

Achievement goal profiles, and perceptions of motivational climate and physical ability in male Brazilian jiu-jitsu practitioners

Authors' Contribution:

- A** Study Design
- B** Data Collection
- C** Statistical Analysis
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Abstract

Background and Study Aim:

Brazilian jiu-jitsu (BJJ) is a martial art with high rates of attrition. At present, little is known about the achievement goals of martial arts practitioners, particularly in BJJ. Thus, our aim was knowledge about achievement goal orientations and perceptions of the motivational climate in a BJJ academy. We hypothesized that mastery-approach goals would correlate with weekly training duration, that goal orientation scores would reflect the corresponding higher-order motivational climate score, and that white belt practitioners would perceive the motivational climate as more performance-oriented than higher belt ranks.

Material and Methods:

The sample comprised 42 males aged 31.9 ± 6.2 years, with 5.4 ± 3.8 years of training experience and a weekly training duration of 7.7 ± 3.4 hours per week. The 3x2 Achievement Goal Questionnaire for Sport (3x2 AGQ-S) was used to assess achievement goal orientations. Perceptions of the motivational climate were measured with the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2). The 10-item Perceived Physical Ability (PPA) subscale of the Physical Self-Efficacy Scale was used to evaluate perceived physical ability.

Results:

Overall, the practitioners emphasized mastery-approach goals, which was congruous, but not significantly associated with higher-order motivational climate scores. Rank correlated both with goal orientations and perceived motivational climate. Additionally, weekly training duration and style preference were associated with task-approach goals.

Conclusions:

Brazilian jiu-jitsu practitioners appear to focus on mastery, making them more likely to demonstrate adaptive behaviour when facing adversity. These findings support previous observations on the compatibility of mastery goals and competitive martial arts.

Key words:

mastery • task performance and analysis • training climate

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Achievement goal – *noun* a personal goal that an athlete sets for himself or herself [36].

Achievement motivation – *noun* the drive to attain a particular personal goal [36].

Achievement sport – *noun* a sport in which the aim is to achieve some independent goal that does not purely depend on beating an opponent, e.g. archery [36].

Motivate – *verb* to make somebody feel enthusiastic, interested and committed to a goal, or to give them a reason or incentive to perform [36].

Motivation – *noun* **1.** the act of giving somebody a reason or incentive to do something **2.** a feeling of enthusiasm, interest, or commitment that makes somebody want to do something, or something that causes such a feeling **3.** the biological, emotional, cognitive, or social forces that activate and direct behaviour [36].

Brazilian jiu-jitsu (BJJ) – a grappling-based martial art with an emphasis on ground fighting. The goal is positional dominance and submission of the opponent by way of a chokehold or joint lock. Competitions are usually structured in a tournament format with time limits and point systems to declare a winner in the absence of a submission [37].

Belt – *noun* **1.** a belt awarded to a sports competitor, especially in the martial arts, as a trophy or a sign of having attained a particular grade **2.** somebody awarded a particular belt for an achievement, usually in one of the martial arts [36].

Achievement goal theory (AGT) – a popular framework for assessing motivational dynamics in performance domains such as education and sports.

Mastery – a goal orientation that emphasizes subjective competence and task-based goals.

Performance – a goal orientation that emphasizes normative competence and performance-based goals.

Performance – *noun* the level at which a player or athlete is carrying out their activity, either in relation to others or in relation to personal goals or standards [36].

INTRODUCTION

Motivational dynamics in performance domains such as academics and sports is a popular topic of inquiry. Emerging as one of the most important frameworks in these contexts is achievement goal theory (AGT). Contemporary interpretations of AGT builds on the work of Nicholls [1, 2], Ames [3, 4], Dweck [5], and Maehr [6, 7], who conceptualized the achievement goal constructs of mastery (task) and performance (ego). The dichotomy between mastery and performance was subsequently expanded upon by Elliot and Harackiewicz [8], who proposed dividing the performance goal into approach and avoidance components in a trichotomous framework. Later, the mastery goal construct was categorized similarly, resulting in the 2 x 2 achievement goal framework by Elliot and McGregor [9]. In one of the most recent theoretical perspectives, Elliot et al. [10] argued for a separation of task- and self-based goals. They further defined task, self, and other as competence evaluation standards separated by approach (positive) and avoidance (negative) in a 3 x 2 framework. This framework was eventually extended to the sport domain with aims of better understanding achievement behaviour in sports [11].

Goal orientations have been investigated as both states and as traits [12]. It is important to distinguish between state, i.e. the dominant goal during a specific task, and orientation, i.e. goal orientations towards engagement in a task, domain, or in general. While states of involvement are mutually exclusive, goal orientations are not [13]. Although the dominant goal state is subject to constant change during sport performance [14], a practitioner can approach an activity with both mastery- and performance-oriented goals [15]. Because goal orientations at the dispositional level appear to interact with situational factors to determine goal involvement state, it has been argued that achievement behaviour is better understood when the application of AGT is accompanied by an assessment of the climate surrounding the given achievement setting [13]. Despite early recognition of the impact of situational determinants on achievement behaviour [16], goal orientations and motivational climate have frequently been investigated in isolation [13].

The literature largely supports the facilitation of a mastery-oriented climate to stimulate adaptive patterns of engagement [4, 5, 12, 15, 17-19]. These patterns encourage the establishment

and accomplishment of personally challenging and valued achievement goals, while maladaptive patterns are associated with a failure to strive for and reach such goals [5]. The impact of performance goals varies. In a dichotomous understanding of achievement behaviour, performance goals have been associated with maladaptive patterns [20]. However, when distinguishing between approach and avoidance, i.e. seeking normative competence versus avoiding normative incompetence, performance-approach goals have been linked to several positive outcomes [21]. Thus, achievement settings that stimulate approach goals appear to be beneficial.

Although AGT is widely applied in research on conventional sports, less is known about achievement behaviour in martial arts. Gernigon and le Bars [22] compared goal orientations between novice and experienced competitive (judo) and non-competitive (aikido) martial arts practitioners. Similar task-orientation scores among the two groups were observed, indicating that a competitive sport context does not conflict with mastery goals. Notably, experienced aikido practitioners were less task-oriented than the corresponding judo practitioners, which the authors proposed could be partly ascribed to the lack of a competition component in aikido, and thus progressively fewer goals with increasing level of proficiency. Contrasting the compatibility between competitive martial arts and goals of mastery are the findings of King and Williams [23], who noted an agreement between traditional martial arts, with its lack of performance emphasis, and task orientation. Interestingly, while Gernigon and le Bars [22] related belt promotions to goals of mastery, King and Williams [23] suggested that promotions are linked to performance goals. Thus, in addition to fundamental sport-specific differences between martial arts branches, investigators may also disagree in the interpretation of their similarities. As such, the transferability of findings between arts might be modest, which highlights the need of more research in the field, particularly on new branches of martial arts.

Recently, a group of Brazilian jiu-jitsu (BJJ) practitioners was compared to muay thai fighters in a reliability assessment of the Task and Ego Orientation in Sport Questionnaire [24]. The latter group scored higher on ego and lower on task goals, indicating a different emphasis on performance in the two arts. Notably, comparative studies on “hard”, e.g. muay thai, versus “soft”, e.g. BJJ, have previously been proposed as an interesting direction of

research [25]. While the findings of the above study might suggest discrepancies between hard and soft martial arts in terms of motivation, the sample size was small, with 12 and 11 male practitioners in the BJJ and muay thai group, respectively.

Brazilian jiu-jitsu shares its roots with judo, with both being derived from the traditional jujutsu that originated in feudal Japan [26]. Competition, whether simulated or official, is a major part of the art. Official matches are usually decided by a submission, such as a chokehold or joint lock, or points due to positional dominance. Simulated competition – sparring, is one of the main components of BJJ training, the other being drilling of techniques [27, 28]. These training components are somewhat reflective of the original achievement goal constructs, with drilling representing mastery as the emphasis is on developing skill, and sparring being more related to normative performance. Due to the ubiquity of competitive settings in BJJ, a practitioner who has progressed in rank is essentially someone who did not let losing stop them. Indeed, losing in training has been recognized as an important part of the learning process and should be seen as something positive [29]. However, despite the prevailing acceptance that losing is an integral part of progression, the drop-out rate is considered high, particularly among the lower ranks. It could be argued that adherence in BJJ might depend considerably on certain goal dispositions, the ability to change these dispositions, and/or a training climate that promotes adaptive behaviour.

At present, knowledge regarding achievement behaviour in martial arts is scarce, with almost no data on BJJ practitioners. Considering the high dropout rates in BJJ, despite being touted as compatible with lifelong practice, describing the motivational profiles and training climate perceptions of the practitioners could be used to inform training strategies and improve adherence. Thus, our aim was knowledge about achievement goal orientations and the perceived motivational climate in a BJJ academy. Additionally, we measured perceptions of physical ability to determine whether this component of physical self-efficacy was related to goal orientations. We hypothesized that mastery-approach goals would correlate with weekly training duration, that goal orientation scores would reflect the corresponding higher-order motivational climate score, and that white belt practitioners would perceive the motivational climate as more

performance-oriented than higher belt ranks.

MATERIAL AND METHODS

Participants

Participants were recruited at the largest BJJ academy in central Norway. Inclusion criteria were > two years of consistent training or recent competitive experience and > two semesters (~one year) of consistent training. The sample consisted of 42 males aged 31.9 ± 6.2 years, with a mean training experience of 5.4 ± 3.8 years and a weekly training duration of 7.7 ± 3.4 hours per week at the time of the study. 78% had competitive experience, 29% taught BJJ classes, and 69% preferred training in the gi (see glossary). All ranks were represented. Questionnaires were distributed in an individual supervised setting. The study was registered with the Norwegian Centre for Research Data. Written informed consent was obtained from all participants prior to participation.

Measures

Achievement goal orientations. The recent 3x2 Achievement Goal Questionnaire for Sport (3x2 AGQ-S) [11] was used to assess achievement goal orientations. Participants gave their responses on a 7-point scale (1 = strongly disagree; 7 = strongly agree).

Perceived motivational climate. Perceptions of the motivational climate were measured with the Perceived Motivational Climate in Sport Questionnaire (PMCSQ-2) [30]. Statements were scored on a 5-point scale (1 = strongly disagree; 5 = strongly agree).

Perceived physical ability. The 10-item Perceived Physical Ability (PPA) subscale of the Physical Self-Efficacy Scale [31] was used to evaluate perceived physical ability on a 6-point scale (1 = strongly disagree; 6 = strongly agree).

Control variables. A separate questionnaire was used to collect data on training history and habits, competitive experience, and style preference.

Internal consistency

Cronbach's [32] coefficient alpha was calculated to assess instrument reliability. All goal orientations were found to have acceptable internal consistency

Technique – *noun* a way of performing an action [36].

Chokehold – *noun* a hold in some martial arts that restricts the opponent's breathing, causing loss of consciousness [36].

Keiko-gi – training top used in *budō* [38] popularly: **keikogi**; jargon **gi**.

($\alpha > 0.70$). Of the two higher-order scales on the PMCSQ-2, the task-involving climate showed high consistency ($\alpha = 0.80$), while the ego-involving climate was borderline acceptable ($\alpha = 0.68$). Low coefficient alphas were also observed in the subscales “punishment for mistakes” ($\alpha = 0.53$) and “intra-team member rivalry” ($\alpha = 0.17$). Poor internal consistency was also evident for the PPA ($\alpha = 0.51$).

Statistical analyses

Data were analysed with IBM SPSS version 24 (Chicago, IL, USA). Normality was assessed with the Shapiro-Wilks test and quantile-quantile plots. Pearson product-moment correlation coefficients were calculated to detect significant relationships. Differences based on competition and instructor status were assessed with independent samples t-tests. Comparisons between ranks and style preference were performed with one-way analysis of variance (ANOVA) with Fisher’s Least Significant Difference post-hoc test. Data are presented as mean \pm standard deviation (SD). A p-value < 0.05 was considered statistically significant.

RESULTS

Mean scores and correlations between goal orientations, higher-order scales of the PMCSQ-2, and PPA are presented in Table 1. PMCSQ-2 subscale scores and correlations are presented in Table 2.

Among goal orientations and the PMCSQ-2 subscales, other-approach goals had inverse correlations with important role ($r = -0.34, p < 0.05$) and punishment for mistakes ($r = -0.40, p < 0.05$), and task- and self-avoidance goals associated inversely with unequal recognition ($r = -0.34$ and $r = -0.32$, respectively, both $p < 0.05$).

Rank showed a relationship both with goal orientations and perceived motivational climate. Brown and black belts reported a mean of 2.2 ± 0.5 on self-avoidance goals, which was significantly lower than the 4.8 ± 1.3 and 5.0 ± 1.9 among white and blue belts, respectively ($p < 0.05$), and tended ($p = 0.07$) to be lower than the 4.3 ± 1.8 among purple belts. Furthermore, white belts (4.2 ± 0.5) perceived the motivational climate as more mastery oriented than blue belts (3.8 ± 0.5) ($p < 0.05$) and tended ($p = 0.06$) to perceive it as more mastery oriented than brown and black belts (3.6 ± 0.9).

Table 1. Scores and correlation coefficients between achievement goal orientations, higher-order climate scales and perceived physical ability (PPA) in Brazilian jiu-jitsu (BJJ) practitioners.

Variable	Correlation coefficients									
	range	mean SD	1	2	3	4	5	6	7	8
1. Task-approach	1÷7	5.91 ± 0.84								
2. Task-avoidance	1÷7	4.68 ± 1.37	0.55***							
3. Self-approach	1÷7	5.88 ± 1.10	0.27	0.31						
4. Self-avoidance	1÷7	4.52 ± 1.73	0.32*	0.73***	0.49*					
5. Other-approach	1÷7	3.66 ± 1.26	-0.04	0.13	-0.02	0.08				
6. Other-avoidance	1÷7	3.30 ± 1.36	0.01	0.32	0.12	0.36*	0.76***			
7. Mastery climate	1÷5	3.99 ± 0.50	0.24	0.19	0.14	0.10	-0.26	-0.10		
8. Performance climate	1÷5	1.84 ± 0.41	-0.20	-0.17	0.03	-0.13	-0.10	-0.02		
9. PPA	1÷6	40.13 ± 5.16	0.03	-0.09	0.10	-0.01	0.15	-0.06	-0.003	0.16

*p < 0.05; ***p < 0.001

Table 2. Perceptions of the motivational climate in a Brazilian jiu-jitsu (BJJ) academy.

Variable	Correlation coefficients						
	range	mean SD	1	2	3	4	5
Master climate							
1. Cooperative learning	1÷5	4.13 ± 0.66					
2. Important role	1÷5	3.86 ± 0.60	0.55**				
3. Effort / improvement	1÷5	3.94 ± 0.52	0.58**	0.60**			
Performance climate							
4. Punishment for mistakes	1÷5	1.50 ± 0.44	-0.21	0.08	0.05		
5. Unequal recognition	1÷5	1.73 ± 0.52	-0.26	-0.21	-0.30	0.27	
6. Intra-team member rivalry	1÷5	2.29 ± 0.60	0.16	0.26	0.18	0.54**	0.43*

* p<0.05; ** p<0.01

Competitors and non-competitors did not differ in goal orientations or perceived motivational climate ($p>0.05$). The same was true for practitioners with previous martial arts experience compared to those with no experience prior to BJJ ($p>0.05$). Instructors scored 3.7 ± 1.9 on self-avoidance goals, which was significantly lower than the 4.9 ± 1.5 among non-instructors ($p>0.05$). Moreover, the instructor group had longer BJJ training experience (8.0 ± 5.0 vs. 4.5 ± 2.6 , $p<0.05$) and greater competitive experience (15 ± 14 vs. 3 ± 4 tournaments attended, $p<0.05$). Except for an inverse correlation with cooperative learning ($r = -0.31$, $p<0.05$), no correlations were observed between competitive experience and goal orientations or perceived motivational climate ($p>0.05$).

Weekly BJJ training duration correlated with task-approach goals ($r = 0.37$, $p<0.05$). Furthermore, those who preferred training in the gi scored significantly higher on task-approach goals than those who preferred no gi (6.2 ± 0.7 vs. 5.5 ± 0.7 , $p<0.05$). Neither group differed from those who reported no style preference ($p>0.05$). Non-ranked practitioners (43.75 ± 5.00) had the highest PPA, but significance was only reached compared to purple belts (PPA: 37.25 ± 6.78 , $p<0.05$). Other than that, PPA appeared to be independent of all psychological and descriptive variables.

DISCUSSION

The main findings of the present study were that the BJJ practitioners appeared to emphasize mastery-approach goals, which was congruous, but not significantly associated with overall perceptions of the motivational climate; that rank was associated with both goal orientations and climate perceptions; and that weekly training duration and style preference was linked to task-approach goals. Neither the higher-order motivational climate scales nor perceptions of physical ability had any apparent relationship with goal orientations. To the best of our knowledge, this is the first study that assesses achievement goals and their relationship with perceptions of the motivational climate and physical ability in a martial arts population. These findings provide novel insights into the achievement motivation and training climate in competitive martial arts.

The participants reported to engage in as much, or more, sparring as technical drilling in their training. Situational structures during sparring might ostensibly favour performance goals, as the practitioner is acting against a resisting opponent whose goal is to dominate and essentially do harm. Generally, skill and progress in BJJ is measured inter-individually by instructors and practitioners. Thus, facilitating mastery goals might seem challenging. It could be argued that the incentives to perform well in relation to others are different than in more conventional individual sports, where the practitioners typically are in a

non-combative setting and often isolated, at least physically, from their opponents. In BJJ, mastery-oriented goals, such as trying to apply a specific technique during sparring, or performance-oriented goals, such as trying to submit the opponent, are accompanied by the goal of avoiding being submitted. In this sense, BJJ implicitly creates an environment where the practitioner constantly has to focus on avoiding failure. At a basic level of technical proficiency, BJJ can be practiced at a very high intensity with little risk of injury [27]. This represents an important distinction between grappling-based and striking-based martial arts, where training and competing in the latter involves a considerable risk of chronic neurological damage [33]. Findings from simulated judo combat, which can be assumed to have similar characteristics to that of BJJ sparring, reveal the dynamic nature of goal involvement state in a competitive martial art setting [14]. These observed frequent and abrupt changes in the dominant goal focus and its relationship with other involvement states also shed light on the differences between achievement goals at the dispositional versus the situational level.

Despite the competitive context, the achievement goal profiles observed in the present study supports the findings of Gernigon and le Bars [22], who noted the compatibility of task orientation and competitive martial arts. Indeed, neither offensive nor defensive techniques are intrinsically related to any achievement goal. A mastery-oriented practitioner might frame getting submitted as feedback to work more on his defence. In fact, it is not uncommon in BJJ training for higher belts to occasionally relinquish dominant positions against lower belts to work on their defence, thus adopting defensive self-approach goals. Conversely, this might not be as common of a strategy in practitioners with avoidance goals. Furthermore, some practitioners might reduce their use of force when going against smaller and/or lower ranked opponents to focus on skill development, while others will hunt a submission with the same intensity no matter the level of opposition. As such, the application of both offensive and defensive techniques and strategies likely depends on individual dispositions. Practitioners with a mastery approach have better strategies when responding to failure, which may lead them to engage differently in training compared to performance-oriented practitioners. Accordingly, descriptions of achievement goals, combined with perceptions

of the training climate, might predict training approach, e.g. the likelihood of applying certain training strategies, such as increasing the exposure to the possibility of a loss to improve defensive techniques.

In martial arts, rank is generally assumed to be an indicator of skill. In the present study, practitioners with brown and black belts scored lower on self-avoidance goals than the other belt ranks, implying that they were the least afraid of self-referenced failure. Since they represented the most advanced practitioners in the study population, this was unsurprising. Their level of proficiency, assuming a close link between rank and skill, makes them less susceptible to failure compared to lower belt ranks, if failure is defined as poorly executing a technique or getting defeated in sparring.

Contrasting the low self-avoidance score of brown and black belts were the blue belt practitioners, who had the highest self-avoidance score. The blue belt represents the first belt promotion in BJJ and reflects a general, yet basic understanding of the sport. A blue belt is still a relative novice, but as opposed to a white belt, a novice with some expectations attached to the rank. This could lead to maladaptive patterns, such as performance-avoidance. Since our study excluded the most inexperienced practitioners, it can be assumed that the white and blue belts were fairly close in terms of skill and experience. Interestingly, and contrary to our hypothesis, the white belts perceived the training climate as significantly more mastery oriented than the blue belts. This could be due to the notion that, despite a similar level of proficiency, white belt practitioners do not have any added pressure of a coloured belt as opposed to blue belt practitioners, who might feel that they should be better than all white belts when that is not always the case. As a practitioner reaches a certain level of proficiency and maturity, relative changes in the environment occurs accordingly, e.g. the practitioner's placement in the rank hierarchy is improved, which in turn can affect goal orientations. For instance, skill improvement might reduce avoidance and increase approach goals in some, as the practitioners gain confidence in sparring. Conversely, improved rank could lead to an increased fear of losing, for instance in situations where the practitioner is unsure if he is able to defend his rank. This observation identifies a potentially interesting research question

with regards to the link between rank and goal orientations in the context of adherence.

The fact that all approach goals correlated with the related avoidance goal illustrates the orthogonality of achievement goals, as each goal represents different and sometimes conflicting aspects of motivational predispositions. Task- and self-avoidance goals have been shown to arise from both approach and avoidance temperaments [10], which may explain the apparent relationship between the two. Elliot et al. [10] emphasized the importance of preventing other-avoidance goals, i.e. avoiding doing worse than others, as appears to be a negative predictor of performance. In the present study, other-avoidance goals scored the lowest of all goals. The sheer number of times a BJJ practitioner is forced to “lose” (i.e. tap to a submission hold), often from the very first day of training, might be an important reason for the low other-avoidance score. Indeed, a BJJ practitioner must learn how to continually accept defeat, which can have implications for motivation, as failure is considered an integral part of the learning process [29].

As opposed to White and Duda [34], who found that competition level was associated with performance-orientation, no apparent relationship between goal orientations and competitive experience were apparent in these BJJ practitioners. Being accustomed to negative match outcomes in training might have influenced this result. While it could be argued that losing is a part of all sports and not unique to BJJ, there are some important distinctions to make between losing in BJJ and in other non-combat (and most combat) sports. In BJJ, losing has potentially serious physical consequences. It means that you are in a position where, if you do not give up, you will get hurt. Thus, winning can in a sense be equated to avoiding getting hurt and to a form of situational survival. A practitioner must always be ready to signal to his opponent “you got me, I give up”, via a physical or verbal tap. Admitting defeat audibly and, for many, often, is a fundamental aspect of BJJ training. Desensitization as a result of constant exposure to positive and negative combat outcomes could be an important contributor to the lack of discrepancy in achievement motivation between competitors and non-competitors. There is often a push towards competing in BJJ, if for nothing else than to learn, which was the case for the academy used for participant recruitment in our study. Additionally, their facilities

host two local tournaments every year, which might inspire practitioners who would never otherwise compete to attend at least one tournament. This should be considered when comparing binary competitor status outcomes, as the most frequent competitors might have a different approach than none- and occasional competitors.

A single, but interesting difference in goal orientation was detected between instructors and non-instructors, with the latter group scoring significantly higher on self-avoidance goals. Although there was no age difference between instructors and non-instructors, the former group had approximately twice as much BJJ training experience and five times the competitive experience. Thus, it is difficult to determine whether self-avoidance is indicative of adherence, the willingness to become an instructor, or both. Training experience in general had no apparent relationship with any achievement goal. Interestingly, while Duda [35] observed a relationship between mastery goals and the duration of sport participation, Gernigon and le Bars [22] found the opposite in aikido practitioners, who appeared to become less mastery-oriented with increasing experience level.

The hypothesized relationship between goal orientations and high-order motivational climate scales was not observed, despite some associations between subscales. This may be due to the sample size, which was restricted to the number of active and available practitioners at the academy. In addition to the sample size, other limitations include low internal consistency on some of the questionnaire scales. This could suggest that some of the items in the questionnaires are not appropriate in a BJJ context, in part because it is ultimately an individual sport. Additionally, the study design does not allow us to infer cause and effect, thus, whether BJJ produces or selects for mastery goals remains to be elucidated.

CONCLUSIONS

Brazilian jiu-jitsu practitioners are regularly exposed to competitive scenarios in training, which may have implications for how they evaluate their own progress and organize their goals. The present findings indicate that these practitioners focus on mastery-related achievement goals, making them more likely to demonstrate adaptive behaviour when facing adversity. These

findings support previous observations regarding the compatibility of mastery goals and competitive martial arts.

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REFERENCES

- Nicholls JG. Quality and equality in intellectual development: The role of motivation in education. *Am Psychol* 1979; 34(11): 1071-1084
- Nicholls JG. Achievement Motivation: Conceptions of Ability, Subjective Experience, Task Choice, and Performance. *Psychol Rev* 1984; 91(3): 328-346
- Ames C. Competitive, cooperative, and individualistic goal structures: A cognitive-motivational analysis. In: Ames C, Ames R, editors. *Research on motivation in education*. New York, NY: Academic Press; 1984: 177-207
- Ames C. Classrooms: Goals, Structures, and Student Motivation. *J Educ Psychol* 1992; 84(3): 261-271
- Dweck CS. Motivational processes affecting learning. *Am Psychol* 1986; 41(10): 1040-1048
- Maehr ML, Nicholls JG. Culture and achievement motivation: A second look. In: Warren N, editor. *Studies in cross-cultural psychology*. New York, NY: Academic Press; 1980: 221-267
- Maehr ML. Meaning and motivation: Toward a theory of personal investment. In: Ames C, Ames R, editors. *Research on motivation in education*. New York, NY: Academic Press; 1984: 115-144
- Elliot AJ, Harackiewicz JM. Approach and Avoidance Achievement Goals and Intrinsic Motivation: A Mediation Analysis. *J Pers Soc Psychol* 1996; 70(3): 461-475
- Elliot AJ, McGregor HA. A 2 X 2 achievement goal framework. *J Pers Soc Psychol* 2001; 80(3): 501-519
- Elliot AJ, Murayama K, Pekrun R. A 3 X 2 Achievement Goal Model. *J Educ Psychol* 2011; 103(3): 632-648
- Mascret N, Elliot AJ, Cury F. Extending the 3 x 2 achievement goal model to the sport domain: The 3 x 2 Achievement Goal Questionnaire for Sport. *Psychol Sport Exerc* 2015; 17: 7-14
- Kaplan A, Maehr ML. The Contributions and Prospects of Goal Orientation Theory. *Educ Psychol Rev* 2007; 19(2): 141-184
- Roberts GC. Motivation in Sport and Exercise From an Achievement Goal Theory Perspective: After 30 Years, Where Are We? In: Roberts GC, Treasure DC, editors. *Advances in Motivation in Sport and Exercise*. Champaign, IL: Human Kinetics; 2012: 5-58
- Gernigon C, d'Ampe-Longueville F, Delignieres D et al. A Dynamical Systems Perspective on Goal Involvement States in Sport. *J Sport Exerc Psychol* 2004; 26(4): 572-596
- Pensgaard AM, Roberts GC. The relationship between motivational climate, perceived ability and sources of distress among elite athletes. *J Sports Sci* 2000; 18(3): 191-200
- Ames C. Achievement attributions and self-instructions under competitive and individualistic goal structures. *J Educ Psychol* 1984; 76(3): 478-487
- Ames C, Archer J. Achievement Goals in the Classroom: Students' Learning Strategies and Motivation Processes. *J Educ Psychol* 1988; 80(3): 260-267
- Utman CH. Performance Effects of Motivational State: A Meta-Analysis. *Pers Soc Psychol Rev* 1997; 1(2): 170-182
- Ntoumanis N, Biddle SJ. A review of motivational climate in physical activity. *J Sports Sci* 1999; 17(8): 643-665
- Dweck CS, Leggett EL. A Social-Cognitive Approach to Motivation and Personality. *Psychol Rev* 1988; 95(2): 256-273
- Elliot AJ. Approach and Avoidance Motivation and Achievement Goals. *Educ Psychol-US* 1999; 34(3): 169-189
- Gernigon C, le Bars H. Achievement goals in aikido and judo: A comparative study among beginner and experienced practitioners. *J Appl Sport Psychol* 2000; 12(2): 168-179
- King LA, Williams TA. Goal orientation and performance in martial arts. *J Sport Behav* 1997; 20(4): 397
- Albuquerque I, Diniz DV, França Ed et al. VB. Reliability of Teosq in Brazilian Jiu-Jitsu and Muay-Thai Fighters: A Pilot Study. *Int J Phys Educ Sport Health* 2015; 1(6): 12-15
- Vertonghen J, Theeboom M. The Social-Psychological Outcomes of Martial Arts Practise Among Youth: A Review. *J Sport Sci Med* 2010; 9(4): 528-537
- Ovretveit K. Anthropometric and Physiological Characteristics of Brazilian Jiu- Jitsu Athletes. *J Strength Cond Res* 2018; 32(4): 997-1004
- Ovretveit K. Acute physiological and perceptual responses to Brazilian jiu-jitsu sparring: the role of maximal oxygen uptake. *Int J Perform Anal Sport* 2018; 18(3): 481-494
- Ovretveit K, Toien T. Maximal Strength Training Improves Strength Performance in Grapplers. *J Strength Cond Res* 2018; 32(12):3326-3332
- Ribeiro S, Howell K. *Jiu-Jitsu University*. Las Vegas, NV: Victory Belt Publishing; 2008
- Newton M, Duda JL, Yin Z. Examination of the psychometric properties of the perceived motivational climate in sport questionnaire-2 in a sample of female athletes. *J Sports Sci* 2000; 18(4): 275-290
- Ryckman RM, Robbins MA, Thornton B et al. Development and validation of a physical self-efficacy scale. *J Pers Soc Psychol* 1982; 42(5): 891-900
- Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951; 16(3): 297-334
- McKee AC, Cantu RC, Nowinski CJ et al. Chronic Traumatic Encephalopathy in Athletes: Progressive Tauopathy following Repetitive Head Injury. *J Neuropath Exp Neur* 2009; 68(7): 709-735
- White SA, Duda JL. The relationship of gender, level of sport involvement, and participation motivation to task and ego orientation. *Int J Sport Psychol* 1994; 25(1): 4-18
- Duda JL. The relationship between goal perspectives, persistence and behavioural intensity among male and female recreational sport participants. *Leisure Sci* 1988; 10(2): 95-106
- Dictionary of Sport and Exercise Science. Over 5,000 Terms Clearly Defined. London: A & B Black; 2006
- Gracie R, Danaher J. *Mastering Jujitsu*. Champaign, IL: Human Kinetics; 2003
- Budō: The Martial Ways of Japan. Tokyo: Nippon Budokan Foundation; 2009

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