









Shifting children's attentional focus to emotions during art museum experiences

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Art exposure can influence children's emotional growth, but little is known about tools that aid emotional development in art museums. We implemented attentional and social manipulations to test whether (1) modifications to unscripted instructions and (2) caregiver prompts shape children's attentional focus towards either the emotional or elemental content (e.g., colour and medium) of paintings. These manipulations occurred within an on-going art museum education programme. Afterwards, children's ($N = 60$; ages 3–13 years) attentional focus towards emotions or elements was assessed by asking them to select words that best described the art. Children focused on emotion more, but the instructional manipulation successfully influenced word choices towards the targeted focus. Caregiver prompts also influenced focus towards the elements and away from emotions. These findings highlight that children's attention to art's emotional content can be altered by social context, which here was demonstrated within a museum programme.

Statement of contribution

What is already known on this subject?

- Research has shown that children's cognitive engagement can be scaffolded by instructions and caregiver prompts in science and natural history museums.
- Programs in art museums can be used to examine children's emotional attention.
- Children's emotional skills have been modified with multi-session educational courses in art museums.

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What does this study add?

- Children's attention to the emotional content of art can be altered by instructional manipulations within art museum educational programs.
- Children's attention to the emotional content of art can be altered by caregiver prompts within art museum educational programs.
- These changes can be observed in a single-visit art museum education program.

Background

The depiction of emotion is central to visual art, and these emotions can be tools to foster children's emotional development (Schabmann et al., 2016). Children as young as 3-years old can accurately identify and learn from emotions depicted in artwork (Misailidi & Bonoti, 2008; Winston, Kenyon, Stewardson, & Lepine, 1995) and therefore can benefit from art-based educational activities. Work by museum professionals, educators, and researchers has increasingly considered the types of activities and tools that effectively enhance the developmental and learning impact of childhood educational programmes in different types of museums across several countries and cultures, including instructional content and social facilitation (Andre, Durksen, & Volman, 2017; Martell, 2008; Milutinovic & Gajic, 2010). However, the majority of research on children's learning in museums has occurred in science museums and natural history museums, with very few studies conducted in art museums (Andre et al., 2017). Art museums offer the opportunity to investigate whether scaffolding can effectively direct children's attention to emotion in works of art and how such tools can shape children's social-emotional competence.

Children spend a significant amount of their time engaging in informal educational activities that aid both cognitive and social-emotional development (Hofferth & Sandberg, 2001). Art museums have the potential to be an excellent informal educational environments for early emotional development of typically developing children where families and educators can target skills related to perspective taking (Hubard, 2011; Huijgen, van Boxtel, van de Grift, & Holthuis, 2017), human connections and empathy (Arnold, Meggs, & Greer, 2014; Eisner, 2002; Gokcigdem, 2016), aesthetic awareness (Stokrocki, 1984), as well as information learning and cognitive development (Ives & Pond, 1980; Kisida, Bowen, & Greene, 2018; Wolins, Jensen, & Ulzheimer, 1992) and critical thinking (Hubard, 2011; Kisida, Bowen, & Greene, 2016). Importantly, randomized control trials suggests that even a one-time educational visit to a museum has positive influence on children's empathic outcomes, critical thinking, and information learning (Kraybill, 2014). Such informal educational opportunities have also proven effective for children with learning difficulties, as well as behavioural and socio-emotional challenges. For instance, through the use of social narrative tasks, art-making, and sensory activities (e.g., those implemented at the Metropolitan Museum of Arts, Museum of Modern Arts, and the Field Museum of Chicago), art museums have enhanced social emotional skills development (Woodruff, 2019) and emotional self-expression (Martin, 2009) in children with autism, who may struggle with recognizing, understanding, labelling, and responding to emotional cues in a socially appropriate manner.

Research on museum education has identified several educational tools that can particularly enrich children's cognitive development. These tools include storytelling, games, computer tasks, hands-on activities, worksheets, and guided play, which have been mainly implemented and researched in multi-session science or children's museums (Andre et al., 2017; Hoffmann, Ivcevic, & Maliakkal, 2020; Hooper-Greenhill & Moussouri, 2000; McManus, 1985). Empirical research on tools that aid emotional development in

single-session visits to art museums is very limited, despite the fact that single-session museum visits are the most common and children are naturally drawn to works of art and use art as a form of self-expression (Kocer, 2012; Weier, 2004). One reason behind this discrepancy is that the physical characteristics of art museums and galleries, including the large empty spaces, quietness, and artworks displayed at adult height, do not immediately lend themselves to children's creative exploration (Weier, 2004). However, when children are given the right tools in 'adult-friendly' settings, they can easily adapt to it, connect with the artwork, and can learn from their own, the programme educators', and their caregivers' insights (Andre et al., 2017; Weier, 2004).

Considering that works of art contain rich emotional content that children as young as 3-years old can discern, these stimuli offer researchers and educators opportunities to work together and explore new avenues to overcome the limits of the gallery space, empower children, and encourage their emotional development in art museums (Andre et al., 2017; Jeffers, 1999). In particular, research is needed on the tools that: (1) shape children's emotional experiences in museums; (2) have measurable impact even after a one-time art museum visit; (3) can be flexibly implemented in any art museums; and (4) can turn any gallery into a fun space that children want to return to. Here, we assessed whether children's attention to the emotional content of art (vs. the elemental details) could be manipulated through two means. We examined whether instructional manipulation and social interaction with a familiar adult influenced children's focus on emotion (vs. elemental details), and whether this focus could be altered in single-session museum visits – the way children most often experience art museums.

The role of instructions in children's attentional focus

Children's attentional focus to specific details in art plays a critical role in what children learn during their visits to the museum. Both museum educators and researchers have observed that the effectiveness of the educational programme is dependent on the techniques that educators use to direct and maintain children's attending behaviours (Bamberger & Tal, 2007; DeWitt & Storksdieck, 2008). However, there is substantial disagreement in the field of childhood education as to how this should be achieved. Some early childhood educators argue in favour of using indirect teaching methods, such as stories and games (Cohen, 2001; Whittington & Floyd, 2009). Yet systematic reviews suggest that educational programmes that include a direct teaching component are the most powerful ways to enhance learning (Joseph & Strain, 2003). These direct methods include educators giving clear instructions and presenting activities that build on cognitive-behavioural and social learning theories (Bandura, 1977; Vygotsky, 1978). Direct methods focus on shaping children's attention, thought processes, and intrapersonal communication, thereby manipulating their learning experiences and behaviours (Ashdown & Bernard, 2012).

The role of social interaction with a familiar adult on children's attention to emotions in art

Museum educational programmes are inherently social events. Children are commonly accompanied by familiar adults in museums – mainly parents and other caregivers, such as grandparents, a babysitter or nanny – who tend to take on one of two roles in museums. On the one hand, caregivers commonly behave as teachers to their children (Cone & Kendall, 1978; Kropf & Wolins, 1989) by guiding their attention and shaping their behaviours in the museum, and thus changing their learning experience (Cone & Kendall,

1978; Falk, 2004; Falk & Dierking, 2000). On the other hand, they are the emotional support systems for their children who facilitate conversations about memories, make personal connections, and develop a joint understanding of the museum experience (Hein, 1998). For these reasons, caregiver–child interactions have been targeted in art-based, multi-session family workshops with the aim of enhancing children’s emotional experiences (Hoffmann et al., 2020; Ivcevic & Maliakkal, 2016).

Present study

Prior findings suggest that children’s museum experiences are influenced by both the educator’s teaching techniques and the social context of the educational programme. Building on the evidence largely gleaned from science or natural history museums, we examined whether a single-visit art museum education programme could similarly influence children’s experience with art. Instructional experiences varied by (1) focus method and (2) social interaction with a caregiver differentially directed children’s attention to the emotional (vs. elemental) content of art.

Specifically, we hypothesized first that targeted but unscripted instructions would draw children’s attention to the emotional content versus the elemental details of artwork, and second, that children’s social context would influence their attentional processes. Finally, we tested how these manipulations shaped children’s museum enjoyment and their willingness to return to the museum (see these results in the Supplementary Materials).

Methods

Participants

Participants were a convenience sample of sixty children (39F/21M, $M_{\text{age}} = 7.59$ years old, $SD_{\text{age}} = 1.9$, range: 3–13 years) and their caregivers (accompanying familiar adult, such as a parent, family member, or a nanny) who attended an educational museum tour at The Metropolitan Museum of Art (The Met). The tour was part of the museum’s ongoing family education programme intended for children ages 7–10 and their adult caregivers. In general, the age range of children attending the programme is quite heterogeneous, with some younger and older siblings also in attendance. Given the *in-situ* design, children of any age were allowed to participate in the study. The programme was free of admission for children, while adults could pay what they wished, with no minimal limit. Participants did not receive any compensation for their participation. We obtained verbal consent from adults who accompanied the children, and assent from children, before participating in the study, in accordance with the (masked for blind review) Institutional Review Board. The study was performed in collaboration with The Metropolitan Museum of Art Department of Education.

Procedure

Programmes selected for this study were unscripted, regularly occurring, free, public educational programmes for children and accompanying adults offered on weekends. Each programme took place exclusively in the museum’s galleries and focused on three different works of art during each programme: *The Gulf Stream* (Homer, 1899); *John Brown* (Curry, 1939), and *Just Moved* (Mosler, 1870) (see Section C of the

Appendix). These paintings were selected because they depict narratives with the potential to evoke varied and strong emotions (e.g., negative: such as despair of being stranded on a boat in Winslow Homer's *The Gulf Stream*; ambiguous: the abolitionist passion and hurricane storm in John Steuart Curry's *John Brown*; and positive emotions: family bonding in Henry Mosler's *Just Moved*). They also have formal qualities that provide rich content for discussions about the elements of art, such as line, shape, and colour. Finally, there were practical purposes related to the choice of paintings for the study, such as proximity of the paintings to each other and to the quiet area of the museum that allowed for discourse.

As part of the study design, educators at The Met were instructed to slightly adjust teaching strategies to manipulate children's attentional focus and social environment during the educational programme. The educators at The Met regularly use unscripted instructions that can be flexibly adapted to the group's needs (e.g., by changing the order of questions, or adjusting the questions and prompts to the ongoing discussion that maximizes children's programme engagement) to prompt children and accompanying adults to focus on a variety of entry points in a work of art. Often, discussions in children's programming in art museums might focus on both emotional content as and elements of a work of art, but for the purposes of this study, questions and instructions were carefully crafted to only focus on the emotional or the elements of art content separately. Depending on which day of the week children and caregivers happened to attend the programme, they were assigned to one of three conditions (Caregiver Prompt – EMOT; No Caregiver Prompt – EMOT; No Caregiver Prompt – ELEM).

Each educational programme lasted a total of 1 hr. The programme took place in the gallery, whereas the completion of the outcome measure occurred near the galley, in a quiet area of the museum. Immediately after the programme ended, children were asked to complete a 5 to 10-minute-long questionnaire that assessed (1) children's demographic information (age and sex), (2) word choices referencing either art elements or emotional elements discussed by the facilitator, (3) the extent to which they enjoyed the programme, and (4) their desire to return to the museum (see Section A and B of the Appendix for the full questionnaire). Accompanying adults were explicitly instructed not to intervene except to help read the questions if needed.

Design

The study used a between-subjects design (see Figure 1 for study design). For examination of Attentional Focus, groups were divided into an 'Emotion focus condition' (EMOT) and an 'Elements of art focus condition' (ELEM). For examination of Social Condition, children assigned to the EMOT group were divided into a 'Caregiver Prompt' and a 'No Caregiver Prompt' condition. Note, the social manipulation only occurred in the context of the EMOT conditions described earlier (not the ELEM condition). Also, see Table 1 for demographics and sample size per procedure.

Attentional focus manipulation

Emotion focus condition (EMOT)

For the emotion focus condition (EMOT) condition, the overarching questions motivating the instructors' discourse with students were as follows: (1) How can we tell what someone in a work of art might be feeling based on their pose and expression? (2) How does the work of art make you feel? Introductory instructions in the EMOT group

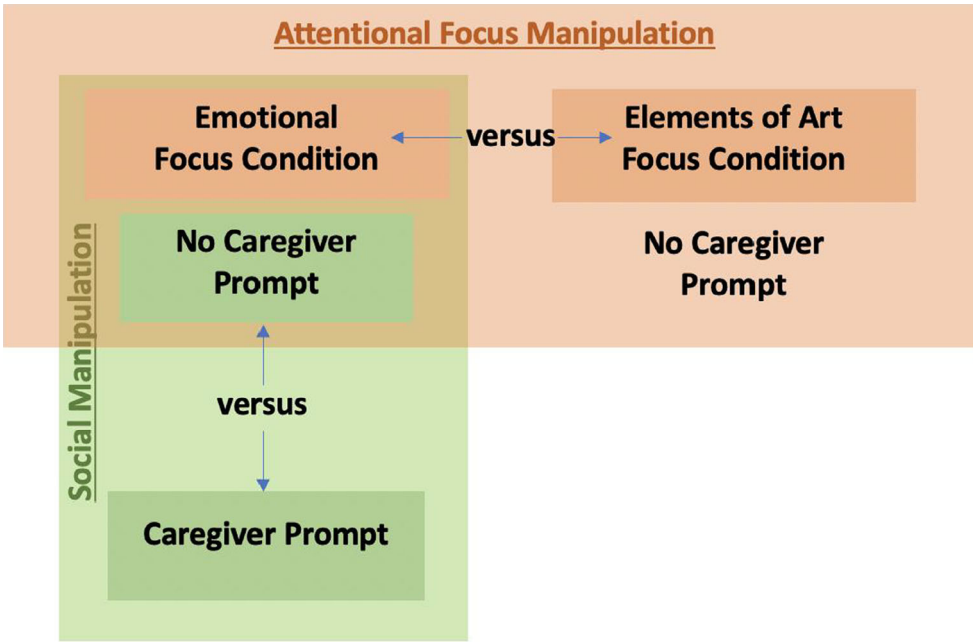


Figure 1. The study design: Focus Conditions [emotional focus condition (EMOT) and elements of art focus condition (ELEM)] and Social Conditions (Caregiver Prompt and No Caregiver Prompt to interact conditions).

Table 1. Attentional focus manipulation: group means (standard deviations) for demographics (sex, age), Word Type proportion scores (emotion vs. element words), programme enjoyment scores – log transformed, and willingness to return to the museum scores – log transformed

Attentional focus conditions	Emotion focus condition (EMOT) No caregiver prompt <i>n</i> = 18			Elements of art focus condition (ELEM) No caregiver prompt <i>n</i> = 25		
	%	<i>M</i> (<i>SD</i>)	Range	%	<i>M</i> (<i>SD</i>)	Range
Sex	72% F/28% M			68% F/32% M		
Age (years)		7.25 (1.74)	4–11		7.78 (2.04)	3–13
Word type, proportion						
Emotion words		0.75 (0.19)	0.44–1		0.51 (0.2)	0.22–0.89
Element words		0.25 (0.19)	0.00–0.56		0.49 (0.2)	0.11–0.78

were a close version of the following: *One way we can learn about art is by thinking about how the figures might feel. Today we are going to think about what is happening in each work of art, the emotions the characters are feeling, and how we feel looking at each painting.* Additional questions for each work of art in the EMOT group included: *What might the woman be feeling? What clues tell you she feels that way? Take a minute to imagine you are in the work of art – how might you feel in this situation? Think about a time in your life when you have felt the way this character might be feeling.* Activities for the EMOT group included movement activities to mimic pose and expression seen on the paintings.

Elements of art focus condition

For the elements of art focus condition (ELEM) condition, the overarching motivating the instructors' discourse with students were as follows: How do artists use the elements of art, and different tools and techniques, to create an image? Introductory instructions in the ELEM group were a close version of the following: *One way we can learn about art is by thinking about the use of colours, line, and shapes used in making the artwork. For each painting today, I want you to notice what colours, lines and shapes were used and think about why they may have been chosen.* Additional questions for each work of art included *What colours do you see in this painting? What do these colours and lines tell us about what is happening in the painting? What lines, colours, shapes or patterns did the artist use to create the scene?* The colours in the paintings were discussed in relation to the elements of aesthetic stimuli and events in the picture. For example, the participants discussed the folds of a dress in the painting and how paint colour, lines and shapes had been used to create those folds. Activities crafted for the ELEM group also included touch objects such as an artist's palette, paint brushes, and other tools to make it a multi-sensory learning experience for the children.

Social manipulation

Caregiver Prompt condition

To examine whether interaction with a caregiver (i.e., familiar accompanying adult) impacts children's emotional experiences with art, one group of children in the EMOT condition was prompted to look at works of art and discuss their abstract, emotional content with their caregivers who accompanied them to the museum visit, and then discuss a time they may have experienced something similar or felt the same way (Caregiver Prompt group). Educators were instructed to add the following lines to the earlier instructions: *Parents and caregivers, can you help your child remember a time they may have felt this way?*

No Caregiver Prompt condition

Another group of children in the EMOT condition were prompted to look at works of art and discuss their abstract, emotional content, but caregivers were not prompted to talk with children (see Table 2 for demographics and sample size per procedure). For this condition, educators were instructed to omit the following type of instructions: *Parents and caregivers, can you help your child remember a time they may have felt this way?* (See Table 2 for demographics and sample size per procedure.)

Measures

Demographics

The questionnaire assessed children's sex (39 F/21M) and age in years ($M = 7.59$, $SD = 1.9$, range = 3–13). Missing age data of four participants was imputed with the average age of the participant pool. Age was mean centred in the analyses.

Art description (Word Choice)

The primary dependent measure in this study was children's word choices to describe the artworks they saw. At the end of the educational programme, children were given a

Table 2. Social manipulation: group means (standard deviations) for demographics (sex, age), Word Type proportion scores (emotion vs. element words), the programme enjoyment scores – log transformed, and willingness to return to the museum scores – log transformed

Social manipulation	No caregiver prompt N = 18			Caregiver prompt N = 17		
	Measures	%	M (SD)	Range	%	M (SD)
Sex	72% F/28% M			53% F/47% M		
Age (years)		7.25 (1.74)	4–11		7.68 (1.93)	4–12
Word type, proportion						
Emotion words		0.75 (0.19)	0.44–1		0.62 (0.22)	0.33–1
Element words		0.25 (0.19)	0.00–0.56		0.38 (0.22)	0.00–0.67

questionnaire that listed the title and artist of each painting followed by three abstract emotion-words and three elements of art words (see Section A of the Appendix for the lists of words). Words were selected by the Met program developer and the researchers with an aim for child-friendly vocabulary that were appropriate descriptors of the art. On the questionnaire, the words were always presented in the same order in all groups. Children were asked to circle three of the six words that they thought best described each painting. The six words all accurately described the painting. The goal of this questionnaire was to test whether the manipulation would result in word choices that were biased towards emotions or elements of art, rather than to test overall memory accuracy. Pictures of the paintings were not included in the questionnaire.

Data analysis

Attentional focus manipulation: Word choice proportion differences between the EMOT and ELEM conditions

To answer whether the educators' instructions influenced attentional focus, we examined the word choices children used to describe the artwork (examined only in the 'No Caregiver Prompt' condition). We calculated a proportion score comparing the number of chosen emotion words to the number of chosen elements of art words. For the analyses, we implemented linear mixed-effects modelling using the 'lmer' function from the 'lme4' package (Bates, Mächler, Bolker, & Walker, 2015) in R (R Core Team, 2014, version 3.3.3) with maximum likelihood estimation to account for any dependency in the data. *Post-hoc* tests were then completed using the 'diffsmeans' function of the 'lme4' package that calculates differences of least squares means and confidence intervals for the fixed effects of the mixed effects model (word type [emotion vs. elements words] and focus condition [ELEM vs. EMOT], and social manipulation groups [No Caregiver Prompt vs. Caregiver Prompt]). The data were structured with word type (emotion vs. element word) as a within-person repeated measure using an unstructured covariance type, with the participant being the upper-level variable in the model. Attention focus manipulation (binary: EMOT, ELEM) was entered as fixed effects predictor of word choice scores (proportion of emotion vs. elements of art words chosen), with random intercepts for each participant and an interaction term between word type and attention focus condition. Given the wide age range (continuous, grand-mean centred) and differences in sex distribution (binary: male, female), both age and sex were included as fixed effects predictors in the model. This approach allowed us to separately but simultaneously estimate the intra-individual differences in the proportion of chosen emotion and

elements of art words in the two attentional focus manipulation groups. Four participants only provided word choices for one painting; therefore, their proportion scores were calculated based on their responses provided for one painting. Finally, we completed additional analyses where we excluded children who were younger than 5 years and older than 10 years of age to test whether results remained the same with a narrower age range.

Social manipulation: Word choice proportion differences between the Caregiver Prompt and No Caregiver Prompt conditions

To ask whether social manipulation ('Caregiver Prompt' and 'No Caregiver Prompt') influenced the proportion of emotions and elements of art-word choices children made to describe the artwork, we examined word choices during the EMOT condition only. Once again, we implemented linear mixed-effects modelling in R with maximum likelihood estimation and an unstructured covariance type. The within-person repeated measure was word type (emotional, elemental), and social condition groups (binary: 'Caregiver Prompt', 'No Caregiver Prompt'), age (continuous, grand-mean centred), and sex (binary: male, female), were entered as fixed effects predictors of word choice scores (proportion of emotion vs. elements of art words chosen), with random intercepts for each participant. Finally, we again tested whether the results remained consistent if we excluded children who were younger than 5 years or older than 10 years.

Results

Attentional focus manipulation: Word choice proportion differences between the not prompted EMOT and ELEM conditions

There was a significant main effect for Word Type, $F(1, 252) = 64.884, p < .001$, such that the children circled significantly more emotion than elements of art words. This main effect was qualified by a Word Type \times Attentional Focus Manipulation interaction [$F(1, 252) = 56.37, p < .001$] (see Figure 2), such that children chose significantly more emotion words in the EMOT condition relative to the ELEM condition [$t(252) = -5.28, p < .001$], and significantly more elements of art than emotion words in the ELEM condition than in the EMOT condition [$t(252) = 5.28, p < .001$; Cohen's $d = .947$; see Table 1 for means (SD)]. The within condition *post-hoc* *t*-tests showed that in the EMOT condition, children selected significantly more emotion words than elements of art words [$t(252) = -10.2, p < .001$; Cohen's $d = 1.964$]. In the ELEM condition, there was no difference between the proportion of selected emotion and elements of art words [$t(252) = -0.422, p > .673$; Cohen's $d = .07$]. The main effect of age [$t(252) = 0.000, p > .05$] and sex [$t(252) = 0.000, p > .05$] were not significant. We also completed the supplementary analyses of the narrower age range of 5–10-year-olds to test whether the effects remained the same. The results did not change.

Social manipulation: Word choice proportion differences between the caregiver prompt and no caregiver prompt conditions

There was a significant main effect for Word Type, $F(1, 204) = 108.8, p < .001$, such that overall emotion words were chosen more often. This main effect was qualified with a Word Type \times Social Condition interaction [$F(1, 204) = 13.588, p < .001$] (see Figure 3).

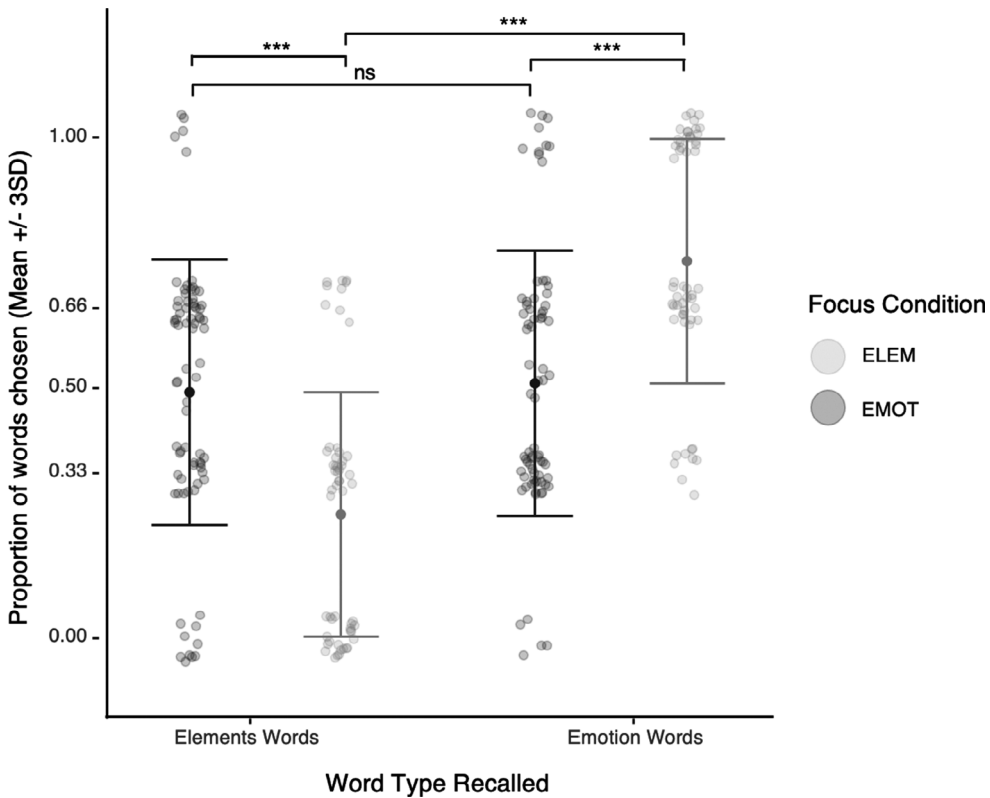


Figure 2. Distribution plot of the proportion of words chosen (elements or emotions) in both focus conditions. ELEM – elements of art focus condition, EMOT – emotional focus condition. Note: As these are proportion scores, the element word proportion score is the inverse of the emotion word proportion score, and vice versa. ns, non-significant, $p < .10$; *** $p < .001$.

Post hoc t -tests showed that the proportion of emotion words chosen in the Caregiver Prompt condition was significantly lower than the proportion of emotion words chosen by the No Caregiver Prompt condition [$t(204) = 2.57, p = .011$]. The proportion of elements of art words chosen in the Caregiver Prompt condition was significantly higher than in the No Caregiver Prompt group [$t(204) = -2.57, p = .011$; Cohen's $d = .508$]. The main effect of age [$t(204) = .000, p > .05$] and sex [$t(204) = .000, p > .05$] were not significant. Finally, we completed the supplementary analyses with a limited age range (5- to 10-year-olds only), and once again, the results did not change.

Discussion

What children pay attention to determines what they learn and remember (Amso & Scerif, 2015). In this study, we demonstrated that attentional focus manipulations and caregiver-child interactions change children's reporting of their attention to emotional details within the context of visual art. This effect was demonstrated in the context of an art museum, and the effect was based on a one-time visit to a routinely provided museum programme. We found that the focus of children's attention can be differentially directed to either emotional or elemental content using techniques that are adaptable within an art

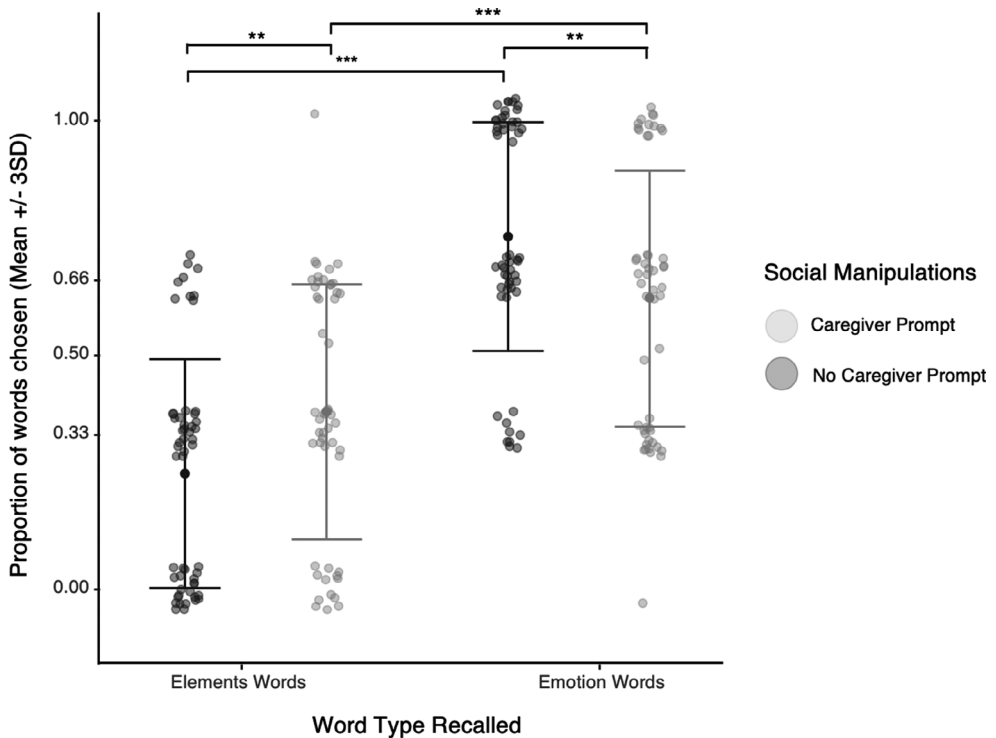


Figure 3. Distribution plot of the proportion of words chosen (elements or emotions) in the both the Caregiver Prompt and the No Caregiver Prompt conditions. *Note:* As these are proportion scores, the element word proportion score is the inverse of the emotion word proportion score, and vice versa. ns, non-significant, $p < .10$; ** $p < .01$; *** $p < .001$.

museum context. These findings provide insight into the social and instructional tools that can facilitate children's attention to specific details in artwork in informal educational settings. Moreover, these results add to our knowledge regarding planning and implementing education programmes within the content of art museums.

Instructions influenced children's attentional focus. Specifically, the EMOT instructions increased children's attentional focus to the emotions displayed in the paintings as evidenced by the greater number of emotional words children used to describe the artwork. Presumably, this attentional shift was the result of encouraging children to think about the feelings of the subjects in the artwork and to think of a time when the children themselves experienced similar feelings, which may have led children to abstract more emotional details. Conversely, the ELEM instructions would have encouraged children to think more about the colours, lines, and shapes in the artwork. If this line of work is continued and replicated, results may point to visual art-based educational programmes as valuable tools for the development of emotional skills through enhancing perspective-taking skills and self-generating emotions.

Drawing on contemporary emotion theory (Cupchik, Vartanian, Crawley, & Mikulis, 2009; Ochsner et al., 2009) positing that the emotions are driven by both automatic (bottom-up) processes as well as more instructed (top-down) ones, it is possible that the influence of the EMOT instructions on children's emotion focus might operate through top-down instructions from the art museum educator. In line with

Schabmann et al. (2016) findings, our study supports the idea that processing emotion in artwork might be enhanced by both bottom-up and top-down processing. Relatedly, Greene, Kisida, and Bowen (2014) found that children remembered a vast amount of details in artwork even weeks following a one-time museum visit if the events depicted on painting were framed as stories, perhaps because the emotional information can scaffold memory (Tyng, Amin, Saad, & Malik, 2017).

In all manipulations, children chose more emotion words than elements of art words describing the paintings, possibly suggesting that the emotional content is more readily available to children in artwork, as far as their reporting indicates. However, the ELEM manipulation biased children's attention more towards the elemental content, as indicated by children selecting more elemental words to best describe the art relative to the EMOT manipulation. Presumably, just as instructional manipulation to emotion can direct children's attention to emotion, instructional manipulation to elements can direct children's attention to the elemental content of art. While much more research is required to understand how museum educators can help children to capitalize on emotions in paintings to increase memory for the art, the current findings are promising in showing that children's attention to different aspects of art can be shifted within a single session.

We did not find support for our hypothesis that interactions with children's caregivers would enhance children's attentional focus to emotions. Instead, we found that prompted interactions with the caregiver decreased the likelihood that children would choose emotional words in describing the artwork. Although we expected to see the opposite effect, we do not think this discrepancy between our hypothesis and the actual results is due to the social manipulation not being strong enough to produce the expected effect. If the manipulation had not been strong enough, we would have anticipated a null effect, rather than the dissociation. One possible interpretation of this finding could be that familiar adults downregulated (i.e., buffered) children's emotional experiences during the dyadic interactions (Gunnar & Hostinar, 2015), and therefore, they were less likely to encode the emotional content of the artwork. Alternatively, in an educational context, caregivers may act as 'teachers' – as suggested by Cone and Kendall (1978) – rather than as an emotional catalyst for children. Caregivers might facilitate an element-based top-down, rather than emotion-based 'bottom-up' processing of stimuli in paintings, which in turn might result in less attention to their own emotions and increased attention to elemental aspects. However, these are speculations, and with the current data we cannot say more about why caregiver prompts resulted in a greater focus on elements.

Despite the wide range in this sample (3–13 years), age was not a significant predictor in any of the statistical models. The results remained unchanged even if we exclude our youngest and oldest participants (<5 and >10 years of age; $N = 6$). Crowley and Jacobs (2011) and Kallery (2011)'s work in museum contexts suggest that programme content and the organization of the presented information play a more important role in children's learning experiences than age-related capacity to process, learn, and remember new information. Children as young as 4 years of age have the capacity to learn and remember complex and abstract information [e.g., the concept of sphericity of the earth in Kallery's (2011) study] if they are given the appropriate tools (e.g., facilitating hands-on, object-based activities; discussing and recalling the viewed content; linking the content to previously acquired knowledge or experiences) when engaging with the programme content. Although our results are consistent with Kallery's (2011) findings, the youngest and oldest ages were undersampled, and therefore, we cannot be confident of how generalizable the findings of this study would be for the youngest and oldest ages. Future studies focusing on ages younger than 5 and older than 10 years of age are needed.

This study took place in an informal educational setting; however, there are implications for formal classrooms settings as well. Visual arts (both viewing/describing arts and using them as a form of self-expression) are commonly used as instructional tools in primary education. Findings from this study suggest that educators can take advantage of attention-shifting strategies to manipulate children's foci on various dimensions of art. For instance, educators aiming to enhance social-emotional learning in the classroom might instruct children to focus on the emotional content seen in paintings and think of a time when they experienced similar feelings as the depicted character. Engaging in social discourse instead may help foster more attention to the elemental aspects of the art.

Consistent with existing socio-emotional learning programmes, the instructions of the MET educators encouraged children to identify the emotions the person in the art piece was feeling. Accurate recognition of emotions within oneself and others is necessary for engaging in socially appropriate and helpful behaviours (Parker, Mathis, & Kupersmidt, 2013; Tremblay, Kirouac, & Dore, 1987). Relatedly, emotion-recognition modification training programmes have shown that accurate recognition of expressions (especially when ambiguous) can reduce aggressive behaviours that result from perceptual biases (Penton-Voak et al., 2013). Other randomized controlled trials have found similar results among children with callous-unemotional traits who showed increased affective empathy and reductions in conduct problems following an emotion recognition skills training (Dadds, Cauchi, Wimalaweera, Hawes, & Brennan, 2012). Such skills are also critical for helping children cultivate emotional literacy and build self-awareness (Collaborative for Academic, Social, and Emotional Learning, 2003, 2013; Maurer, Brackett, & Plain, 2004) which facilitates more effective communication and improved social interactions (Izard et al., 2001). Instructors also encouraged the caregivers to help their children recall a time when they felt the same way as the emotions depicted in the paintings. Instructions like these have been shown to improve emotional empathy and perspective taking (Arnold et al., 2014; Gokcigdem, 2016; Huijgen et al., 2017). Such techniques are already commonly used in social-emotional learning programmes in schools and have been shown to improve skills such as recognizing and labelling emotions, as well as emotion generation and expression (e.g., see Strong Kids and Strong Teens social and emotional learning curricula in Carrizales-Engelmann, Gueldner, Walker, Feuerborn, & Tran, 2016). These tools teach skills that are building blocks of healthy emotional functioning and increased emotional intelligence (Brackett, Rivers, & Salovey, 2011). The current findings showed that these instructional manipulations at the very least influenced word choices towards the emotional content for children, raising the possibility that art museum-based education could provide another avenue for strengthening children's social-emotional skills.

The benefits of educational programmes that target children's social-emotional development amplify when families and schools work together (Albright & Weissberg, 2010; Tolan, Guerra, & Kendall, 1995). Durlak and DuPre (2008) meta-analysis suggests that approximately one of four programmes have a family component to it and preliminary evidence suggests that some of these collaborations indeed improve children's social functioning, school performance, and attitudes (Albright & Weissberg, 2010). For more information on specific programmes see Albright and Weissberg (2010). Social-emotional learning activities outside of the classroom allow for a broader ecological implementation and sustainability of newly acquired skills (Tolan et al., 1995) across a variety of contexts, including in the home, the classroom, and the larger school environment (Albright & Weissberg, 2010). One such environment can also be the art museum, where emotionally charged stimuli are readily available in the form of arts, and family members are given the

space and tools to talk about the emotions depicted in the artwork. Yet, art museums are more commonly used as spaces for children's intellectual growth (e.g., art education classes; e.g., Knutson, Crowley, Lin-Russell, & Annsteiner, 2011) than for regularly occurring school field trips for children's social-emotional development, possibly due to difficulties in establishing such collaborations and implementing a shared curriculum. Future studies are needed to explore this further, but the current findings suggest that art museums have a potential to complement existing school and family interventions that aim to aid children's social-emotional functioning.

There are several limitations to this study. This study was not factorial by design, and such asymmetry did not allow us to make inferences about differential effects of the focus and social conditions on word type scores. In addition, this study did not include conditions without explicit instructions and/or a condition that focused on both elements of art and emotions depicted in the paintings that would have provided valuable control conditions for the experimental manipulations. Because of the *in-situ* nature of this study, we had little control over the specific instructions provided by the educators and over the content of the caregiver prompts. Moreover, although the Caregiver prompt manipulation produced differences in children's attention, we cannot rule out the possibility that the caregivers in the No Caregiver Prompt group could have commented on the content, despite instructions. Although these interactions were explicitly discouraged and minimized, in naturalistic settings (as opposed to highly controlled laboratory contexts), such confounds cannot be fully avoided. This study was implemented as part of a regularly occurring educational programme and was designed to limit participant burden. As a result, we were limited in our knowledge of the participants' motivations for visiting The Met, and the frequency with which the children and their parents regularly engage with art at home or in museums. Relatedly, we did not collect information on the caregiver-child relationships, or whether the caregiver attending the programme was the primary or secondary caregiver, which would be important to consider in future work examining the role of parents in scaffolding children's interaction with art. Moreover, only three specific paintings were used, and this study only tested within one museum located in New York City. Furthermore, no formal confirmation that the words were known by all the children tested, and the word list in the two conditions might not have been balanced for difficulty, complexity, or match to the art. This could have contributed to the overall bias children showed towards emotion words, but it would not explain the effect of the manipulation. Future studies should consider a variety of different emotion and elemental words, other works of art, and interventions across multiple museum programmes. Finally, as online education continues to grow, the educational potential of virtual museum programming should be investigated. Such research, especially with an eye towards social-emotional development, is virtually non-existent. Researchers undertaking such work need to take into consideration the type of instructions they use to present the arts to children, as well as the unique effect of the social environment in which children engage with the arts online.

This study has implications for art museum education programme development, as well. In family programming in museums, museum educators develop lesson plans around a theme or essential question, set specific learning goals and objectives for each programme, and distil relevant information that will be shared through age-appropriate teaching strategies to meet each lesson's goals and objectives. Educators engage adults and children through prompts for close looking, open-ended questions, parent-child conversations, and multi-sensory activities. This framework, common to many early childhood programmes in museums, was adhered to for this study in order for data to be

relevant and useful for programmes at a variety of institutions. The ability for museum educators to influence the trajectory of conversations, and shape what knowledge children take home from interacting with works of art and their caregivers, is a particularly interesting finding from this study. These data support the importance of topics and themes in art museum programmes, as well as carefully constructed lesson plans, questions, activities, and prompts to impact art museum learning in early childhood.

Conclusion

Visual arts may be a valuable opportunity to investigate and facilitate emotional development in children, and reciprocally, emotions may offer a valuable means of manipulating attention for works of art. In this study, we examined how attentional focus and social manipulation might impact children's attention to emotional details in art during a single-session museum programme. We found that flexible, unscripted instructions to self-generate emotions and perspective take can enhance children's capacity to abstract emotional details in artworks. In contrast, interactions between the child and a caregiver decreased children's attention to the emotional content in paintings. These findings yield insight into social and attentional tools that facilitate children's emotional development and learning about art and call attention to the importance of goal-oriented designing of art museum education.

Conflicts of interest

All authors declare no conflict of interest.

Author contribution

Jennifer Kalter (Conceptualization; Investigation; Project administration; Writing – original draft; Writing – review & editing) Tricia Choy (Data curation; Project administration; Writing – review & editing) Nim Tottenham (Conceptualization; Investigation; Methodology; Resources; Supervision; Writing – review & editing) Emily Blumenthal (Investigation; Project administration; Writing – review & editing) Bridget Callaghan (Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing) Marta Korom, M.A. (Conceptualization; Formal analysis; Methodology; Visualization; Writing – original draft) Jennifer Silvers (Conceptualization; Investigation; Methodology; Supervision; Writing – review & editing) Michelle VanTieghem (Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Supervision; Visualization; Writing – review & editing).

Data availability statement

Research data are not shared. At the time of data collection, we did not ask for permission to share the data and there is no way for us to recontact participants now.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Supinfo S1 Program enjoyment and children's willingness to return to the Met