

# Grit and Children's Taekwondo Performance

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## Abstract

The present research examined psychological grit and sports-related performance outcomes with  $n = 102$  taekwondo students and their parents. The focus of the study was to evaluate how psychological grit relates to taekwondo students' practice and assessment (i.e., testing and competition) outcomes. The results of the study were predominantly supportive of the hypotheses. "Instructor-rated" grit was significantly related to students' testing performance, tournament attendance, and attrition while "parent-rated" grit was only significantly related to students' testing performance. Possible reasons for the differences between the sources are discussed, such as the possibility that the two rater sources may have utilized different observational opportunities. Implications of the findings on the significance of grit are discussed including the creation of adaptive instructional techniques and curriculum in response to students' level of grit.

**Keywords:** Grit, Taekwondo, Motivation, Persistence, Goal-setting

## I. Introduction

Presently, there is a paucity of research establishing whether personal "grit," as a motivational construct, is related to martial arts performance (Bell, [2008](#)). Martial arts should increase grit because it meets the criteria for grit development as discussed by Duckworth ([2016](#)). Martial arts is an arena for the characteristics that Duckworth ([2016](#)) describes as important for the development of talent (i.e., interest, practice, purpose and hope) with youth.

Children's martial arts training provides a perfect laboratory for studying the early development of grit. First, martial arts schools are ubiquitous, with many schools of different styles and approaches locally available. Although many adults take martial arts classes, these schools are commonly populated with children. Schools frequently market to parents, stressing the benefits of a martial arts education for their child. In fact, many parents express reasons for enrolling their child that are beyond simply learning self-defense techniques. From a parent's

perspective, the benefits of martial arts instruction may also include improved social, emotional, self-esteem and self-regulation outcomes. Parents may anticipate, and be attracted to the outcome, that their child's participation in such training will enhance personal grit.

It is obvious that some children find their passion in martial arts (Law, [2004](#)). Martial arts provide numerous opportunities for "deliberate practice" to improve their executive functioning (Diamond, [2012](#)). Additionally, martial arts training usually involves a highly structured and detailed motivational system, with highly visible goals that are used to motivate students (Theeboom, De Knop, & Weiss, [1995](#)). Rank is earned through overcoming challenges, and success can be gained through competition. Finally, martial arts training is a relatively long-term commitment. A black-belt can take years to achieve, and many children either fail or give up.

Given the role of the martial arts school, it is probably not surprising that martial arts instructors may see themselves as making kids grittier. From the first day of training they are cultivating a passion for the martial arts, motivating children to practice, set goals and achieve). However, this has yet to be established in the research literature. This would suggest that a student's grit scores improve as they train in the martial arts. However, a first step would be examining whether grit is related to martial arts performance. Since a martial arts school provides an arena with many of the characteristics important for the development of grit it is expected that it should impact the "grittiness" of children.

The more supportive a children's early development, the better the child can develop positive feelings of personal competency and "agency" within their social world (Kinniburgh, Blaustein, Spinazzola & Van der Kolk, [2017](#)). For example, positive early development and children's development of effective self-regulatory strategies has been found to underlie a child's readiness for school and academic success (Blair & Raver, [2015](#); McCarthy, [2017](#)). Further, recent research on children and adaptability has examined the linkage between early developmental factors (e.g., parenting style) and children's level of resilience or psychological grit (Weir, [2017](#)). Among other outcomes, grit has been associated with how much effort someone applies to the accomplishment of a physically-exerting task (e.g., Giles-Corti & Donovan, [2002](#); Silvia, Eddington, Beaty, Nusbaum, & Kwapil, [2013](#)), and this meaningfully suggests a possible motivating factor to examine with children's martial arts training. The present study evaluated how 102 young taekwondo school students' psychological grit scores, as well as those by their parents, was associated with taekwondo students' practice and assessment (e.g., testing) outcomes.

The psychological construct of grit has been described as a combination of both perseverance of effort and consistency of interest related to pursuing one's desired performance goals (Duckworth, [2016](#); Kaplan & Koval, [2015](#); Suzuk, Tamesue, Asahi, & Ishikawa, [2015](#)). The grit construct has been shown to be related to performance and attrition in contexts that require prolonged and sustained effort to achieve desired goals despite obstacles and setbacks. (e.g., military training: de Beer & van Heerden, [2017](#); Duckworth, Peterson, Matthews, & Kelly, [2007](#); Maddi, Matthews, Kelly, Villarreal, & White, [2012](#)). The understanding of how psychological grit, among other motivational factors, relates to individuals' coping within different social and performance contexts can guide the design of mental health and/or educational environments for individuals across a life span (Frydenberg, [2017](#)).

One performance context where psychological grit may be a useful construct to examine is in the martial arts. The martial arts require a long-term commitment to a goal (i.e., black-belt attainment) that requires overcoming many hurdles to achieve. Most martial arts require frequent testing to acquire various color belt ranks before earning a black-belt. In addition, there are many opportunities to pursue other goals such as competition titles and teaching certifications. It is also an area where many students start, but only a much smaller subset achieve the rank of black-belt. Additionally, even among students that do achieve a black-belt, there still may be considerable variability in performance. It is expected that grit could be a central construct in explaining performance and attrition in the martial arts.

Studying grit in children may also illuminate the development of the construct (Perkins-Gough, [2013](#)). Duckworth ([2016](#)) has suggested that exposing children to challenges is key to the development of grit. Martial arts are a discipline that provides such challenges and, therefore, could be helpful in making children more “gritty.” One of the major challenges relates to martial arts instruction is the retention of students (i.e., avoidance of high attrition) which can be quite high, especially in the critical early stages of training (Donohue, [2005](#)). The present study is assessing attrition behavior as it relates to student's grit. Establishing a relationship between grit and performance in the martial arts would be the first step in confirming this hypothesis.

### ***1. Psychological Grit***

Psychological grit has been more recently applied to understanding its impact on students' motivation and performance in different assessment contexts (school, sports). Psychological grit has been found to be a relatively good predictor of students' feelings of academic self-esteem, self-regulated learning behaviors, and predicted course performance (e.g., Weisskirch, [2016](#); Wolters & Hussain, [2015](#)), as well as both academic and work-related performance outcomes (e.g., Suzuk, et al., [2015](#)). For example, college students' grit scores have been found to predict their corresponding college grade point averages, adaptation to college life, intent to persist, satisfaction with college life, and general feelings of “belongingness” (Bowman, Hill, Denson, & Bronkema, [2015](#)). One recent study reported that feelings of personal harmony and perceived well-being were more strongly associated with the grit scores among male participants across both student and non-student samples (Vainio & Daukantaite, [2015](#)).

### ***2. Benefits of Martial Arts Participation***

Martial arts for children, among other activities, has been shown to produce benefits in feelings of physical development, balance self-control, self-discipline, creativity, and behavioral flexibility (Diamond & Lee, [2011](#); Fong, Fu, & Ng, [2012](#)). For example, Lakes and Hoyt ([2004](#)) investigated the effects of a three-month intervention using Taekwondo school-based training on students' self-regulatory abilities. Two hundred and seven students ranging from kindergarten through fifth grade were either randomly assigned to a martial arts training intervention or a standard physical education class. Students assigned to the Taekwondo intervention were trained in self-regulation techniques across physical, emotional (affective), and cognitive performance domains. An assessment of training outcomes indicated

that the students trained in the martial arts classes showed significant improvements in mathematical test performance, conduct behavior, emotional and cognitive self-regulation, and prosocial behavior.

Other studies have suggested that there are significant associations between the years of a person's taekwondo training and his/her level of self-esteem related to perceived abilities and positive psychosocial adjustment reactions (Richman & Rehberg, 1986; Theeboom, De Knop, & Vertonghen, 2009). Psychological grit has been involved with athlete's goal-related planning during and after a task has been completed, even for recovery after a sports match (Cook, 2015; Mayol, Ransford, Colliver, Dobersek, Lee, & Beekley, 2016).

Grit is an important motivational construct to investigate in the practice of martial arts (Bell, 2008). Instructional techniques and curriculum can involve processes encouraging students to become grittier within a martial arts performance context, which may generalize to their motivational behavior in other performance contexts (e.g., educational attainments).

The present research examined the association between taekwondo students' psychological grit scores and their martial arts performance. Specifically, "grittier" students are expected to perform better at testings, attain a higher rank, attend more tournaments and continue training at the school.

H<sub>1</sub>: Students with higher parent- and instructor-rated grit will have higher test scores.

H<sub>2</sub>: Students who attend tournaments will have higher parent- and instructor-rated grit scores.

H<sub>3</sub>: Students with higher grit scores will be less likely to leave the school (i.e., attrition).

## II. Method

### 1. Participants

Participants in the study consisted of students who attended a small taekwondo school in the Midwest region of the United States. Data were also collected from the parents of these students. Students were of any level (white belt through 3rd degree black-belt) and ranged in age from 6-17 ( $M = 9.72$ ,  $SD = 2.75$ ). A total of 102 students were rated by either their parents, instructors, or both. With respect to one characteristic, gender, this sample was representative of the population of students in the national organization. The proportion of males to females in the sample was not significantly different from the population,  $\chi^2(1) = 2.33$ ,  $p < .05$ .

### 2. Measurement

#### 1) Grit

Grit is typically measured using a 12-item self-report scale (Duckworth, 2016). In this study, parent-rated grit was used instead of self-report grit. The self-report scale was viewed by the authors as problematic for children, especially young children. Therefore, the 12 items were adapted so the parents would be able to rate the grit of their children. The grit items are rated on the same five-point Likert-type scale, with the overall grit score consisting of the average of these items. If more than one parent rated the child, their ratings were averaged to

obtain a single grit score.

A grit score was also collected from the instructors. All the instructors used in this study were level three certified instructors from the American Taekwondo Association (ATA). The instructors were given a list of all the students in the study and asked to rate any that they had in three or more classes. Instructor grit was measured with a single five-point Likert-type item.

## *2) Martial arts performance*

Performance was measured using scores from two rank testings near the time of the initial grit measurement. Students were rated by three instructors at each testing on their performance of their forms, sparring, self-defenses, weapons and board breaks. Students could achieve a maximum of 10 points total across these areas (i.e., five points for forms and five points total for the others). A total score was derived by averaging across raters and across testings.

Additionally, tournament attendance was measured during the first half of the 2016-2017 tournament season. During this period, there were two school tournaments, three regional tournaments and two national tournaments. Students who went to any single tournament get credit for tournament attendance. Finally, attrition was measured six months after the initial data collection.

## **3. Procedure**

Students and parents were asked to participate in the study. After signing an informed consent form, at least one parent was asked to complete the grit measure, along with several other measures and surveys for each of their children enrolled in the youth program at the school. The child was also given the self-report version of the grit scale and told to complete the items as best he/she could. If the child did not understand an item, he/she was told to skip the item. In addition to the adult version of the scale, the child was also given reworded items of the scale mixed in designed to have a lower reading level. Although the intention of this study was to use the parent-rated grit, these extra measures will be explored to determine their usefulness in a future study.

## **4. Analyses**

Analyses of the hypotheses, as well as any post-hoc data analyses, were conducted using the IBM Statistical Package for the Social Sciences (SPSS) 24.0 program software.

## **III. Results**

Hypothesis 1 was evaluated by correlating the grit scores with the testing scores. As shown in Table 1, hypothesis one was supported for both parent- and instructor-rated grit scores. Students with higher scores for testings tended to have higher grit ratings from instructors ( $r = +.424$ ,  $n = 80$ ,  $p = .000$ ) and parents ( $r = +.282$ ,  $n = 61$ ,  $p = .027$ ). Further analyses were conducted since some students chose not to attend tests during the data collection period. Students who attended at least one of the two testings were compared with students who did

not attend either. For instructor-rated grit, the mean score of test-takers ( $M = 3.72, SD = .96, n = 80$ ) was higher than non-test-takers ( $M = 3.14, SD = .71, n = 22$ ), and this difference was significant ( $t(28) = -2.608, p = .015, d = .73$ ). For parent-rated grit, the mean score of test-takers ( $M = 3.66, SD = .50, n = 61$ ) and non-test-takers ( $M = 3.31, SD = .49, n = 9$ ) was not significantly different ( $t(68) = -1.955, p = .055, d = .63$ ). The impact of attendance at testing sessions was supported for instructor-rated grit only.

Table 1. Means and correlations of instructor-rated grit, parent-rated grit and test scores

SCORE	Mean (SD)	Parent-rated grit (PRG)	Instructor-rated grit (IRG)
PRG ( $n = 70$ )	3.62 (.51)		
IRG ( $n = 102$ )	3.59 (.80)	$r = .251^*, p = .045, n = 64$	
Test score ( $n = 84$ )	8.63 (.75)	$r = .282^*, p = .027, n = 61$	$r = .424^*, p = .000, n = 80$

\* $p < .05$

Hypothesis two was tested by comparing the parent and instructor-rated grit scores for students who attended at least one tournament with those that did not attend any tournaments. For parent-rated grit scores, the mean grit of students who attended tournaments ( $M = 3.62, SD = .57, n = 42$ ) and those who did not attend ( $M = 3.60, SD = .42, n = 28$ ) were not significantly different ( $t(68) = -.168, p = .867, d = .04$ ). The difference was significant ( $t(99) = -2.777, p = .007, d = .53$ ), when attendees ( $M = 3.84, SD = .65, n = 42$ ) were compared with non-attendees ( $M = 3.42, SD = .86, n = 60$ ) on instructor-rated grit. As shown in Figure 1, hypothesis two was supported for “instructor-rated” grit only.

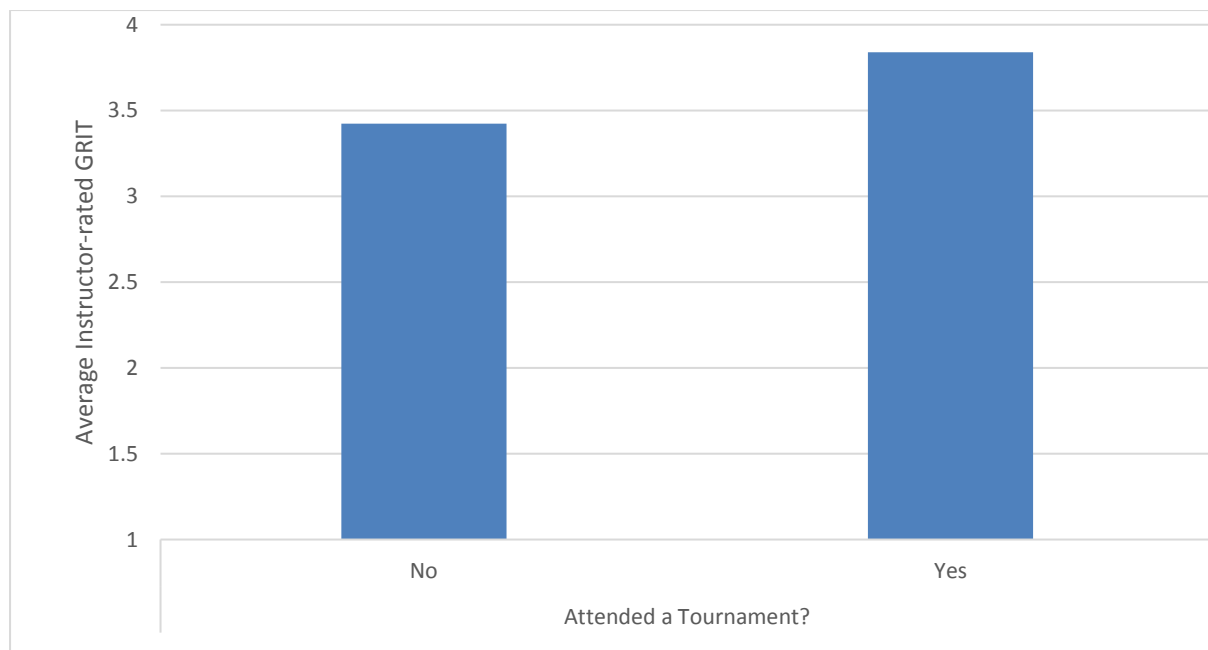


Figure 1. Mean instructor-rated grit by tournament attendance

Hypothesis three was partially supported as well. For parent-rated grit scores, the mean grit of students who were still attending six months after the initial measurement ( $M = 3.63$ ,  $SD = .53$ ,  $n = 63$ ) and those who left the school ( $M = 3.47$ ,  $SD = .27$ ,  $n = 7$ ) were not significantly different ( $t(68) = -.801$ ,  $p = .426$ ,  $d = .31$ ). The difference was significant ( $t(29) = -2.673$ ,  $p = .012$ ,  $d = .73$ ), when students still attending ( $M = 3.74$ ,  $SD = .69$ ,  $n = 78$ ) were compared with students who left ( $M = 3.16$ ,  $SD = .97$ ,  $n = 23$ ) on instructor-rated grit. Given the smaller number of students who were rated by parents, this result may be related to parents' willingness to complete the grit scale.

## IV. Discussion

Psychological grit has been found to be a relatively good predictor of middle school students' feelings of academic self-esteem, self-regulated learning behaviors, and predicted course performance (e.g., Weisskirch, [2016](#); Wolters & Hussain, [2015](#)), as well as both academic and work-related performance outcomes (e.g., Suzuk, et al., [2015](#)). The present research assessed grit and performance indices among 102 taekwondo students to gain a better understanding of how the individual-difference factor of "grit" related to their performance in the school and associated competitions. Results were largely supportive of the hypotheses. Instructor-rated grit was related to the full set of criterion variables studied (i.e., testing performance, tournament attendance, and attrition), and parent-rated grit was associated with test performance.

Across all three hypotheses instructor-related grit ratings of students was more reliable in differentiating students' taekwondo performance outcomes in comparison to parents' grit ratings of their children. In the analysis of the first hypothesis, both parent- and instructor-rated grit were both significant in meaningfully predicting the test scores of students. For the second hypothesis, results suggested that parent-rated grit scores were not able to distinguish between students who attended tournaments and those who did not attend while instructor-rated grit scores were a good predictive factor of this same performance issue. Finally, regarding the third hypothesis, the mean grit of students who were still attending six months after the initial measurement and those who left the school were significantly different based on the results of the instructor-rated grit scores but was not for parent-rated grit scores. One issue with may involve the nature of the criterion variables. Both tournament attendance and attrition may involve decisions that are unrelated to the grit of the student. That is, a student may not attend tournaments because of a financial decision made by the parents, and not because he/she does not wish to do so.

The relative predictive strength of the instructor-rated grit scores of the taekwondo students may be best explained by the nature of the observational sampling opportunities and how efficacious the instructors may have felt during the grit rating process in comparison to the other rating group (parents) (Villanova, Bernardin, Dahmus, & Sims, [1993](#)). Further, the instructors, like managerial raters in a performance appraisal situation, may have a more specific and detailed rating schema about "taekwondo performance" while the parents may be utilizing a broader schema of the children's grit across several different social and performance

contexts (e.g., academics) which reflects past research on the predictive power of task-specific assessments in measuring other socio-motivational constructs (Wang & Richarde, [1988](#)).

Further, when discussing attrition, it is important to note the rank at which the student left (Donohue, [2005](#)). In practice, attrition becomes a larger burden for the Instruction staff after a student attains the level of black belt but more research needs to focus on this student motivational issue. An interesting curriculum presented in a dynamic manner is key. Perhaps a new benchmark “standard” should be discussed for black belt students that is different from the color belt students in follow-up research on this topic.

Parent-rated grit, however, was only significantly related to students’ testing performance. There is no research to date which makes this same finding, and this preliminary finding should be explored in future research. It is likely that instructor-rated and parent-rated grit are two different (but related) constructs. Parents rated the grit of their child based upon their observations across multiple contexts (school, home, and other family-related contexts). In contrast, instructors rated the grit of a student using a single-item scale based on observations in a single context (i.e., the martial arts school). Therefore, it may be that instructors are rating grit as specific (“singular-context”) to martial arts, while the parents are rating the children based upon a more generalized (“multi-context”) concept of grit. The instructor’s mentoring relationship with the student involves a mastery-oriented focus which would influence the focus breadth and purpose of the evaluation-feedback context within the martial arts instruction (King & Williams, 1997). Conversely, the parental relationship with the student, and associated socio-contextual factors, goes beyond the martial arts classroom and involves observations across various task-specific contexts (Hewitt, Silberg, Neale, Eaves, & Erickson, [1992](#)).

Because instructor-rated grit was more consistently related to the criteria in this study, it is possible that specific rating grit is more important than generalized grit. That is, a child can be “gritty” but still may not have a passion for taekwondo. It is also important to remember that there are many factors, outside the control of the child that could contaminate our criterion variables. The child, no matter how gritty, is still dependent on parents to dedicate time and money to their taekwondo training. If the parents cannot, or will not, bring their child to classes, tournaments and testings, the level of grittiness of the child will not matter.]

### ***Significance and Limitations of the Study***

It is vital to acknowledge that not all students succeed in the sport of taekwondo, and it is important to identify factors which may be trainable and can help diverse students be better motivated and persistent in their sports activities, as well as more adaptive to life’s challenges in school and other social contexts (e.g., Bowman, Hill, Denson, & Bronkema, [2015](#)).

In addition, the significance of grit as a central construct in the martial arts, could have an impact on curriculum decisions and instructional techniques adopted by the schools. Instructors could specifically focus on techniques design to impact the level of grit, or adapt to the level of grit of the students. Further, instructors can educate parents on the importance of the development of grit through martial arts by emphasizing their central role as suggested by Duckworth ([2016](#)). If martial arts instruction is seen as part of the student’s development by



the parents, and not just as a tool for self-defense, then this may impact attrition.

Grit-related sports performance has not been examined to date with diverse groups of young athletes in this sport, with many “first-generation” athletes in this sport, and better understanding the potential association between a child athlete's internal motivations, grit, and his/her goal-setting behavior in a sport becomes a practical training and an ethical imperative for educational after-school and recreational sports training programs across the nation (Seligman, 2007). Past research has suggested that there are long-lasting effects to the early development of grit-related resilience in later work and educational pursuits (e.g., Hobden & Hobden, 2015).

This study was conducted at a single martial arts school, within a specific style of martial arts (Taekwondo). Although the authors believe that the sample used in the study was representative of taekwondo students one might find in typical martial arts schools across the United States, it would be beneficial to replicate this study in other locations, schools, and styles.

This study was based on a cross-section of the taekwondo students at the school, and does not reflect changes over time. Future research should examine the long-term relationship between students' grit behavior and associated belt attainments over time through a repeated-measure design. More specifically, follow-up research should assess if children's participation in martial arts makes them grittier over time. Another focus for future research would be to examine if taekwondo students tend to be grittier in comparison to non-taekwondo students, as well as to assess if the relatively less gritty taekwondo students are more likely to engage in attrition and fail to attain a black belt.

Further, the issue of criterion contamination could be addressed by collecting data on the reason(s) for tournament non-attendance and attrition. If decisions to continue training and attend tournament were made for reasons not-related to the level of grit of the student, this could be controlled in the analysis. It is expected that future studies that focus on a sample of students whose motivation is cited as the reason for these decisions, will be more likely to find a relationship between grit, tournament attendance, and attrition.

## **V. Conclusion**

This study contributes to the literature in several ways. First, it demonstrates that grit is an important construct in a specific context (i.e., youth taekwondo). This suggests that grit will have applied value to martial arts schools as they seek to explain attrition in their schools. It is also possible that this knowledge will lead to useful interventions to improve retention based on enhancing grit. Additionally, this study examined grit in children, who are still developing competencies important to grit during their key “formative” years of physical and cognitive development. Most studies in the literature have focused on grit in adult populations, and there is much to be understood about foundational needs of children and adolescents in youth sports.

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