Difference in creativity between pre-schoolers following formal and informal education

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Abstract

This study examined the differences in creativity between pre-schoolers following formal and informal education. Four participating schools were measured on teaching style and learning environment to make a distinction in type of education. Pre-schoolers were examined using the Torrance Test of Creativity and the Alternative Uses test. The sample size was 92 participants (formal education N = 38, informal education N = 54). Repeated measures of Multivariate Analysis of Variance (MANOVA) was used to examine the effects of type of education on creativity differences, measured by originality and fluency of both tests. The results of this study did not show a significant difference, when measuring for originality and fluency, in creativity levels of pre-schoolers between formal- and informal education. A possible explanation for these results can be found in other features of education which support the development of creativity skills, such as pedagogic environment and teacher-child relationship.

Keywords: creativity, formal education, informal education, TTCT-test, AU-test

Creativity plays an important role in the 21st century skills (Larson & Miller, 2012). The term 21st century skills refers to a broad set of knowledge, skills, work habits, and character traits that are believed to be critical for the society in which they will work and live in the current world (Larson & Miller, 2012). Children are expected to learn skills such as communicating, collaborating, analytical thinking, problem solving, finding and evaluating information, creating, and innovating (Saavedra & Opfer, 2012). With the new focus on teaching children 21st century skills, creativity is an important topic that deserves more research.

Creativity is a complex cognitive activity that relates to many other cognitive processes; and as claimed by some researchers, a difficult term to define (Feldhusen & Goh, 1995). However, an important element of creativity that takes centre stage in several definitions is the ability to produce something original and useful (Bronson & Merryman, 2010; Beghetto & Kaufman, 2007; Runco & Jaeger, 2012). Research shows that creativity skills can improve when given practise (Selby, Treffinger, Isaksen, & Lauer, 2004; Robinson, 2001). Due to a decline in creativity in the early childhood, it is suggested to evoke creativity in pre-school (Kim, 2011). In fact, many preschools are already trying out different ways to stimulate children's creativity (Schrum & Levin, 2012). Various factors in the classroom can foster these creative skills (Davies, 2013). This research focuses on teaching style and learning environment, where informal learning is the key.

Informal learning is found to stimulate the creative abilities of children (Haddon & Lytton, 1986; Cole, Sugioka, & Yamagata-Lynch, 2000). Informal learning is defined as a process of cultivating learning through conversation, exploration, and enlargement of experience (Eshach, 2007). This type of learning has lately been applied more often inside the classroom, which means that children in schools are motivated intrinsically to teach themselves knowledge and skills, being enthused and changed by the process, and having some control of the learning process, but under teacher guidance (Jeffrey & Woods, 2003). Besides, the learning environments are less structured and managing the teaching is shifted from the teachers to the pupils (Eshach, 2007; Jeffrey & Woods, 2003).

One important factor of informal education is the teaching style. As stated earlier, active learning is part of this learning process. Roehl et al (2013) shows that, through active learning, students are encouraged to develop their creative skills. This is supported by Torrance (1972), who stated that the most effective technique for stimulating creativity involves active learning opportunities. Active learning can be defined as a way of learning in which the teaching method strives to engage students in the learning process (Auster & Wylie, 2013). It focuses on student activity and student involvement in the learning process (Roehl, 2013). To achieve this active learning in the classroom it is important to shift from a teacherled to a student-led way of teaching (Eshach, 2007; Jeffrey & Woods, 2003).

Apart from teaching style, the learning environment in which the informal education takes place can also foster creativity abilities. Research shows evidence for the importance of flexible use of space and time (Davies, 2013). The learning environment in informal education is characterized by less structure (Eshach, 2007). To encourage creativity, the classroom should be open and spacious so children can move around the space. The use of different areas supports the growth of ideas (Davies, 2013). Another physical attribute of informal education is the arrangement of the classroom. Neither the pupils nor the teachers have desks. The classroom looks rather like a workshop (Jeffrey, 2006), where pupils have the opportunity to work with multi-sensory materials (Davies, 2013). Besides, a flexible use of time is applied in informal education in schools. In other words, creativity is promoted the most when pupils are allowed to work at their own pace without pressure (Davies, 2013).

With the recent rise of focus on fostering creativity in the classroom, the aim of this study is to examine children exposed to two types of education on their level of creativity. In this study the four participating schools will be distinguished whether they are educating their pupils in a formal or informal way. From initial observations an obvious difference can be noticed: It appears that one school uses less structured classes and classrooms, while the other three schools give education in a more structured school setting. Comparing the teaching style and learning environment of these schools, a distinction can be made in their way of education. Taking into consideration that the early childhood is a critical period for developing divergent thinking (Kim, 2011), this research will focus on the group of children four-year-olds. We are aiming to investigate the difference in creativity between pre-schoolers that are following formal and others that are following informal education. And we are specifically aiming to focus on the teaching style and learning environment to explain the differences.

Having in mind that creativity can be improved by practise, it is expected that preschoolers who follow informal education will score higher on creativity than pre-schoolers who follow formal education.

Method

Participants

Pre-schoolers from four different schools in the Netherlands participated in this research. One school was observed, due to its learning environment, as informal education; and the other three schools as formal education. These initial observations were specified in the section 'procedure of distinguishing schools' in this study. The total sample size of this research was 92 participants, 38 participants (girls N = 20, boys N = 18) who are following formal education and 54 participants (girls N = 29, boys N = 25) who are following informal education. Active consent was obtained from their parents to participate in this research.

Distinguishing the schools

Form of education. In this study, we decided the type of education by looking at two aspects: Teaching style and learning environment. Formal education was seen as teacher-led and structured; and informal education was seen as student-led and less structured. Each school was assigned a name (A, B, C, D). Two tools were used to measure the learning environment and teaching style correspondingly.

- (1) *Teaching style*. Teaching style was measured by observation on the following dimensions: active learning, student involvement, and student-led teaching. In addition, two subparts 'teaching methods' and 'instructional planning' of the questionnaire The Teaching Style Inventory (Dunn & Dunn, 1997) were used to assess the form of teaching. These subparts measured the techniques of giving instruction (e.g. small groups assignments, brainstorming, pre-structured tasks) and methods of teaching (e.g. lecture, use of media, peer-tutoring). Teachers were asked to indicate how often (1 = never, 2 = rarely, 3 = occasionally, 4 = frequently, 5 = always) they used each teaching technique. These scores were added up and were charted on the teaching style profile. For the subpart 'teaching methods' and 'instructional planning', a higher score indicated more informal education. The two subparts of the questionnaire were translated to Dutch by the researcher. The use of two different instruments led to more valid and reliable measures (Golafshani, 2003).
- (2) *The learning environment.* The learning environment was measured by a map of the classroom. During the observation a map was made by the researcher with the purpose to describe spatial arrangements (Chesterfield, 1997). A classroom map set the context of the education of a school. Besides, it showed the available facilities and spaces. Blackboards, location of the desks, and different learning areas were

marked. The different maps of the schools were compared.

Procedure of distinguishing schools

Initial observations. The four participating schools were selected due to a difference in education on first sight. A rough distinction was made from the initial observations and impressions. It became clear that one school was unlike the others. Concerning the learning environment, school D used a different method than the other three schools. This was seen by the absence of desks, classes and, blackboards. Regarding to school A, B, and C all used desks for their pupils and teachers and every class had their own classroom. This difference in learning environment made that school D stand out on initial observations. Furthermore, the pre-schoolers of this school had multiple teachers and are following education with pupils of different. These characters were not seen in the other three participating schools, which made a first rough distinction.

Teaching style. Using observation and questionnaires, differences in teaching style were noticed between the four participating schools. Three out of four schools (school A, B, and C) were alike in their way of teaching. These schools used both classical and individual instructions, which were supported by a digital schoolboard. During classical instructions, pupils were asked several questions to involve them. While working individually, pupils did not have the opportunity to choose the task they wanted to work on. The majority of the time teachers had prepared tasks and assigned them to the pupils. Besides, these tasks were prestructured and pupils had little influence. Pupils were occasionally assigned to work in small groups or pairs. However, since they were expected to work on their own task, collaboration with peers did not occur. During creativity tasks, children were able to give preference for a specific task. These tasks, though, were (pre)structured.

The following school, school D, used a different approach when it came to teaching style. From the observation and questionnaires it appeared that the majority of the time instructions were given in small groups. Noteworthy, children of different ages were put together in the same class. Where the classes of schools A, B, and C consisted of children of four and five year olds, school D put together four, five and six year olds. The idea behind this is that the younger children learn from the older ones. Besides, this school did not use typical classes. In other words, pupils had several teachers and were only together as a class for lunch time. As seen from the observation and questionnaires, this school used brainstorming sessions and peer tutoring. Pupils had the opportunity to choose the tasks they wanted to work on. Those tasks differed from pre-structured and completely open for influence of the student. Classes were given with the help of a digital schoolboard and iPads.

Learning environment. The same three schools, (A, B, and C), had similarities in the learning environment of their school. The learning environment consisted of one classroom, where the students' desks were set together in small groups. The classrooms had one creativity area in which children could paint and clay, or an creativity area was created in the hallway where children could build blocks.

School D was standing out in their learning environment, consisted of one large, spacious area in which various classes were combined. Each "class" had their own space with benches and a digital schoolboard, which meant that neither pupils nor teachers had their own desk. Besides these spaces for classes, the area consisted of several spaces with their own purpose. Areas of creativity, building, subjects, and rest could be found in this learning environment.

Final distinction. Taken all together, it was clear to say that all four schools were using multiple ways of instruction, having various learning areas and let pupils work in groups, pairs or individually. However, when compared all results from observations, questionnaires, and maps, one school in particular lightened up. This school (school D) used informal education, seen by the use of peer tutoring, brainstorming, active learning, and student-led way of teaching. Besides, the learning environment was in favour of informal education. Characters like less structure, spacious classroom, different learning areas, and no use of desks were seen in this school. Altogether, three out of four schools were using a more formal way of education (school A, B, and C) and one school educates their pupils in an informal way (School D).

| | | School A | School B | School C | School D |
|----------|---------------|----------|----------|----------|----------|
| Teaching | Classical | Х | Х | Х | Х |
| style | instruction | | | | |
| | Individual | Х | Х | Х | Х |
| | instruction | | | | |
| | Small groups | Х | Х | Х | Х |
| | Peer-tutoring | | | | Х |
| | Brainstorming | | | | Х |
| | Use of media | Х | Х | Х | Х |

Table 1

| Results of the | e questionnaire, | observation, | and maps |
|----------------|------------------|--------------|----------|
|----------------|------------------|--------------|----------|

| | Pre-structured | Х | Х | Х | Х |
|-------------|----------------|---|---|---|---|
| | tasks | | | | |
| | Open tasks | | | | Х |
| Learning | Absence of | | | | Х |
| environment | desks | | | | |
| | Non-assigned | | | Х | Х |
| | seats | | | | |
| | Different | | | | Х |
| | learning areas | | | | |
| | Use of | | | | |
| | multi-sensory | Х | Х | Х | Х |
| | materials | | | | |
| | Different ages | Х | X | X | Х |
| | in a class | | | | |

Measuring creativity

Creativity. Creativity was measured by divergent thinking, a thought process that produces multiple or alternative ideas (Bronson & Merryman, 2010; Runco & Acar, 2012). To measure this, two tests were conducted: The Torrance Test of Creative Thinking (TTCT) and the Alternative Uses (AU).

(1) The Torrance Test of Creative Thinking (TTCT). With the TTCT children were asked to complete abstract figures that have different shapes and designs. The results were scored on two subdimensions: fluency and originality (Torrance, Ball, & Safter, 2008). Fluency was the total number of relevant ideas generated in response to the stimulus. This showed the ability to produce a number of figural images. Originality was defined as the rarity of the responses which shows the ability to produce uncommon responses (Torrance, Ball, & Safter, 2008; Kim, 2006). According to Kim (2006) the TTCT appears to be a good instrument for measuring everyday creativity. In case of reliability, Treffinger (2010) noted that test-retest reliabilities of the subdimensions lie between 0.60 and 0.70 which means that the TTCT can be seen as a reliable measure instrument. The TTCT was scored following the guidelines of the manual, except originality. The norm of the dependent variable originality was changed, due to cultural and social background

differences. In this study, originality was based on the infrequency of the ideas. To get the originality score, a response was given 2 points when it was mentioned by less than 5% of the participants, 1 point when it was mentioned by 5 till 10% of the participants, and 0 points were given when the response was mentioned by more than 10% of the participants. The TTCT was adjusted to the age category of our participants. This implies that the test and instructions were translated to Dutch and the instructions were simplified.

(2) Alternative Uses (AU). The second test to measure divergent thinking was the Alternative Uses (AU) test. Children were shown six pictures of daily objects, and they were asked to think of as many creative uses for this item. A newspaper, for example, could be used for reading or as craft paper, binoculars or table-mat. The scoring consisted of two components: originality and fluency (Guilford 1967). Originality was defined as how unusual the generated answers were. This component was scored based on the frequency of the responses. The less frequent a response was given, indicated a higher originality score. To get the originality score, a response was given 2 points when it was mentioned by less than 5% of the participants, 1 point when it was mentioned by 5 till 10% of the participants, and 0 points were given when the response was mentioned by more than 10% of the participants. Fluency was the number of accepted uses generated by the child. Each use was worth one point. The fluency scores of each child were added up to create a total fluency score. Vosburg (1998) noted that the reliability of the AU has an overall alpha of 0.86, which implies that this is a reliable instrument. In this study the AU was adjusted due to the age category and language capabilities of the pre-schoolers. Instructions were translated to Dutch and were made easier to understand. The test taking was similar to the study of Gilhooly and colleagues (2007). This study used the same test taking as seen in the control group of the research of Gilhooly and colleagues (2007). However, this study did not use the think aloud method as this was not possible considering the age of the participants.

Test procedure

Each participant was examined individually during school hours. The TTCT and the AU were scheduled on different days so the participants had enough concentration for each test. When it is not possible to do so in practice, children would have a break in between the two tests. The participants were given around 30-50 minutes to finish the TTCT and 20-30 minutes to finish the AU. The tests started with a short talk between the researcher and the

child. When the child felt comfortable the test was officially started. When testing a child with the TTCT, the child received colourful markers and sheets of paper with shapes drawn on it. The child was asked to draw a picture containing the presented shape. For each activity, the child had ten minutes to complete the drawings.

When using the AU test, an example was given to the child before the test started. A newspaper was shown and examples of several uses were demonstrated (reading, using it as binoculars or craft paper). After the example six pictures of daily objects on sheets were shown in a random sequence among the children. Children were asked to name as many creative uses for each stimulus. During the test several prompts were given to stimulate to child ("Can you think of more uses for ...?"). If a child was not able to name more alternative uses, the researcher presented the next stimulus.

Data analysis plan

Repeated multivariate analysis of variance (MANOVA) was used to determine differences between the independent variable on more than one continuous dependent variables. Separate MANOVAs were used in this study to examine the creativity differences between formal and informal education (N = 92) for TTCT as well as AU. The independent variable was the school type, i.e. whether children are following formal or informal education. And the dependent variables were: (1) TTCT with fluency and originality; and (2) AU with originality and fluency.

First the raw scores on the TTCT and AU were transformed in to standard scores. The data-analyses of this study were executed in Statistical Package for the Social Sciences (SPSS).

Results

Repeated measures Multivariate analysis of variance (MANOVA) was used to examine the effects of type of education on creativity differences. Creativity was evaluated on fluency and originality measured by the TTCT (N = 90) and AU (N = 85). Before conducting the repeated MANOVA, the data were examined to ensure all of its underlying assumptions were met.

Univariate normality was assessed with Shapiro-Wilk tests and boxplots. Some variables were statistically significant (Originality TTCT p = 0.002 and originality AU p = 0.001). This is not considered problematic, as (a) MANOVA is considered robust with respect to univariate non-normality when group sizes exceed 30, and (b) a boxplot of this distribution suggested that the departure from normality was mild. Additionally, no multivariate outliers were found in the data, supporting the assumption of multivariate normality. There appeared

to be a roughly linear relationship between each pair of dependent variables at each levels of the independent variable. This suggested that the assumption of linearity has been met. The Box's M was non-significant at $\alpha = 0.001$, meaning that the assumption of homogeneity of variance-covariance matrices has not been violated.

Table 1

Descriptive Statistics for informal education and formal education on Each Dependent Variable

| | | Informal | | Formal | | Total | |
|------|-------------|----------|-------|----------|-------|----------|-------|
| | | (N = 52) | | (N = 38) | | (N = 90) | |
| | _ | М | SD | М | SD | М | SD |
| TTCT | Fluency | 5.343 | 2.846 | 4.276 | 3.013 | 4.902 | 2.948 |
| | Originality | 3.105 | 1.691 | 2.693 | 2.152 | 2.935 | 1.895 |
| | | Informal | | Formal | | Total | |
| | | (N=49) | | (N=36) | | (N=85) | |
| AU | Fluency | 2.645 | 1.146 | 2.452 | 0.821 | 2.565 | 1.024 |
| | Originality | 1.105 | 0.936 | 0.974 | 0.653 | 1.051 | 0.829 |

As all the underlying assumptions were supported by the data, repeated measures MANOVAs was conducted. The results showed that there was no significant difference of type of education on the originality and fluency of the TTCT, F(4, 87) = 1.003, $\rho = .411$, partial $\eta^2 = .044$. Furthermore, MANOVA was statistically non-significant F(2, 89) = .415, $\rho = .662$, partial $\eta^2 = .009$, indicating no significant difference of type of education on the originality and fluency of the AU. This indicated the absence of any meaningful difference between types of education on creativity.

Discussion and conclusion

This study examined the effect of the education type on the level of creativity of preschoolers. The results of this study did not show a significant difference, when measuring for originality and fluency, in creativity levels of pre-schoolers between formal- and informal education. This finding does not support literature which states that informal education improves creativity (Haddon & Lytton, 1986; Cole, Sugioka, & Yamagata-Lynch, 2000). Research argues that through student-led education, pupils are motivated intrinsically which consequently leads to the development of creativity skills (Eshach, 2007; Jeffrey & Woods, 2003). These key characters were seen during the observations in the school where pupils are following informal education. However, despite the enriched learning environment and supportive teaching style, the hypothesis that pre-schoolers of informal education score higher on creativity is rejected.

The lack of significant differences can be explained by other possible features which shared by both formal and informal education, beyond learning environment and teaching style, which may also support the development of creativity skills. Davies (2013) showed various characteristics of education that are most effective in promoting creativity in children. These key variables include, besides learning environment and teaching style, pedagogical environment and the relationships between teachers and pupils. These variables seem to be of importance of stimulating creativity as Davies (2013) stated that they are the basis of an environment in which children feel safe enough to explore. This is supported by research of Cole and colleagues (2000), which shows that the student-teacher relationship influences the extent in which pupils experience freedom to express their creative ideas. In this study, the results can be explained by the possibility that schools using formal education have other ways to improve the creativity of their pre-schoolers.

Besides, some characters of informal education were seen in the schools that use formal education. Different learning areas, for example, were available in the classrooms. Davies (2013) showed that these areas contribute to the growth of ideas. In addition, multisensory materials were present in every classroom. The use of clay, water, blocks, and sand are examples of materials that stimulate the development of creativity (Fasko, 2001). With the use of these multi-sensory materials inside the classroom, pupils can explore new materials and are given unlimited options for exploration. Also, pupils were assigned to work in small groups which is found to enhance creativity skills in pupils (Fasko, 2001; Eshach, 2007). Through conversation and collaboration informal learning is stimulated and contributes to informal education (Eshach, 2007). The results of this study can be explained by the use of these informal education characters. It is possible that these education methods are sufficient to improve creativity.

However, we should be careful in interpreting the results in this study, as the explorative nature of this study shows limitations. First of all this research made use of a modest number of samples. Using only four schools in this research makes it hard to generalize the results to a wider population. Secondly, the observations used to distinguish different ways of education took place on only one day in one classroom. Information retrieved from this instrument may not ensure that the findings can be generalized to the

whole school. Thirdly, this study focused just on learning environment and teaching style, whereas many more aspects of education can contribute to the development of creativity.

However, a strong point of this study is the use of multiple instruments to measure the type of education and level of creativity. Besides, the Torrance Test of Creativity and the Alternative Uses are found valid instruments to measure creativity (Bronson & Merryman, 2010; Runco & Acar, 2012).

Taken all together, this study has shown that there is no significant difference between formal and informal education on the level of creativity of pre-schoolers, which, even though unexpectedly, added our knowledge about stimulating the development of creativity through education. While 21st century skills are becoming more and more important inside the classroom (Larson & Miller, 2012) and early childhood being the critical period of developing creativity (Kim, 2011), it is important to continue research on education to enhance creativity skills. Future research can contribute to create education methods to help students to develop and improve their creativity skills. Recommendation for future research is to include more aspects of education, like pedagogic environment and student-teacher relationship, to gain better understanding of how creativity can be stimulated inside the classroom.

References

- American Psychiatric Association. (2010). Diagnostic manual of the American Psychological Association (6th ed.). Washington, DC: Author.
- Auster, E. R., & Wylie, K. K. (2006). Creating active learning in the classroom: A systematic approach. *Journal of Management Education*, 30(2), 333-353.
- Beghetto, R. A., & Kaufman, J. C. (2013). Fundamentals of creativity. *Educational Leadership*, 70, 10-15
- Bronson, P., & Merryman, A. (2010). The creativity crisis. Newsweek, 156, 44-49
- Chesterfield, R. (1997). Classroom observation tools. Improving Educational Quality Project. Retrieved from: http://www.ieq.org/pdf/Class_ObsTool.pdf
- Cole, D. G., Sugioka, H. L., & Yamagata-Lynch, L. C. (2000). Supportive classroom environments for creativity in higher education. *The Journal of Creative Behavior*, 33(4), 277-293. doi:10.1002/j.2162-6057.1999.tb01407.x
- Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P., & Howe, A. (2013). Creative learning environments in education: A systematic literature review. *Thinking Skills and Creativity*, 8, 80-91.
- Dunn, R. S., & Dunn, K. J. (1997). Teaching style inventory. Lawrence, KS: Price Systems
- Eshach, H. (2007). Bridging in-school and out-of-school learning: Formal, non-formal, and informal education. *Journal of Science Education and Technology*, *16*,171-190. doi:10.1007/sl0956-006-9027
- Fasko, D. (2001). Education and creativity. Creativity Research Journal, 13, 317-327. doi:10.1207/S15326934CRJ1334 09
- Gilhooly, K. J., Fioratou, E., Anthony, S. H., & Wynn, V. (2007). Divergent thinking: Strategies and executive involvement in generating novel uses for familiar objects. *British Journal of Psychology*, 98, 611-625.
- Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report, 8*, 597-606.
- Guilford, J.P., Christensen, P.R., Merrifield, P.R., and Wilson, R.C., 1967. Alternative Uses Manual. Sheridan Supply Co
- Haddon, F. A., & Lytton, H. (1968). Teaching approach and the development of divergent thinking abilities in primary schools. *British Journal of Educational Psychology*, 38(2), 171-180.

- Jeffrey, B., & Woods, P. (2003). *The creative school: A framework for success, quality and effectiveness*. London, United Kingdom: Routledge.
- Jeffrey, B. (2006). Creative teaching and learning: Towards a common discourse and practice. *Cambridge Journal of Education*, *36*(3), 399-414.
- Kim, K. H. (2011). The creativity crisis: The decrease in creative thinking scores on the torrance tests of creative thinking. *Creativity Research Journal, 23*, 285-295. doi:10.1080/10400419.2011.627805
- Larson, L. C., & Miller, T. N. (2012). 21st century skills: Prepare students for the future. *Kappa Delta Pi Record*, *47*, 121-123. doi:10.1080/00228958.2011.10516575
- Plucker, J. A. (1999). Is the proof in the pudding? Reanalyses of Torrance's (1958 to present) longitudinal data. *Creativity Research Journal*, *12*, 103-114. doi:10.1207/s15326934crj1202_3
- Runco, M. A., & Acar, S. (2012). Divergent thinking as an indicator of creative potential. *Creativity Research Journal, 24*, 66-77. doi:10.1080/10400419.2012.652929
- Saavedra, A. R., & Opfer, VF. D. (2012). Learning 21st-century skills requires 21st-century teaching. *The Phi Delta Kappan, 94(2)*, 8-13. doi:10.1177/003172171209400203
- Schrum, L., & Levin, B. B. (2012). *Evidence-based strategies for leading 21st century schools*. Thousand Oaks, United States: Sage Publishing.
- Selby, E. C., Treffinger, D. J., Isaksen, S. G., & Lauer, K. J. (2004). The conceptual foundation of view: A tool for assessing problem solving style. *Journal of Creative Behavior, 38,* 221-243. doi: j.2162-6057.2004.tb01242.x
- Torrance, E. P. (1972). Can we teach children to think creatively? *Journal of Creative Behavior, 6,* 114–143.
- Torrance, E. P. (2008). Torrance® Tests of Creative Thinking. Norms-Technical Manual. Figural (Streamlined) Forms A & B. Illinois: Scholastic Testing Service, Inc.