post-test only) design prevented evaluation of changes in dropout rates or effort put into rehabilitating an injury by athletes entering a sports therapy clinic for treatment. Future studies would do well to address these issues by using probability-based approaches to sampling [15], more advanced experimental manipulations (e.g., scenarios that make use of experimental confederates, etc.), and utilize more complex research designs (e.g., multiple-groups, prepost-test designs, etc.) that provide insight regarding dynamic changes in adherence behaviors over time [11].

Conclusion

In brief, the aim of this study was to test the role of intrinsic/extrinsic motives for seeking (by an injured athlete) and providing (by an athletic therapist) treatment on adherence behaviours during the rehabilitation of a sports injury. Using a vignette-based manipulation within a randomized experimental design, this study provides support for Ryan and Deci's [8] contention that intrinsic motives play a prominent role in sustaining optimal patterns of behavior which in this study were represented by lower dropout rates plus higher effort invested in rehabilitating a sports injury. These results do nothing to undermine the proposition that motivation – including reasons for entering and providing treatment in a sports therapy clinic – is a complex phenomenon that is perhaps best understood via SDT [8]. While this conclusion is speculative at best, our results indicate the study of motives operating during rehabilitation displayed by injured athletes and athletic therapists can play an important role and deserve further scrutiny using SDT as a guiding framework. In closing, it would seem advisable for health professionals overseeing the recuperation of injured athletes to seek information about 'why' they enter rehabilitation programs following a sport injury as a component of standard care given that intrinsically motivated athletes seem less susceptible to dropout yet likely to exert greater effort into rehabilitating a sports injury than extrinsically motivated athletes.

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