Relationship between elementary school children's sports and physical activity habits, self-assessed physical fitness and GRIT score

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1. Background and Purpose

Children are less likely to engage in sports or other physical activities to improve their health than adults. Most children enjoy participating in sports itself and engaging in physical activities with friends. Parents expect sports and other physical activities to improve their health and physical fitness, including the proper growth of their children. To continuously promote physical activity, it is essential to do so in a socially and educationally beneficial manner. Recently, GRIT has emerged as a critical measure of social competence. This is a vital educational objective. We believe that sports and other physical activities can improve children's GRIT.

This study aimed to examine the relationship between children's habits related to sports and other physical activities, self-assessed levels of physical fitness, and GRIT scores.

2. Summary of Results

☆ Factor analysis of the Short GRIT scale

As in previous studies, two factors that could be interpreted as GRIT perseverance of effort and consistency of interest were extracted.
Additionally, Cronbach's α coefficient for each factor was good.

☆ Differences in physical activity time by GRIT score

Children with better GRIT scores engaged in significantly more sports and other physical activities.
This suggests that children who engaged in more sports and physical activities during the day had better GRIT scores.

☆ Differences in GRIT score by physical fitness and physical activity preference

GRIT scores were significantly higher in children with a higher physical fitness level, a higher preference for sports and physical activity, and a higher level of physical activity. These results concluded that encouraging sports and physical activity and boosting physical fitness can help improve the GRIT score.

【Participants】

The participants in this study were 5856 elementary school children. Data from 5798 children were used for the analysis, excluding children whose sex and grade were unknown.

Table 1. Number of Participants

	Grade1	Grade2	Grade3	Grade4	Grade5	Grade6	Total
Boys	476	485	495	464	495	497	2912
Girls	423	464	522	513	482	482	2886
Total	899	949	1017	977	977	979	5798

【Measurement Items】

(Physical activity, self-assessed physical fitness level)

The following items were investigated using a questionnaire:
- Average daily sports and physical activity hours (weekdays and weekends),
- self-assessed physical fitness level (five-point Likert scale)
- sports and physical activity preferences (four-point Likert scale)

(GRIT: Guts, Resilience, Initiative, Tenacity)

The Short GRIT Scale (eight items) was used in the Japanese version. After confirming the scaling using factor analysis, a composite score was used.

【Analysis procedures】

Step 1: We applied factor analysis to the GRIT scale data and extracted two subfactors (perseverance of effort and consistency of interest). A simple summation of the individual items determined the scores for overall GRIT and each sub-factor.
➡ Factor analysis using maximum likelihood estimation and Promax rotation

Step 2: Two groups were created using the average GRIT score for each sex as the boundary value.

Step 3: Examine the differences in sports and physical activity times on weekdays and weekends between the two groups in Step 2.
➡ Independent-samples t-test

Step 4: Examine the differences in GRIT scores according to self-assessed physical fitness level and sports and physical activity preferences. ➡ Independent-samples t-test and one-way ANOVA with multiple comparison by the Bonferroni method

Results Ⅰ: Factor analysis of Short GRIT scale

Table2. Result of Factor analysis of Short GRIT scale

Items	F1: GRIT perseverance of effort	F2: GRIT consistency of interest	Communality
1. I am a hard worker.	0.83	-0.05	0.69
2. I finish whatever I begin.	0.77	0.06	0.60
3. Setbacks don't discourage me.	0.62	0.00	0.39
4. I am diligent.	0.60	-0.01	0.36
5. I often set a goal but later choose to pursue a different one.	-0.01	0.75	0.57
6. I have been obsessed with a certain idea or project for a short time but later lost interest.	0.02	0.67	0.45
7. New ideas and projects sometimes distract me from previous ones.	-0.09	0.64	0.41
8. I have difficulty maintaining my focus on projects that take more than a few months to complete.	0.16	0.45	0.23
Eigenvalue	2.07	1.63	3.70
Factor contribution (%)	25.85	20.41	46.26

Interfactor correlations	F1: GRIT perseverance of effort	F2: GRIT consistency of interest
F1: GRIT perseverance of effort	1.00	0.42
F2: GRIT consistency of interest	0.42	1.00

As in previous studies, two factors that could be interpreted as GRIT perseverance of effort and consistency of interest were extracted. Moreover, Cronbach's α coefficient for each factor was good.

Cronbach's α coefficient
F1: α = 0.794, F2: α = 0.727

Results Ⅱ: Differences in physical activity time by GRIT score

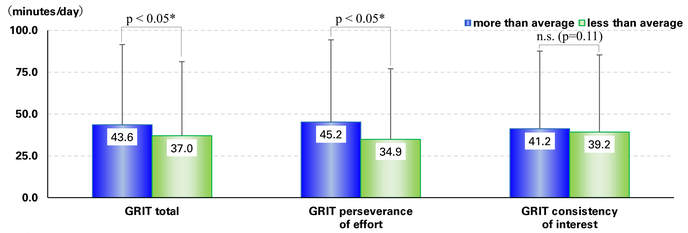

Fig1. Differences of physical activity time on weekdays by GRIT score

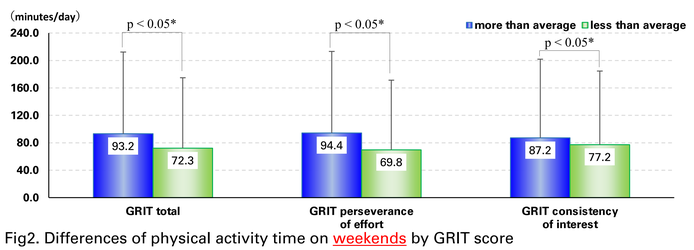

Fig2. Differences of physical activity time on weekends by GRIT score

Children with high GRIT scores engaged in significantly more sports and other physical activities. However, no significant difference was observed in the score of the "consistency of interest" subfactor regarding sports and physical activity hours on weekdays. This suggests that children who engaged in more sports and physical activities during the day had better GRIT scores.

Results Ⅲ: Differences in GRIT score by physical fitness and physical activity preference

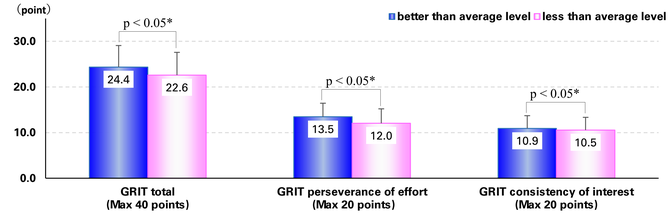

Fig3. Differences of GRIT score by self-assessed physical fitness

GRIT scores were significantly higher among children whose self-assessed physical fitness levels were higher than average. Moreover, children with a higher preference for sports and physical activity had higher GRIT scores. Similarly, a significant difference in GRIT score was confirmed depending on the positivity of physical activity. The differences in GRIT scores were also substantiated by the preference for sports and physical activity and self-assessed physical fitness levels. It was concluded that encouraging sports and physical activity and boosting physical fitness can help improve GRIT.

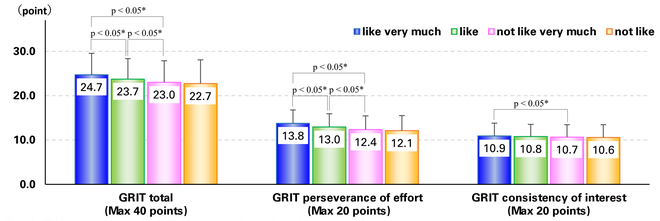

Fig4. Differences of GRIT score by physical activity preference

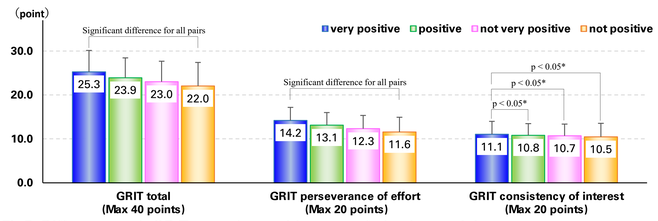

Fig5. Differences of GRIT score by positiveness of physical activity

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