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*Full Length Research Paper*

# Effect of piano education on the attention skills of 7-12 year old children

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This research is aimed to determine the effects of piano education on the attention skills of 7-12-year-old children. In the research, pretest-posttest control group design is used, and attention skills of both of the groups are measured before and after the experiment. Unlike the control group (n=53), the experimental group (n=46) had private piano education an hour a week for 14 weeks with a tutor, and as a result of the cooperation with the parents, the students practised the piano on their own at home. For collecting data, 4 stage Stroop Colour-Word Test is used. In analysing the data, SPSS 23.0 packaged software and 2x2 mixed ANOVA's are used. Independent factors are determined as group (piano lesson group and control group) and time (pretest-posttest). Dependent variables are reading black and white (RBW), name the colour of the square patches (NCS), reading the coloured words (RCW) and saying the colours of the coloured words (SCCW). Different ANOVA's are used for each dependent variable. In the study, in all the applied sections, it was seen that the reading time of the children who have been having piano education has shortened and their attention skills have been improved. Nevertheless, especially in 'Name the Colour of Square Patches' and 'Reading the Coloured Word' tests results it was seen that, children having piano education have improved their attention skills statistically more than the children who are not having piano education. Children having piano education are considered to be more careful about the aliasing effect and their perception to be improved.

**Key words:** Piano education, attention skills, Stroop colour-word test.

## INTRODUCTION

Education is the most significant phenomenon used to have individuals equipped with desired behaviours and qualities and develop the temperamental hereditary factors. It is believed that societies transfer their distinctive elements to new generations in accordance with traditions and conventions and ensure that they are learnt. During this learning process, attention is the basic element and one of the first phases of learning. Attention

is a basic component of the human data processing system (Caglar and Koruc, 2006). While according to the Turkish Linguistic Society Dictionary (2005), attention is defined as focusing the thoughts and feelings on something. Vigilance, in the dictionary of psychology is defined as the ability to ignore some of the perceptual functions, thoughts, sensual entries, cognitive stimuli while choosing some of these and focusing on them, thus

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to perceive chosen stimulants more clearly and to control and direct all of these processes voluntarily (Budak, 2000), attention and perception are necessary in order to notice stimuli received by sense organs during sensual registry and transfer them to short term memory (Kurtuldu, 2012). According to Anderson (2002), attention control arises in babyhood and develops rapidly in early childhood. However, cognitive flexibility, targeting and data processing develop at the age of 7-9 and fully develop at the age of 12. According to Piaget (as cited in Ulugbay (2013)) the intelligence development of children is accelerated especially between 2-7 years and 7-12 years of age. This situation took effect in choosing 7-12-year-old children for the sample and the belief that music education might have a significant position in the development of children's attention level, and skills were determinant in deciding the subject.

This is because music education allows development of children's skills such as analysis, synthesis, coordination to develop, and tends towards creativity by developing a deliberate thought. Today, music education experts emphasise that musical instrument training, which is an important aspect of music education, is of capital importance for the personality development, development of emotions and skills in children and their learning to be self-confident, patient and self-disciplined along with having sustainable attention skills. Also, according to Hallam (2015), active engagement with music has a significant impact on brain structure and function. Hallam (2015) suggests that correlation studies prove that there are relationships between musical activities and the various skills related to literacy including verbal and auditory working memory, spatial reasoning and mathematical performance, intellectual development, creativity, emotional intelligence etc. Early piano education gained importance after 1950's. There were not a consensus between musicians and child development experts on the correct time to start piano education and the schedule that should be followed, since musicians did not master on child development and child development experts did not master on music education; and these were interdependent. However, by time it is understood that the earlier the child starts music education the better the result is, and philosophy of music education is formed. As a result of this the effect of playing piano on the development of child started to be investigated (Minina, 2012).

While playing the piano, which is an instrument played widely in Turkey, melodies with several rhythms written in two staves in different clefs (treble clef – bass clef) have to be performed correctly and precisely. Performing these complicated tasks requires a perfect eye, hand and foot cooperation. Besides these psychomotor skills, many activities such as polyphonic hearing can be done together while playing the piano. Given complex activities are known to benefit the development of data processing in children's brains. Playing the piano is also believed to

require continuous attention and focusing.

In a study of Shaw and Rauscher (as cited in Ulugbay (2013)), it is argued that the most functional way to improve cognitive structure that affects preschool children's demonstrating high skills in mathematics and science is playing piano; and that music education, particularly piano education until the age of 12 is an activity requiring functions which mathematics and chess entail, such as high brain functions.

Studies of Pavlov (2008) are focused on the importance of instrument education. In one of his researches, there were 41 children who played an instrument (n= 14 playing flute, n=27 playing piano) and 25 children who did not play any instrument. All children were between the ages of 6 and 7, their characteristics and cognitive abilities were equal. After 7-8 months of education, all of the children had 6 different neuropsychological tests measuring their attention skills and cognitive abilities. Children who played an instrument were shown to have higher improvement than the children who did not play. Children who played flute had higher perception of space when compared to the others. Children who played piano had higher acceleration as well as improvement in verbal reasoning, verbal memory, logical intelligence, cognitive and psychomotor skills. Permiakova and Tkachenko (2016) conducted a study on children who recently have started to play piano and had similar results. Their study, which was made in Ekaterinburg consisted of 50 children; 26 of them did not play any instrument, while 24 of them have started to take piano lessons. After a period of one year, these children had required tests at the Neuropsychology Laboratory of Moscow State University. The children who played piano were shown to have higher improvements in cognitive and psychological skills; and 1.5 times higher acceleration especially in motor development. In the second part of this study, Permiakova and Tkachenko (2016) made a second experiment on 10 male children who have hyperactivity and attention deficit disorder. 5 of them played piano and 5 of them did not play any instrument. Both of the groups had similar tests as the previous groups, such as attention, memory and cognitive ability. After a period of one year, children playing piano had significantly better results than the children who did not play piano. Piano education is recommended especially for children diagnosed with hyperactivity and attention deficit disorder.

The studies mentioned above show the benefits of music and piano education for brain development. One of other rare studies showing the benefits of piano education for attention skills is Demirova's (2008) research. Demirova (2008) presented in her study that piano education affects the attention skills of elementary school children positively. Also, Kuscu (2010) stated that the attention skills of preschool children improve significantly because of musical activities including Orff Schulwerk approach. In accordance with the international



and national studies mentioned above, it can be stated that studies show the significant effect of music education, particularly piano education on children's development.

Attentive study and long-term concentration are two important factors of playing piano, which is among the instruments that are suitable to begin at an early age. Attention has the same importance in every school, education system and curriculum. In this context, the relationship between playing the piano and attention that is defined as a bridge or a tool between the students' musical improvement and their performing this on the piano by Demirova (2008) is detected.

## PROBLEM SITUATION

During the education of a child, school success is one of the most concerned issues by the parents and teachers. There are many factors playing a role in school success, and a child not being able to focus on a subject plays a negative role in his/her school life as well. This problem occurs when the child starts elementary school, and he/she is expected to focus on a subject. However, focusing on a subject can be taught by an education starting at an early age (Ozdogan, 2001). Attention, as it is seen, is an ability that can be improved. The researchers stated that in order for children to be able to concentrate and to improve their attention span, music education could be an effective tool. However, piano education having effect on children's attention skills has not been a subject except for a few research. Accordingly, the problem sentence of this research has been determined as: Is piano education effective on the attention skills of 7-12-year-old children? Research questions have been considered to provide an opportunity to solve the problem of the research.

## Research questions

1. Is there a significant interaction effect between group (experimental and control) and test (pretest and posttest) factors on reading black and white (RBW)?
2. Is there a significant interaction effect between group and test factors on naming the colour of square patches (NCS)?
3. Is there a significant interaction effect between group and test factors on reading the coloured words (RCW)?
4. Is there a significant interaction effect between group and test (pretest and posttest) factors on saying the colours of the coloured words (SCCW)?
5. Is there a significant interaction effect between group and test factors on time difference between SCCW and RCW?
6. Is there a significant interaction effect between group and test factors on wrong answers?

7. Is there a significant interaction effect between group and test factors on spontaneous recovery numbers?

## Research objective

In this research, the aim is to determine the effects of piano education on the attention skills of 7-12-year-old children.

## Importance

This research is considered important for the following reasons;

1. Being one of the first studies on determining the effects of piano education on the attention skills of children.
2. By stating the effect of piano education on the attention skills of 7-12-year-old children.
3. By being beneficial and being a resource for the institutions giving piano education, teachers and students and the researches on this subject.

## Assumptions

In this research it is assumed that;

1. Children have responded to the instructions sincerely, caringly and carefully during the Stroop Test applications;
2. Stroop test is an effective tool for measuring attention.

## Limitations

Research is limited by:

1. 46 students taking piano education and 53 students who do not take piano education at the age of 7-12 in Bursa province.
2. An application period of fourteen weeks on piano education.
3. Stroop Colour-Word Test which is used in order to determine the attention skills of students and personal information form.
4. Statistical analyses on Stroop Colour-Word Test.

## METHODS

In this chapter, model, population and sample of the research; data collection tools used in the research; and collection and analyses of data are studied.

## Model of the research

This study is conducted using a mixed factorial design. According to Fraenkel et al. (2012), factorial designs are experimental designs

**Table 1.** Age Distribution of experimental and control groups.

Age	Experimental group						Control group					
	Female		Male		Total		Female		Male		Total	
	f	%	f	%	f	%	f	%	f	%	f	%
7	8	17,4	2	4,3	10	21,7	7	13,2	4	7,5	11	20,8
8	2	4,3	1	2,2	3	6,5	3	5,7	1	1,9	4	7,5
9	6	13,0	4	8,7	10	21,7	6	11,3	5	9,4	11	20,8
10	4	8,7	2	4,3	6	13,0	6	11,3	1	1,9	7	13,2
11	5	10,9	0	0,0	5	10,9	6	11,3	0	0,0	6	11,3
12	9	19,6	3	6,5	12	26,1	12	22,6	2	3,8	14	26,4
Total	34	73,9	12	26,1	46	100	40	75,5	13	24,5	53	100

that involve two or more independent variables, at least one of which are manipulated. Field (2013) classifies the factorial designs according to whether the independent variables are measured using different or the same entities. If the independent variables are measured using different entities the design is called independent factorial design, and if they are measured using the same entities the design is called repeated-measures factorial design. If some independent variables are measured with different entities, whereas others used the same entities the design is called a mixed design.

In this study, we have two independent variables; the first one is the group factor which has two levels (experimental group – control group), while the second one is the test factor which also has two levels (pretest-posttest).

The attention skills of both groups are measured before the experiment. The experimental group had private piano lesson an hour a week for 14 weeks with one of the researcher who is a piano tutor. As a result of the cooperation with the parents, the pianist researchers also controlled the students practising piano on their own at home. Each lesson has been planned by researchers with a curriculum including musical content such as technical studies (scales, arpeggios etc.) pieces, and sight reading practices. After the test, both of the experimental and control groups are measured again.

### Study group

Study group of this research consists of 99 7-12-year-old elementary school students in Bursa, some of whom have had piano education (experimental group  $n=46$ ) and who have not had piano education (control group  $n=53$ ) in the 2017-2018 spring term. The research was originally planned to be done with 110 students, 55 of them in the experimental group and 55 in control group; however, students who could not take the posttest due to private reasons have not been evaluated, and data of 99 students, 53 in control group and 46 in experimental group, was used. In determining the sample group, homogeneous sampling among purposive sampling types was used.

Purposive (purposeful) sampling is a non-probability and selective sampling approach. The purposive approach allows selecting and studying highly informative situations deeply according to the purpose of the study (Buyukozturk et al., 2010). On the other hand, homogeneous sampling is selecting a homogeneous subgroup or situation related with the problem of the research among the population and studying on it (Buyukozturk et al., 2010). The experimental group consists of 46 students (34 female and 12 male) between the ages of 7-12 who are studying in elementary private schools in Bursa and have private piano lessons. The control group is formed by the students ( $n=53$ ) that are also studying in a private school (Private Nilufer Yonder

Elementary and Secondary School) in the same city to ensure that the economical statue of the families are nearly same with the students' families of experimental group. The students on the control group do not have any private lesson of piano or another instrument and do not do any activity that is believed to be improving attention. In the control group, the number of female and male students and their age distribution were specially paid attention to. Table 1 represents the age distribution of the students.

### Criteria for being selected for experimental group

Selected children should:

- i. Be at the ages of 7-12.
- ii. Have no psychological (attention deficit, hyperactivity problems, specific learning disability etc) and physical complaints.
- iii. Have started piano education at least 2 months ago.

### Criteria for being selected for control group

Children being selected should:

- i. Not be playing the piano or any other instruments or doing any activities that are believed to improve attention.
- ii. Be between ages 7-12.
- iii. Not have any psychological (lack of attention, hyperactivity problems, specific learning disorder etc.) or physical (visual or auditive etc.) complaints.

### Data collection tools

Information about people's attention span are obtained from neuroimaging studies, zoological experiments, electrophysiologic and neuropsychologic data (Kilic, 2002). In this study it was preferred to use neuropsychological test. The piano is a polyphonic instrument having a wide sound range. Thus piano, unlike most of the other music instruments lets treble clef (G clef) notes and bass clef (C clef) notes be played at the same time. Playing the notes which differ according to the clefs on both staves (for instance in treble clef on the first line is note E while in bass clef it is G) makes the student affected by the interference effect of attention. That is why the data about students attention levels were collected by the Stroop Colour-Word Test. Stroop test is a neuropsychological test capturing the frontal lobe activity. McKeen Cattell (as cited in Karakas et al. (1999) discovered that telling names of objects or colours takes more time than reading words about them while improving this test; and Stroop showed that it was simply a colour-word interference effect in 1935. According to Glaser and Glaser (as cited in Karakas et al. (1999)) Stroop test reflects three basic

**Table 2.** Descriptive statistics of the RBW response times.

Test	Group	M	SD	N
Pretest	Control	41.99	18.276	53
	Experimental	42.27	20.437	46
Posttest	Control	34.87	9.360	53
	Experimental	30.46	8.572	46

courses; selective attention, reading and saying colours. Likewise, it works as a critical experimental job used frequently for studying data processing speed and parallel processing models. According to MacLeod (as cited in Karakas et al. (1999)) not only is this test used for evaluating regular persons' cognitive processes but also evaluating several psychiatric and neurological disorders.

In accordance with the literature review, the cognitive processes which Stroop test measures are stated as focused attention, selective attention, reaction inhibition, resistance to interference effect and data processing speed (Karakas and Dincer, 2011). The phenomenon known as Stroop interference effect is not being able to inhibit, and occurs when naming the colours take more time than reading actual words of colours (Karakas and Dincer, 2011). There are several Stroop tests applied individually and formed on the basis of naming the colours which are printed in different colours than they actually are. These are 3 card original Stroop test which is arranged in 10 columns with 5 items each; 3 card Nehemkis and Lewinsohn form which consists of 100 items; single card Dodriform consisting of 178 items; and 3 card Victoria form consisting of 6 lines with 4 items each (Karakas and Dincer, 2011). There is a version of this test which has musical notes instead of word and colour elements as well (the musical Stroop effect) (Gregoire et al., 2013).

In the current research, a registration form is generated for gathering personal information and demographic qualifications of children, 4 stage Stroop Colour-Word test which was confirmed to be valid in the age of 7-12 by Elmastas (2000) was used for collecting data. Aforesaid stages are explained below as presented in Appendix 1.

#### 1. Card - "Reading Black & White" (RBW)

Name colours which are printed black on a white background is a quality of the original Stroop Test. This stage has the characteristics of a control stage which determines the fundamental level of reading and data processing speed.

#### 2. Card - "Naming the Colour of Square Patches" (NCS)

This is a control stage determining the fundamental level of speed of data processing and naming colours by naming red, blue and green squares printed on white background.

#### 3. Card- "Reading the Coloured Words" (RCW)

Different colours printed on a white background are expected to be named. Each word is printed in a different colour than its actual colour, and this is the main stimulant of Stroop Tests. Naming the Coloured Words are related to interference effect.

#### 4. Card - "Saying the Colours of the Coloured Words" (SCCW)

Saying the colours of the different coloured words printed on a white background is expected. Stroop effect occurs when the colour used in printing the word and actual colour of the word is different from each other. On this stage, Stroop interference effect occurs when the person focuses on saying the colour of the word but also has a tendency to read the coloured word. Being able to say the colour despite this tendency requires flexibility, perceptive configuration, and shifting attention and behaviour. Stroop Tests

are stated to measure attention other than naming colours and reading (focused attention) (Karakas and Dincer, 2011; Kilic et al., 2002; Karakas et al., 1999).

### Collecting and analysing data

Before collecting data, permission was taken from the ethics committee of Uludag University. Data was collected via Stroop Colour-Word Test and analysed statistically. Before the test was given, students in the experimental and control groups had been informed; required permissions had been taken from the parents for the experimental group and from the Ministry of National Education for the control group. The environment had been set and needed material had been put on the table before the Stroop Colour-Word Test was given. External factors which would distract students such as noise and light were taken under control. Before starting, instructions of Stroop Colour-Word Test were read to the students and explanations were made about how to answer the test. Afterwards, the cards were given to the students in the order mentioned above, and time span and number of wrong answers for each test were recorded. The assessment was completed in approximately 10 min.

As this test was given to healthy individuals, neuropsychological results of the test stages were ignored, and the differences between the children who take and do not take piano lessons were emphasised. In analysing the data, SPSS 23.0 packaged software and 2x2 mixed ANOVA's were used. Independent factors were determined as group (experimental group and control group) and time (pretest-posttest). Dependent variables are response time for RBW, response time for NCS, response time for RCW, response time for SCCW, time difference between RCW and SCCW, number of wrong answers, and spontaneous recovery numbers. Different ANOVA's were used for each dependent variable.

## FINDINGS AND DISCUSSION

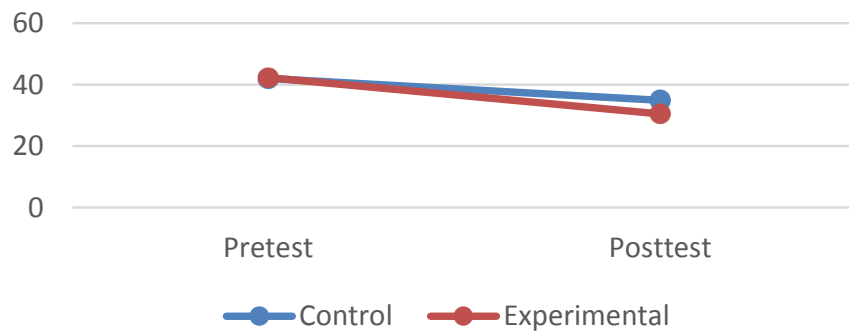
### First research question

Table 2 shows RBW response time means and standard deviations in seconds, while Table 3 represents the ANOVA results for RBW response times.

In Table 3 when RBW time spans are examined, it can be seen that the main effect of the test factor was significant:  $F(1, 97) = 49.384, p = <.001$ . This case shows that when response time is examined (evaluating two groups as one), answers of the posttest ( $M = 32.82$ ) were given faster than the pretest ( $M = 42.12$ ). Main effect of the group variable was not significant,  $F(1, 97) = 0.576, p = 0.450$ . This case shows (evaluating pre and posttests as one), response time of the control group ( $M$

**Table 3.** Analyses of RBW response times.

Source of variance		SS	Df	MS	F	p
Within groups	Test	4414.7	1	4414.67	49.384	<.001
	Test * group	271.1	1	271.07	3.032	0.085
	Residual	8671.2	97	89.39	-	-
Between groups	Group	209.9	1	209.9	0.576	0.450
	Residual	35353.7	97	364.5	-	-



**Chart 1.** Change in the RBW time of the groups.

**Table 4.** Descriptive statistics of the NCS response times.

Test	Group	M	SD	N
Pretest	Control	51.27	13.87	53
	Experimental	50.23	13.54	46
Control	Control	47.72	12.54	53
	Experimental	42.27	12.05	46

= 38.43) and the experimental group ( $M = 36,37$ ) were not significantly different. Interaction was not significant,  $F(1, 97) = 3.032, p = 0.085$ . This situation shows that the acceleration in the experimental group (pretest = 42.27, posttest = 30.46), was not significantly more than the acceleration in control group (pretest = 41.99, posttest = 34.87). As seen in Chart 1, both of the groups have shorter response time in the posttest. Although the experimental group is seen to have accelerated more than the control group, the difference was not significant.

**Second research question**

Table 4 shows NCS response time means and standard deviations in seconds, while Table 5 represents the ANOVA results for NCS response times.

When NCS time spans are examined, effects of the test factor were significant,  $F(1, 97) = 88.66, p = <.001$ . This situation shows that responses of the posttest ( $M =$

45.19) were faster than the pretest ( $M = 50.78$ ). Main effect of group factor was not found significant,  $F(1, 97) = 1.613, p = 0.207$ . This case shows that there was not a significant difference between response times of the control group ( $M = 49.50$ ) and experimental group ( $M = 46.25$ ). Test \* Group interaction was found to be significant,  $F(1, 97) = 13.06, p = <.001$ . This situation shows that acceleration of the experimental group (pretest= 50,23, posttest= 42,27) was more than the acceleration of control group (pretest = 51,27, posttest = 47,72). As seen on Chart 2, experimental group has accelerated significantly more than the control group.

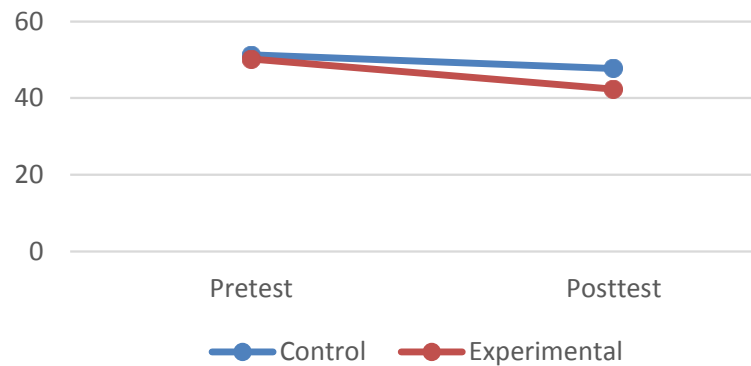
**Third research question**

Table 6 shows RCW response time means and standard deviations in seconds, while Table 7 represents the ANOVA results for RCW response times.

When RCW time spans were examined, it is seen that

**Table 5.** Analysis of the NCS response times.

Source of variance		SS	df	MS	F	p
Within groups	Test	1630.1	1	1630.09	88.66	< .001
	Test * group	240.1	1	240.05	13.06	< .001
	Residual	1783.5	97	18.39	-	-
Between groups	Group	518.3	1	518.3	1.613	0.207
	Residual	31174.8	97	321.4	-	-

**Chart 2.** Change in the NCS times of the groups.**Table 6.** Descriptive statistics of the RCW response times.

Test	Group	M	SD	N
Pretest	Control	43.37	18.204	53
	Experimental	43.80	21.596	46
Control	Control	38.09	12.689	53
	Experimental	33.44	9.833	46

**Table 7.** Analysis of RCW response times.

Source of variance		SS	df	MS	F	p
Within groups	Test	3012.1	1	3012.13	43.969	< .001
	Test * group	318.4	1	318.39	4.648	0.034
	Residual	6645.1	97	68.51	-	-
Between groups	Group	218.9	1	218.9	0.479	0.490
	Residual	456.7	97	456.7	-	-

the effect of the test factor was significant,  $F(1, 97) = 43.969$ ,  $p < .001$ . This situation shows that response times on posttest ( $M = 35.93$ ) were shorter than the response times of the pretest ( $M = 43.57$ ). Main effect of the group factor was not significant,  $F(1, 97) = 0.476$ ,  $p = 0.490$ . This situation shows that there was not a significant difference between the response times of the

control group ( $M = 40.73$ ) and experimental group ( $M = 38.62$ ). Test \* Group interaction was significant,  $F(1, 97) = 4.648$ ,  $p = 0.034$ . This case shows that acceleration of the experimental group (pretest = 43.80, posttest = 33.44) was significantly higher than the control group (pretest = 43.37, posttest = 38.09). As seen in Chart 3, the experimental group has accelerated significantly

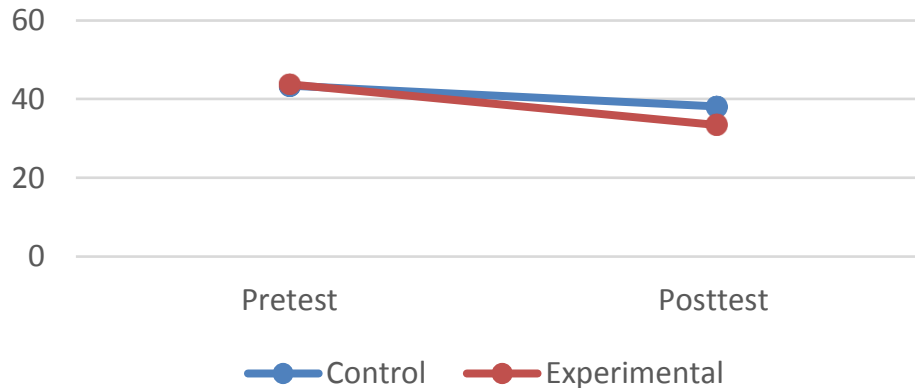


Chart 3. Change in the RCW times of the groups.

Table 8. Descriptive statistics of the SCCW response times.

Test	Group	M	SD	N
Pretest	Control	105.04	43.42	53
	Experimental	100.09	34.14	46
Posttest	Control	94.58	43.14	53
	Experimental	81.54	30.68	46

Table 9. Analysis of the SCCW response times.

Source of variance		SS	df	MS	F	p
Within groups	Test	10360.2	1	10360.2	44.165	< .001
	Test * group	805.3	1	805.3	3.433	0.067
	Residual	22754.3	97	234.6	-	-
Between groups	Group	3986	1	3986	1.449	0.232
	Residual	266879	97	2751	-	-

higher than the control group.

**Fourth research question**

Table 8 shows SCCW response time means and standard deviations in seconds, while Table 9 represents the ANOVA results for SCCW response times.

When SCCW time spans are examined, the main effect of the test factor is seen to be significant,  $F(1, 97) = 44.165, p = <.001$ . This case shows that response times in the posttest were ( $M = 88.52$ ) shorter than the response time in the pretest ( $M = 102.74$ ). Effect of the group factor is not found significant,  $F(1, 97) = 1.449, p = 0.232$ . This situation shows that response times of the control group ( $M = 99.81$ ) and the experimental group ( $M$

$= 90.82$ ) were not significantly different. Test \* Group interaction was not significant,  $F(1, 97) = 3.433, p = 0.067$ . This situation shows the acceleration of the experimental group (pretest = 100.09, posttest = 81.54 ) was not significantly higher than the acceleration of the control group (pretest = 105.04, posttest = 94.58). As seen on Chart 4, response times of both groups were shortened. Although the experimental group is seen to be accelerated higher, this was not found statistically significant.

**Fifth research question**

Table 10 shows SCCW-RCW time difference means and standard deviations in seconds, while Table 11 represents

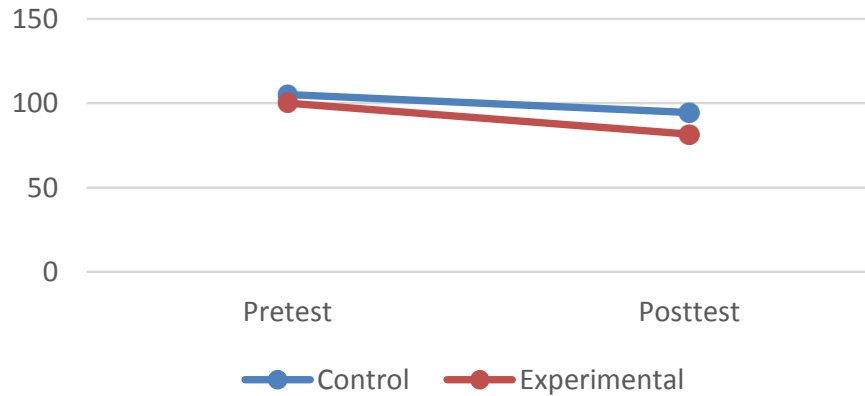


Chart 4. Change in the SCCW times of the groups.

Table 10. Descriptive statistics of time differences between SCCW and RCW.

Test	Group	M	SD	N
Pretest	Control	61.67	36.80	53
	Experimental	56.28	31.12	46
Posttest	Control	56.49	35.96	53
	Experimental	48.10	24.20	46

Table 11. Analysis of time difference between SCCW and RCW.

Source of variance		SS	df	MS	F	p
Within groups	Test	2199.8	1	2199.8	5.481	0.021
	Test * group	111.0	1	111.0	0.276	0.600
	Residual	38930.1	97	401.3		
Between groups	Group	2337	1	2337	1.344	0.249
	Residual	168674	97	1739		

the ANOVA results for SCCW-RCW time differences.

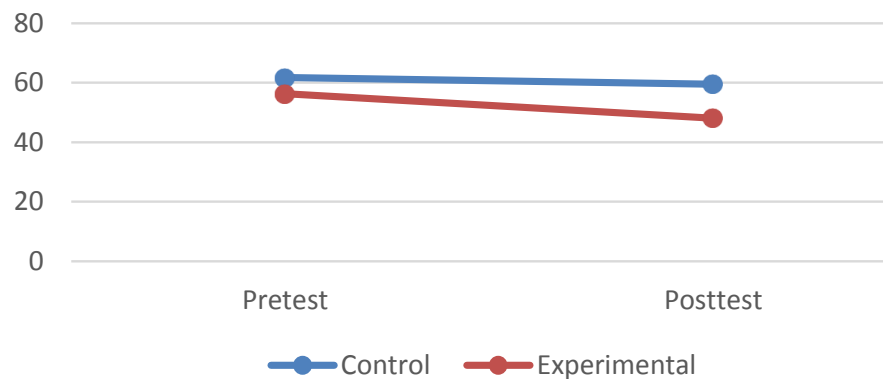
When time differences are examined, it is seen that the main effect of test variable was significant,  $F(1, 97) = 5.481, p = 0.021$ . This situation shows that time differences were less in the posttest ( $M = 52.59$ ) than the pretest ( $M = 59.17$ ). Main effect of the group factor was not found significant,  $F(1, 97) = 1.344, p = 0.249$ . This situation shows that there was not a significant difference between the control group ( $M = 59.08$ ) and experimental group ( $M = 52.19$ ). Test \* Group interaction was not found significant,  $F(1, 97) = 0.276, p = 0.600$ . This situation shows that the decrease in the time differences of the experimental group (pretest = 56.28, posttest = 48.10) was not significantly higher than the control group (pretest = 61.67, posttest = 59.49). As seen on Chart 5, time differences decreased in both groups. As much the difference in the experimental group looks higher, this

case was not found statistically meaningful.

### Sixth research question

Table 12 shows the wrong number means and standard deviations, while Table 13 represents the ANOVA results for wrong numbers.

When the number of wrong answers is examined, it is seen that the main effect of the test factor is not significant,  $F(1, 97) = 1.689, p = 0.197$ . This situation shows that the number of wrong answers in the posttest ( $M = 0.909$ ) is close to the number of wrong answers in the pretest ( $M = 1.394$ ). Main effect of the group variable is not found significant,  $F(1, 97) = 0.062, p = 0.803$ . This situation shows that there was not a significant difference group ( $M = 1.264$ ) and experimental group ( $M = 1.174$ ).



**Chart 5.** Change in the time differences of the groups.

**Table 12.** Descriptive statistics of number of wrong answers.

Test	Group	M	SD	N
Pretest	Control	1.302	2.407	53
	Experimental	1.500	1.835	46
Posttest	Control	1.226	2.407	53
	Experimental	0.848	2.328	46

**Table 13.** Analysis of the number of wrong answers.

Source of variance		SS	df	MS	F	p
Within groups	Test	6.519	1	6.519	1.686	0.197
	Test * group	4.095	1	4.095	1.059	0.306
	Residual	375.066	97	3.867	-	-
Between groups	Group	0.401	1	0.401	0.062	0.803
	Residual	622.821	97	6.421	-	-

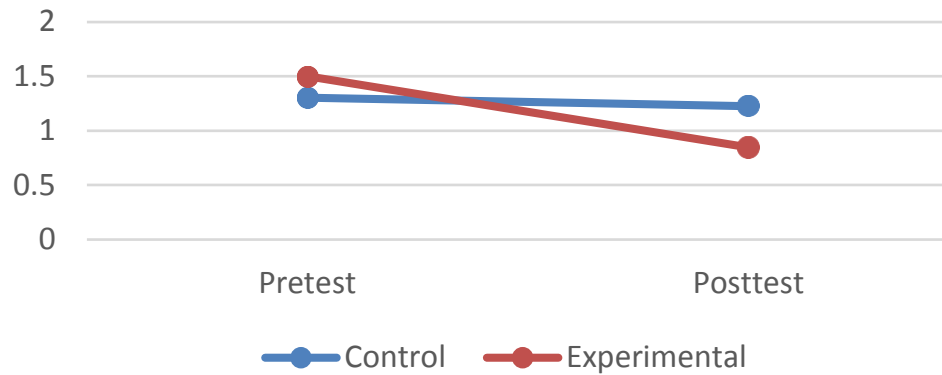
Test \* Group Interaction was not found significant,  $F(1, 97) = 1.059$ ,  $p = 0.306$ . This situation shows that the decrease in the number of the wrong answers of experimental group (pretest = 1,500, posttest=0,846) was not significantly higher than the decrease in the control group (pretest = 1,302, posttest = 1,226). As seen in Chart 6, there is a decrease in the number of wrong answers in both of the groups. Even though the decrease in the number of wrong answers in the experimental group looks higher than the control group, this case was not found statistically meaningful.

### Seventh research question

Table 14 shows spontaneous recovery number means and standard deviations, while Table 15 represents the ANOVA results for spontaneous recovery numbers.

When spontaneous recovery numbers are examined, the main effect of the test factor is seen to be significant,  $F(1, 97) = 17.14$ ,  $p = <.001$ . This situation shows that spontaneous recovery numbers in the posttest ( $M = 1.051$ ) were less than the recoveries in the pretest ( $M = 1.818$ ). Main effect of the group variable was not found significant,  $F(1, 97) = 0.826$ ,  $p = 0.366$ . This situation shows that there was not a significant difference between the spontaneous recovery numbers of the control group ( $M = 1.529$ ) and the experimental group ( $M = 1.326$ ). Test \* Group interaction was found significant,  $F(1, 97) = 10.10$ ,  $p = 0.002$ . This case shows that the decrease in the spontaneous recovery numbers in the experimental group (pretest = 2.043, posttest = 0.609) was significantly higher than the decrease in the control group (pretest = 1.623, posttest = 1.434). As seen in Chart 7, the decrease in the spontaneous recovery numbers of the experimental group is significantly higher than the decrease in the





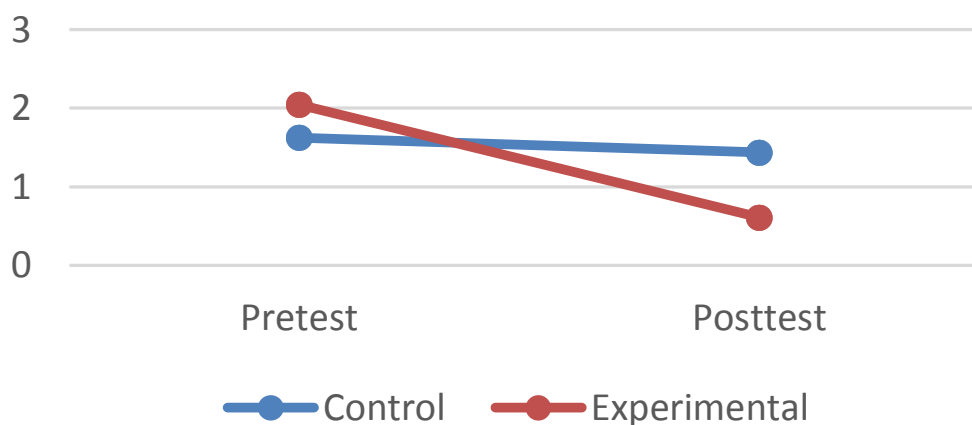
**Chart 6.** Change in the number of wrong answers in the group.

**Table 14.** Descriptive statistics of spontaneous recovery numbers.

Test	Group	M	SD	N
Pretest	Control	1.623	1.584	53
	Experimental	2.043	1.788	46
Posttest	Control	1.434	1.448	53
	Experimental	0.609	0.906	46

**Table 15.** Analysis of spontaneous recovery numbers.

Source of variance		SS	df	MS	F	p
Within groups	Test	32.45	1	32.453	17.14	< .001
	Test * Group	19.12	1	19.120	10.10	0.002
	Residual	183.71	97	1.894	-	-
Between groups	Group	2.014	1	2.014	0.826	0.366
	Residual	236.632	97	2.440	-	-



**Chart 7.** Change in the spontaneous recovery numbers in the groups.

control group.

## Conclusion

In the research, the effects of piano education given to 7-12-year-old children on attention skills are shown. The level of the effects of piano education on attention skills of children is measured by the Stroop Colour-Word Test consisting of 4 parts. Experimental group and control group are stated to have different levels of success in 4 parts of Stroop Colour-Word Test. Accordingly, in the *black and white reading* part, two groups are seen to get shorter reading time and no significant difference has occurred. This part of the test serves as quality of control, determining the basic level of reading and data processing speed. Thus, this result states that children in both groups show similar qualities and have similar differences in their data processing speed. In *name the colour of square patches* part of the test, which is for controlling the basic level of data processing speed; reading time of two groups in the posttest is shorter than the pretest. However, an increase in the speed of the experimental group is seen to be considerably more than the control group. In the RCW section, reading time of both groups in the posttest were shorter than the ones in the pretest. However, in the experimental group, which consists of children having piano education, the acceleration is seen to be significantly more than the control group of children who do not have piano education. In the *saying the colours of coloured words* section, the reading time of both groups got shorter similarly, and there was not a significant difference between the groups. In the study, in all the applied sections, the *coloured word* tests results, it was seen that children having piano education have improved their attention skills statistically more than the children who are not having piano education. Children having piano education are considered to be more careful about the aliasing effect and their perception to be improved.

Stroop test is usually used on determining the attention skills of children having neurologically or psychiatric disorders. In literature, it is seen than the aforesaid test has not been used widely in music education. In the literature review, researches on several sports branches such as chess (Kaynar, 2014), skiing (Goktepe et al., 2016), golf (Tunc, 2013), orienteering (Atakurt et al., 2017) were found, whereas there is a limited number of researches found on the effects of piano education which would be compared to the findings of current researches. One of these few researches is of Yesil and Unal (2017). In the mentioned research, Stroop test is given to 1st and 4th-grade children in order to determine the effect of music education on the attention and working memory of adults. It was stated that long term systematic music education has no significant effect on attention skills; however, in some test requiring active use of working memory, improvements were found. Systematic and

intensive music practice in adults is thought to have positive effects on cognition (Yesil and Unal, 2017).

Another research stating the effect of piano education on attention (Ciftci and Ozelma, 2017) has corresponding results with our current results. In the research, 4th-grade students have been given half an hour piano education two times a week for 6 months; consequently, a significant improvement on their attention and concentration, general learning skills, school success, psychomotor skills and mental development was found. According to Demirova (2008), results showing that piano lessons have a positive effect on children who are examined in the research are also corresponding with current research results.

## Recommendation

1. It is recommended to make new and various researches showing the effect of piano education on attention skills of children using various measurement tools and methods.
2. The current study is limited by 14 weeks. Piano education is a long term education and its benefits on mental skills increase is directly proportional to the time spent. Thus, it is recommended to make longer-term researches to measure the effects of piano education on attention skills.
3. The experimental group of the current research consists of students having private piano lessons 1 hour a week. Major students in conservatories of music spend more time with their instruments during a day. Researches made with these students might provide different results on the effects of piano on attention. Improvement of a sample group chosen among conservatory students in their attention skills as from the first year of their instrument training can be seen.
4. Research is made on 46 students who have private piano education. Similar research can be made increasing the number of students.
5. Attention skills of sample group consisting of private piano students are measured via Stroop test. Data taken via Stroop Test can be used as an 'enriched pattern' and that can be supported by the parent, student and teacher opinions.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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*Full Length Research Paper*

# **Finnish principals: Leadership training and views on distributed leadership**

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**This study looks at the views of Finnish comprehensive school principals on distributed leadership and presents discussion on the leadership training required by principals and looks at it in relation to the views of principals. In Finland the qualification requirements for principals are based on their experience as teachers, and studies in educational administration. In general, studies in leadership are not mandatory. In terms of distributed leadership, one relevant question is the way distribution happens. Is it based on delegation of tasks or does it happen in interaction between teachers and principal? The data were principals' responses to an electronic survey (n=71). The respondents represented 71 schools around Finland. The results showed that principals viewed distributed leadership differently depending on the type of question. In the Likert-scale questions they (n=71) emphasised distributed leadership as an interaction between principal and teachers and their situations, whereas in open-ended answers (n=44) the delegation had a bigger role. In terms of training background, the results indicate that principals (n=13) having university studies in educational leadership and administration emphasised more distributed leadership as an interaction than principals having other types of training. This paper poses questions concerning the content and structure of educational leadership training. Further, this study implies that there is a growing need to examine educational leadership in terms of training, and views concerning leadership structures and practices in schools.**

**Key words:** Distributed leadership, educational leadership, leadership training, principal.

## **INTRODUCTION**

The tasks and responsibilities related to principals' work have expanded and have become more complex during recent decades, and that observation also applies to Finnish principals. In general, the duties of Finnish comprehensive school principals include multiple administrative tasks and meetings, responsibilities related to the organization of school level education, curriculum

work, and support for the development of the whole work community (FNBE, 2013). This internationally-identified trend in the role of a school leader has led to examinations and theory-building concerning the profession itself. There have been various approaches to educational leadership that aim to conceptualize the phenomenon (Dinham, 2016), and to support and

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develop the field of educational leadership.

This article focuses on distributed leadership that has been one popular way to solve the challenges met by principals in their everyday work for some decades. Distributed leadership has been understood in this study through two aspects: distributed leadership as delegation of predetermined tasks and distributed leadership as interaction between principals and teachers and their situations that take place in the official and unofficial structures of school environments. The data are Finnish comprehensive school principals' responses to principal survey in 2017 (n=71). This paper looks at the principals' views on distributed leadership, and in addition, considers whether the leadership training influences principals' views on distributed leadership. This article answers the following three research questions, first, to what extent do the principals view distributed leadership as interaction between the principal, teachers and their situations? Second, to what extent do the principals view distributed leadership as the delegation of predetermined tasks? And third, does the leadership training principals have undertaken affect their views on distributed leadership?

### Defining distributed leadership

Due to the simultaneous development of classical leadership theories and public school from the beginning of the 20th century, it is not surprising that the views on leadership dominating the industrial branch influenced the way leadership was realised in the school contexts as well. That approach emphasised strong top-down management in which the leader told the subordinates what they needed to do, and these orders were not to be questioned (Brasof, 2017). Consequently, these trends have affected research done in the field, and for a relatively long period of time, the research interest has been in the actions of leaders holding the top positions. During the past few decades, research and theory-building have increasingly started to take an interest in the leadership structures in schools, such as the work of leadership teams and distribution of leadership tasks. Evidently, leadership no longer belongs to principals only but has been understood as a wider phenomenon including all professionals working in school communities (Dinham, 2016). Furthermore, recent research indicates that distribution of leadership tasks may support teachers' professional capacity building, and through that develop their teaching and learning (Brasof, 2017; cf. King and Stevenson, 2017). Also, principals have found distributed leadership as meaningful aim for development, and they see that it is important to encourage teachers to participate more in leadership processes (Dinham et al., 2018)

Despite being a multifaceted concept lacking one solid definition (Tian, 2016), distributed leadership in its

various conceptualizations shares some core features that are characteristic to it. Firstly, distributed leadership emphasises the group or network as quality of leadership, and secondly, it makes leadership available to various groups. Thirdly, it assumes that knowledge and know-how are qualities of many rather than of just a few. In general, existing approaches to distributed leadership reveal the variety of understandings concerning its essence. For example, distributed leadership can be defined as a continuum consisting of two opposite ends, of which one is defined as authoritarian leadership and the other as chaos (Kyllönen, 2011) or it may be formulated around two conceptualizations, leader-plus and practice (Spillane and Healey, 2010). In the leader-plus and practice approach, leader-plus defines leadership distribution as happening through formal positions in which principal shares leadership tasks with assigned individuals, such as curriculum experts and leadership team members, whereas practice focuses on the composition of the leadership structure, who and how many participate in the leadership (Spillane and Healey, 2010). This latter practice also pays attention to principals, leadership team members, and others coming from the formal positions, but it widens the scope. It emphasises the aspect of interaction within them, and further, between them and the others working in the same school community (Spillane and Healey, 2010). Moreover, it looks at leadership distribution between the actors who happen to be in the right time in the right place (situation) and who have the knowledge (ability) needed for successfully carrying out the task at hand (Sergiovanni, 2007). In addition, it has been stated that the real meaning of distributed leadership is located in the recognition and development of teachers' expertise which may be stay unrelaxed and underdeveloped if the focus is purely on redistribution of responsibilities (Dinham, 2016).

This study employs the approaches of leader-plus and practice. Distributed leadership is understood and examined as a structure, a phenomenon consisting of two aspects of which one has been formed from a school's official structures (e.g. leadership team) and the tasks delegated by the principal, and the other emphasises interactive situations between the principal and the leadership team, and also interaction within the official and unofficial structures of the school. This interpretation of distributed leadership has already been examined in a study conducted in a large Finnish city, in which Lahtero et al. (2017) looked at how the views of principals and leadership team members on distributed leadership settled on this structure divided between views on delegation and interaction. In that study, results showed that when the views on distributed leadership as delegation increased, the views on it as interaction in situations decreased, and further, when the view emphasising delegation decreased, it increased the views on it as interaction in situations.

The study introduced here widens the scope used in

the earlier (Lahtero et al., 2017) study that focused only on one Finnish city promoting distributed leadership as a local definition of policy for educational leadership in comprehensive schools and examines whether there are differences in how the principals view leadership distribution around the country. However, the premise in this study regarding this aspect is that principals have an understanding about distributed leadership, and further, most of them realise it at some level. This pre-understanding is based on an observation stating that the Finnish principals generally share and distribute their tasks (Taajamo et al., 2014), which is in line with education policy guidelines that define distributed leadership as a precondition for the realization of pedagogical leadership in basic education context (FNBE, 2013).

Within this frame that understands distributed leadership as a structure consisting of aspects described as delegation and interaction, delegation may be interpreted as being the first step towards the actual distribution of leadership (Fonsen, 2014), and when put in the context of this study, delegation of separate leadership tasks seems to be the most typical way to realise distributed leadership in Finnish schools (Kyllönen, 2011). Nevertheless, delegation certainly improves the quality of the decisions that are made, especially then when the knowledge guiding the decision-making process the participating subordinates have exceeds that of the principal. In principle, delegation of minor tasks can lighten a principal's work load, and give the principal more time and energy to concentrate on their other duties. Even though certain tasks are undoubtedly tied to the official leadership position, successful leadership as a whole is supported through teachers' active participation in the school's development work, and benefits from this. Therefore, it is fruitful to approach distributed leadership from a perspective of dynamic interaction between the principal and teachers, and not diminishing its potential by limiting it to narrowly-delegated leadership tasks among selected individuals. In its interactive form, distributed leadership will become visible not only in formal and in advance settled structures but also in informal roles and relationships between all working in the school community (Duif et al., 2013). Moreover, it is important that discourses concerning the challenges met in the school community engage its members rather than alienate them. It is equally important that the school structurally is a place that opens up opportunities for people to transform emerging ideas into actual practices, and invites them to do so (Brasof, 2017). Within that frame, leadership finds its form and essence in the interaction between the principal and teachers, and not in isolated actions conducted by the principal alone. Further, the leadership as such will have a different meaning when the decision-making process is guided by collective discourses instead of by hierarchical structures (Juuti, 2013), and ongoing interaction also increases the

possibility for people ending up having a shared understanding about the practices in their organisation. Therefore, from a research perspective it would be important to pay attention to leadership practices formed from the interactions between principals, teachers, and their situations, not just to isolated leadership acts (Spillane and Healey, 2010).

### **Finnish principals' qualification requirements and professional development**

What is common at the European level is that qualification requirements for principals in most countries often include aspects of administration and a teaching background in terms of both education and work experience (Kumpulainen, 2016). Furthermore, in the Finnish education context, the municipalities responsible for organizing education are autonomous actors, and therefore the educational leadership structure and the degree of school autonomy vary between municipalities and sometimes even between schools within the same municipality. Consequently, teacher and substitute teacher recruitment may also be included in the principals' duties (FNBE, 2013). Across Europe, the degree of autonomy of schools varies between the EU countries, and so does the autonomy and responsibilities of school principals. In general, there seems to be more autonomy in the principals' work in deciding on course content and school budget allocations than in deciding on teaching staff recruitment. In Finland many principals also teach along with their leadership duties, which may not be the case in some other European countries, such as Sweden, Norway, and Estonia (Taajamo et al., 2014).

According to the current decree on educational personnel (Asetus opetustoimen henkilöstön kelpoisuusvaatimuksista 986/1998) the qualification requirements for principals comprises four main areas which are a master's degree, a teaching qualification relevant to the educational level in question, work experience as a teacher, and a certificate in educational administration approved by the Finnish National Board of Education (15 credit points), university studies in educational leadership and administration (minimum 25 credit points) or other knowledge on educational administration. These alternative forms of training have the same basic core, namely an education degree approved by the Finnish National Board of Education. That degree is formed around five focus areas including studies in public law and administration concerning municipalities, education, personnel, and finance. University studies on educational leadership and administration add to that an introduction to the principal's work by becoming familiar with the literature and research concerning educational leadership, and doing interviews with experienced principals (Taipale, 2012, 26).

Local education organizers (that is often municipalities) have their own policies and aims for professional development, and they may prefer certain training programmes. The professional leadership programme is one of the programmes that local education organizers provide to their principals. This programme is partly subsidized by the state, and is convenient for municipal councils due to its low cost. The professional leadership programme consists of two parts of which one is obligatory and the other optional. The obligatory part is about practicing leadership, and participants may choose one optional topic from among human resource management, customer management, production management, and network management (FNBE, 2011). In principle, this is a valid training program for leaders. However, it is not about leadership in educational contexts and it does not include any pedagogical aspects of leadership. Therefore, it is not an academic training programme for school leaders. The participants in this programme are evaluated by professionals who happen to have strong professional knowledge in the area of leadership within which the evaluation is done (that is, the four optional parts of the programme).

In addition to these aforementioned training opportunities, the principals may participate in other in-service training programmes. However, the in-service training for Finnish principals is mainly short-term, and participation in a long-term training focusing on aspects of pedagogical leadership is only occasional (Taipale, 2012). In international comparison, Finnish comprehensive school principals on average seem to be less educated in terms of educational leadership competence than their peers in other OECD countries (Kumpulainen, 2016).

## Research questions

This study looks at educational leadership from the perspective of its distribution. The aim is to approach the distribution by following the conceptualizations used in an earlier study by Lahtero et al. (2017), and to examine the extent to which Finnish comprehensive school principals see distributed leadership as an interaction between the principal, teachers, and their situations, and the extent to which it can be seen as delegation of predetermined tasks. In addition, this study examines the leadership training that principals have and whether it affects their views on distributed leadership. The research questions are the following:

RQ1: To what extent do the principals view distributed leadership as interaction between the principal, teachers and their situations?

RQ2: To what extent do the principals view distributed leadership as the delegation of predetermined tasks?

RQ3: Does the leadership training principals have undertaken affect their views on distributed leadership?

## DATA AND METHODS

The data were gathered with a survey of school principals, a semi-structured electronic questionnaire, sent to principals at 88 Finnish comprehensive schools with the upper grades (that is, grades 7-9). The principal survey was one part of a national sample-based 9th graders' learning to learn assessment in 2017. The principal survey was sent to all 88 schools that were selected to learning to learn assessment, and thus, the schools represented by the principals were determined accordingly. One of the authors was part of the research team conducting the assessment. The response rate was 80.7% (n=71), and 42% (n=31) of respondents were women and 58% (n=40) men.

The respondents represented two types of comprehensive school, those having all grades from 1 to 9 (n=29) and schools having only the upper grades from 7 to 9 (n=42). The total number of these schools in Finland is 687 (Statistics Finland 2018). In general, schools in Finland are relatively small, and 19 of the respondents led schools having fewer than 300 pupils, 27 having 300-500 pupils, and 25 of respondents led schools that had over 500 pupils. Geographically the school sample represents Finland well, but the number of principals participating in this survey is relatively low in terms of the total number of comprehensive school types our respondents represented.

In terms of the studies on leadership, 58 of the respondents had a certificate in educational administration approved by the Finnish National Board of Education, 28 had undertaken the professional leadership programme, and 13 university studies in educational administration (25 credit points). Further, three of the aforementioned principals having the professional leadership programme qualification mentioned earlier also had university studies in educational administration (min. 25 credit points). In addition, nine respondents reported having 'other education' than the ones specified in the survey, and that category consisted of short courses in leadership and leadership experience gained in the national defence forces.

The principal survey consisted of a Likert scale and open-ended questions that were based on earlier research (Lahtero et al., 2017) and the theoretical approach to distributed leadership introduced earlier in this article. For the principal survey used in this study the Likert-scale and open-ended questions were modified to better meet the national context as the earlier research had been conducted in one Finnish city only. Further, this modification was needed because the research design of Lahtero and colleagues' research differed from the study at hand. Factor analysis was used in order to structure the answers from the Likert scale questions and to clarify distributed leadership as a phenomenon. Further, it enabled the comparison with previous research (Lahtero et al., 2017). The open-end questions were analysed using summative content analysis (Hsieh and Shannon, 2005), in which the certain words and contents related to distributed leadership were located, and the meanings given to them were examined and organized into various themes within the distributed leadership theory used in the study (Ojasalo et al., 2015). In order bring out the principals' own voices some excerpts from their written comments have been included, and the individual respondents have been referred to according to the survey question number (Q20) and the respondent number (e.g. P45 referring to principal number 45 in this study). All the excerpts have been translated from Finnish into English by the authors.

## RESULTS

Based on the Likert scale questions, two factors were formed. Factor one, Distributed leadership as interaction

**Table 1.** The factors linked to the first and the second research question.

<b>Factor 1. Distributed leadership as interaction between principal, teachers and their situations</b>	<b>Factor 2. Distributed leadership as delegation of predetermined tasks</b>
Leadership ought to be distributed among the whole school community	The leadership tasks that are distributed ought to be accurately defined
In an appropriate situation, every teacher at the school can participate in leadership	A teacher who does not possess any official leadership position cannot participate in leadership on any occasion
Distributed leadership is not restricted to the official structures of the school	In terms of practice, it is easiest to restrict the leadership to include only the principal and the leadership team
Leadership can also be distributed to teachers who do not occupy an official leadership position	The distribution of leadership tasks to teachers ought to be based on a clear delegation decision
Distributed leadership can take place spontaneously when needed	-

between the principal, teachers and their situations (RQ1) was formed from five variables, and the second, Distributed leadership as delegation of predetermined tasks, (RQ2) from four variables (Table 1).

The consistency of the factors was measured with explorative factor analysis that indicated Factor 1 Distributed leadership as interaction between the principal, teachers and their situations having reliability of 0.81 (Cronbach alpha) and Factor 2 Distributed leadership as delegation of predetermined tasks 0.69 (Cronbach alpha). Thus, both factors had acceptable internal consistency, and the respective summative variables were formed.

### **Viewing distributed leadership as interaction and delegation**

For Distributed leadership as interaction between principal, teachers and their situations, the mean for Factor 1 was 3.72, and for Distributed leadership as delegation of predetermined tasks, the mean for Factor 2 was 3.06. Thus, the respondents viewed distributed leadership as being more like interaction than delegation. Further, the linear correlation between the factors appeared negative (Pearson Correlation -0.62), and hence, 38% of the variation in Factor 1 can be explained with Factor 2 variation. Therefore, it seems like the more distributed leadership is viewed as delegation, the less it is viewed as interaction, and then again, the more views on distributed leadership are based on characteristics of interaction, the less they are based on delegation (Figure 1).

The respondents were also asked to explain their views on distributed leadership with their own words by answering a question 'In general, how do you view

distributed leadership in a school context? In your opinion, how is distributed leadership related to decisional power, responsibilities, and taking into account all concerned? Please, explain and justify your answer.' Over the half (n=44) of the respondents answered to this question. Principals' responses were coded under two main categories that described the different ways to distribute leadership, and their attitudes towards leadership distribution in general (Table 2).

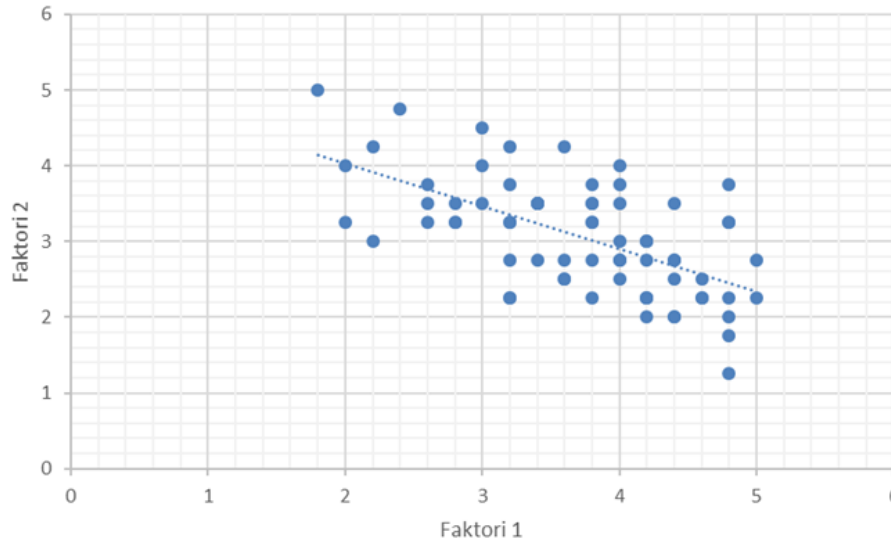
In their answers, the principals saw distributed leadership as something that cannot be avoided in the modern school context. Further, it was interpreted as being in line with the definitions of policy given in the relatively recent National Core Curriculum (FNBE, 2014) that has been implemented gradually from 2016, starting from the lower grades of comprehensive school. Moreover, the principals believed that distributed leadership would engage teachers and increase their motivation to work because distributed leadership provides a feeling that one can have an influence on one's own work. Distributed leadership seemed to increase well-being and the feeling of meaningfulness of work in an expert organization like a school. One principal described this as the following.

People working in schools have many kinds of knowledge and know-how. There is a lot of work [in a school], and we need many people in order to get the work done. Distributed leadership engages, and the principal does not have to do everything or be able to do so. The capacity of the whole community increases through the distribution of leadership (Q20P2).

Despite distributed leadership being seen mainly in a positive light, and described as facilitating the task of leadership in many ways, three respondents stated that leadership should not be distributed at all.

At its worst, distributed leadership can lead to a





**Figure 1.** The linear correlations between Factor 1 and Factor 2.

**Table 2.** The main categories and codes used in the classification of open-ended responses.

Category definition	Codes	Principals' open-ended responses
Principals' descriptions concerning the ways to distribute leadership	Distribution of leadership as delegation	17 principals
	Distribution of leadership as interaction	6 principals
	Distribution of leadership defined as both delegation and interaction	2 principals
Principals' attitudes towards the distribution of leadership	Descriptions including positive expressions concerning leadership distribution	41 principals
	Distribution is unnecessary and not needed	3 principals

situation in which no one takes responsibility. The school is primarily a unit lead by the chief, the principal (Q20P66).

Distributed leadership was mainly viewed as delegation and not so much as interaction in the written responses of the principals. Thus, interestingly their views described in their own words contradicted the results gained through the Likert scale that emphasized more interaction. However, the number of respondents to the open-ended question was lower, and therefore these differences are speculative to some extent.

Over one third (=17) of the principals answering the open-ended question described distributed leadership purely as delegation. They explained that clearly defined responsibilities and task descriptions were the prerequisites for delegation, and if these steps are neglected, the risk of arbitrary leadership would increase. In their view, distributed leadership can mainly occur through a different type of leadership structure, such as leadership teams, subject-based teams and having vice or assistant principals.

Some parts of the leadership [at school] have to be

defined clearly, such as who takes responsibility. At the official level, the leadership is distributed between the principal, the vice principal and the leadership team in our school (Q20R66).

Only six principals viewed distributed leadership as interaction. These views emphasized leading professional capacity, tolerating uncertainties, good quality and mapping the strengths of all working in the school community.

The aim of this study is to become a school that emphasises humanity and is efficient, and that bases its work on leading the capacity. We believe that through this approach it is possible to find everyone's specific area of expertise (Q20P55).

Only two respondents described distributed leadership as including both aspects, delegation and interaction.

Some parts of the leadership must be predefined. In other words, one has to know who has the official responsibility for certain issues. Otherwise leadership can be distributed according to situations calling for it, and for example, one teacher can take the lead at a meeting or take over some task units (Q20R69).

### **Leadership training and principals' views on distributed leadership**

The respondents' leadership training background was looked at in relation to the leadership structures in the schools. It appeared that if the principal had undertaken either the professional leadership programme or university studies in educational leadership and administration (min. 25 credit points) it was more likely that the school had a leadership team (professional leadership programme 82%, university studies 84%) whereas at schools where the principal had only the certificate in educational administration approved by the National Agency of Education (15 credit points) only 60% had utilised this form of leadership team in their leadership structures.

Moreover, the principals' leadership training backgrounds in relation to their views on distributed leadership were examined. The results indicate that the answers of principals who had undertaken university studies in educational leadership and administration (min. 25 credit point) had the highest value (4.15) emphasising distributed leadership as interaction between principals and teachers and their situations in contrast to answers from principals with other backgrounds in leadership training (3.62). Among the respondents who had completed university studies in educational leadership and administration, the linear correlation was negative (Pearson Correlation -0.78) between Factor 1 and Factor 2, and 60.8% of the variation in Factor 1 can be explained with variation in Factor 2. Therefore, it was concluded that in this setting, the negative correlation between Factors 1 and 2 was higher than the corresponding correlation among all respondents. Hence, the views on distributed leadership as interaction were slightly stronger among principals who had completed university studies in educational leadership and administration. However, the number of respondents having undertaken university studies in educational leadership and administration was relatively small ( $n=13$ ), and therefore, this result cannot be given too much weight. Yet, it is an interesting observation that professional leadership programme did not have similar effect on the principals' views on distributed leadership.

### **DISCUSSION**

This study looked at principals' views on distributed leadership, and it built on theoretical understanding of distributed leadership used in previous research (Lahtero et al., 2017). In addition, this study considered the leadership training influence on principals' and leadership team members' views on distributed leadership. In this study, the scope was widened to include schools around Finland in order to examine the views at the national level in contrast to the earlier research (Lahtero et al., 2017)

focusing on one city that had a rather top-down approach for defining policy concerning leadership distribution, and educational leadership structures in general. The principals participating in this study represented a range of municipalities and therefore several local education policy contexts. Finland is rather low-hierarchical and decentralized, and therefore every local education organizer has considerable decisional power concerning local arrangements and applications of national norms (Simola et al., 2017).

There appeared to be some similar patterns but also some differences, between the two Finnish studies. Firstly, both studies indicate that when principals' views on distributed leadership as delegation increase, their views on it as interaction between principals and teachers and their situations decrease. And further, when principals' views on distributed leadership as delegation decrease, their views on it as interaction increase. Therefore, in terms of an individual school, distributed leadership consists of a combination of predetermined tasks that the principal delegates to the school's official leadership structures, and of interaction that happens between the principal and the teachers, and the official and unofficial structures of the school. The emphasis of these two aspects of distributed leadership depends on each individual school context. Secondly, in the Likert Scale questions used in this study, principals' views emphasized distributed leadership as interaction, and in the open-ended questions their descriptions of distributed leadership had more elements of delegation. Thus, their views differed depending on the type of question. However, there were fewer answers in the open-ended questions, hence, that may have had some influence on the results. Anyway, the results of this study differ slightly from those in Lahtero et al. (2017) study where the principals had more emphasis on distributed leadership as delegation in both types of question. However, the research designs were not identical as the study at hand focused only on principals, and therefore left out the views of leadership team members that were included in the study of Lahtero et al. (2017). Therefore, in the future it would be beneficial to widen the scope of the research at the national level to include both leadership team members and all school teachers because that would enable to examine how different professionals working in schools view the same phenomenon. That would be a fruitful setting for looking at the differences and similarities appearing in the views of people working at various positions within the same school contexts. That might reveal how teachers with different roles in relation to leadership experience leadership (Wan et al., 2018).

This study also scratched the surface concerning the leadership training school principals in Finland are required to have undertaken. In general, to be a principal one has to be a qualified teacher, have teaching experience, and (at least) have the certification in educational administration (15 credit points) approved by

the Finnish National Board of Education. Thus, the minimum studies required do not include any aspects of leadership in educational contexts. The present results indicate that principals who have undertaken university studies in educational leadership and administration (min. 25 credit points) viewed distributed leadership more as interaction between principals and teachers and their situation than their peers not having done the studies. In other words, university-level studies seem to provide a different basis for viewing distributed leadership than participation in short-term in-service trainings or having completed the professional leadership programme. It has been noted elsewhere that in distributed leadership, the main question is the way the distribution happens (Halttunen, 2009). Further, in terms of viewing it as delegation or interaction, delegation seems to be the first step on the path to distributed leadership (Kyllönen, 2011). Moreover, the distribution of leadership ought to become visible in relationships between people working together in the same organisation, not in formal roles and responsibilities (Dinham, 2016; Scribner et al., 2007). Thus, the interaction within an organization makes the distribution of leadership genuine (Juuti, 2013). In practice, this means providing time, space and opportunities to act accordingly, and further, it requires sensitivity in terms of decision making situations that require participation of the work community (Duif et al., 2013). Therefore, the results following from leadership distribution are not necessary predictable by their nature but stem from the dynamics of the school community (Scribner et al., 2007). Viewing distributed leadership as interaction may result in fresh ideas and innovation.

The results of this study reinforce earlier observations (Lahtero and Kuusilehto-Awale, 2015) indicating that it would be more important to emphasise the holistic and integrative nature of educational leadership than to concentrate on individual tasks or skills related to a principal's work. In educational leadership training curricula, the leadership should not be divided into unconnected components but rather represented as their combination. The results concerning how the educational leadership training influences principals' views on leadership structures are only suggestive, and therefore, more research is needed in order to map this terrain properly (cf. Tian, 2016).

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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*Full Length Research Paper*

# **Elementary teachers' perceptions of preparedness to teach English Language Learners**

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**With the steady increase in the English Language Learner (ELL) population in the U.S., this case study was aimed at capturing elementary teachers' perceptions of how well their teacher preparation program was prepared to teach ELLs. This work utilized the case study design, and included five North American elementary teachers as the subjects of the research who were teaching ELLs in a small Christian Academy located in southern Haiti. All of the teachers were fluent in English, and two of the teachers from Canada were also fluent in French. All of the elementary students spoke Creole. The instruments in the case study included a questionnaire, two interviews, and classroom observations of teaching. The data was coded and triangulated. The results of this study supported existing research, and specifically included a desire for explicit coursework on how to teach reading to ELLs within their teacher preparation program, as well as increased time instructing ELL students in high ELL population schools that utilized inclusive instruction during their student teaching placements. Required second language coursework was also recommended, as the teachers believed it would have enhanced their understanding of the complexity of language acquisition and develop empathy for ELL students.**

**Key words:** Teacher education, English Language Learners, teacher perceptions.

## **INTRODUCTION**

In North American universities, pre-service elementary teachers are being prepared to teach reading, writing, mathematics, science, social studies, and other subject areas to their young learners. Yet, many of these pre-service teachers are native English speakers and will be providing instruction through the use of the English language. A recent statistic stated that nearly five million English Language Learners (ELLs) attended U.S. public schools in fall 2015 (<https://nces.ed.gov>, 2018) which represented a substantial increase of 8.1% from the year 2000. With a steady increase in the ELL student

population in U.S. schools, the question arises of how effective preservice teachers will be in their instruction of these students upon completion of their college teacher preparation programs.

In the United States, the term English Language Learner (ELL) is a general term that refers to students whose native language is not English. These students are often living in a home environment with parents or caregivers who predominately speak a language other than English. These students attend schools where they are immersed in the English language throughout the

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school day, as it the primary language used in instruction. As the ELL student population in the United States has steadily increased, teacher preparation programs at U.S. colleges and universities are tasked with the challenge of ensuring that the pre-service teacher candidates enrolled in their programs will be prepared to effectively instruct students whose native language is not English. Research has shown that specialized knowledge is required to effectively teach ELL students. Such specialized knowledge includes the teacher understanding the language experiences of the English Language Learner. It cannot be assumed that the elementary-aged ELL student is fully proficient in their native language, as fluent oral communication in the native or first language (L1) does not ensure that the ELL student is proficient in reading and writing (deJong et al., 2013). Therefore, the pre-service teacher preparation programs' effectiveness in providing teacher candidates with this knowledge needed to be determined after they were employed as classroom teachers, which was the intent of this study.

Other research supported the need for specialized instruction in pre-service teacher programs, and noted that some states, such as Arizona, have mandated college coursework called Structured English Immersion (SEI) that entails up to 90 h of instruction aimed at teaching strategies, such as word knowledge and building background, to pre-service teachers (Markos, 2012). Yet, Markos noted that these courses did not include pre-service teachers examining their own attitudes towards linguistic diversity, which she believed was an essential component in being an effective teacher of ELL students. Florida teacher preparation programs are also required to include two to three courses of English for Speakers of Other Languages (ESOL) that are taught by bilingual faculty or those with an ESOL endorsement and meet the ESOL teacher competency standards (Coady et al., 2011). In another study, Balderrama (2001) found that some education programs have created pre-service teacher courses that focused on building empathy for ELL students through an experiential component where the college students recorded their exposure to, or experiences with a language other than English in order to increase their understanding the complexity of language learning. Balderrama (2001) noted that empathy was an important component, but it should not be the sole focus of a course to prepare future teachers for working with ELL students. In light of these research findings, the actual perceptions of new teachers in classrooms with a high ELL population, such as the teachers in this study, were needed to determine if the need for specialized strategy and language instruction in their teacher preparation programs was accurate.

Another facet of teacher specialized knowledge for teaching ELL students has emerged in the research regarding the importance of understanding the student's cultural experiences. As native English speaking

teachers, a communication barrier exists that prevented many teachers from learning about the student's first language (L1) experiences due to the lack of ability to communicate with the student's parents or caregivers. Without communication between home and school, cultural misconceptions may have impacted student learning (Costa et al., 2005; de Jong et al., 2013). In addition, Garcia et al. (2010) proposed that culturally responsive classroom instruction relies on the teacher knowing and understanding their students' cultural experiences and without this rich background knowledge, the learning potential would not be maximized. Insights from new elementary teachers who have experienced teaching non-English speaking students from a different culture, such as the teachers from this study, were needed to shed light on the reality of the teacher preparation programs' effectiveness.

Teachers also need to have the specialized linguistic knowledge of each discipline they are teaching and be able to teach the content academic language and model the concepts the students are learning. This provides a challenge for teachers to find an effective way to engage ELL students in learning the new specialized terminology and make connections to learned vocabulary terms and concepts. Turkan et al. (2014) called this specialized knowledge Disciplinary Linguistic Knowledge (DLK) and proposed that it was necessary for the teacher to possess DLK in order to assist ELL students in accessing the concepts through oral and written communication. In other words, ELL students needed to be able to utilize the language in order to make sense of the new learning. However, teachers must avoid the misconception that ELL students will understand concepts simply based on exposure and practice with English words, as they noted that learning an additional language is seldom that simple (Harper and de Jong, 2004). Another study by Faez (2012) found that pre-service teachers who provided academic and language support for ELL students also stated that they felt a high level of responsibility for these students and would often advocate for them in the school setting. The need for experienced teacher insights on the linguistic knowledge and advocacy needed for teaching ELLs, such as those garnered in this study, proved to be essential for future teacher preparation program revision. In response to the steady increase of ELLs in American schools and the related concern of the preparation of teachers who will be educating these students, this study was aimed at understanding how effectively new elementary teachers are prepared in North American colleges or universities for teaching English Language Learners in their classrooms. As noted in the research above, teacher preparation programs in U.S. colleges and universities have started to recognize the need for the improvement of coursework and student teaching experiences in order to prepare pre-service teachers with specialized knowledge and relevant experience with the English Language Learner student population.

The primary goal of this study was to gain insights from new elementary teachers, who had less than five years of teaching experience, and who were currently teaching in a classroom with a high percentage of English Language Learners. These insights offered important contributions for university teacher education programs who are in the process of reevaluating the effectiveness of the required courses in the elementary education major, and possibly lead to new course creation that will better prepare new teachers in the field who will be teaching ELL students. The research has found that teachers who are better prepared have a higher likelihood of making an impact on student learning, which is often a large component of how teachers are evaluated in their school systems (de Jong et al., 2013). Therefore, it was essential to examine the effectiveness of teacher training programs through the lens of the teachers who were expected to have the specialized knowledge for teaching English Language Learners in their classrooms.

## METHODOLOGY

The case study design was employed in this study, as it is an in-depth collection of information based on individuals in a bounded system, such as the Christian Academy located in southern Haiti. This research design is also classified as an instrumental case study as it sought to illuminate the issue of teacher preparation for teaching English Language Learners (Creswell and Guetterman, 2019). The context of study, participants, instruments, procedures, and the analysis were described subsequently to offer insights on how effective new elementary teachers are in teaching ELL students after the completion of their college teacher preparation programs.

### Context of study

The study took place at a Christian Academy, which is a pre-kindergarten through second grade school located in the small village in southern Haiti. The school was developed by a Christian organization located in the Midwest region of the United States. The school employed five teachers from North America: three from the Midwest region of the United States, and two from Ontario, Canada. The five teachers in the pre-kindergarten through second grade school were native English speakers, and two of the Canadian teachers also were fluent in French. The teachers attended teacher preparation programs in North American universities within the past three years, and taught in classrooms where the ELL student population was 100%, as all of the students who attend Christian Academy were native speakers of Haitian Creole. The school also employed five Haitian teachers who were native speakers of Creole, and instructed the students in French, as this was a predominant language of educated Haitians. The North American teachers and the Haitian teachers co-teach in each grade level classroom. The Christian Academy had a Haitian director who spoke fluent Creole, French, and English, and also employed several Haitian support personnel that assisted in running the school operations. The school was developed and sponsored by a mission organization in the Midwest region of the United States.

### Participants

The five North American elementary teachers were the participants

in this study, and were recruited through the use of email. The teachers' ages ranged from 23 to 27, and were therefore considered to be new elementary teachers with less than five years of experience. The five teachers' actual teaching experience ranged from six months to four years at the time of the study. Participants were not compensated for their participation in the study.

### Instruments and procedures

The five teachers in this study consented to participate through the completion of a questionnaire, two on-site interviews, and by allowing one of the authors of this study to observe them teaching in their classroom in Haiti. The study's instruments included a questionnaire that included nine questions aimed at determining each teacher's demographic information and educational background, including details on their teacher preparation program. Such questions included their native language and other learned languages that they were fluent in, the number of years and grade levels that they have taught, as well as their specific college credentials. Additional information on their college coursework or experiences within their teacher preparation program in relation to teaching English Language Learners (ELLs) was asked, as well as if they were familiar with the Sheltered Instruction Observation Protocol (SIOP) of other teaching framework that was designed for supporting ELLs.

Each teacher was also interviewed. The interview included nine open-ended questions about the strategies that they used when they first began teaching non-English speaking students, and the challenges they faced in trying to communicate and teach them in English. The teachers were also asked about their Creole language instruction and how this helped them to communicate and teach more effectively in this setting. The topics of additional skills, professional development, teaching resources and curriculum that were being utilized were also explored in order to understand their existing pedagogy.

Classroom observations were based on the eight SIOP components, and were noted on an observational checklist. The eight SIOP components include lesson preparation, building background, comprehensible input, strategies, interaction, practice and application, lesson delivery, and review and assessment (Echevarria et al., 2017). This particular framework for effective ELL instruction was selected due to its use in several Midwestern school districts and teacher preparation programs in the U.S. The group interview questions originated from the classroom observation notes, and were based on the SIOP components that were evidenced in their instruction. When discussing each of the SIOP components that were observed in the lessons, the teachers were asked to reflect upon their teacher preparation program coursework in order to recall and identify if that particular skill was taught. The instruments, procedure, and purpose for utilization are outlined in Table 1.

### Analysis

The data from this case study was coded and triangulated in order to identify emerging themes. The coding process involved labeling and segmenting portions of the transcribed responses in order to identify broad themes. Triangulation involved the process of corroborating pieces of evidence of the emerging themes among the three types of instruments used to collect data from the teacher participants in this study (Creswell and Guetterman, 2019).

The coding of the participants' responses to the questionnaire, two interviews, classroom observation checklist took place to determine if there were any emerging themes from the data that would illuminate how new elementary teachers perceived their teacher education program preparation for teaching English

**Table 1.** The instruments, procedure, and purpose for utilization.

<b>Instrument</b>	<b>Procedure</b>	<b>Purpose</b>
<b>Questionnaire</b> (nine questions)	Emailed and completed by each teacher before the site visit to Haiti	To obtain demographic and background information on each teacher's college preparation program.
<b>Interview: Individual</b> (nine questions)	Completed before classroom observations took place	To learn more about their experience teaching ELL students.
<b>Classroom Observation Checklist</b> (eight SIOP components)	Each teacher was observed teaching ELL students for a 45 minute period	To observe if the teachers were implementing any of the eight SIOP instructional components for teaching ELL students.
<b>Interview: group</b> (no prepared questions; questions arise from the sharing of classroom observations)	Completed after classroom observations took place	To share with the researcher insights from classroom observations in order to gain more specific details of the teacher's experiences and challenges teaching ELL students.

Language Learners after they gained experience in their own classrooms. Through the triangulation of the three instruments (questionnaire, interviews, and classroom observation checklist), the coding of emergent themes was evident. The emerging themes related to their experiences in teacher education programs and how well these programs supported them in their actual instruction of ELL students may offer important contributions for university teacher education programs.

## RESULTS

### Questionnaire responses

The demographic and general background information that was yielded from the completion of the questionnaire is outlined in Table 2. The additional commentary from the teacher participants on the questionnaire was discussed further in detail in Table 2. Table 2 shows that all five teachers stated that they were native English speakers, with two of the teachers speaking two additional languages. These two teachers noted that they were mandated to take French instruction in grades four through nine in their Canadian school system. They also noted that they learned Creole through teaching and formal language instruction at the Christian Academy in Haiti, and found that it was very similar to the French language. All five of the teachers earned four year degrees in Elementary Education, and had obtained teaching experience through teaching at the Christian Academy, with two of the teachers noting that they had one or two years of teaching in North America prior to teaching in Haiti.

It was noted that two of the five teacher participants earned English as a New Language (ENL) endorsements from their colleges, and that they had taken specific college coursework as a requirement for earning the ENL endorsement and were familiar with the SIOP model. These two teacher participants noted that this specific

coursework was assisting them in teaching English Language Learners in their current classroom. Two other teachers who did not list taking any specific college coursework aimed at teaching ELL students, were fluent in three languages: English, French, and Creole. They commented that learning these languages helped them in their teaching of ELL students. One teacher noted that she felt her Intercultural Communications and Religion coursework supported her work with ELL students. This was an interesting comment, as both of those college courses were usually considered to be general education courses, and not be required for pre-service elementary teachers.

In addition, many of the questionnaire responses included the description of college required experiences that some of the teachers felt their teacher education programs designed to support their teaching of ELL students. Four of the five teachers commented on having teaching placements or practicum experiences in schools with a high ELL student population, as well as completing Human Relations (HR) hours in schools with large ELL student populations. Two teachers specifically stated that visiting an English Immersion school as part of their college coursework was an important experience to support their current work with ELL students. One teacher mentioned that her travel abroad experiences in college benefited her understanding of students who were learning English.

Lastly, the questionnaire asked the teacher participants if they had any other thoughts regarding their college teacher education programs and its effectiveness for preparing them to teach ELL students. Two teachers commented on how learning a new language in their pre-college education was helpful to them during their college years. Two other teachers stated that they wished they had more experiences with English as a Second Language (ESL) teachers and ELL students during college, more specific courses on how to teach reading to



**Table 2.** Questionnaire responses.

Teacher (Pseudonym)	Years of teaching experience	Grade levels taught	Native language	Additional languages	College credentials	College courses on teaching ELLs
Miss E	First year (6 months)	Kindergarten	English	none	BA: Elementary Education, English as a New Language (ENL)	Courses related to ENL Endorsement
Miss K	3 years	Pre-Kindergarten	English	French Creole	BA: Elementary Education, BA: Psychology Minor: Sociology	
Miss C	4	Kindergarten Grade 1 and 2	English	French Creole	BA: Elementary Education, BA: Psychology Minor: Sociology	
Miss M	4	Grade 2	English	none	BA: Elementary Education Minor: Art, Endorsements: Art Education, Coaching, K-8 reading	Intercultural Communication Religion class
Miss P	2	Grade 1	English	none	BA: Elementary Education Minor: Special Education ENL endorsement	Courses related to ENL Endorsement

students who are learning English, as well as coursework on teaching strategies for instructing ELLs.

### Individual interview responses

When the five elementary teachers were individually interviewed, several common responses occurred. All of the teachers stated that they used actions, gestures, or hand motions when they first started teaching ELL students as a way of communicating. Three of the teachers added that they used teacher modeling to convey ideas, and one teacher mentioned that she used a lot of visuals and videos in her initial teaching. One teacher commented that she used a lot of repetition in her Kindergarten classroom.

As a part of their teaching at the Christian Academy, the five teachers were required to participate in Creole language lessons in order to support their communication with their students who are native Creole speakers. When the teachers were asked how this new language learning enhanced their teaching, they all commented that it helped them understand how complicated it was to learn a new language and increased their empathy for their students who were learning English and other subject areas through the English language. Two teachers stated that they really understood the importance of enunciation and an appropriate pacing of speech when they are teaching, as it was important for them during their Creole lessons.

When the teachers were asked about the challenges

they encountered when teaching their native Creole speaking students to read, write, and speak in English, they all commented on how the letter sounds were different in both languages which made the pronunciation of the English words very difficult for the students. They added that due to mispronunciations of English words by their students, it created more challenges for the students to spell and write correctly in English, which was also the language the students were to use to demonstrate and communicate their learning. The teachers were also asked how they addressed these challenges in the classroom, and four of the five teachers responded that they created their own curriculum materials in order to address the learning needs of their students. Two of the kindergarten teachers added that they added in more visuals and culturally relevant pictures when they created teaching materials. One example included removing the common picture of an igloo on student worksheets that were aimed at teaching the short /i/ sound with a picture of an iguana, as it was more relevant to their Haitian students' daily experiences.

The five teachers also responded that they searched the internet for resources that they can adapt for their students, when they had a stable supply of electricity. Websites such as Reading A-Z, YouTube, and Teachers Pay Teachers were mentioned as resources that were beneficial in supporting their adaptation of the curriculum materials in order to meet their ELL students' needs. One teacher commented on how difficult it was to find materials that are ready to be used and did not require modifications. When asked to reflect on their college

teacher education programs and how they could be improved to help them be better prepared teachers of ELL students, four out of the five teachers responded that they would like to have had more specific coursework on how to teach English Language Learners. Two teachers commented that they only had Human Relations (HR) hours with ELL students and how this was not enough to help them learn how to teach this population of students. One teacher added that she took a specific course on teaching strategies for ELL students, and found that it was more focused on teaching upper elementary or secondary ELL students instead of how to teach young learners who were learning English and were not strong readers or writers in their native or first language (L1). A different teacher commented on how she wished that she had more emergent reading strategy coursework, as she believed it would have supported her work in teaching ELL students to read. Another teacher who did have a practicum experience in a high ELL population school noted that it was not as beneficial as it could have been due to that school using a pull-out model for ELL instruction, rather than an inclusive model where the general education teacher is responsible for educating the ELL students and does not rely on the ESL teacher to provide the additional learning support needed by the child.

### **Classroom observations**

Four of the five teacher participants were observed in their classroom teaching for a 45 minute period. One teacher had requested not to be observed due to student behavior issues that were taking place in her classroom. A checklist based on the eight SIOP components for sheltered instruction was utilized to mark observed teaching techniques that are the underpinning features of the eight SIOP components (Echevarria et al., 2017). Additional notes were recorded to describe the teaching that was observed, as well as the observable student responses to this teaching. Table three below provides an overview of the observation data that was collected.

As shown in Table 3, all four of the teachers who were observed teaching their ELL students utilized several features within the eight SIOP components. Interestingly, only two teachers had noted learning about the SIOP model in their college elementary education coursework on the questionnaire, yet all four teachers were implementing several of the SIOP features during the observation. Also interesting to note was the lack of a language objective in their lesson preparation, which is a key feature in the SIOP model. Language objectives articulate for learners the academic language functions and skills that they need to master to fully participate in the lesson and meet the grade-level content standards (Echevarria et al., 2017). Often teachers believe that this means they should focus on the vocabulary used in the

lesson, as three of the four teachers demonstrated during the classroom observation. Yet, language objectives also focus on the process and function of how language is used to help students access the concepts they are expected to learn. As language involves students in reading, writing, speaking and listening, an example of this involvement may be a language objective that states the process of how students will demonstrate their learning such as through writing an essay or giving an oral presentation. The functions of language may also be highlighted in a language objective that states that students will orally explain, report findings through writing, or read different author perspective on the same issue (Echevarria et al., 2017).

One notable trait that was observed in all four of the teacher's instruction was the teacher's natural and intermittent use of the Creole language in the classroom to support the students' understanding of a concept that was being taught in English. The use of the Creole language to support their students' learning was the result of the teachers' participation in learning the native language spoken in this part of Haiti. This may be considered a highly unique situation, as it may not be feasible for elementary teachers to learn the various native languages spoken by their ELL students. Yet, it does highlight the importance of how teachers may support their ELL students by understanding different languages.

### **Group interview responses**

In a group setting, the five teacher participants were presented with the classroom observation notes, and all of them were quite surprised to learn that they were using several of the SIOP features in their teaching. They all stated that they did not intentionally plan their lessons with the SIOP model in mind. After listing a few of the features that were noted in their instruction, such as teacher modeling and appropriate pacing of the lesson, all five teachers mentioned that these were teaching skills that they learned in their college teacher education preparation programs, and that they were prepared to use them in their teaching.

When the teachers learned that three of the four of the observed lessons included intentional teaching and review of the vocabulary, they all commented that vocabulary instruction was a prominent part of their lesson design for all of the subjects that they teach, and that it was possible that one particular lesson did not have an observable focus on new vocabulary. One teacher commented that she felt that she planned her lessons based on vocabulary learning related to the concepts, as the students were most likely not familiar with the English words needed to understand the concept being taught. When asked if they were familiar with language objectives, which are a unique feature in the

**Table 3.** Overview of the observation data.

<b>SIOP component</b>	<b>Miss E</b>	<b>Miss K</b>	<b>Miss C (Not observed)</b>	<b>Miss M</b>	<b>Miss P</b>
Lesson preparation	(i) Content objective (ii) Vocabulary (iii) Teacher modeling (iv) Supplementary materials (v) Student opportunity for speaking, listening, and viewing	(i) Content objective (ii) Student opportunity for reading, writing, speaking, listening, and viewing		(i) Content objective (ii) Vocabulary (iii) Teacher modeling (iv) Student opportunity for speaking, listening, and viewing	(i) Content objective (ii) Vocabulary (iii) Teacher modeling (iv) Supplementary materials (v) Student opportunity for speaking, listening, and viewing
Building Background	(i) Link to prior learning (ii) Key vocabulary was emphasized	(i) Several links to prior learning (ii) Key vocabulary was emphasized repeatedly throughout lesson		(i) Link to prior learning (ii) Key vocabulary was emphasized repeatedly through repetition and visuals on the board	(i) Several links to prior learning (ii) Key vocabulary was emphasized repeatedly throughout lesson
Comprehensible Input	(i) Pacing appropriate (ii) Teacher modeling (iii) Gestures (iv) Visuals projected on board	(i) Pacing was slow and appropriate (ii) Teacher modeling during the majority of the lesson (iii) Gestures such as clapping during counting (iv) Visuals on wall were referred to frequently		(i) Pacing appropriate and adjusted as needed (ii) Teacher modeling on board with the aid of a document camera (iii) Gestures (iv) Visuals projected on board with doc camera	(i) Pacing appropriate and teacher speech was enunciated and expressive (ii) Teacher modeling on board (iii) Gestures (iv) Visuals
Strategies	(i) Gradual release of responsibility	(i) Gradual release of responsibility (ii) Student use of strategies in stations (iii) Use of questions to support thinking skills		(i) Gradual release of responsibility (ii) Use of questions to support thinking skills	(i) Gradual release of responsibility
Interaction	(i) Student discussions (ii) Teacher spoke in Creole as needed to support students learning concepts that were in English	(i) Student discussions (ii) Students clapped out the syllables with partners (Ex: hap-py) (iii) Teacher spoke in Creole as needed to support students learning concepts that were in English (iv) Small group work		(i) Student discussions (ii) Teacher spoke in Creole as needed to support students learning concepts that were in English	(i) Small group work (ii) Individual work on the board with teacher support (iii) Teacher spoke in Creole as needed to support students learning concepts that were in English
Practice and Application	(i) Use of manipulatives	(i) Station work		(i) Students practiced writing new word family words and drew pictures	(i) Use of manipulatives
Lesson Delivery	(i) Content objective was supported (ii) Pacing appropriate (iii) Student engagement was evident	(i) Content objective was supported (ii) Pacing appropriate (iii) High student engagement was evident		(i) Content objective was supported (ii) Pacing appropriate (ii-) High student engagement was evident	(i) Content objective was supported (ii) Pacing appropriate and adjusted to support learning (iii) Student engagement was evident; use of song to refocus students as needed

**Table 3.** Contd.

Review and Assessment	(i) Vocabulary was reviewed (ii) Feedback to students was offered (iii) Checking in on small groups	(i) Feedback to students was offered (ii) Checking in on students in stations	(i) Vocabulary was reviewed as well as word family words (ii) Feedback to students was offered repeatedly	(i) Vocabulary was reviewed as well as the content objective (ii) Feedback to students was offered repeatedly
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SIOP model, all five teachers responded that they were not. This was interesting, as two of the teachers noted that they were familiar with the SIOP model from their earlier college coursework in the questionnaire, yet the use of language objectives was not a familiar feature to them at this time.

Lastly, the teachers were asked if they would like to add in any comments about their teacher preparation programs as it related to teaching ELL students, and all of them mentioned the need for more specific coursework on how to teach students who are learning English. Two of the teachers commented on needing more practice teaching reading in their student teaching placements, as this was one area they felt would have helped them teach their young students in the Christian Academy. In response to this comment, the three other teachers agreed that a larger focus of reading instruction during their teaching placements would have been beneficial.

**Analysis**

The themes that emerged from the questionnaire, interviews, and classroom observations were based on the teachers’ perceptions of their college teacher preparation programs and how they were impacting their teaching in a unique school setting where one hundred percent of the student population are English Language Learners (ELLs). The following themes occurred throughout

the teacher statements recorded in this study:

1. More specific coursework on how to teach ELLs should be required in teacher education preparation programs in order to produce teachers who are better prepared for the reality of teaching in today’s classrooms.
2. Reading coursework should include a stronger focus on how to teach emergent readers, which the teachers believed would support their work with ELL students.
3. Student teacher placements, including practicums, should include more time teaching reading and working with ELL students in an inclusive classroom setting.
4. Learning another language is beneficial for teachers, as it may support their teaching of ELL students who speak the same language, or assist the teacher in understanding the complexity of language learning and lead to the development of empathy for ELL students.

**DISCUSSION**

The implications of the findings in this study may be used to supplement or add credibility to the body of research presented in the introduction, for example, the insights from the experienced elementary teachers who were teaching ELL students in this study, support the need for college teacher education programs to offer more specific coursework on strategies for ELL instruction

(Markos, 2012), and for understanding language acquisition and the specific disciplinary knowledge (Turkan et al., 2014) needed to teach ELL students more effectively in both elementary and secondary teacher education programs (de Jong et al., 2013). Elementary teacher education programs, which include methods courses on teaching students to read, may find the need to redesign these courses in order to offer more practice with emergent reading strategies, and include culturally relevant literature aimed at the importance of understanding students’ backgrounds (Garcia et al., 2010). Student teaching practicums and placement expectations may also be redefined to include a larger portion of time spent on the teaching of reading, as this practice would support the new elementary teacher who is teaching ELL students. The findings may also inform how college teacher education departments select and plan student teaching placements, in order to ensure that at least one placement setting will involve the student teacher candidates in teaching ELL students in an inclusive setting where ELL students are not pulled out and intentionally supported by ESL teachers rather than the general education teacher.

Another implication from the study’s findings may result in teacher education departments examining their required general education courses for the teacher education students, as a linguistics course or foreign language requirement may help prepare teachers for teaching ELL

students, which also supports and extends (Turkan et al., 2014) findings for the pre-service teacher's need to understand language acquisition. These general education course requirements could also enhance the teacher candidate's understanding of the complexity of language learning, and foster the development of empathy for students who are learning a new language, as well as learning new concepts through instruction in this new language.

### Limitations of the study

Case studies include a small number of participants, and due to this fact, the findings may not be generalizable. The setting of this case study was unique, as the elementary teachers were teaching in classrooms where the student population was one hundred percent comprised of native Creole speaking students. Another limitation of this study was related to the fact that all five teachers at the Christian Academy were being provided with Creole language instruction to support their communication with their students. In a public school setting in the United States, teachers would not be expected to learn their student's native languages, nor be provided with language instruction. Lastly, the replication of this study would be difficult due to the uniqueness of the setting which included the entire ELL student population in the school with a native language of Creole, and the teachers provided with instruction in that specific language. Therefore this study's findings could not be generalized through a repeated similar study.

### Future research

Based on the limitations of the study, future research may involve replicating the instrument tools and procedures used in this study with new elementary teachers who teach in a more traditional school setting that includes a high ELL student population. In addition, this study's instrument tools and procedures could be utilized with new secondary teachers, as it would provide insights on specialized content area teachers' perceptions of their preparedness for teaching ELL students after completing their college teacher education programs. Lastly, teacher education faculty may conduct a similar questionnaire or exit survey with the teacher education graduates who have been teaching in a school setting for one year, in order to gain insights on how their teacher education programs could be improved in the area of ELL instruction practices.

### CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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*Full Length Research Paper*

# **Grit, growth mindset and participation in competitive policy debate: Evidence from the Chicago Debate League**

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**Non-cognitive skills (NCS) contribute to variation in how students respond to challenges inside the classroom and beyond. Competitive policy debate is a co-curricular activity that both encourages cooperative learning and is hypothesized to promote NCS. The goal of this pilot was to examine the relationship between debate participation and change in four NCS among high school students over the course of an academic year. Two surveys (Fall and Spring) were administered during the 2017/18 academic year to students who participated in the Chicago Debate League (n=102). Surveys assessed demographic factors, characteristics of debate participation, and four indicators of NCS each measured using established scales: Growth mindset, grit, mood, and civic engagement. Paired t-tests were used to quantify change in NCS over time. Linear regression was used to assess the relationship between characteristics of debate participation and change in NCS. In the Fall, median length of debate participation was 6.2 months. Average age was 16, most (82%) participants were non-White and 52% were female. Over the academic year, growth mindset increased ( $\Delta=0.29$  (95% Confidence Interval (CI): 0.10, 0.48) while grit declined ( $\Delta= -0.17$ , 95% CI: -0.34, -0.01). Civic engagement and mood were unchanged. Duration of participation was associated with increased change in grit ( $\beta=0.04$ ,  $p\leq 0.01$ ), but was unrelated to the other NCS. Motivation for joining debate did not explain variation in any NCS. Debate participation is associated with improvement in some NCS. Findings have implications for scalable interventions to promote NCS in the context of cooperative learning.**

**Key words:** Cooperative learning, grit, growth mindset, motivation, urban debate.

## **INTRODUCTION**

Empirical research increasingly demonstrates that variation in educational achievement, particularly in the context of social disadvantage, is not fully, or even primarily, explained by intrinsic cognitive ability. Instead, high achieving individuals are distinguished by their “non-

cognitive skills” (NCS): beliefs, attitudes, and motivation toward learning that help them persevere and grow from challenges (Guez et al., 2018; Kornilova et al., 2009; Blackwell et al., 2007; Culin et al., 2014; Duckworth et al., 2007; Johnson et al., 2017; MacNamara and Collins, 2010;

Stokas, 2015). Supported by evidence from neuroscience that the human brain remains malleable well into adulthood (Fuchs and Gould, 2000), NCS encompass beliefs that human capacities for learning are fluid and extend across lifespan. These constructs have caught the attention of education researchers, policymakers and practitioners alike as potential modifiable determinants of student achievement.

One core NCS is the construct of “growth mindset.” As articulated by psychologist Carol Dweck, who coined the term, growth mindset captures a belief that intelligence evolves from experience and develops throughout life; it stands in contrast to the conceptualization that intelligence is a fixed trait (Dweck and Leggett, 1988; Blackwell et al., 2007; Dweck, 2008). In the context of educational achievement, learners with a growth mindset believe that their cognitive capacities change in response to adequate effort and training, which helps cultivate motivation for learning, approach-oriented coping with setbacks, and a willingness to follow through on long-term goals. In research, surveys that aim to measure this construct ask students to rate their level of agreement with statements such as “*I am not good at math*” and “*I can be successful in learning mathematics, even if I have had trouble with it in the past*” as an indicator of fixed and growth mindset, respectively. More broadly, people with a growth mindset tend to seek out challenges and develop a sense of self-efficacy and robust ability for emotional regulation in response to hardships (Dweck et al., 2014; Jamieson et al., 2018; Yeager et al., 2016).

Another core NCS construct is “grit,” which describes the tendency to persevere and sustain long-term motivation toward a goal (Duckworth et al., 2007). This concept seeks to capture the notion of a trade-off between short-term challenges for long-term achievements. For example, high grit predicts retention of cadets following intense summer training sessions at West Point (Blackwell et al., 2007; Duckworth et al., 2007; Kelly et al., 2014). Some research indicates that, compared to IQ, grit is a stronger predictor of grade point average (GPA) among undergraduate students at elite institutions; however, IQ is a stronger predictor of performance on college entrance exams (e.g., SAT, ACT) relative to grit (Blackwell et al., 2007). This difference is thought to reflect the notion that grit influences cumulative effort over long periods of time (e.g., GPA over many semesters), rather than ability to perform at a single evaluation (e.g., taking the SAT). Additional studies of undergraduate students have extended this notion by showing that grit is associated with a range of outcomes indicative of long-term commitment: higher academic achievement, self-regulated learning, and

overall satisfaction (Bowman et al., 2015; Hodge et al., 2018; Wolters and Hussain, 2015). While grit has utility as a NCS, this concept has come under notable criticism for focusing on individual responsibility versus the context of learning, which de-emphasizes the role of structural inequalities in educational opportunities and achievement (Kirchgasler, 2018).

For education researchers and practitioners, growth mindset and grit are conceptualized as modifiable determinants of achievement (Brady et al., 2017; Damgaard and Nielsen, 2018; Wilson and Buttrick, 2016). These NCS represent strategies that can be developed through practice and sustained effort, akin to muscular strength that can grow from training, but also atrophy from lack of use. This notion is especially important in the context of disadvantage (Spitzer and Aronson, 2015); racial/ethnic minorities, students with disabilities, and individuals from low socioeconomic backgrounds are more likely to endorse beliefs consistent with a fixed mindset, which may contribute to lower achievement for these groups (Good et al., 2003; Jury et al., 2017; Martin, 2013; Master and Meltzoff, 2016; Scherr et al., 2017).

Interventions designed to foster growth mindset and grit have had moderate success at improving achievement among disadvantaged students in the US and elsewhere (Andersen and Nielsen, 2016; Aronson et al., 2002; Ballen et al., 2017; Claro et al., 2016; Conn, 2017; Goyer et al., 2017; Yeager et al., 2016). Despite these encouraging results, the question remains: how could a school system cultivate grit and growth mindset within educational settings and in a scalable manner? Many existing strategies take an explicitly individualistic approach that highlights the importance of NCS for personal achievement, while teaching students effective study skills and coping strategies (Blackwell et al., 2007; Wilkins, 2014). Other efforts have a more structural focus that target school culture as a whole. These efforts promote social and emotional learning by empowering teachers and school leaders, encouraging them to use growth-oriented vocabulary when working with their students’ failures and mistakes, and creating contextual opportunities that would challenge students to grow in safe environments (Bashant, 2014; Hoerr, 2013; Lou and Noels, 2016; Integrating Social, Emotional, and Academic Development, 2019). Such efforts are multifactorial and represent an essential step toward creating a substantial shift in redefining the purpose and value of public school education in the US.

One potential avenue for promoting NCS that has not received much attention is through *cooperative learning* (Ashman and Gillies, 2003; Johnson and Johnson, 2002). Cooperative learning reflects the notion that schooling

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naturally occurs within a social dimension via a dynamic interplay between individual accountability and group interdependence (Johnson, 2003). It offers a framework for tying NCS to educational achievement via joint problem-solving, providing and receiving peer instruction, and engaging in active learning (Laurian-Fitzgerald and Fitzgerald, 2016). Cooperative learning has been effectively implemented in different learning environments (e.g., K-12 and college) and with a wide range of groups (e.g., intellectually gifted students, racial/ethnic minority students, students with disabilities) (Capar and Tarim, 2015; Kyndt et al., 2013; Neber et al., 2001; Slavin, 1985, 1996; Stevens and Slavin, 1995; Xu and Wen, 2018). Additionally, it has been suggested that when implemented successfully, cooperative learning environments facilitate complete immersion in tasks, sometimes described as creative states of “flow” and high productivity (Nakamura and Csikszentmihalyi, 2002; Shernoff et al., 2014). A growing body of empirical studies indicates that students working toward a communal goal in a group (e.g., solving a complex task, recollecting information, or playing an interactive computer game) perform, on average, better than students working on those same tasks in pursuit of an individual goal (Boykin et al., 2004; Gemechu and Abebe, 2017; Ladley et al., 2015; Premo et al., 2018; Schultze et al., 2012). Cooperative learning environments (e.g., mixed or flipped classrooms), where students watch lectures beforehand and then apply that knowledge in the classroom via groupwork, accelerate learning and improve academic performance, especially among struggling students (Zamani, 2016). Overall, interventions that enhance both NCS and cooperation appear to be more effective in boosting achievement than those lacking a cooperative element (Foldnes, 2016; Kramarski and Mevarech, 2003; Slavin, 2014).

Building on research suggesting that NCS are important determinants of academic achievement, and the notion that cooperative learning modalities provide an effective way of engaging with these types of skills, this study explores whether an existing co-curricular activity, competitive policy debate, offers a scalable means to promote NCS in an urban school setting. In competitive policy debate, students work in teams of two and compete as a unit at afterschool and weekend tournaments: that is, the pair wins (or loses) together. Evidence from both qualitative and quantitative studies show that debate participation teaches both critical thinking cognitive skills and potentially NCS (Cridland-Hughes, 2012; Davis et al., 2016; Fine, 2010). Moreover, debate participation has been positively associated with positive achievement outcomes including likelihood of graduating high school, performance on college entrance exams, logical reasoning and literacy, and civic engagement and advocacy (Anderson and Mezuk, 2012; Mezuk, 2009; Mezuk et al., 2011; Mirra et al., 2016). Debate clubs are offered in middle and high

schools, including in lower-resource urban districts like Chicago Public Schools. Finally, there are efforts to support “debate across the curriculum,” being a central component of all subjects in school (Bellon, 2000; Merrell et al., 2017; Zorwick and Wade, 2016). If the hypothesized relationship between debate and NCS is supported, this co-curricular activity may thus provide a scalable way to promote these skills, including in lower-resource, urban school districts.

In this study, we investigated how competitive debate relates to NCS in a sample of students who participated in the Chicago Debate League (CDL). We hypothesized that over the course of a school year, active participation in debate would be positively correlated with three NCS—grit, growth mindset, and a greater tendency toward civic engagement. As a negative control, we examined mood, which we hypothesized would not be related to debate participation. We also hypothesized that motivation for joining the debate team would impact these relationships, such that students who joined the activity primarily for extrinsic reasons would experience more gains in NCS than those who joined for intrinsic reasons. We contextualize these findings within the broader discussion of promoting NCS and student achievement both within and outside the classroom.

## MATERIALS AND METHODS

### Participants and setting

Data collection took place over the 2017-2018 school year in Chicago Public Schools (CPS). During the study period, the CPS district served approximately 107,352 students in grades nine to twelve, of which 41,099 (38%) were African American, 50,688 (47%) were Hispanic or Latino students, 9,215 (8.6%) were non-Hispanic White, 4,262 (4%) were Asian, and 2,088 (2%) represented other minority backgrounds. Around 88,844 (83%) of all the CPS students in high school qualified for a free or reduced lunch (Chicago Public Schools, n.d.).

The CDL has worked in partnership with CPS to provide policy debate programming since 1997 (“About the CDL-Chicago Debates,” n.d.). Between 45-50 CPS middle and high schools usually participate in the CDL, which hosts five to six weekend tournaments (each consisting of maximum six rounds) during the academic year.

CDL coaches were informed of the study through information sessions held by the research team; students were informed about the study through posted flyers and by their coaches. Over the 2017/2018 school year, 2,742 CPS middle and high school students participated in the CDL, 102 of which were recruited into the current study. Data collection took place over the course of four debate tournaments (two in the Fall and two in the Spring semester) during which study participants completed brief (~20 min) self-administered surveys. These surveys were created in collaboration with staff from the National Association for Urban Debate Leagues (NAUDL), consistent with principles of community-engaged participatory research. The survey data was subsequently linked to archival records on debate participation (e.g., number of rounds debated, win-loss record) using an anonymous identifier code.

This project was approved by the Institutional Review Board at the University of Michigan and the CPS Research Review Board



(Project ID 1357). Written informed consent was obtained from the guardians of all students and for students aged  $\geq 18$  years old; written informed assent was obtained for students  $< 18$  years old. Participants received a \$10 gift card to a local store for each survey (total possible compensation for completing Fall and Spring surveys: \$20).

## Measures

The surveys assessed demographic and academic characteristics, including age, gender (female, male, non-binary, and prefer not to answer), race/ethnicity (White, Black, Asian, Hispanic or Latino, Mixed), grade level, enrollment in honors classes, and participation in other activities (that is, arts, sports, volunteer or community participation, academic clubs, working for pay, or caregiving for a family member). Debate experience, indicated by tournament participation records, was measured by both duration of debate participation (range 0 - 70 months) and number of rounds debated (range 1 - 185 rounds).

"Surveys also asked about student' motivation to join (Fall only) or remain on the debate team (Spring only)" the debate team. Reasons for joining were categorized as *extrinsic*, *intrinsic* or *both intrinsic/extrinsic motivation* by investigators. *Extrinsic motivation* was assigned if debaters indicated that their decision to join (or remain engaged with) the team was due to external factors (e.g., encouragement from friends, the debate coach, other teachers or principal, current or former members of the debate team, or family members). *Intrinsic motivation* was assigned if participants indicated that they joined (or remained engaged with) the team for personal reasons (e.g., to help with school, to learn argumentation, to get into college). Students who cited both external and personal motivation were assigned to the joint *intrinsic/extrinsic* group.

## Outcomes

NCS were assessed using existing Social Emotional Learning (SEL) scales that had been modified for the study population (Panorama Education, n.d.). Each SEL scale used a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. Grit was assessed using the adapted SEL-Grit scale (6 items, Cronbach  $\alpha=0.69$  (Fall) and  $\alpha=0.66$  (Spring), which asked students to rate their agreement with each statement (e.g., *I get obsessed with a certain idea or project for a short time but later lose interest*). Growth mindset was assessed using the SEL-Growth mindset and SEL-Self-efficacy scales (6 items,  $\alpha=0.82$  (Fall) and  $\alpha=0.76$  (Spring)), which asked students to rate each statement (e.g., *I can learn all the material presented in my classes*). Civic engagement was assessed using the modified SEL-Social awareness scale (6 items,  $\alpha=0.73$  (Fall) and  $\alpha=0.69$  (Spring)), which asked students to rate their agreement with each statement (e.g., *I have a responsibility to be involved in community issues*). Finally, mood was assessed using the modified SEL-Emotion regulation scale (8 items,  $\alpha=0.80$  (Fall) and  $\alpha=0.85$  (Spring)), which asks respondents to rate their agreement with each statement as to how they have felt over the past two weeks (e.g., *I have felt worthless; I have felt stressed*).

## Analysis

Descriptive statistics were used to characterize participants (e.g., age, gender, race/ethnicity, grade level, after school activities), their debate experience (e.g., duration of participation, number of rounds debated) and motivation for participating in debate (that is, extrinsic, intrinsic, or both extrinsic/intrinsic), and the four NCS measures at the Fall and Spring assessments. Non-parametric Spearman

coefficients were used to quantify the correlations between the four NCS measures at the Fall and Spring assessments.

Paired t-tests were used to assess overall change in the four NCS measures between the Fall and Spring semesters. A one-way analysis of variance (ANOVA) and Kruskal-Wallis non-parametric tests were used to compare the mean level of the outcomes across the three motivation groups. Next, linear regression models were fit to estimate the relationship between debate experience and each NCS measure. We conducted a sensitivity analysis to assess whether the relationship between debate experience and the NCS measures was linear using penalized splines (supplemental material). Based on smoothing plots, partial residual diagnostics, Akaike's Information Criterion, and adjusted  $R^2$ , the indicators of debate experience were subsequently transformed to address non-linearity and improve model fit. However, none of these non-linear transformations changed the direction or significance of associations. Therefore, to ease interpretability and ensure comparability of results across models, we present outcomes from the untransformed analyses in the main paper, but illustrate the non-linear associations with supplemental analyses (Supplemental Table 1, Figures 1-2). To examine effect modification by motivation to join debate, we also included a cross-product between experience and motivation. All regression models were adjusted for age, gender, and race/ethnicity.

All statistical tests were two-tailed and statistical significance was set at  $\alpha=0.05$ . All analyses were conducted in R (v 3.4.3).

## RESULTS

As shown in Table 1, 102 CDL debaters participated in the study. Average age was 16 years (Standard deviation (SD)=1.2) and approximately half were female. One-third were Hispanic/Latino, 19% were Black, and 18% were non-Hispanic White. Most (77%) were enrolled in an honors program. The most frequently reported reasons for joining the debate team were to learn argumentation (55%), to help get into college (47%), and because of a debate coach (43%). After categorizing these reasons, 13 (13%) participants indicated only extrinsic motives, 15 (15%) indicated only intrinsic motivations, and 58 (57%) indicated both intrinsic and extrinsic motivations ( $n=16$  had missing data). Table 2 illustrates that the most commonly cited reasons for staying in debate at the Spring assessment were related to the influence of a coach (30%) or friends (22%), the enjoyment of learning new things (29%) or meeting other students at tournaments (20%), and the improvement in school performance (24%). These reasons for remaining engaged in the activity were not used in the regression analyses due to small cell sizes.

Table 3 shows the correlations between the four NCS measures in the Fall and Spring. Grit was significantly correlated with growth mindset [Fall  $\rho=0.47$  ( $p<0.0001$ ) and Spring  $\rho=0.56$  ( $p<0.0002$ )]; civic engagement [Fall  $\rho=0.32$  ( $p=0.002$ ) and Spring  $\rho=0.33$  ( $p=0.03$ )], but not mood [Fall  $\rho=0.16$  ( $p=0.14$ ) and Spring  $\rho=0.23$  ( $p=0.47$ )]. Civic engagement was significantly correlated with growth mindset in the Fall ( $\rho=0.34$ ,  $p=0.001$ ), but not in the Spring ( $\rho=0.23$ ,  $p=0.16$ ). Mood was only correlated with growth mindset in the Fall ( $\rho=0.28$ ,  $p=0.01$ ). These results indicate good convergent and discriminant validity

**Table 1.** Characteristics of participants in the Chicago study of student success (n=102).

<b>Demographic characteristic</b>	<b>N (%)</b>
Age, mean (SD)	16 (1.2)
Female	53 (52.0)
Not reported	15 (14.7)
<b>Race/ethnicity</b>	
Hispanic/Latino	32 (31.4)
Black	19 (18.6)
White	18 (17.6)
Asian	6 (5.9)
Mixed race	11 (10.8)
Not reported	16 (15.7)
<b>Current grade</b>	
9 <sup>th</sup>	14 (13.7)
10 <sup>th</sup>	32 (31.4)
11 <sup>th</sup>	21 (20.6)
12 <sup>th</sup>	19 (18.6)
Not reported	16 (15.7)
AP/Honors	78 (76.5)
<b>After school activities</b>	
Performance or Fine Arts	36 (35.3)
Academic program or club	24 (23.5)
Community engagement/Volunteering	36 (35.3)
Sports	35 (34.3)
Paying job or caregiving	21 (20.6)
None reported	37 (36.3)

of these established scales with each other.

Table 4 shows the distribution of the four NCS measures overall and by motivation to join debate. Average change score for growth mindset was  $\Delta=0.29$  (95% Confidence Interval (CI): 0.10, 0.48) from the Fall to Spring semesters. Civic engagement ( $\Delta=-0.02$ , 95% CI: -0.19, 0.15) and mood ( $\Delta=0.04$ , 95% CI: -0.12, 0.20) remained unchanged. Grit declined from the Fall to Spring assessments ( $\Delta=-0.17$ , 95% CI: -0.34, -0.01). As shown in Figure 1, this decline in grit was largely driven by the group with intrinsic motivation ( $\beta_{\text{unadjusted}}=-0.17$  (SD=0.08), p-value=0.048). However, after adjusting for age, gender, and race/ethnicity, motivation to join debate did not significantly moderate grit or growth mindset. In the adjusted analysis, debaters with intrinsic motivation had higher initial (Fall) levels in civic engagement compared to those with extrinsic motivation ( $\beta_{\text{adjusted}}=0.15$  (SD=0.06), p-value=0.01).

Table 5 summarizes the relationship between debate experience (that is, months of debate experience and number of rounds debated) and the four NCS measures in the Fall semester and their change over the school

year. After adjusting for age, gender and race/ethnicity, greater length of debate experience, as measured by months of participation, remained significantly associated with positive change score for grit ( $\beta=0.08$  (SD=0.03); p-value=0.01, adjusted  $R^2=0.10$ ), but not the other three NCS measures. The relationship between debate experience and change in grit from Fall to Spring was non-linear: grit declined over this time for those with less debate experience but increased for those with  $\geq 10$  months of participation (Supplemental Figures 2). Neither grit, growth mindset, civic engagement, nor mood were significantly associated with debate experience, measured as number of rounds debated, although all the associations were in the same direction.

## DISCUSSION

This study examined how four NCS-growth mindset, grit, civic engagement, and mood-changed over the course of an academic year within a sample of high school debaters.

Overall, debaters reported a significant increase in

**Table 2.** Factors that influence decision to participate in debate

Factors influencing decision	Decision to join, N (%)	Decision to remain engaged, N (%)
<b>Extrinsic motivation</b>		
My friends	31 (30.4)	22 (21.6)
My family	20 (19.6)	11 (10.8)
Debate alumni	10 (9.8)	-
My debate coach	44 (43.1)	32 (30.4)
Principal or another teacher	12 (11.8)	-
Debaters on the team	31 (30.4)	14 (13.7)
<b>Intrinsic motivation</b>		
I thought it would help me get into college	48 (47.1)	24 (23.5)
I thought it would help with school	32 (31.4)	12 (11.8)
I thought it would make me better at argumentation	56 (54.9)	-
I enjoyed learning new things	-	30 (29.4)
I liked the topic	-	14 (13.7)
I enjoyed the competition	-	25 (24.5)
Going to tournaments and meeting students from other schools	-	20 (19.6)
<b>Sample of write-in responses</b>		
	15 (14.7)	4 (3.9)
	“Making friends and improving social skills”	“Distracts me from my issues.”
	“I love to argue against people/prove my point”	“I already spent money on it”
	“I want to become a lawyer so I could use it”	-
	“I needed to blow off some steam”	-
	“No specific reason, had nothing else to do”	-
	“I wanted to be a part of something great”	-

growth mindset, but a significant decline in grit, during this period. Attitudes toward civic engagement and mood did not significantly change over this period. Length of debate experience altered how grit changed over time: over the school year there was a decline in grit for students with limited debate experience, but an

increase in grit for those with at least 10 months of participation. Finally, motivation to join debate did not substantively relate to either initial levels of NCS or change over the school year. However, students indicating intrinsic motivation did report higher initial levels of civic engagement, consistent with the notion that debate attracts students who

want to engage in dialogue on social problems. Taken together these findings support the hypothesis that debate participation is positively associated with growth mindset, and to some degree grit, among urban high school students. While the present study was limited to students participating in the CDL, these findings can be

**Table 3.** Correlation between non-cognitive skills: Fall and spring semesters

Parameter	Grit		Civic engagement		Growth mindset	
	Fall	Spring	Fall	Spring	Fall	Spring
Grit	1	1				
Civic engagement	0.32*	0.33*	1	1		
Growth mindset	0.47**	0.56*	0.34*	0.23	1	1
Mood	0.16	0.23	0.06	0.16	0.28*	0.26

\*p &lt; 0.05, \*\*p &lt; 0.0001.

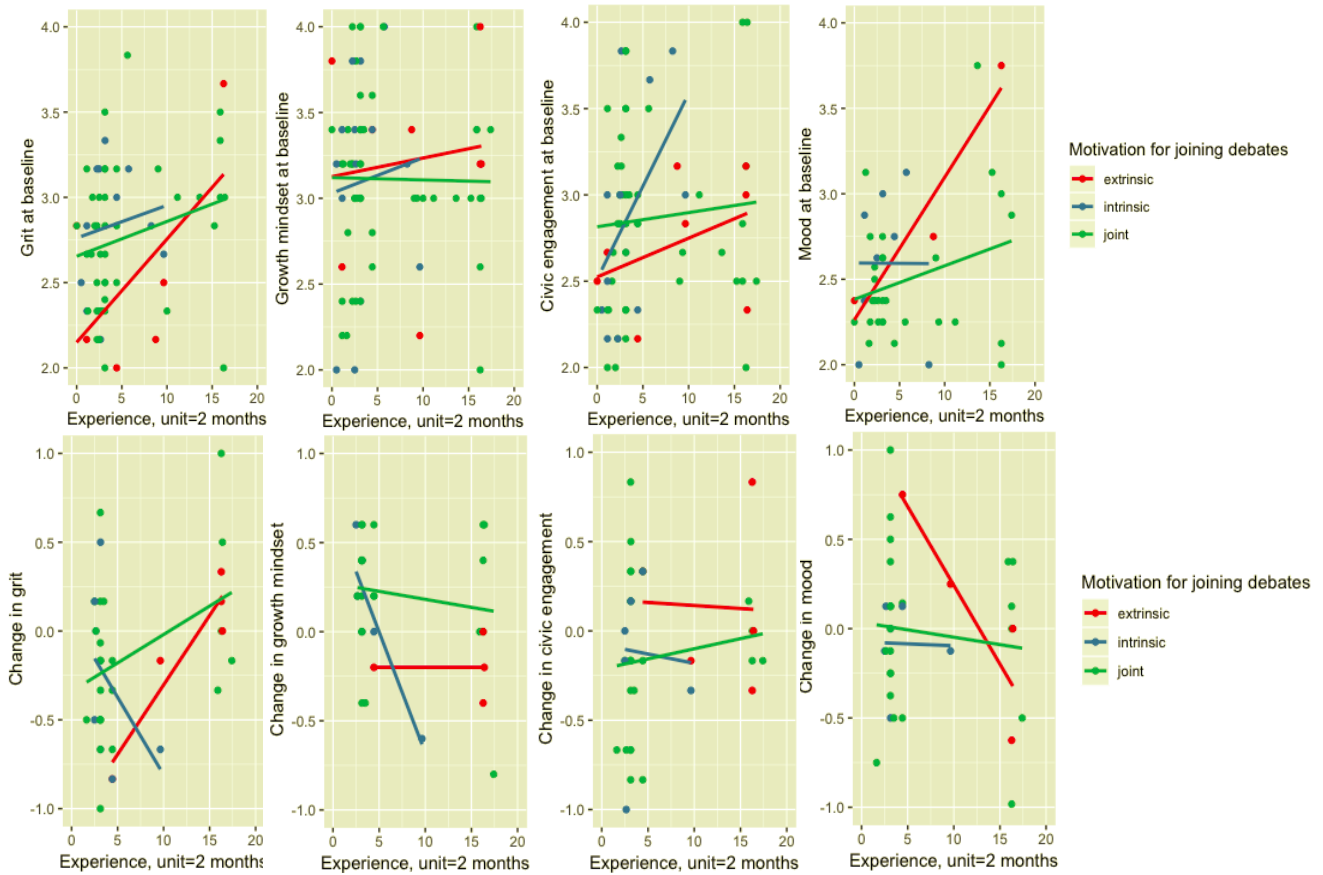
**Table 4.** Initial level and change in non-cognitive skills by motivation to join the debate team

Non-cognitive skills	Overall	Motivation to join debate			ANOVA F, p-value
		Intrinsic	Extrinsic	Both	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
<b>Fall</b>					
Grit	2.5 (0.62)	2.5 (0.69)	2.2 (0.75)	2.6 (0.56)	2.0, 0.14
Growth mindset	3.0 (0.73)	3.0 (0.79)	2.8 (1.09)	3.1 (0.60)	0.9, 0.40
Civic engagement	2.7 (0.62)	2.7 (0.70)	2.5 (0.49)	2.8 (0.62)	1.4, 0.25
Mood	2.1 (0.72)	2.0 (0.75)	2.0 (0.90)	2.1 (0.69)	0.2, 0.84
<b>Spring</b>					
Grit	2.3 (0.64)	2.1 (0.45)	2.0 (1.14)	2.5 (0.54)	1.6, 0.22
Growth mindset	3.4 (0.54)	3.2 (0.73)	3.3 (0.48)	3.4 (0.52)	0.3, 0.75
Civic engagement	2.9 (0.59)	2.7 (0.33)	2.8 (0.67)	2.9 (0.61)	0.3, 0.75
Mood	2.0 (0.73)	2.0 (1.1)	1.8 (0.96)	2.1 (0.64)	0.2, 0.81
<b>Change score</b>					
Grit	-0.17 (0.53)*	-0.29 (0.51)	-0.10 (0.45)	-0.11 (0.50)	0.4, 0.69
Growth mindset	0.29 (0.58)*	0.10 (0.41)	0.12 (0.73)	0.35 (0.60)	0.6, 0.53
Civic engagement	-0.02 (0.55)	-0.12 (0.45)	0.13 (0.46)	-0.06 (0.57)	0.4, 0.71
Mood	0.04 (0.50)	-0.08 (0.23)	0.32 (0.70)	-0.003 (0.50)	1.0, 0.36
Characteristics of debate experience	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Kruskal-Wallis $\chi^2$ , df, p-value
Number of debate rounds (count)	29 (39.5)	19 (21.5)	57 (41.8)	30 (38.0)	60, 55, 0.31
Months of debate experience (months)	6.3 (14.9)	5.0 (5.3)	25.9 (21.7)	6.3 (25.8)	40, 39, 0.42

\*P-value from paired t-test of change from fall to spring assessments, p&lt;0.05.

contextualized in a broader discussion of NCS in educational settings. Prior studies of NCS among high school students have also reported mixed findings for change in grit and growth mindset over the course of an academic year (Donohoe et al., 2012). Other reports suggest that the relationship between mindset and grit is bi-directional (Ng and Ng, 2018) and mutually reinforcing (Bedford, 2017). In contrast to our expectations, students reporting intrinsically-motivated reasons for joining debate did not significantly differ, either initially or over time, in grit or growth mindset as compared to the students with more extrinsic reasons. Notably, the most

commonly cited extrinsic motivation to join the activity was the debate coach. This is supported by prior research that underscores the influence of role models and mentors in educational settings in general (Brown and Treviño, 2014; Orland-Barak, 2014; Stern et al., 2018) and within a context of cooperative learning activities like debate (Ferguson-Patrick, 2018; Gillies, 2016, 2014). This is also consistent with social interdependence theory, which emphasizes that positive outcomes from cooperative learning is a function of how mentors and team leaders structure learning goals and shape the nature of group interactions (Johnson, 2003;



**Figure 1.** Association between duration of debate participation (in months) and the four non-cognitive skills (NCS): grit, growth mindset, civic engagement, and mood. The top panels show initial (fall/baseline) levels in these four NCS measures. The bottom panels show change from the fall to spring assessments, stratified by reason for joining the debate team.

**Table 5.** Relationship between debate experience and non-cognitive skills

Parameter	Grit	Growth Mindset	Civic Engagement	Mood
<b>Debate experience (unit=2 months)</b>				
<b>Fall</b>	<b>β (95% CI)</b>	<b>β (95% CI)</b>	<b>β (95% CI)</b>	<b>β (95% CI)</b>
Model 1	0.010 (-0.022; 0.042)	0.011 (-0.24; 0.046)	0.017 (-0.016; 0.050)	0.030 (-0.010; 0.069)
Model 2	0.008 (-0.028; 0.045)	0.021 (-0.021; 0.062)	0.004 (-0.035; 0.043)	0.028 (-0.016; 0.071)
<b>Change score</b>				
Model 1a	0.068 (0.020; 0.115)*	-0.046 (-0.104; 0.012)	0.029 (-0.025; 0.083)	-0.013 (-0.064; 0.037)
Model 2a	0.080 (0.019; 0.141)*	-0.044 (-0.115; 0.027)	0.014 (-0.048; 0.075)	-0.032 (-0.097; 0.033)
<b>Number of debate rounds (unit=2 rounds)</b>				
<b>Fall</b>	<b>β (95% CI)</b>	<b>β (95% CI)</b>	<b>β (95% CI)</b>	<b>β (95% CI)</b>
Model 1	0.001 (-0.006; 0.009)	0.004 (-0.004; 0.013)	0.005 (-0.003; 0.013)	-0.001 (-0.010; 0.009)
Model 2	0.003 (-0.005; 0.012)	0.005 (-0.004; 0.014)	0.002 (-0.007; 0.011)	-0.003 (-0.013; 0.007)
<b>Change score</b>				
Model 1a	0.004 (-0.005; 0.013)	-0.008 (-0.019; 0.002)	0.004 (-0.005; 0.014)	0.000 (-0.009; 0.009)
Model 2a	0.004 (-0.007; 0.015)	-0.004 (-0.016; 0.008)	0.004 (-0.007; 0.014)	-0.001 (-0.012; 0.010)

Model 1 and 1a: Unadjusted. Model 2 and 2a: Adjusted for age, gender, and race/ethnicity. \*p < 0.05 (Linear regression).

Johnson and Johnson, 2002).

Debate is an inherently social activity, where students are part of large teams, and each student is paired with a partner for competition. Such debate structure promotes individual accountability, while maintaining a sense of group interdependence through peer feedback and pursuit of a common goal, which is a key to a successful cooperative learning (Johnson and Johnson, 2009; Tran, 2013). In this way, debate features a learning environment that differs from most existing interventions designed to cultivate NCS, which tend to be centered on the individual. Commonly-used individual-centered interventions range from workshops and online programs, to educational resources for teachers and parents (Bettinger et al., 2018; Burgoyne et al., 2018; Burnette et al., 2018; Cheng et al., 2017; Seaton, 2018; Singer-Freeman and Bastone, 2017). Unlike these individual-centered interventions, small group activities such as policy debate reorient participants toward assuming individual responsibility for common goal in the context of active collaboration and shared decision-making (Postmes et al., 2005). Such an orientation provides a foundation for testing and refining individual abilities with interactive peer feedback and performance evaluation (Huber and Lewis, 2010; Mercier and Landemore, 2012). Scholars working in communication studies and political science emphasize that debate facilitates political awareness and improves public argumentation (Davis et al., 2016; Hogan et al., 2016; Zorwick and Wade, 2016). The present findings extend this work to show that debate, as a cooperative learning activity, offers a potential platform for positive social reinforcement and fostering of NCS.

Findings should be interpreted in context of study strengths and limitations. This is a pilot study of a single site of a high school debate league, and thus these results may not be generalizable to non-urban school districts. This study was designed to explore the relationships between debate participation and NCS over a relatively brief period; these results are thus informative for refining hypotheses for future research, rather than testing hypotheses in their own right. As the sample was limited to students currently participating in debate we cannot determine if the lack of change in some of NCS over time reflects selection bias; future research should include comparison groups of students engaged in other types of co-curricular activities.

This study also has several strengths. To our knowledge, this is the first study to quantitatively assess and measure change in multiple indicators of NCS in an urban debate league. Exploring potential mediators of the relationship between debate participation and academic achievement can inform both afterschool debate programs like the CDL and efforts to integrate debate into education settings more generally (Glass and Westmont, 2014; Wang and Holcombe, 2010). The sample is notable for its diversity in terms of gender and race/ethnicity, which allows us to examine these relationships

for groups that are relatively understudied in NCS research.

## Conclusion

Prior studies have shown that policy debate is a powerful tool for developing critical thinking, literacy and argumentation skills (Mitchell, 1998; Mirra et al., 2016). The findings of this study suggest that policy debate might also offer a viable platform for improving motivation and resilience among high school students. Policy debate is both accessible (that is, there are no “try-outs”) and multilevel (there are novice, junior varsity, and varsity divisions of competition). As compared to individual-based or teacher-oriented interventions for enhancing NCS, competitive debate creates an inherently interactive and rigorous learning environment that can be conceptualized as a form of cooperative learning that teaches students how to navigate social challenges in constructive and collaborative ways. Additionally, efforts like the CDL demonstrate that policy debate is scalable to large urban districts that serve students from a variety of socioeconomic backgrounds. A structured format such as policy debate should be considered as a potential tool for promoting NCS among student learners that could function alongside or in complement to current educational efforts focused on integrating social and emotional learning into all aspects of public school education (e.g., Integrating Social, Emotional, and Academic Development, 2019).

Taken together, these and other studies suggest that policy debate creates learning opportunities that are both accessible and challenging in a team-based social environment. These features make policy debate a fertile setting for promoting NCS like growth mindset and grit in a scalable manner. Future research should build on these findings to evaluate how debate participation supports student achievement and personal growth long-term.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

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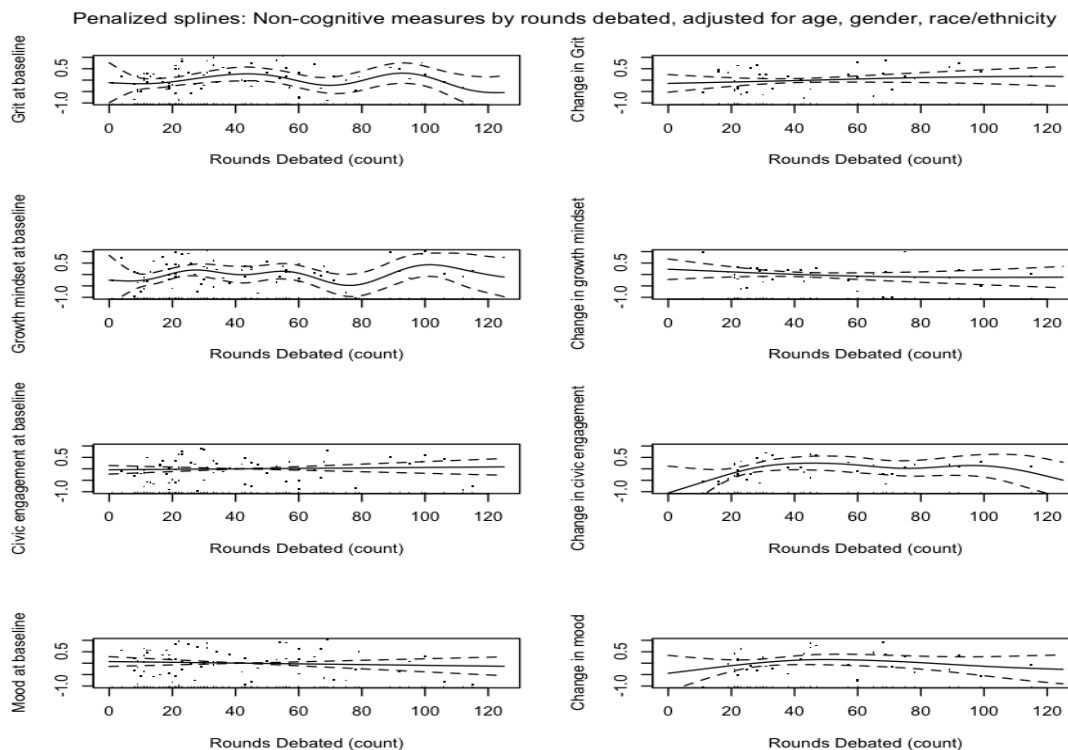
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## Supplemental Material

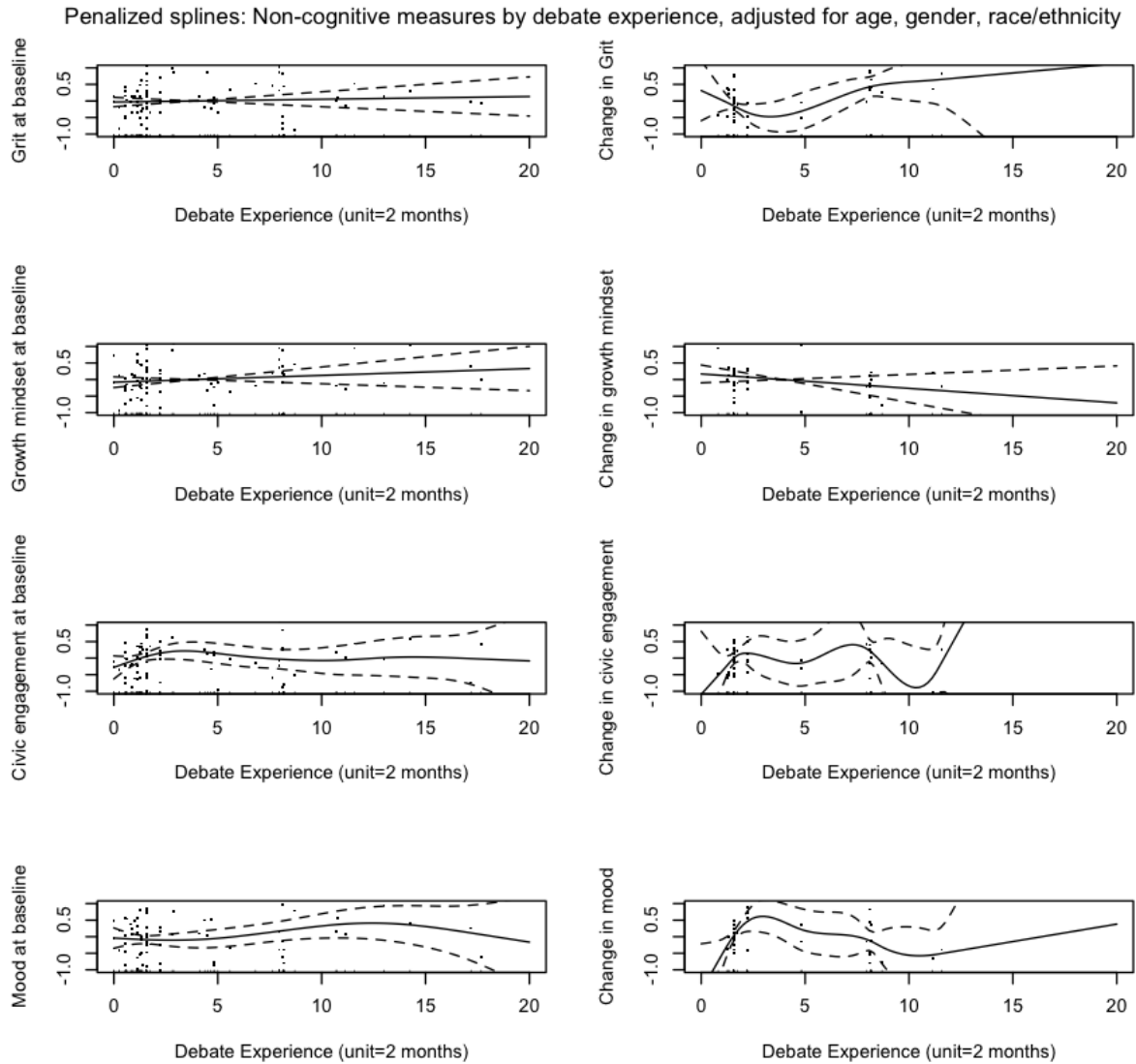
Table 1. Relationship between debate experience and non-cognitive measures

Parameter	Grit	Growth Mindset	Civic Engagement	Mood
Fall	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
<b>Debate Experience (unit=2 months)</b>				
Model 1	.005 (-.011; .021)	.006 (-.012; .023)	.009 (-.008; .025)	.015 (-.005; .035)
Model 2*	.004 (-.014; .022)	.010 (-.010; .031)	.011 (-.713; .732) †	.585 (-.643; 1.81) †
<b>Change score</b>				
Model 1a	.034 (.010; .058)**	-.023 (-.052; .006)	.015 (-.012; .042)	-.007 (-.032; .019)
Model 2a*	.040 (.009; .070)**	-.022 (-.057; .014)	.065 (-.098; .227) ‡	-.005 (-.012; .002) ±
<b>Rounds debates (unit=2 rounds)</b>				
Model 1	.001(-.006; .009)	.004 (-.004; .013)	.005 (-.003; .013)	-.001 (-.010; .009)
Model 2*	.110 (-.250; .470) †	.182 (-.194; .558) †	.002 (-.007; .011)	-.003 (-.013; .007)
<b>Change score</b>				
Model 1a	.004 (-.005; .013)	-.008 (-.019; .002)	.004 (-.005; .014)	.000 (-.009; .009)
Model 2a*	.004 (-.007; .015)	-.004 (-.016; .008)	.109 (-.075; .294) ‡	.045 (-.165; .255) ‡

\*Adjusted for age, gender, and race/ethnicity. \*\* $p < .05$ . † According to smoothing plots, AIC and adjusted  $R^2$  outcome is log-transformed; result is reported in % change in geometric mean. ‡ According to smoothing plots, AIC and adjusted  $R^2$  predictor is log-transformed; result is reported in the original scale for outcome for the double increase in the round units (2 rounds x2). ± According to smoothing plots, AIC and adjusted  $R^2$  predictor is fitted as a quadratic term. There is a positive increase in mood with a unit increase in debate experience, when students start debating. The positive effect of increased debate experience on mood tapers down after about 10 months of debating.



**Supplemental Figure 1.** Relationship between duration of debate experience (number of rounds debated) and non-cognitive skills: Initial levels and change from the fall to spring assessments. Association between debate experience (number of rounds debated) and four non-cognitive skills (NCS): grit, growth mindset, civic engagement, and mood. The left panels show initial (fall/baseline) levels in these NCS measures. The right panels show change in the NCS measures from the fall to spring assessments



**Supplemental Figure 2.** Relationship between duration of debate experience (months of participation) and non-cognitive skills: Initial levels and change from the fall to spring assessments. Association between duration of debate participation (months of participation) and four non-cognitive skills (NCS): grit, growth mindset, civic engagement, and mood. The left panels show initial (fall/baseline) levels in these NCS measures. The right panels show change in the NCS measures from the fall to spring assessments.

**Related Journals:**

