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# A multilevel analysis of factors affecting kindergartners' creative dispositions in relations to child-level variables and teacher-level variables

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## Abstract

Kindergarteners' creative dispositions are not only affected by their individual characteristics, but also by the organizational creative climate of their kindergartens. Using the Hierarchical Linear Models (HLM), this study examined a correlation between a 5-year-old child's variables (e.g. child's creativity and their perceptions of creative classroom climate), teacher's variables (e.g. the types of kindergarten, teacher's perceptions of organizational creative climate, and teacher's creative dispositions) and child's creative dispositions. The study sample included a total number of 20 kindergarten teachers who teach 5-year-old children and a total number of 195 kindergarteners selected from 10 exemplary kindergartens (i.e. kindergartens recognized by the Ministry of Education in Korea for their outstanding curriculum) and 10 average kindergartens of similar size. The findings of the study are as follows. First, the levels of children's creative thinking and their creative dispositions both were higher in the exemplary kindergartens than those in the average kindergartens. Furthermore, in terms of the levels of teachers' creative dispositions and their perceptions of the organizational creative climate, teachers working in the exemplary kindergartens scored higher than those in the average kindergartens. Next, despite that no direct correlations existed between kindergarteners' creative dispositions and teachers' creative dispositions, kindergarteners' creative dispositions were affected by the types of the kindergartens (e.g. the outstanding curriculum of the exemplary kindergartens) and teachers' perceptions of organizational creative climate. In conclusion, this study indicates the significance of building an organizational creative climate of kindergartens not only for the children but for the teachers to foster children's creative dispositions.

**Keywords:** Kindergarteners, Creative dispositions, Creative thinking, Organizational creative climate, Creative classroom climate

## Introduction

Studies have defined creativity as a product of novel and useful thoughts (Amabile et al. 1996; Starko 2014), focusing on an individual's ability to generate a creative and useful product. Earlier studies have categorized the factors affecting creativity into four

dimensions: ‘person,’ ‘product,’ ‘process,’ and ‘press.’ (Rhodes 1961). First, the characteristics of creative people are associated with certain personality, cognitive and emotional traits, and personal experiences. Second, creative products include innovative, valuable products and inventions that are useful to society. Third, a creative process is focused on the creative ways of synthesizing ideas and adding new ideas to existing knowledge. Lastly, the emphasis has also been on the significance of environments that affect individual or organizational creativity.

In particular, when it comes to children’s creativity, the focus needs to be on an individual child’s creative potential and the process of creative expression. In other words, more attention should be paid to children’s cognitive ability as well as psychological factors such as personality traits, and emotional development (Sharp 2004). To develop children’s creativity, children’s creative dispositions associated with factors such as personality traits and motivations are crucial (Csikszentmihalyi 1996). The development of children’s creative dispositions can be heavily dependent on how much children’s educational institutions encourage children’s creativity. Children’s creativity consists of a reciprocal relationship between personal characteristics and the social environment (Mellou 1996), and an organizational creative climate of kindergartens is an important variable that promotes or decreases children’s creativity (Furman 1998). Furthermore, it is assumed that different levels of the creative climate of kindergartens could affect teachers’ teaching–learning, interactions, and attitudes, effectively affecting children’s creative dispositions. To improve 21st-century school education, creativity has been one of the two critical factors in determining school climate (Marsh 2008). To develop children’s creativity, OECD has also continued to highlight the role of ‘school’ environments (Lucas et al. 2013).

Although there have been concerns that experiences of school education have a negative effect on the development of children’s creativity (Guilford 1950), the positive value of the institutional atmosphere that respects and acknowledges the creativity has also been emphasized (Beghetto and Kaufman 2014; Runco 2003; Westby and Dawson 1995). It has been criticized that the education for children’s creativity mainly takes place in forms of a one-time special activity or out-of-class experiences, which is a mere addition to the existing curriculum (Cho et al. 2012).

As creative sociocultural environments have recently been highlighted, scholars started to pay closer attention to the creative environments and climate of young children’s educational institutions. According to Davies et al. (2013), the literature review of 210 previous studies showed that factors affecting creativity are physical environment, appropriate use of resources, activities outside the classroom/institution, environments encouraging learners’ autonomy, the role of play and games, flexible use of time, respectful relationships between teachers and learners, and use of communities and social networks. The factors ranging from time, space, and resources of educational institutions, relationships between teachers and children, and to use of communities are primarily determined by their curriculum.

Since 2012, the Republic of Korea has provided free childcare for all children aged 0–2 years while providing the national curriculum called Nuri and subsidizing educational expenses for all children aged 3–5 years. As a result, the enrollment rate of Korean young children in educational institutions is much higher than the average enrollment

rates of children in OECD member countries. In Korea, approximately 93.7% of 3-year-old children were enrolled in kindergartens whereas the average enrollment rate for 3-year-old children among OECD member countries was 79.3% (Ministry of Education 2019). As Korean young children tend to attend educational institutions (i.e., childcare and kindergarten) earlier, the environments of these institutions have become one of the most critical factors influencing children's creativity.

The Framework on Education (Article 9, Paragraph 3) of Korea states that school education should emphasize holistic education which includes development of student's creativity and personality. To be specific, Nuri, the national curriculum for children aged 3–5 years, also focuses on cultivating creative competence through holistic development of young children (Nah 2013). Because children's creativity reaches its peak during early childhood (Dacey 1989), sufficient support from adults and educational environments plays an important role in fostering children's creativity. Thus, it is crucial to examine the creative educational environment for kindergarteners.

Since 2015, to enhance the quality of early childhood education pursuant to the Nuri curriculum which focuses on the development of children's creativity and personality (Kim et al. 2019), Korean Ministry of Education has designated some kindergartens across the nation as the top exemplary kindergartens, 100 kindergartens in 2015 and 50 in 2016, and has shared their outstanding curriculum in public. These exemplary kindergartens are chosen specifically for they have already applied the Nuri curriculum into their creative education. To synthesize creativity and their curriculum, the principals and teachers of these exemplary kindergartens have made various efforts to restructure and recreate their kindergartens and classrooms. Thus, the working environments and teachers' dispositions of these exemplary kindergartens are expected to be far different from other kindergartens.

Accordingly, the purpose of this study is to examine whether the creative climate of kindergartens could affect children's creative dispositions. The main research questions are as follows: (a) What are the differences in study variables (i.e. children's creativity-related variables and teachers' level variables) between exemplary kindergartens and average kindergartens? (b) What factors impact children's creative dispositions?

## Literature review

### Kindergarteners' creative dispositions and creative classroom climate

Earlier studies on kindergarteners' creativity mainly focused on individuals' creative characteristics and cognitive thinking processes. In contrast, recent studies started to pay closer attention to social environments that may affect individuals' creative products and behaviors (Min and Choe 2008). In addition to students' creative cognition and emotions, many scholars highlight the significance of environments in fostering creativity, with their research focus on the effects of creative classroom culture (Beghetto and Kaufman 2014) and creative classroom climate (Péter-Szarka 2012).

The creative classroom climate or atmosphere (Table 1) affects kindergarteners in three dimensions: cognitive, emotional, and relational. First, a creative classroom climate should encourage kindergarteners to think more comprehensively and creatively (Cromptley 1992), make them be motivated to set their own goals, allow them to freely make decisions based on their abilities and judgments, and help them emotionally interact

**Table 1 Characteristics of creative classroom climate**

Factor	Sub-factor	Definition
Cognitive support (Cropley 1992)	Divergent thinking	Creating a climate to support divergent thinking rather than convergent thinking Creating an atmosphere that evaluates various answers rather than one answer
	Original thinking	Creating a climate that supports a variety of problem-solving methods, rather than one method
Affective support	Intrinsic motivation (Furman 1998)	Creating a climate where children are more intrinsically motivated to engage than being extrinsically motivated
	Fun (Nickerson 1999)	Creating a fun atmosphere
	Openness (Cropley 1992)	Creating a climate where opinions from various perspectives are accepted
	Challenge spirit (Cropley 1992)	Creating a climate to take risks and action
Relational support (Bak and Park 2009)	Independence (Choe et al. 2005)	Creating an atmosphere that supports each student's own ideas
	Relationship with teachers and peers	Creating an atmosphere where all children are welcomed and supported Creating a climate of mutual respect and support among children

with their classmates and teachers through interactions (Furman 1998). In addition, a creative classroom atmosphere provides an open space for kindergarteners to think creatively and to embrace different ways of thinking and builds a safe space where they can try new things without fear or risk while offering professional knowledge to students (Cropley 1992). Most importantly, a creative classroom climate begins where learning becomes fun (Nickerson 1999).

The creative learning environments can also be constructed through the relationships which kindergarteners build with their teachers or with their classmates (Bak and Park 2009). In particular, kindergarten teachers play a significant role in shaping the creative climate of their classrooms. Instead of acting according to their classroom rules, kindergarteners tend to act like their teachers (Cropley 1992). Thus, it is crucial for teachers to show their kindergarten students that they value creativity for the purpose of creating a creative classroom climate. For instance, when kindergarteners try new things, creative teachers would be very encouraging to their new ideas and very open to unconventional ideas. In addition, creative teachers would provide sufficient time and resources for kindergarteners to generate their own ideas and allow students to express their opinions from various angles. While promoting students' independent thinking, teachers should also be able to provide constructive feedback. Meanwhile, instead of forcing kindergarteners to get one easy answer, teachers should show that they appreciate their students making efforts to generate their own unique ideas (Cropley 1992).

Kindergarteners' creative attitudes will be developed when teachers encourage them to think and explore a set of given problems in various ways, embrace their unconventional

ideas, and wait until they complete their own tasks. Unless kindergartners feel safe to try new things or to express their thoughts in their classrooms, even those with innate creative abilities and dispositions might struggle to utilize their creativity. Therefore, teachers must build a creative classroom climate where kindergartners can proactively complete their assignments and freely share their opinions (Min and Seo 2009). Accordingly, children's creative dispositions and personalities are greatly influenced by a classroom climate where children support each other while maintaining autonomy, a collaborative teaching–learning method, and a classroom climate where children are free to share their own thoughts (Kim and Choi 2014). After examining the correlation between classroom climate, teaching–learning methods, and students' creativity, Lew (2016) concluded that teachers' enthusiasm and a supportive classroom climate where students help and encourage each other will eventually motivate students to collect data, analyze and express their own creative thinking processes.

In addition, a peer relationship is also one of the important factors in building a creative class climate. If children are able to build and maintain good relationships with their friends, they can be more initiative in playing because they may feel free to suggest a new game or lead it (Bak and Park 2009). Being active in a peer relationship is closely associated with children's independence, which is one of the creative dispositions (Choe et al. 2005). Moreover, those who maintain good peer relationships are more likely to generate innovative ideas because they are not afraid of sharing their own ideas in that particular environment. Therefore, while a creative classroom climate encourages children to develop comprehensive and creative thinking skills, it helps them to motivate themselves, creates a fun learning atmosphere, promotes openness, challenge spirit, and independence, and builds a cooperative relationship between teachers and children.

#### **Teachers' creative dispositions and organizational creative climate**

Teachers' positive perceptions of creativity will have an effect on their attitude towards creativity, which also have a positive impact on building a creative classroom climate and school culture (Skiba et al. 2010). Teachers' perceptions of creativity are crucial because the study shows that the characteristics of teachers' favorite students were negatively correlated with the characteristics of creative children (Westby and Dawson 1995). This finding indicates that teachers can have a negative impact on development of children's creativity because teachers' beliefs and attitude towards creativity affect the emotional traits of creative children such as originality, independence, and challenge spirit.

Teachers' creativity is as important as their perceptions of creativity. Studies on teachers' creative dispositions mainly focus on a correlation between teachers' personality traits, (e.g. their critical thinking skills, emotional traits, and attitude) and learners' ability to enhance their creativity (Bramwell et al. 2011; No et al. 2007; Soh 2000). Personal attributes of creative teachers are associated with their intelligence, motives, and value of life. They tend to participate in group activities to foster their creativity (Bramwell et al. 2011). As creative teachers generally feel free to improvise (Bramwell et al. 2011), they generally affect their students' creativity through their teaching–learning methods, emotional support, and creative thinking, and also by being creative role models of their students (No et al. 2007).

Kindergartens' organizational climate is crucial when it comes to using teachers' creativity in their classrooms. The creative organizational climate significantly affects psychological processes in the organization ranging from problem-solving, decision-making, communicating, coordinating, moderating, learning, and to creating curriculum. As a result, these processes have a major impact on the organization itself (Ekvall 1996).

Although only a few studies have directly examined kindergartens' organizational climate, they concluded that factors including level of autonomy, adventurous work style, management encouragement, support of colleagues, organizational support, and sufficient resources affect organizational creative climate (Jin et al. 2007; Jung and Kim 2013; Park 2016; Roh et al. 2011). Changes in learning organizations (i.e. school) play a significant role in nurturing children's creativity, which is affected by factors including creative classroom climate, creative program, creative teachers, and creative teaching methods. To change organizations like school, the change should first be made among teachers (Mellow 1996). For instance, Korean Ministry of Education started to frame policies supporting creative education at national, provincial, and local levels. At the same time, some argued that the relevant policies and regulations supporting creative school environments should be made at the level of kindergartens and schools while the Ministry of Education and Provincial Offices of Education in Korea merely provide support (Choi 2011). As a result, the Ministry of Education has designated exemplary kindergartens in recognition of their outstanding curriculum for initiating studies and making progress of improvements on the Nuri curriculum at their level.

### **Study context**

In September 2017, the data were collected by the first author. The present study was conducted after receiving the research ethics approval (KICCEIRB-2017- No. 10) from the Korea Institute of Child Care and Education. The study examined 5-year-old kindergarteners and their kindergarten teachers from two different groups of kindergartens: the exemplary kindergartens recognized by the government and the average kindergartens in Korea. Since 2015, the Ministry of Education in Korea has designated exemplary kindergartens across the nation in recognition of their efforts to adopt the high-quality national curriculum, Nuri. In so doing, the government has encouraged kindergarten teachers to make efforts to reconstruct and improve the curriculum. In 2015, 23 of 50 exemplary kindergartens which focused on creative education were designated while a total number of 54 kindergartens were designated in 2016.

### **Method**

The study examined whether a direct or indirect correlation exists (1) between the groups of kindergartens (exemplary vs. average), teachers' creative dispositions, and their perceptions of organizational creative climate; and (2) children's creative thinking, their creative dispositions, and their perceptions of creative classroom climate. Survey data on kindergarteners were collected through one-on-one tests, interviews, and reports from their teachers whereas teacher-related data were mainly obtained from their self-reports. These collected data were analyzed with a two-level HLM. Level 1

was formed with child-level variables, whereas Level 2 was formed with teacher-level variables.

### **The sample**

The purpose of this study was to examine the correlation between child variables and teacher variables in relation to the creative dispositions of 5-year-old kindergarteners. The study included 10 teachers from 5 exemplary kindergartens with an outstanding curriculum, 10 teachers from 5 average kindergartens, and a total number of 200 5-year-old kindergarteners (at the minimum of 10 kindergarteners per teacher).

Since the exemplary kindergartens designated by the Ministry of Education in Korea were spread across the nation, the study included kindergartens from three big metropolitan cities (e.g. Incheon, Daejeon, and Busan) in addition to Korea's capital city, Seoul, and its most populous province, Gyeonggi. The primary criteria for selecting the comparison group were location (the proximity to the group); the second criteria were similar numbers of children. Under the circumstances where it was too hard to contact potential participants, the consent for participation was given from the principals of kindergarten in cooperation with inspectors of local education offices and teachers. After recruiting teachers who desire to participate and their classes were designated, they were asked to distribute the ads for study participation and recruit participants on a first-come-first-served basis.

A total number of twenty teachers participated in the study (10 from the exemplary kindergartens; 10 from the average kindergartens). Their mean age was 29.83 ( $SD = 6.19$ ). The questionnaires for teachers were sent to their kindergarten in advance and collected along with the children's questionnaires on the day of the visit, and the tests for children were conducted on the appointed day at the kindergarten. Except for children who were absent on the day of the visit or had missing information, a total number of 195 kindergarteners (97 boys and 98 girls) participated in the study. The mean age of children was 5.83 ( $SD = .39$ ).

### **Data collection instruments**

#### **Instruments used for children**

##### ***Creative thinking (Torrance Tests of Creative Thinking, TTCT)***

The study used the TTCT developed by Torrance, which consists of three subtests (constructing figures, finishing an incomplete shape, and constructing line or circle). For each subtest, the time limit was 10 min, and a trained examiner performed a one-to-one test with a child. TTCT scoring factors include a checklist of 'originality, fluency, elaboration, abstraction of title, resistance to early termination, and creative strengths.' A researcher who completed the TTCT Scoring Training scored the TTCT, and the score ranged from 0 to 45. The type A test of the TTCT was used and the overall reliability coefficient was .73.

#### **Kindergarteners' creative dispositions**

To study creative capabilities of children, it is necessary to examine some personal attributes, including both cognitive and non-cognitive traits that have a positive impact on generating creating thinking and creative products. (Hah et al. 2008; Lee 2005; Park

and Bak 2007; Shin 2000). Through the literature review, expert consultation and a preliminary study, Kim et al. (2012) constructed 26 items on 7 non-cognitive characteristics related to creativity. Based on 7 non-cognitive characteristics suggested by Kim et al. (2012), the present study examined the related factors of the tool from the Rating Scale for Creative Characteristics of Kindergarteners (RSCCP) produced by Lee et al. (2002) who referred to PRIDE (Rimm 1983), to construct items for children's creative dispositions. Next, we developed the test for children's creative dispositions through expert consultations and a preliminary study. Children's creative dispositions were composed of a total number of 22 items ( $r = .92$ ) including 'patience and passion' ( $r = .82$ ), 'humor' ( $r = .90$ ), 'confidence' ( $r = .56$ ), 'adventures and challenges' ( $r = .85$ ), 'curiosity' ( $r = .84$ ), 'openness and autonomy' ( $r = .62$ ), 'imagination' ( $r = .86$ ). It was rated by teachers on a 5-point Likert Scale.

### **Creative classroom climate**

Kindergarteners' perceptions of creative classroom climate affect their creativity. The present study examined the correlation between three characteristics of creative classroom climate (friends, teachers, and rules) suggested by 'A Questionnaire for Characteristics of My Surroundings' (Kim et al. 2012) and the assessment tool for evaluating creative classroom climate suggested by Min (2007) and Lee and Han (2016). After expert consultations and a preliminary study, the final test consisted of 'support from friends and pleasant classroom atmosphere' ( $r = .65$ ), 'support from teachers and freedom of communication' ( $r = .73$ ), and 'strict rules and directive learning environment' ( $r = .51$ ). The test included 21 items ( $r = .78$ ), which was carried out one-to-one with an interviewer. For the purpose of facilitating children's understanding, the test was rated on a 3-point Likert scale using a plate with facial expressions.

### **Instruments used for teachers**

#### **Teachers' creative dispositions**

As the assessment tool for teachers' creative dispositions, the study used 'the Measurement Tool of Creative Disposition for Teachers in Early Childhood Education' developed by No et al. (2007). This tool was designed for kindergarten teachers to self-assess their creative dispositions on a 6-point Likert scale. Based on the characteristics of a creative person, the 41 items ( $r = .94$ ) are first categorized by two factors: 'cognitive factor' and 'affective factor'. The cognitive factor is further divided into three subfactors including 'flexibility' ( $r = .90$ ), 'originality' ( $r = .87$ ), and 'imagination' ( $r = .72$ ) while the affective subfactors include 'humor' ( $r = .86$ ), 'anti-norm' ( $r = .65$ ), 'commitment/patience' ( $r = .60$ ), 'openness' ( $r = .83$ ), 'seeking adventure' ( $r = .80$ ), 'self-confidence' ( $r = .60$ ), and 'independence' ( $r = .67$ ).

#### **Teachers' perceptions of organizational creative climate**

To measure teachers' perceptions of organizational creative climate in their kindergartens, the study utilized the validated evaluation tool of KEYS which Park (2016) translated and modified for Korean educational institutions. KEYS focuses on the environmental factors affecting the creativity of organizations based on the theory of Amabile et al. (1996). The questionnaire is categorized into 10 factors. For instance, the

‘managers’ practice’ factors are associated with job performance of teachers such as level of freedom and challenging work; the ‘organizational motivation’ factors are associated with organizational systems and policy in relation to development of organizational or individual creativity, the ‘resources’ factors include time, money and all resources necessary for creative tasks, and the ‘achievement’ factor which focuses on efficiency of work. A total number of 84 items ( $r = .97$ ) were rated on a 4-point Likert scale.

**Analysis methods**

In reliability testing of the scale, the Cronbach’s  $\alpha$  coefficient, a measure of the internal consistency between a set of items, was calculated using the SPSS 23 statistical program. Furthermore, it was used to verify the correlations between children’s creativity, their creative dispositions, and their perceptions of creative classroom climate. After testing the Pearson’s correlation coefficient, a  $\chi^2$  static analysis, two independent sample  $t$ -tests, and one-way ANOVA were conducted. Next, the multilevel model analysis was performed using HLM 7.01 for Windows. The analysis models are consisted of an unconditional model and a conditional model. Since the unconditioned model is without independent variables, the multilevel model tested the validity of the dependent variable whether they differ between two groups of kindergartens.

After the validity check, research questions were tested using the conditional model which includes child-level variables, teacher-level variables, and kindergarten-level variables. When the multilevel model based on the unconditional model was valid, the conditional model was analyzed (see Table 2). Level 1 analyzed the impact of participants’ creativity and their perceptions of organizational creative climate on their creative dispositions. Level 2 tested how much teacher-level variables represent their creative dispositions. The creativity of participants was analyzed with the same model as their creative dispositions.

**Table 2 Mathematical representation of the model**

Model	Equation
Unconditional model	Level 1 (child-level) $Y_{ij} = \beta_{0j} + r_{ij}$
	Level 2 (teacher-level) $\beta_{0j} = \gamma_{00} + u_{0j}$
	Integrated model $Y_{ij} = \gamma_{00} + u_{0j} + r_{ij}$
Conditional model	Level 1 (child level) $(Creative\ dispositions)_{ij} = \beta_{0j} + \beta_{1j} * (Creativity\ score_{ij}) + \beta_{2j} * (Creative\ classroom\ climate_{ij}) + r_{ij}$
	Level 2 (teacher-level) $\beta_{0j} = \gamma_{00} + \gamma_{01} * (type\ of\ school) + \gamma_{02} * (Teachers' \ creative\ dispositions_j) + \gamma_{03} * (Teachers' \ perceptions\ of\ organizational\ creative\ climate) + u_{0j}$ $\beta_{1j} = \gamma_{10} + u_{1j}$ $\beta_{2j} = \gamma_{20} + u_{2j}$
	Integrated model $Creative\ Dispositions_{ij} = \gamma_{00} + \gamma_{01} * type\ of\ kindergarten_j + \gamma_{02} * Teachers' \ creative\ dispositions_j + \gamma_{03} * Teachers' \ perceptions\ of\ organizational\ creative\ climate_j + \gamma_{10} * Creativity\ score_{ij} + \gamma_{20} * Children's\ perceptions\ of\ creative\ classroom\ climate_{ij} + u_{0j} + u_{1j} * Creativity\ score_{ij} + u_{2j} * Children's\ perceptions\ of\ creative\ classroom\ climate_{ij} + r_{ij}$

$Y_{ij}$ : creative dispositions or creativity of the  $i$ th participants of the  $j$ th teacher;  $\beta_{0j}$ : average creative dispositions or creativity of the  $j$ th teacher;  $r_{ij}$ : differences between individuals in creative disposition or creativity in the  $j$ th class;  $\gamma_{00}$ : average creative dispositions or creativity of all participants;  $u_{0j}$ : differences between teachers in children’s creative dispositions and creativity

## Results

### Descriptive statistics

Regarding variables related to children, the mean values were calculated for children's creativity dispositions, creative thinking, and their perceptions of creative classroom climate (see Table 3).

According to the results of the TTCT test that measured children's creativity, the overall mean score was 103.74. The test indicated that children in the exemplary kindergartens have higher levels of creativity than those in the average kindergartens. Regarding 'originality,' the average score was significantly higher in the exemplary kindergartens than in the average kindergartens.

In regard to 'children's creative dispositions,' the mean score was 3.88 out of 5 while children in the exemplary kindergartens scored higher in their creative dispositions than those in the average kindergartens.

Based on the direct interviews with kindergarteners, the mean score of 'children's perceptions of creative classroom climate' is 2.49 out of 3. The exemplary kindergartens scored higher than the average kindergartens. In terms of 'support from friends,' the average kindergartens had a higher average score whereas the exemplary kindergartens scored higher in 'support from teachers and freedom of communication.' In addition, the exemplary kindergartens also had a higher average score in 'strict rules and directive learning environment.'

The overall mean score of 'teachers' creative dispositions' was 4.59 out of 6. To be specific, the exemplary kindergartens scored higher ( $MS = 4.74$ ) than the average kindergartens ( $MS = 4.43$ ).

The analysis of 'teachers' perceptions of organizational creative climate' showed that the overall mean score was 3.33 while the exemplary kindergartens had a higher mean score of 3.37 than 3.30 of the average kindergartens. Regarding four factors including 'manager's practice,' 'organizational motivation,' 'resources' and 'achievement,' the exemplary kindergartens scored higher in all factors despite no significant differences between two groups of kindergartens.

**Table 3** Descriptive statistics of child-level variables and teacher-level variables

Variable	<i>M</i> ( <i>SD</i> )	Minimum Value	Maximum Value
Level 1 ( <i>N</i> = 195)			
Children's creative dispositions	3.88 (.64)	2.39	4.96
Children's creativity	103.74 (19.23)	41.00	140.00
Children's perceptions of creative classroom climate	2.49 (.29)	1.19	3.00
Level 2 ( <i>N</i> = 20)			
Types of kindergarten	.50 (.51)	0 (average kindergarten)	1 (exemplary kindergarten)
Teachers' creative dispositions	4.59 (.62)	3.58	5.90
Teachers' perceptions of organizational creative climate	3.33 (.34)	2.70	3.99

### Predicting kindergarteners' creative dispositions based on predictors of children variables and teacher variables

This study used the HLM techniques to explain the relationship between teacher-level variables (Level 2), children-level variables (Level 1) and children's creative dispositions. The unconditional model was created to examine whether children's creative dispositions and creativity vary depending on the types of kindergarten; and what percentage of the variation is explained by the types of kindergarten and by children's individual characteristics (see Table 4). According to the analysis of the unconditional model of children's creative dispositions, the level 1 variance ( $\sigma^2$ ) indicating the within-group variance was .17 while the between-group variance ( $\tau_{00}$ ) was .25. The calculation of Intraclass Correlation Coefficient (ICC) indicates that approximately 59.3% of children's creative dispositions (ICC = .593) can be explained by the types of kindergarten (Level 2).

The multilevel model analysis showed that the (fixed) average of the children's creative dispositions was 3.88. When the teachers' creative dispositions and teachers' perceptions of organizational creative climate variables were controlled, children's creative dispositions in the exemplary kindergartens increased significantly by .37 ( $t = 2.98, p < .01$ ) than those in the average kindergartens. When the types of kindergarten and teachers' creative dispositions were controlled, teachers' perceptions of organizational creative climate increased by 1 point, which resulted in an increase of .76 ( $t = 3.64, p < .01$ ) in children's creative dispositions. Finally, there were no significant differences in children's creative dispositions when the types of kindergarten and teachers' perceptions of organizational creative climate were controlled.

A significant correlation existed between children's creativity and their perceptions of creative classroom climate. To be specific, children's creative dispositions increased by .0062 when children's creativity increased by 1 point ( $t = 4.04, p < .001$ ) and other variables remained the same. Moreover, when children's perceptions of creative classroom climate increased by 1 point, children's creative disposition also increased by .26 ( $t = 2.26, p < .05$ ).

Next, regarding the random effect, the average between-group variance was significant (.12). Accordingly, there was a significant difference in children's creative dispositions between kindergartens. The variance of slope of children's perceptions of creative classroom climate was significant (.067). Thus, it indicates that the correlation between children's perceptions of creative classroom climate and children's creative dispositions varies among kindergartens.

**Table 4** The results of the unconditional model of children's creative dispositions

Fixed effect	B	SE	t	df	p
Overall average ( $\gamma_{00}$ )	3.87	.12	33.32	19	<.001
<b>Creative dispositions</b>					
Random effect	SD	$\sigma^2$	$\chi^2$	df	p
Between-group ( $u_0$ )	.50	.25	294.90	19	<.001
Within-group ( $r$ )	.41	.17			
Deviance (– 2LL)					264.21

Finally, in comparison to the unconditional model (264.21), the deviance of conditional model (243.59) decreased, indicating that the conditional model was more appropriate to explain the children's creative dispositions (see Table 5).

As predictor variables, children's creative thinking and their perceptions of creative classroom climate can affect children's creative dispositions, which is also correlated with the types of kindergarten and teachers' perceptions of organizational creative climate.

## Discussion

The study indicates that a correlation exists between children's critical thinking, children's perceptions of creative classroom climate and children's creative dispositions. Furthermore, there were differences in teachers' creative dispositions and their perceptions of organizational creative climate between the exemplary kindergartens and the average kindergartens. The study's key findings are discussed as follows.

First, on average, the levels of children's creative thinking and children's creative dispositions in the exemplary kindergartens were higher than those in the average kindergartens. Children from the exemplary kindergartens scored higher in 'support from teachers and freedom of communication' whereas children from the average kindergartens scored higher in 'strict rules and directive learning environment'. These results are in line with Furman (1998)'s research which suggests that creative classroom climate is imperative for children's creativity. The creative and supportive classroom climate also contributes to the free interaction among peers (Kim, et al. 2019). Playful and humorous classroom climate also influences enhancement of creativity (Chang et al. 2013), indicating that children's interaction with teachers and peers positively affects their creativity. In regard to teachers' role as one of the predictor variables, Moon (1999) suggested that teachers should create an open and permissive classroom atmosphere and use the questions that promote children's divergent thinking. Because a correlation exists between the creative classroom climate and children's creative motivation, it also shows that there

**Table 5 The results of the conditional model children's creative dispositions**

	<i>B</i>	<i>SE</i>
Fixed average	3.88***	.08
Level 1 (child-level)		
Creative thinking	.0062***	.0015
Children's perceptions of creative classroom climate	.26*	.12
Level 2 (teacher-level)		
Types of kindergarten	.37**	.15
Teachers' creative dispositions	.11	.16
Teachers' perceptions of organizational creative climate	.76**	.28
Variance within Kindergartens	.15	
Variance between kindergartens		
Constant	.12***	
Slope of creative thinking	.00002	
Slope of children's perceptions of creative classroom climate	.067*	
Deviance (− 2LL)	243.59	

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

is a significant correlation between creating a permissive and supportive classroom climate and children's creative dispositions (Min and Seo 2009). In particular, it is important to note that such positive correlations were evident among children in exemplary kindergartens.

Concerning teachers' creative dispositions, teachers working in the exemplary kindergartens scored a little bit higher than those working in the average kindergartens. Furthermore, teachers' perceptions of organizational creative climate in the exemplary kindergartens were higher than those in the average kindergartens. On average, the four variables including managers' practice, organizational motivation, resources, and achievement in the exemplary kindergartens scored higher.

The organizational creativity and innovation is the product of "the interaction among people, the processes they engage in, and the environment in which they work" (Puccio et al. 2007). This is applicable to kindergartens as well. Compared to an average corporation, a kindergarten is a small organization primarily comprised of female employees. In addition, the organizational creative climate may have a greater impact on the Korean kindergartens due to its relationship-focused nature. (Kang et al. 2016). The more open the organizational climate of kindergartens is and the more supportive the director tends to be, the more creative the teachers tend to be. Also, the more open, sincere, and sociable the teacher him or herself is, the more creative disposition the teacher has (Seo and Kim 2017).

Analyzing the field studies in the UK, Cho et al. (2010) pointed out that the administrative leadership roles are significant in supporting collaboration opportunities inside and outside the school to develop education curriculum, utilizing various cultural materials, and promoting intimate relationships among teachers. While changing conventional educational curriculum, creative teachers are managing the community they created along the process (Bramwell et al. 2011). In the case of the exemplary kindergartens, for the purpose of restructuring the Nuri curriculum, the principals and the vice-principals of the kindergartens constantly cooperate with their teachers and make efforts to share their products with other kindergartens. Thus, it is assumed that that particular nature of the exemplary kindergartens may have influenced teachers' perceptions of creative working atmosphere.

The exemplary kindergartens provide human and material resources to teachers so that teachers can focus on developing creative classes for children while their organizational system enables teachers to run their classes more smoothly. For instance, as of the principals' role, the exemplary kindergartens were able to allocate the tasks depending on teachers' work experience, age, personality traits or dispositions, simultaneously maintaining ways to promote the cooperation among teachers. With creativity in mind, some kindergartens divide teachers into different departments where they could self-evaluate and revise their curriculum or encourage teachers to form study groups among themselves. Furthermore, in the beginning of each semester, teachers are encouraged to participate in class planning, they are given their freedom to teach, and they can be provided with admirative assistances to solely focus on their classes. Their working environments both directly and indirectly influence teachers, which presumably affected teachers' ability to create creative classroom climate as well. In particular, to make teachers more creative in their classrooms, teachers should be supported enough to take risks,

they need to have opportunities to get feedback on their trial lessons, and lastly, they should be encouraged to maintain cooperative relationships with the principal, peers and other creative specialists (Collard and Looney 2014).

Second, the multilevel model analysis on children's creative dispositions showed that children in the exemplary kindergartens had higher scores on their creative dispositions than those in the average kindergartens when the variable of teachers' perceptions of organizational creative climate was controlled. When two variables -the types of kindergarten and teachers' creative dispositions- were controlled, children's creative dispositions increased depending on the level of teachers' perceptions of organizational creative climate. Although teachers' creative dispositions do not directly influence children's creative dispositions, the types of their kindergarten and their perceptions of organizational creative climate will most likely affect children's creative dispositions. This finding is distinct from Sali and Akyol (2015)'s study that proves a correlation between teachers' creative thinking skills and children's creative thinking skills. The primary reason for two different outcomes may be due to the focus of our study on teachers' creative attitude. This indicates that how well teachers utilized their own creativity both in their classroom and at their institution is a more significant variable than teachers' creative dispositions for the purpose of influencing children's creative dispositions.

Furthermore, a positive correlation existed between children's creative dispositions, and their critical thinking level and their perceptions of creative classroom climate. Especially because there was a significant difference between two groups of kindergartens, it indicates that the correlation between children's perceptions of creative classroom climate and their creative disposition may vary depending on the types of their kindergartens.

When teachers share their authority with children and create a permissive and horizontal atmosphere, children will be able to have their voice, explore freely, and enhance their creative skills. Such classroom climate is created through the cooperation between teachers and children, which is most likely to be correlated with the overall organizational climate. In particular, teachers in the exemplary kindergartens tend to characterize their kindergartens as creative working environments, which often affects children's creative dispositions. Thus, it indicates that the organizational supports for teachers and the organizational creative climate are significant prerequisites for fostering children's creative dispositions.

### **Conclusion, implications, and future directions**

As one of children's competencies, their creative dispositions are correlated with both children's creative thinking and their perceptions of creative classroom climate. Furthermore, children's creative dispositions are also influenced by the types of their kindergartens (exemplary or average) and teachers' perception of organizational creative climate.

Children's creative dispositions are not only affected by their individual variables but also by their socio-cultural backgrounds. To be specific, the permissive, supportive and interactive climate created by teachers will significantly impact children's creative dispositions.

Because creativity does not just reside in our brain systems, but it arises from interactions with people's thoughts in a socio-cultural context (Csikszentmihalyi 1996), building

a creative classroom climate, not children's creative thinking, is of utmost importance in fostering children's creative dispositions. Children's creativity can be nurtured in a cooperative process where children are motivated by their own interests and curiosity and they are free to share opinions with others to solve problems together. As one of the important variables affecting children's creativity, their teachers are often affected by the organizational creative climate of their workplaces. Since the administrative leadership role plays a significant role in building creative working atmosphere and maintaining the organizational creative climate, the administrative leaders of kindergartens should establish a working atmosphere where teachers can participate in professional development through a cooperative relationship with their community to become creative teachers.

Although this study primarily focused on the exemplary kindergartens, future research needs to examine the overall correlation between teachers' creative dispositions, teachers' perceptions of organizational creative climate, children's creative dispositions and children's perceptions of creative classroom climate through analyzing the administrative leadership role and their management of organizational creative structure. In the end, this study has some limitations since it has a small sample size that targets 10 kindergartens and 195 kindergarteners, meaning it should be interpreted with caution. Recently, the Nuri curriculum has been revised and is set to be applied. Revised Nuri curriculum emphasized the enhancement of creativity, play-centered curriculum, and teachers' autonomy regarding the implementation of it (Kim 2019). Thus, it is recommended for future researches to follow up on the educational effects of the curriculum emphasizing creativity.

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#### Authors' contributions

The author read and approved the final manuscript.

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#### Availability of data and materials

All data are held by KICCE under data storage guidelines.

#### Ethics approval and consent to participate

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#### Competing interests

The author declares that they have no competing interests.

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