# Effects of Executive Function and Anger Coping on School Life Satisfaction

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#### Abstract

The purpose of this study is to examine whether executive function and anger coping influence school life satisfaction at secondary school and high school. Students were asked to evaluate school satisfaction in secondary school and high school. Furthermore, they were also asked to rate execution functions and anger coping. The results showed that executive function of participants with high satisfaction was more than executive function of participants with low satisfaction at high school. It suggest that high school students need to control their own actions and thoughts in many situations. The result also showed that participants with high satisfaction. The result of correlation indicated that correlations between Satisfaction and coping was significant including Cognitive reinterpretation and Problem solving at secondary school and high school. The result suggests that on the learning side, students with high coping may have higher school satisfaction.

Key Word: executive function, anger coping, school satisfaction, secondary school, high school

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#### I. Introduction

It is very important for pupils and students to live a fulfilling life at school. In particular, as satisfaction with schools increases, learning, student life, friendship is substantial. In this research, as a factor to promote satisfaction at school, we examine the relationship between school satisfaction, anger coping and execution function.

Does school satisfaction influence the behavior and recognition of children in school life? Nagai (2009) examined the relationship between helpseeking intentions to friends and teachers and school life satisfaction in elementary school pupils. The result indicated that satisfaction with school life affects the help-seeking intentions to friends and teachers.

Kawamura, Musashi & Kawamura (2016) examined the relationship between school satisfaction and children's recognition of teacher's humor. The results showed that pupils in the conductive group positively and highly recognized teachers' two types of humor more than pupils in the other groups.

Yamada, Ikeda & Akada (2018) studied the relationship between school satisfaction and physical competence. The result shows that the higher the school satisfaction level, the higher recognition of exercise behavior by effort that is the recognition that exercise can be promoted by

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effort and exercise was recognized. These results suggest that school satisfaction is effective for promoting recognition and competence, such as children request help for others and encourage a positive view towards others.

What factors are affecting school satisfaction? In this study, we focused on executive function and anger coping as factors influencing school satisfaction. Firstly, execution function is assumed as a factor affecting school satisfaction. Execution function is a higher-order cognitive function that controls thought and behavior. When we carry out tasks, our thinking and actions are controlled by maintaining rules of tasks, updating information, and switching rules. Miyake et al. (2004) assume that the execution function is composed of three basic elements including updating, shifting and inhibition. Updating is a function of updating and monitoring representation of working memory. It monitors information on tasks and replaces old information. Shifting is a function of switching between tasks. It is a function to shift from a rule to another rule when performing tasks. Prohibition is suppression of dominant reaction. It is a function to intentionally inhibit the dominant automatic reaction. It is assumed that the executing function plays an important role in learning, friendship, and student life in secondary high school high school.

Secondary, execution function was assumed as another factor affecting school satisfaction. Anger coping is a mechanism that controls its own anger. When we feel angry, it is not an appropriate action to direct their anger to the other person directly. Anger coping is a function to control anger and take appropriate action by changing our way of recognition when we feel anger. Coping against anger plays an important role in student life. Then, what kind of anger coping is there? Sasaki & Yamasaki (2002) indicated that there are six factors in coping using factor analysis. The factors involved in coping are Emotion expression, Emotional support seeking, Cognitive reinterpretation and Problem solving. Emotion expression is expressing feelings and emotions at that time when feeling anger. Emotional support seeking is to calm ourselves through contact with people. Cognitive reinterpretation is to think about it in a good direction and to reinterpret it to be positive for you when you feel anger. Problem solving means trying to solve the problem when faced with anger producing scenes.

The purpose of this research was to examine how the execution function and coping affected school satisfaction in secondary school and high school. In this research, university students were asked to rate the satisfaction of the student life, the friendship relationship at the secondary school and the high school. Then they were asked to rate executive function and coping. It was assumed that execution function influence school satisfaction of secondary school and high school. Therefore, it was predicted that the higher the school's satisfaction level, the higher the score of the execution function would be. Also, it was assumed that coping will affect school satisfaction of secondary school and high school. Therefore, the higher the school's satisfaction level the more the coping scores were expected to be higher.

#### II. Method

#### Participants:

Sixty university students participated in this research, including 38 male student and 22 female students. Mean age was 19.38 years old and the age range was 18 to 22 years old.

#### Design

A 2 x 4 x 6 mixed design was employed, with between-participant factors of satisfaction on secondary school and high school, and withinparticipant factor of stress coping and executive function. The scores of stress coping and executive function were independent variables, while satisfaction on secondary school and high school was dependent variable.

#### Materials and Procedure

Students took three tests including "School satisfaction" "stress coping" and "executive

function" questionnaire.

In "School satisfaction" questionnaire, participants were asked to grade according to four ranks (from 1 to 4) how satisfied they were with learning, friendship and student life in secondary and high school days. Satisfaction on secondary school questionnaire is a questionnaire consisting of three questions "How satisfied were you with student life in secondary school days?" "How satisfied were you with learning during secondary school?" "How satisfied were you with friendship during secondary school?" Satisfaction on high school questionnaire was the same as that on secondary questionnaire consisting of three questions "How satisfied were you with student life in high school days?" "How satisfied were you with learning in high school?" "How satisfied were you with friendship during high school?"

Students were asked to grade according to four ranks (from 1 to 4) on their behavior and thought using the Executive Functions Questionnaire that consist of six categories (Sekiguchi & Yamada, 2017). The Executive Functions Questionnaire is composed of twenty four questions. It consisted of four items in each of six categories, including the Shifting, Updating, Inhibition, Planning, Monitoring and Absorption. For example, Questions in Shifting were "I am good at providing ideas", "I can simultaneously manage well even if I received consultation from multiple people" and so on. Questions in Updating were "I can manage things corresponding to the situations and others even if there is a problem", "I can easily follow talking even if the topics change" and so on. Questions in Inhibition were "I can steadily take in new ideas", "I can organize my work plan well"and so on. Questions in Planning were "I can continuously conceive if I think about fun things", "I am not good at working on long-term planning" and so on. Questions in Monitoring were "I can simultaneously proceed multiple things", "I am good at organizing" and so on. Questions in Absorption were "I tend to concentrate only one thing", "I tend to make plans for schedules with deadlines" and so on.

In "Anger coping" questionnaire, students were asked to grade according to four ranks (from 1 to 4) what kind of actions or ideas they do when they feel angry using the GCQ (the General Coping Questionnaire) questionnaire that consist of four categories (Sasaki & Yamasaki, 2002). The GCQ test is a questionnaire test consisting of thirty two questions. It consisted of eight items in each of four categories, including the Emotion expression, Emotional support seeking, Cognitive reinterpretation, and Problem solving. For example, Questions in Emotion expression were "I express my thinking with attitude" " I express my unpleasant with attitude" and so on. Questions in Emotional support seeking were "I am supported for my feelings by familiar people" "I try to address kind words from someone" and so on. Questions in Cognitive reinterpretation were "I try to see the bright side of the situation" "I try to interpret the problem in a good direction" "I try to find a bright element in the problem" and so on. Ouestions in Problem solving were "I concentrate on problem solving" "I try various things to break the bad situation" and so on.

These questions have been printed on two A4 papers with the content of research ethics, research purpose and attribution such as age, sex and sibling relation of participants. The survey was conducted in a group. We distribute the paper to participants and asked them to answer on questions at their own pace. Before their answering the question, we explained the purpose of this survey, strict protecting of the secrecy of data, and disclosure to academic societies to participants. For this investigation, we informed the students that they have the right to refuse the investigation, there is no need to submit a questionnaire if students do not want to participate in the survey. The response time was about 15 minutes.

#### III. Results

In analyzing the data, the contents of the response were checked, and an incomplete answer

was seen with one participant. Therefore, the data of this participant was deleted, and the data of 59 participants were analyzed.

School satisfaction data was classified based on satisfaction level of secondary school and high school. Score of school satisfaction is the sum of three school satisfaction including Friendship, Learning and Student life satisfaction. The mean scores of satisfaction at secondary school and high school were 8.76 (SD=1.89) and 9.59 (SD=1.35), respectively. We classified participants with secondary school's satisfaction score of 9.00 or more as "High satisfaction" at secondary school and participants with score less than 9.00 as "Low satisfaction" at secondary school. Likewise, we classified participants with high school's satisfaction score of 10.00 or more as "High satisfaction" at high school and participants with score less than 10.00 as "Low satisfaction" at high school. Based on these satisfaction scores, participant's data were classified into four groups, including School Dissatisfaction, High school satisfaction, Secondary school satisfaction and School Satisfaction group. Satisfaction score of participants in "School Dissatisfaction" group was low at both secondary school and high school. Satisfaction score of participants in "High school satisfaction" group was low at secondary

but high at high school. Satisfaction score of participants in "Secondary school satisfaction" group was high at secondary school but low at high school. Satisfaction score of participants in "School Satisfaction" group was high at secondary school and high school. As a result, there were 16 participants in School Dissatisfaction group, 9 participants in High school satisfaction group, 13 participants in Secondary school satisfaction group and 21 participants in School Satisfaction group.

# 1. School Satisfaction at Secondary and High school

Table 1 indicates the mean and standard deviation of school satisfaction score as sex of participants, satisfaction and school type. A three-way ANOVA for sex of participants, content of satisfaction and school type was performed. Table 2 is the result of ANOVA. The analysis revealed a significant main effects for school satisfaction (F (2,110) = 12.45, p<.01), which indicates that satisfaction at high school was more than satisfaction at secondary school. The analysis also reveals a significant main effect of satisfaction (F (1,55) = 9.01, p<.01). Multiple comparisons by Holm test indicated that Friendship satisfaction was better than Learning satisfaction and Student life satisfaction (ps<.05). The interaction of sex of participants

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Friendship	satisfaction	Learning	satisfaction	Student life satisfaction	
Secondary School	High school	Secondary School	High school	Secondary School	High school
		М	ale		
3.20	3.29	2.43	2.86	3.06	3.14
0.76	0.57	0.78	0.69	0.87	0.73
		Fer	nale		
3.09	3.36	2.86	3.18	3.05	3.50
0.81	0.66	0.71	0.50	0.84	0.51

Table 1 School Satisfaction at Secondary and High school

Note: The value in italics is the standard deviation.

	SS	df	MS	F	
Sex of participants	2.60	1	2.60	2.28	ns
error	62.65	55	1.14		
Satisfaction	10.42	2	5.21	12.45	**
Sex of participants x Satisfaction	2.11	2	1.06	2.53	+
e(Satisfaction)	46.02	110	0.42		
School type	6.10	1	6.10	9.01	**
Sex of participants x School type	0.45	1	0.45	0.66	ns
e(School type)	37.23	55	0.68		
Satisfaction x School type	0.51	2	0.26	1.12	ns
Sex of participants x Satisfaction x School type	0.79	2	0.40	1.73	ns
e(Satisfaction x School type)	25.10	110	0.23		
Total	193.97				

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#### Table 2 ANOVA of Satisfaction

Note: +p<.10 \*p<.05 \*\*p<.01



Figure 1 Three School Satisfaction types and Sex of Participant

and satisfaction was marginally significant (F(2,110)=2.53, p<.10). Multiple comparisons by Holm test revealed that satisfaction of female was better than satisfaction of male participants on Learning satisfaction (p<.05), although different of sex was not significant on Friendship and student life satisfaction, as shown in the Figure 1. The main effect of Sex and the interactions were not significant.

## 2. Anger Coping and the Satisfaction at School Life

Table 3 indicates the mean and standard deviation of anger coping score as functions of secondary and high school satisfaction. A three-way ANOVA for Secondary school satisfaction, High school satisfaction and Anger coping was performed. Table 4 is the result of ANOVA. The analysis revealed a significant main effects for Secondary school satisfaction (F (1,55) = 4.13, p<05), which indicates that participants with high satisfaction at secondary school graded anger coping more than participants with low satisfaction. The analysis also reveals a significant main effect of anger coping (F (3,165) = 5.03, p<.01). Multiple comparisons by Holm test indicated that Emotion expression was better than Emotional support seeking (p<.05) and Problem solving (p<.05). The main effect of high school satisfaction and interactions were not significant (Fs<1.00).

# **3. Executive Function and the Satisfaction at** School Life

Table 5 indicates the mean and standard deviation of executive function score as functions of secondary and high school satisfaction. A threeway ANOVA for Secondary school satisfaction, High school satisfaction and Anger coping was performed. Table 6 is the result of ANOVA. The analysis reveals a significant main effect for

School Dissatisfaction	High school satisfaction	Secondary school satisfaction	School Satisfaction							
	Emotion expression									
18.63	18.33	19.85	18.95							
3.14	4.27	4.62	4.23							
	Emotional	support seeking								
19.69	17.89	20.85	21.10							
4.07	4.09	3.92	3.96							
	Cognitive r	reinterpretation								
20.81	20.56	21.00	22.43							
2.58	2.67	2.94	3.90							
	Proble	m solving								
20.50	20.67	20.92	21.86							
3.35	2.21	2.30	3.17							

Table 3 The mean and standard deviation of Anger Coping score as functions ofSecondary and High school Satisfaction.

Note: The value in italics is the standard deviation.

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Source	SS	df	MS	F	
Secondary school satisfaction	81.84	1	81.84	4.13	*
High school satisfaction	0.18	1	0.18	0.01	ns
Secondary school x High school	12.74	1	12.74	0.64	ns
Error(Between)	1090.43	55	19.83		
Anger Coping	177.04	3	59.01	5.03	**
Anger Coping x Secondary School	21.25	3	7.08	0.60	ns
Anger Coping x High School	16.4	3	5.47	0.47	ns
Anger Coping x Secondary School x High School	14.03	3	4.68	0.40	ns
Error (Within)	1935.09	165	11.73		
Total	3349.01	235			

Table 4 AN	OVA as functions	of Secondary	and High so	chool Satisfaction.
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Note: +p<.10 \*p<.05 \*\*p<.01

# Table 5 The mean and standard deviation of Executive Function score as functions ofSecondary and High school Satisfaction.

School Dissatisfaction	High school satisfaction	Secondary school satisfaction	School Satisfaction
	Sh	ifting	
9.50	10.56	10.08	11.10
1.70	1.89	2.27	2.22
	Up	dating	
9.69	10.33	9.77	10.38
1.16	0.67	1.67	1.70
	Inh	ibition	
10.00	11.22	11.23	11.10
1.32	1.13	2.01	2.04
	Pla	nning	
9.44	10.33	9.46	10.05
1.17	1.05	1.34	1.73
	Mor	nitoring	
11.50	12.67	12.23	13.14
1.41	1.49	1.72	1.61
	Abs	orption	
11.13	12.22	12.31	12.48
2.71	1.40	1.90	1.65

Note: The value in italics is the standard deviation.

Secondary school satisfaction (F (1,55) = 7.15, p < .01), which indicates that score of executive function of participants with high satisfaction at high school graded more than score of participants with low satisfaction.

The analysis also revealed a significant main effects for executive function (F (5,275) = 24.69, p < .01). Multiple comparisons by Holm test indicated that score of Inhibition was better than score of Planning and Updating (*ps* < .05), that score of Monitoring was better than score of Inhibition, Shifting, Updating, and Planning (*ps* < .05), and that score of Absorption was better than score of Inhibition, Shifting, Updating, updating, and Planning (*ps* < .05). The main effect of secondary school satisfaction (F (1,55) = 1.87) and interactions (Fs < 1.00) were not significant.

Miyake et al (2000) assume that the execution function is composed of basic three elements by a latent variable analysis. Three executive function are updating, shifting and inhibition. Therefore, we analyze the basic executive functions that consists of three elements.

Table 7 indicates the mean and standard deviation of executive function score that consists of three basic elements as functions of secondary and high school satisfaction. A three-way ANOVA for Secondary school satisfaction, High school satisfaction and Anger coping was performed. Table 8 is the result of ANOVA. The analysis revealed a significant main effects for executive function (F (2,110) = 5.36, p<.01). Multiple comparisons by Holm test indicated that score of Inhibition and Updating was better than score of Shifting (ps<.05) and that score of Inhibition was better than score of Updating (ps<.05).

The analysis reveals marginally significant main effect for High school satisfaction (F (1,55) = 3.47, p < .10), which indicates that score of executive function of participants with high satisfaction at high school graded more than that with low satisfaction. The main effect of secondary school satisfaction and interactions were not significant (Fs<1.00).

### 4. Correlations between Executive Function and School Satisfaction.

Table 9 indicates the correlations between executive function and school satisfaction. The analysis reveals that the correlation coefficients between Inhibition, All EF (executive function including six elements), Basic EF (executive function including three elements) and School Satisfaction on the learning satisfaction at

Source	SS	df	MS	F	
Secondary school satisfaction	12.51	1	12.52	1.87	ns
High school satisfaction	47.77	1	47.77	7.15	*
Secondary school x High school	4.77	1	4.77	0.71	ns
Error (Between)	367.29	55	6.68		
Executive Function	308.08	5	61.62	5.03	**
Executive Function x Secondary School	3.15	5	0.63	0.60	ns
Executive Function x High School	7.85	5	1.57	0.47	ns
Executive Function x Secondary School x High School	4.85	5	0.97	0.40	ns
Error (Within)	686.35	275	2.50		
Total	1442.62	353			

Table 6 ANOVA as Executive functions of Secondary and High school Satisfaction.

Note: +p<.10 \*p<.05 \*\*p<.01

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School Dissatisfaction	High school satisfaction	Secondary school satisfaction	School Satisfaction
	Sh	ifting	
9.50	10.56	10.08	11.10
1.70	1.89	2.27	2.22
	Up	dating	
9.69	10.33	9.77	10.38
1.16	0.67	1.67	1.70
	Inh	ibition	
10.00	11.22	11.23	11.10
1.32	1.13	2.01	2.04

# Table 7The mean and standard deviation of Executive Function score as functions of<br/>Secondary and High school Satisfaction.

Note: The value in italics is the standard deviation.

Table 8	ANOVA	as Executive	functions of	of Secondary	and High	school Satisfaction
				•		

Source	SS	df	MS	F	
Secondary school satisfaction	6.17	1	6.17	0.98	ns
High school satisfaction	21.82	1	21.82	3.47	+
Secondary school x High school	2.28	1	2.28	0.36	ns
Error(Between)	345.8	55	6.29		
Executive Function	20.02	2	10.01	5.36	**
Executive Function x Secondary School	1.87	2	0.93	0.50	ns
Executive Function x High School	2.15	2	1.08	0.58	ns
Executive Function x Secondary School x High School	3.91	2	1.95	1.05	ns
Error(Within)	205.53	110	1.87		
Total	609.55	176			

Note: +p<.10 \*p<.05 \*\*p<.01

secondary school were significant(ps<.05), that correlation coefficient between All EF, Basic EF and School Satisfaction on the life satisfaction at secondary school were significant (ps<.05), and that the correlation coefficients between Shifting (ps<.05), Planning (ps<.05), Monitoring (ps<.01), Absorption (ps<.05), All EF (ps<.01), Basic EF (ps<.05) and the student life satisfaction at high school were significant. Also, it reveals that the correlation coefficients between Monitoring and Friendship satisfaction at secondary school and at high school were marginally significant, that the correlation coefficients between Planning and Learning satisfaction at secondary school and the correlation coefficient between Monitoring and learning satisfaction at secondary school were marginally significant, that the correlation coefficient between Updating and Student life satisfaction at secondary school and the correlation coefficient between Absorption and Student life satisfaction at secondary school were marginally significant, and that the correlation coefficient between Updating and Student life satisfaction at high school was marginally significant (ps<.10).

## 5. Correlations between Anger Coping and School Satisfaction

Table 10 indicates the correlations between anger coping and school satisfaction. The analysis

reveals that School Satisfaction on the learning satisfaction at secondary school was significantly correlated with Cognitive reinterpretation, Problem solving and All coping (ps<.05). The analysis also reveals that the learning satisfaction at High school was significantly correlated with Cognitive reinterpretation and Problem solving and School Satisfaction (ps<.05).

Also, it reveals that the correlation coefficient between Emotional support seeking and learning satisfaction at secondary school, the correlation coefficient between Cognitive reinterpretation

	Friendship satisfaction		Learning sa	atisfaction	Student life s	Student life satisfaction	
	Secondary School	High School	Secondary School	High School	Secondary School	High School	
Shifting	0.102	0.083	0.215	0.030	0.199	0.272*	
Updating	-0.053	0.155	0.169	0.074	0.216+	0.244+	
Inhibition	0.116	-0.064	0.283*	0.072	0.213	0.162	
Planning	-0.110	0.036	0.227+	0.164	0.116	0.287*	
Monitoring	0.227+	0.251+	0.230+	0.103	0.179	0.432**	
Absorption	0.072	0.114	0.115	-0.039	0.249+	0.261*	
All EF	0.108	0.149	0.325*	0.095	0.316*	0.436**	
Basic EF	0.080	0.066	0.278*	0.069	0.257*	0.281*	

Table 0	Correlations	hotwoon	Executive	function	and Sak	ool Satisfaati	on
Table 9	Correlations	perween	Executive	ппспоп	and Sch	1001 Satistacti	on.

Note: +p<.10 \*p<.05 \*\*p<.01.

Note: All EF is executive function including six elements. Basic EF is executive function including three elements.

Table 10 Currenations between Anger Cuping and School Sausiacu	Fable 10	Correlations betwe	en Anger Coping	and School Sat	isfaction
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	Friendship satisfaction		Learning satisfaction		Student life satisfaction	
	Secondary School	High School	Secondary School	High School	Secondary School	High School
Emotion expression	-0.053	0.053	-0.048	-0.179	-0.157	-0.121
Emotional support seeking	0.256+	0.115	0.167	0.132	0.143	0.025
Cognitive reinterpretation	0.106	0.230+	0.282*	0.267*	0.154	0.119
Problem solving	-0.210	0.096	0.295*	0.311*	0.221+	0.233+
All Coping	0.063	0.194	0.256*	0.180	0.125	0.078

Note: +p<.10 \*p<.05 \*\*p<.01

and friendship satisfaction at high school, the correlation coefficients between Problem solving and life satisfaction at secondary school and at high school were marginally significant (ps<.10).

#### **IV. Discussion**

One of purposes in this research was to examine whether the execution function affects the school satisfaction of secondary school and high school. It was predicted that the higher the school's satisfaction level, the higher the score of the execution function would be. The result showed that the difference of executive function between high satisfaction group and low satisfaction group was significantly at high school but not at secondary school. The prediction of this research was recognized in high school, but not in secondary high school.

Why did the executive function affect school satisfaction in high school, but not in secondary school? An explanation on this can be inferred from the result of the correlation coefficient. The correlation coefficient results showed that only one correlation coefficient between school satisfaction and factor of the executive functions (Inhibition) in Learning was significant in secondary school, but in high school, but four correlation coefficients between school satisfaction and factors of the executive functions (Shifting, Planning, Monitoring and Absorption) on in Student Life were significant. The number of significant correlation coefficients between executive function and satisfaction was more in high school than in secondary school. Student life satisfaction in this research is the satisfaction in how to spend after school and on holidays. A significant correlation between school satisfaction and execution function may reflect the relationship between how to spend after school and holiday and execution function. Kimura, Nishimura & Arai (2004) indicated that secondary school students and high school students spend time with friends and lovers on holidays. It is assumed that compared to secondary school students, more high school students actively play

clubs and work part-time, and as a result, the number and types of people touched after school and on holidays would be more at high school than at secondary school. High school students need to control their own actions and thoughts in many situations rather than secondary school students. Therefore, the executive function may have been more related to the high school student than the secondary school student in order to raise the satisfaction of the living.

Another purposes in this research was to examine whether anger coping affects the school satisfaction of secondary school and high school. It was predicted that the higher the school's satisfaction level, the higher the score of the anger coping would be. The result showed that participants with high satisfaction graded anger coping more than participants with low satisfaction at secondary school significantly but not at high school. And the result of correlation indicated that correlations between satisfaction and coping was significant including Cognitive reinterpretation and Problem solving at secondary school and high school. Why was the correlation between school satisfaction and coping significant in learning but not in student life or friendship? One possibility is that acquiring coping requires better learning ability. Therefore, on the learning side, students with coping may have higher school satisfaction. Otera (2017) suggests that ability of coping is related to academic ability.

Finally, Sekiguchi & Tannno (2006) shows that the execution function and anger are related in study using students as participants. Olson et al. (2005) also indicated that there is a relationship between the execution function and anger in study using young children as participant. From now on, we would like to further study the relationship between executive function and anger coping

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