RESEARCH ARTICLE

Aesthetic development of children [version 1; peer review: 1 approved with reservations]

MASATOSHI HAMADA

Invited Researcher, Cemti, University Paris 8, 2 rue de la Liberté, Saint-Denis cedex, 93526, France

Abstract

Background: The dynamics between conceptualizing art-making and responding to aesthetic phenomena in relation to aesthetic development of children (ADC) are unclear. This study aimed to investigate what facilitates the transition between conceptualizing art-making and responding to aesthetic phenomena in terms of metaphors of life and nature in ADC.

Methods: We adopted an ethical methodology prioritizing movement and respecting children's autonomy toward positive emotions. The participants were eight Japanese children (age range: 7—15 years; 6 girls, 2 boys). They were in the same painting class to ensure nearly identical aesthetic conditions.

Results: Four states according to children's ages were observed in their perceptions of metaphors of life and nature in conscious and unconscious ways in the iterative dynamics between conceptualizing art-making and responding to aesthetic phenomena.

Conclusion: Two important findings from systems-oriented perspectives are that emotional communication in art can be theorized, and that the four states of the aesthetic development of children seem to be related to children's age-specific tension-flow rhythms. By making the process of art therapy for ADC, we can expect art therapy and art-based research to be more developmentally appropriate for children.

Keywords

aesthetic development, children, metaphors of life and nature, emotional communication in art, tension-flow rhythms, conceptualizing art-making, responding to aesthetic phenomena, consciousness and unconsciousness
Introduction
Studies on the aesthetic development of children (ADC) have been crucial both in our understanding of child development in education (Burrill, 2010) and of children’s cultural contexts (Manifold, 2012). The implementation of ADC in art therapy has recently been thought to be essential because the current context, such as the coronavirus disease 2019 (COVID-19) pandemic, can increase the years of therapy needed for children, and children’s aesthetic senses could vary during this turbulent period.

Harrison (1990) suggested that children’s classification abilities require their ability to recognize similarities. Furthermore, a child’s ability to identify emotions between visual stimuli results from their classification abilities (Winston, Kenyon, Stewardson, & Lepine, 1995). Therefore, it follows that ADC could also relate to children’s classification abilities.

Jessen and Grossmann (2016) suggested that conscious perception and unconscious perception are connected to emotions. Similarly, Winston et al. (1995) suggested that ADC includes not only parameters of perception but also those of emotions. Almeida-Rocha et al. (2020) studied ADC when responding to aesthetic phenomena and validated Parsons’s (1989) theory that the parameters of ADC varied according to the children’s ages. Therefore, it is understood that ADC, when responding to aesthetic phenomena, could relate to emotions stemming from both the conscious and unconscious mind and vary according to children’s ages.

Children’s aesthetic sense and artistry are nurtured by receiving alternating feedback from external and internal factors. (Manifold, 2012). Thus, conceptualizing art-making and responding to aesthetic phenomena is necessary for ADC. The study of conceptualizing art-making related to children’s emotions, however, has only just begun to be investigated (Chilton et al., 2015). This could be an explanation as to why the dynamics of ADC between conceptualizing art-making and responding to aesthetic phenomena remain unclear.

The genesis of emotions might stem from metaphors of life and nature in the conscious and unconscious mind (Chilton et al., 2015); therefore, conceptualizing and responding to metaphors of life and nature could be necessary for ADC. Thus, the following question is addressed in this study:

Q1: What facilitates the transition between conceptualizing art-making and responding to aesthetic phenomena in terms of metaphors of life and nature in ADC?

Methods
Ethics and consent
A third-party non-governmental organization (NGO) in Japan, Nijiiro Creyon, collected the data used in this study. Nijiiro Creyon has official registration as an NGO working with children and communities in the Ishinomaki region of Japan. Nijiiro Creyon’s Articles of Incorporation states, as part of its code of ethics, that they can participate in non-profit activity to promote academic, cultural, and artistic activities for children; therefore, no approval from an external ethics committee was required as the study methods were part of normal activities for the NGO. The author received the data from Nijiiro Creyon and conducted the analysis; the author did not have any contact with the children or parents.

On November 14, 2020, the author sent the materials and presentation describing the method of the study to the NGO. The NGO consented to take part in the study and agreed to collect the data. Before conducting the survey, the NGO obtained verbal consent from the children and their parents after explaining the purpose of the study; the Japanese Ministry of Health, Labour and Welfare does not require written consent if no intervention is applied or samples are obtained from the human body, thus verbal consent was appropriate for this study. At the NGO, the staff use a notebook to record the discussions they have after each activity is complete. This notebook was used to record the names of the children and parents who consented to be part of the study. The notebook is kept securely, and third parties are not able to access it. The study began on February 1, 2021. After analyzing the data collected, the author explained the results to the NGO on February 12, 2021. Consent for publishing these results was obtained from the NGO on January 28, 2022.

Study design
Due to the uncertainty regarding how long the COVID-19 pandemic will last, we chose to conduct a cross-sectional study. Specifically, we chose a method similar to Almeida-Rocha et al. (2020), which has been used in studies with children of various ages under the same conditions. Further, because it was difficult to find several children with the same aesthetic environment, we chose to include as many children as possible from the same aesthetic environment as our participants, even if it was only a small number. Accordingly, we decided to compare our results with those of previous cross-sectional and longitudinal studies to determine if our findings could be supported.
The study used a comparative design to explore the key developmental phenomena in ADC. We compared up to four states, as children’s senses are either conscious or unconscious of the metaphors of life and nature in both conceptualizing art-making and responding to aesthetic phenomena. Thus, two experiments were conducted: the first was to explore how children conceptualize art-making, and the second was to explore how children respond to aesthetic phenomena. We then studied the dynamics between the two experiments regarding the metaphors of life and nature.

**Intervention description**

We adopted an ethical methodology for the following reasons: The sense of metaphors of life and nature is a fundamental factor of positive emotions (Chilton *et al.*, 2015). Therefore, ethical considerations respect children’s autonomy in increasing their self-healing power, which results in an ethical approach being recommended to allow children to participate in a natural, fun, and playful way regarding positive emotions. For this reason, the methodology prioritized movement, such as playing with art cards without any limitations.

**Participants**

The participants were Japanese children aged between 7 and 15 years (N = 8; 6 girls and 2 boys) who attended painting classes run by the NGO. The eligibility criterion was that all children attended the same painting class, to ensure similar aesthetic conditions. The NGO looked for participants across a wide age range. The participants and their parents were given information about the survey at the NGO’s painting classes. The NGO conducted the survey in February 2021 during the COVID-19 pandemic after all the participants and their parents provided their consent in-person. All participants wished to participate and no parent withdraw their children from the study.

**Measurement and materials**

Children’s classification abilities stem from recognizing similarities (Harrison, 1990) and identifying emotions (Winston *et al.*, 1995); thus, we investigated ADC based on the participants’ classification abilities. Regarding the materials used to facilitate classification, D’Onofrio and Nodine (1981) suggested that a wide stylistic range of paintings is necessary for exploring ADC; therefore, painting cards (Boyer, 2016), which consisted of 33 paintings from the Renaissance art period and abstract art were selected for inclusion in the study. Two experiments were conducted using these cards.

The cards of people and landscape still lifes were regarded as “metaphors of life and nature,” similar to Dietrich and Hunnicutt (1948); the cards of shape, illustration, and design were regarded as “skill,” as seen in Kuscevic, Kardum, and Brajcic (2014).

**Procedure and ethics**

The ethical methodology could help bring out children’s innate senses and unconscious mind. Burrill (2010) suggested that, through free movement and expression, children construct concrete concepts and internal images that are consistent with the environment around them. These images include emotions, a sense of life, memories, aesthetic sensations, and intellect. Further, Švachová (2016) studied Suzanne Osten, who is the founder and long-time artistic director of the Swedish research theater Unga Klara, which has focused on children and youth since 1975. The study suggested that each child’s unconscious needs and desires could be the motivation for the accompanying artistic activities. Thus, we proceeded this study with a focus on the children’s conscious and unconscious mind.

The ethical considerations followed a positive approach, as data were collected during the COVID-19 pandemic, and participants might be experiencing extraordinary stress due to this context. The methodological approach and ethical considerations resulted in this study emphasizing that the children should participate in a natural, fun, and playful way. Thus, this research used a co-constructivist approach, similar to Richards (2014), in which the children set the pace and direction of the data generation related to their perspectives and voices in the experiments.

**Data analysis and reflexivity**

We conducted text mining based on Trevors *et al*. (2017) to avoid analyst’s subjective elements. In this article, we used the text mining tool for Japanese language (Yasuda, 2011) because the participants were Japanese children.

The following software was used for text mining.

Name: TinyTweetCrawler (TTM)

Version: version 0.16

Website: https://mtmr.jp/ttc/
The following procedure was used for data analysis:

1) A table was created on an Excel sheet with a tag (A to H) of the participants.

2) The data collected from the interviews was entered into the table on the Excel sheet (CSV format).

3) Text mining was run by the TTM software. A cross-tabulation of words and terms (number of occurrences) was output as a result.

4) Non-zero number of occurrences were regarded as related words and merged words were generated.

5) An Excel table of participant tags and merged words was created by inputting the number ‘1’ if a participant corresponded to the merged word, and ‘0’ otherwise.

6) A correlation analysis was run in Excel and output the correlation coefficients between the merged words. Generally, an absolute value of correlation coefficient from 0.4 to 0.7 is treated as a moderate correlation and from 0.7 to 1 is treated as a strong correlation. Thus, the absolute value of correlation coefficient equal to or greater than 0.4 was adopted as a major parameter relationship.

**Experiment 1: how children conceptualize art-making**

Experiment 1 took 40 minutes per participant; data was collected by interviewers who wrote down the participants’ responses. First, each child classified the 33 cards into three categories: similar, normal, and dissimilar by comparing them to their own paintings. The children were then asked why they decided to classify certain cards as similar, and how they created their own paintings. The children's responses were written down by the interviewer during the interview, and text mining was conducted to exclude the subjective factors of the questioner. Because the sense of metaphors of life and nature could be essential to art activities in children (Chilton et al., 2015), we assumed that children will always have this sense, whether it is conscious or unconscious. If the children answered with a word related to the metaphors of life and nature, we considered it to be conscious; if they did not, we considered it unconscious.

Participants were classified into three categories: “similar,” “normal,” and “dissimilar.” However, because the only data used in the analysis was the reason for selecting a similar picture, the children were asked to select the one picture they felt was most similar to the picture they selected as “similar,” and then asked why they selected that picture, with the intention of highlighting the reason.

**Experiment 2: how children respond to aesthetic phenomena**

Experiment 2 took 40 minutes per participant and data was collected by interviewers who wrote down the participants’ responses. The children were then asked to sort the 33 cards freely, without limiting the number of groups or the number of cards in each group. We then inquired about the child’s reasons for their classifications. The children’s responses were written down by the interviewer during the interview and text mining conducted.

** Reflexivity**

The interviews for this study were conducted with a teacher and a student of a painting class who had already established a trusting relationship with each other. The interviews were conducted at the location of the painting class. Additionally, the analysis was done specifically on metaphors of life and nature related to positive emotions. However, since negative emotions are also necessary to magnify positive emotions and children express positive, negative, and mixed emotions when they create pictures (Chilton et al., 2015), the ratio of positive, negative, and mixed emotions in the emotions of individual children is different. Therefore, the difference in emotions between the researcher and the subjects could be a deviation.

**Results**

Figure 1 depicts an example of the classification of the cards in Experiment 2 with unlimited numbers of groups and cards in groups. As seen in this example, children recognize paintings irrespective of the style of the painting and regardless of the historical period. These results are shown below in relation to the children’s own painting skills, the sensations they acquired visually, and their emotions.

Tables 1 and 2 show the results of each experiment depicting the children from youngest (A) to oldest (H). The tables indicate how the children answered each question regarding the factors in conceptualizing art-making and responding to
Figure 1. An example of a same genre classification by a child.

Table 1. Results of experiment 1: factors related to how the children conceptualized art-making.

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Note: Letters A–H represent children in ascending order (youngest to oldest). *Answers given by children regarding their classification of similarity.

Table 2. Results of experiment 2: factors related to how the children responded to aesthetic phenomena.

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Note: Letters A–H represent children in ascending order (youngest to oldest). *Answers given by children regarding their free classification.
aesthetic phenomena. At a glance, the tables show that the ADC is so patchy that it is difficult to tell whether there are relationships between conceptualizing art-making and responding to aesthetic phenomena. However, by organizing the tables, we can visually decipher that the ADC changes with growth in the relationships. The correlation seems to be in the metaphors of life and nature of people.

**Figure 2** illustrates the results shown in Tables 1 and 2 and outlines the four states found from the youngest to the oldest children regarding the metaphors of life and nature in the combination of conceptualizing art-making and responding to aesthetic phenomena:

State 1: unconscious and unconscious

State 2: conscious and unconscious

State 3: conscious and conscious

State 4: unconscious and conscious

**Q1: What facilitates the transition between conceptualizing art-making and responding to aesthetic phenomena in terms of metaphors of life and nature in ADC?**

We employed the study design to explore the developmental phenomena of children by explicitly comparing the four states. Accordingly, we found that the factors that make up the investigated transition in the research question depend on the four states of ADC, as described below.

**Figures 3–6** illustrate the relationships of the major parameters in each state. As shown in **Figure 3**, by feeling the metaphors of life and nature unconsciously, the children of State 1 conceptualize art by feeling and imaging color, and respond to aesthetic phenomena by feeling and imaging intriguing or strange images and describing color.

As shown in **Figure 4**, the children of State 2 started conceptualizing art-making by feeling and seeing metaphors consciously associated with color and skill, but continued to feel and see metaphors unconsciously in response to aesthetic phenomena.

As shown in **Figure 5**, the children of State 3 started generating metaphors in response to aesthetic phenomena related to emotions and associated with skill. As **Figure 6** shows, the children of State 4 completed the transition of the metaphors from conceptualizing art-making to responding to aesthetic phenomena and feeling and seeing the metaphor unconsciously again when conceptualizing art-making. By completing the transition of metaphors in emotions, the children developed an aesthetic sense that alternates between conceptualizing art-making and responding to aesthetic phenomena.
Figure 3. State 1, unconscious and unconscious, of the aesthetic development of children.

Figure 4. State 2, conscious and unconscious, of the aesthetic development of children.
Conceptualizing art

In a systems-oriented perspective, individuals are thought to develop through three combined levels of action: environmental, intrapersonal and interpersonal, and sociocultural (Demick & Wapner, 1988; Wapner & Demick, 1998). It is perhaps not surprising that our experimental results encompass the previous studies when viewed from a systems-oriented perspective. It may also simply be that good research conditions resulted in similarities with the previous studies.

Comparison with the results of previous studies
The findings of this study partly support Winston et al. (1995), as ADC of responding to aesthetic phenomena was found to be associated with that of conceptualizing art-making. However, the findings suggest that ADC is more dynamic, with iterations between conceptualizing art-making and responding to aesthetic phenomena. Therefore, the findings similarly support Manifold (2012) as a child’s aesthetic sense and artistry are nurtured by alternating feedback from external and internal factors. In addition, the findings suggest that aesthetic sense in relation to conscious and unconscious ways of expressing metaphors of life and nature transition to emotions through iterative dynamics. This finding supports the suggestions of Boyakova, Savenkova, and Torshilova (2020), based on more than half a century of long-term experimental research, such as the importance of valuing human life and human existence, fostering a dialectic of the mind, and encouraging openness to the external world as well as the novelty of the self. This research emphasizes that the external environment surrounding the child plays an important role in the universality of the child’s aesthetic elements and the process of art and culture that permeates the child’s entire maturation process.

The findings of this study suggest that the four states of ADC follow children’s ages when the aesthetic environment is similar. This means that ADC could be combined with the natural ability of children and the aesthetic environment by which children are surrounded, as suggested by Boyakova et al. (2020). The findings also indicate that ADC could enhance and expand children’s sense of metaphors of life and nature. The findings partly support Chilton et al. (2015),
in that the senses could be a fundamental factor of positive emotions in the natural art ability of children. However, as posited by Boyakova et al. (2020), it may be the aesthetic environment instead that could enhance and expand the senses.

There are two important findings in our results: emotional communication in art may be theorizable, and the four states of ADC seem to be related to the age-specific rhythms of children.

**Emotional communication in art**

In an environment where children are uninhibited, they could express a wide range of thoughts and emotions in creative art. When children view art, they may be smiling, calm, indifferent, or experience a variety of emotions. Between the art and the children's emotions, a non-verbal relationship is established. In art, this is called emotional communication.

Art, such as painting, may not always be aware of how the viewer perceives it (Langer, 1953), but even if the emotions of the children and the viewer, or the artist and the children, are different, some kind of emotional communication in art will be established between the children's emotions and the art. Even though the effect of emotions in art have been studied since the early 20th century (Stanislavski, 1937), to our knowledge, emotional communication in art has not yet been theorized. This may be why the research on ADC has focused only on responding to aesthetic phenomena.
Looking at ADC from the perspective of nonverbal communication, the four states would indicate that the two-way nonverbal communication between children and art is tied to the age of the children. The formation of this two-way nonverbal communication requires both conceptualizing art and responding to aesthetic phenomena based on the metaphors of life and nature. If research is carried out from this perspective, emotional communication in art would be theorized, and it may lead to an education method that respects children and their relationship with nature and life like Burrill (2010).

**ADC and children's age-specific tension-flow rhythms**

Infants aged 0-5 years have age-appropriate unconscious tension-flow rhythms, and these age-specific rhythms are almost identical when infants perform dance and art (Burrill, 2011). In our discussion below, we conclude that the tension-flow rhythms may also occur at later ages under several assumptions.

We assume that the same tension-flow rhythms are present in dance and art at later ages. Our experiment was conducted while the children were playing in a free-flowing, unrestricted environment. Therefore, we believe the children had almost the same positive emotions, or at least did not have negative motivations. In this environment, the ADC showed four states. If the tension-flow rhythms were the same for dance and art, it means that there could be at least four age-specific tension-flow rhythms between ages 7 to 15. Indeed, in the context of embodiment research, there is growing interest in the phenomenon of interpersonal resonance between infants and their mothers in nonverbal communication occurring at later ages, showing almost identical tension-flow rhythms under the same emotional environment even at ages 18 to 29 (Koch & Rautner, 2017). Because tension-flow rhythms are unconscious, metaphors of life and nature in the conscious and unconscious mind would be related to children's age-specific tension-flow rhythms.

**Hypothesis derived from ADC**

Interestingly, the emotional communication and tension-flow rhythms seem to have some relationship through ADC. This relationship, derived from the fact that tension-flow rhythms change with emotion and awareness even at ages 18 to 29 (Koch & Rautner, 2017), and from the findings in our experiment, leads to the following hypotheses.

State 1: Children to art and art to children are two-way unconscious emotional communication in art. Emitting tension-flow rhythms from early childhood up to the age of 5, children unconsciously perceive art with the rhythms.

State 2: Children to art becomes unidirectional conscious emotional communication in art. The tension-flow rhythms emitted by the children begin to change after infancy and are updated by the children's consciousness and emotions. Meanwhile, art to children remains unidirectional unconscious emotional communication in art, and is influenced by art with tension-flow rhythms from infancy.

State 3: Children to art and art to children become two-way conscious emotional communication in art. The tension-flow rhythms are updated by children's consciousness and emotions; children emit art with their own rhythms and are influenced by art with the rhythms. For this reason, the fundamental new tension-flow rhythms in various consciousnesses and emotions toward youths is formed during this period.

State 4: Children to art becomes unidirectional unconscious emotional communication in art again. The tension-flow rhythms emitted by the children begin to be specific to their consciousness and emotions. Art to children remains unidirectional conscious emotional communication in art, renewing new tension-flow rhythms in various consciousnesses and emotions.

The hypotheses have a very important premise: children should enjoy doing art in a free-spirited and playful way, as we have displayed in our ethical approach. Under this condition, children feel metaphors of life and nature naturally in their mind. In the positive environment, movement becomes primary in art activities like Burrill (2010). Thus, we can expect that movement and art have similar tension-flow rhythms.

**Limitations of this study**

We performed this study under near-ideal conditions in which the children’s aesthetic environments were as close to identical as possible. However, implementing a longitudinal study with many participants from the same aesthetic environment was difficult during the COVID-19 pandemic. Our findings from this cross-sectional study with a small number of participants were compared with previous results; however, as this could not be fully controlled, it presents a limitation in this study, mainly because the children's aesthetic environments varied. Nevertheless, in addition to surfaces that were visible to the children such as color and skill, this study explored the underlying conscious and unconscious metaphors of life and nature from a systems-oriented perspective.
Implications for policy, practice and further research

Psychological interventions for children are necessary, not only for those affected by the COVID-19 pandemic (Northwest Mental Health Technology Transfer Center, n.d.), but also for those who have lived through disasters such as tsunamis (Takahashi & Setou, 2019). ADC should be introduced in art therapy while capturing the changing aesthetic sensibilities of children. This suggestion is important for research and therapy. McNiff (2019) suggests that to address the idea of how art heals is to acknowledge that dimensions of art that are shared across cultures and infinite differences in people, communities, and artistic expression exist simultaneously. Further, McNiff (2011) notes that arts-based research is especially important for arts therapies that use creative expression as a way of knowing, a way of communicating, and a way of promoting personal and social development. If we can make this process of art therapy and art research ADC-appropriate, we can expect therapy and research to be more developmentally responsive to children.

It is vital to consider the implication of this research in the context of the COVID-19 pandemic. Children may experience significant stress due to the COVID-19 pandemic (Northwest Mental Health Technology Transfer Center, n.d.); thus, during this period, children’s aesthetic sense may display variations, as seen in this study’s findings. Therefore, a discipline implementing ADC in art education and art therapy during the COVID-19 pandemic may be an ethical and appropriate approach.

The variation of the children’s aesthetic environments may have affected the children’s conscious or unconscious senses of metaphors of life and nature; therefore, further studies regarding how, why, and when children feel metaphors of life and nature in their conscious or unconscious mind may be a worthwhile challenge.

Further research into emotional communication in art and children’s age-specific tension-flow rhythms should be conducted from a systems-oriented perspective in a variety of settings. The findings result in the hypothesis derived from ADC, the emotional communication in art and tension-flow rhythms. We would like to test the hypothesis, but as it is far beyond our resources, so we invite other interested researchers to continue to investigate these possibilities.

Conclusion

Our findings show that the ADC is more advanced in both conceptualizing art-making and responding to aesthetic phenomena. Recently, museum art materials have become a new modality for art-based therapy (Monsuez et al., 2019; Montreal Museum of Fine Arts, n.d.), and these findings support art activities in museums, and specifically, the implementation of movement with art-making and art appreciation. We found that methodology should prioritize movement and respect children’s autonomy in relation to positive emotions. The present findings are consistent with Burrrill (2010) and show that movement could be crucial in ADC, especially in the context of the COVID-19 pandemic.

In conclusion, based on the present findings, four states were identified in which children perceived metaphors of life and nature in conscious and unconscious ways, which could lead to positive emotions in art activities. The factors of ADC were according to the states that followed the children’s ages if their aesthetic environments were similar.

Adopting an ethical methodology which prioritizes movement and respects children’s autonomy in relation to positive emotions could be crucial in ADC, especially within the context of the COVID-19 pandemic. Therefore, our study concludes that, in seeking to acknowledge and support wider ADC, insights into metaphors of life and nature between conceptualizing art-making and responding to aesthetic phenomena are pedagogically important for the process of art therapy and art research.

Data availability

Underlying data


Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

Author biography

Masatoshi HAMADA has a Ph.D. in statistical science and MBA. He has worked with UNESCO to study relationships between refugee children and positive emotions through art activities since 2014.

Competing interests

No competing interests were disclosed.
Grant information
The author(s) declared that no grants were involved in supporting this work.

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Renata Martinec
Faculty of Education and Rehabilitation Sciences, Department of Motor Disturbances, Chronic Diseases and Art-Therapies, University of Zagreb, Zagreb, Croatia

In this article, the author tried to consider the dynamics between conceptualizing art-making and responding to aesthetic phenomena in relation to the aesthetic development of children (ADC) by including terms of metaphors of life and nature in ADC. Results show that four states according to children’s ages were observed in their perceptions of metaphors of life and nature in conscious and unconscious ways in the frame of the dynamics between conceptualizing art-making and responding to aesthetic phenomena. According to obtained data, the author pointed out that emotional communication in the art can be theorized, and that the four states of the aesthetic development of children seem to be related to children’s age-specific tension-flow rhythms.

This article is interesting and has significant potential, but the methodology is rather unclear and should be described in more detail. For example, why words related to the metaphors of life and nature were to be considered as conscious and, if they did not, considered as unconscious?

Given that a smaller number of respondents were included in the research, it might have been more transparent if the paper had shown examples of pairs of children’s works, similar cards along with associated words.

Also, it should be described how the categories in table 1. and table 2. were defined (such as metaphors, skill, color, emotions, feeling, and image).

It is interesting premise that children's age-specific tension-flow rhythms are connected to aesthetic development and metaphors of life and nature. But are there some other variables that could influence ADC?

Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?
Partly

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Expressive arts-therapies, dance movement therapy, complementary therapy

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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