# The effects of task explicitness to communicate on the expressiveness of children’s drawings of different topics.

# Abstract

Effects of asking children to communicate through their drawings have been investigated using animate rather than inanimate drawing topics. The present study investigated the impact of a communication context on children’s drawings of topics with contrasting animism. Three hundred and twenty two children, 156 boys and 166 girls aged 6-11 years were allocated to two conditions. The communication condition (n=161) involved instructions to communicate emotion and the reference condition (n=161) gave no instruction to communicate. Children drew either houses or human figures (House, *N*=160, Human figures, *N*=162), producing freehand drawings of the topic; a baseline version followed by a happy and a sad version in counterbalanced order. Expressive content in the communication condition was greater than in the reference condition and impacted differentially on the strategies used between the houses and human figures drawings. The findings are considered with respect to the cue dependency model and framework theory of art.

# Introduction

Drawings are often resources for children to express and encode affective information (e.g., Burkitt, 2008; Cox, 2005; Golomb, 1992; Jolley, 2010). Children use expressive strategies throughout childhood in a wide range of literal, mood adjusted content and abstract ways (Brechet, Baldy, & Picard, 2009; Golomb, 1992; Ives, 1984; Jolley, Fenn & Jones, 2004; Picard, Brechet & Baldy, 2007; Sayil, 1998; Winston, Kenyon, Stewardson et al., 1995). In relation to a research approach that analyses the perceived expressive quality of drawings, a U shaped developmental pattern with expressive decline in middle childhood has been proposed (Winner & Gardner, 1981; Davis, 1997). For example, when drawings are rated for the perceived quality of aesthetic expression using dimensions of expressivity such as abstraction or literality for a range of emotions (for example, anger, sadness and happiness), preschool children’s and adults’ expressivity have been seen as the peaks of a U curve, with more routine literal strategies being used across development in between these peaks. However the U shaped developmental curve has been challenged by contrasting findings of an inverted U shaped progression across childhood or a flat line progression depending on cultural ideas of what constitutes aesthetic expressive quality (Haanstra, Damen, & van Hoorn, 2011; Kindler, 2000; Pariser & van den Berg, 1997).

The present study is based in an alternative approach where drawing cues and strategies of expressivity are analysed. Investigations of the development of children’s drawn expressivity have tended to use different types of task, different task instructions, and different forms of coding with varying methods of analyses resulting in different claims about developmental progression. For example, it has been argued that the quantity and quality of expressive strategies increases with age, particularly between 7-11 years (Parsons, 1987) where children develop from an interest in literal properties of objects to expressive content properties of drawings, such as bad weather to depict sadness. Winston et al. (1995) coded expressivity in 6, 9 and 12 year old children’s drawings of happy and sad trees examining content and abstract cues and found the use of both of these types of cues to increase gradually with age. Jolley et al. (2004) showed that expressive drawings develop incrementally with age. They measured both the quantity of appropriate expressive themes and perceived quality of expression in 4- 12 year old children’s happy and sad freehand drawings of houses and trees and observed that they progressed through a reliance on literal and content properties between the ages of 6-9 years to the use of more literal and more abstract strategies by 12 years of age.

So defined, content properties include literal strategies, for example smiling, and non-literal features such as bad weather or drooping flowers. Abstract features include non-literal and non-figurative forms such as alterations in colour and line pressure (Burkitt, 2008; Burkitt & Barrett, 2010; Jolley et al., 2004; Picard & Lebaz, 2010; Picard et al., 2007). More recently, Picard and Gauthier (2012) conducted a large scale study to provide a comprehensive view of patterns of expressive development using a coding scheme that also addressed both the quality and quantity of expression. They found a developmental shift between the use of literal features in childhood (5-10 years) to the use of more metaphorical features, such as a damaged tree or an abstract composition in early to mid-adolescence (11-15 years).

**The important of topic type**

There is some evidence however to show that the progression of the quality and quantity of drawing strategies is partly dependent on the drawing topics in question. Picard et al. (2007) found that children use more literal strategies to depict human figures and more non-literal features to draw houses with increasing age. Children used non-literal properties (such as clean windows for a happy house and core features or broken features for a sad house) and non-literal abstract properties (for example, colour change to encode happiness and sadness and line type) more than when drawing mood in human figures. They also found that children used literal expressive strategies, such as mood appropriate alterations in facial expressions and actions, more when drawing human figures than when drawing houses.

 Findings regarding abstract strategies such as colour use in relation to happiness and sadness are mixed and tend to reflect the types of tasks children are asked to complete in the drawing situation. For example, when completing outline figures in completion tasks using one colour, children tend to use more preferred colours for positive figures (men, dogs and trees, Burkitt, Barrett & Davis, 2003) and less preferred colours for negative figures. However colour use does not reliably signal colour preferences in relation to feelings towards a topic when freehand tasks are employed (Burkitt, Barrett & Davis, 2004; Crawford, Gross, Patterson, & Hayne, 2012; Picard & Lebaz, 2010). On the other hand, literal content features in relation to affect such as frowning and smiling, actions and appropriate weather are less invariant across topic type (Burkitt, & Barrett, 2010; Burkitt & Newell, 2005; Picard et al., 2007; Jolley et al., 2004; Winston et al., 1995).

Picard et al.’s (2007) topic specific findings demonstrate the need to examine the development of children’s expressivity in relation to the precise topics in question. The present study therefore examined differences in expressive strategies between two topics of varying animism and extended previous research by exploring the impact of a communicative context on children’s drawn expressivity.

**The role of communication contexts and topic type**

The cue dependency model of children’s drawings (Freeman, 1980, 1995) posits that children’s drawing strategies are shaped by precise multiple cues within the drawing context. Subtle changes in task instructions can alter children’s usual graphic strategies to depict positional and affective information (Barrett, Beaumont & Jennett, 1985; Barrett & Bridson, 1993; Burkitt & Barnett, 2006; Burkitt & Watling, 2013; Light & McEwen, 1987; Light & Simmons, 1983; Sitton & Light, 1992). One such instruction that has resulted in changes in children’s usual graphic routine is the explicit request to communicate information to an audience. Although there is general agreement that children’ expressive ability improves with age, the supporting research often uses task instructions that request a specific mood with varying degrees of explicitness about the communicative function of the drawing. This task variation makes it difficult to assess the reliability of findings across the field. For example, Jolley et al. (2004) asked children to draw a happy or sad mood in trees and houses so that the topic looked happy or sad. Contrastingly, Picard and colleagues (2007) asked children to draw human figures and houses so that the experimenter could see that the topics were happy or sad. These sets of instructions convey a different level of explicitness about the communicative expressive function of the drawing. Whilst drawings are public by their visible nature (Freeman, 1995), the extent to which children are communicating mood in response to instructions remains unresolved.

Drawings often have a communicative function (Callaghan, 1999; Freeman, 1980, 1995; Golomb, 1992; Ives, 1984; Parsons, 1987;Stetsenko, 1993) and empirical work assessing contexts where children are explicitly communicating is required. Researchers (Bekhit, Thomas & Jolley, 2005; Woolford, Patterson, Macleod et al., 2015) observe that children’s drawings continue to be interpreted for emotional information about the child artist or their feelings towards the topics they draw in assessment and interview settings. Children’s drawings are used clinically and therapeutically to generate discussion, to supplement or substitute for verbal communication and to possibly aid diagnoses (Bekhit et al., 2005; Dalley, 1984; Hammer, 1997; Hunsley, Lee, & Wood, 2003; Malchiodi, 1998). They are used by educationalists for similar purposes, and forensic practitioners have begun to assess the utility of drawing to aid eye witness interviews of potentially emotional events. Children reveal more information when asked to both draw and speak about an event without necessarily increasing errors in this information than when they are simply asked to speak about an event (Gross & Hayne, 1998; Hunsley et al., 2003). Macleod, Gross & Hayne, 2014; Patterson, & Hayne, 2011). Such contexts involve communication between children and practitioners and whilst it is possible that children are altering their drawings to communicate to professionals in these settings (Burkitt & Watling, 2013; Macleod, Gross & Hayne, 2014) we know very little about how explicit communicative contexts influence children’s drawings of a range of topics.

Few studies have directly compared the effects of communicative task instructions on children’s expressive drawings. Research using specific communication contexts has found evidence to suggest that children alter strategies depending on the communicative purpose of their drawings both to convey factual positional information (Light & Simmons, 1983; Sitton & Light, 1992) and affective information (e.g., Burkitt & Watling, 2013; Burkitt, Watling & Murray, 2011; Callaghan, 1999). Children as young as three years of age can show an understanding that the purpose of drawings is to communicate knowledge about the topic to other people (Callaghan, 1999; Light & McEwen, 1987).

When communicating how they feel about themselves and other people, children alter the literal and abstract aspects of their drawings when they are explicitly instructed that an audience will need to understand whether they feel positively or negatively towards a drawn figure (Burkitt, Watling & Murray, 2011). Literal and non-literal content features vary depending on the type of audience that children are told will need to decode the affective character of the topic. For example, certain prosocial behaviours such as gift giving are increased in children’s drawing of happy people when children draw for adults, and increased negative behavior, such as hitting, when children draw for a child audience (Burkitt & Watling, 2013).

**Human figure and house drawings in an explicit communication context**

The impact of communication contexts on expressive human figure drawing has shown that children will reveal more expressive strategies when they believe an audience will view their drawings (Burkitt, Watling, & Murray, 2011). Children tend to include more literal emotion related features such as smiles and frowns, and more expressive strategies overall with age such as mood appropriate weather and appropriate facial features when they are explicitly asked to communicate to an audience. Moreover, the type of audience interacts with the specific emotion in communicative contexts (Burkitt & Watling, 2013). For example, more positive literal and abstract properties , such as gift giving and good weather, are shown to adult rather than peer audience types, and more negative features such as frowning and hitting and shown to peer rather than adult audiences.

It is not yet known however whether instructions to communicate impact on children’s use of expressive strategies for inanimate topics. House drawings were selected in the present study for four reasons. Firstly, the topic is a very familiar and popular drawing topic for children within the selected age range (Cox, 2005; Golomb, 1992; Jolley, 2010). Secondly, house drawings form part of assessment protocols and are used in professional contexts without a strong evidence base for their validity (see Bekhit et al., 2005; Buck, 1948, 1981; Hunsley et al., 2003; Killian, 1985) regarding signs of affect or any effects of the communicative contexts within which they are created.

Thirdly, it is reasonable to expect that children will respond differently to topics with different degrees of animism (houses and human figures) when depicting happiness and sadness. These are human emotions which are arguably regarded differently in relation to human figures and houses. Lastly, a coding scheme previously applied to code expressive house and human figure drawings was used in the present study to increase comparability of findings across the field (e.g., Picard et al., 2007).

The present study was therefore designed to assess the impact of task communicative task instructions across two topic types varying in animism using the coding scheme employed by Picard et al. (2007). The age range of 6 to 11 years was selected on the basis of the proposed topic specific developmental progression between 7-11 years (Picard et al., 2007) where children used increased and advanced literal and abstract features progressively through this time period.

The experimental conditions were defined as “communication” and “reference” (Burkitt & Watling, 2013; Burkitt, Watling & Murray, 2011) due to the point that children who do not receive explicit instructions to communicate may still be communicating to the experimenter. Group differences by communication context can still be compared across drawing tasks and context as the experimenter is constant across conditions. The relationship between children’s ability to depict mood and their graphic development score was checked in the present study using the same measures as a comparable study (Picard et al., 2007). An increase in the use of expressive properties has been found to correlate with improvement in graphic ability (Jolley et al., 2004; Picard et al., 2007) and, as such it was expected that this trend would be evident in the present study.

It was anticipated that the use of expressive strategies would vary by communication and reference condition, and by topic type. On the basis of previous research with human figure drawings (Burkitt & Watling, 2013; Burkitt, Watling and Murray, 2011), we expected that children in the communication rather than reference condition would increase the use of literal features such as smiling and frowning, increase affect related actions and non-literal content features such as good and bad weather in an explicit communication rather than reference context, and use more abstract features, such as line pressure and colour differentially between the communication and reference conditions increasingly with age.

It was expected that expressive strategies would be used differentially between the topics (Picard et al., 2007) in that children would use literal and non-literal content properties in relation to house drawings more than in human figure drawings. It was also expected that children would use more abstract and combined strategies with increasing age for the house and human figure drawings. Expectations regarding the precise type of literal and abstract features for the house drawings between communicative contexts were open ended given the exploratory nature of the study in relation to the impact of contrasting communicative instructions on drawings of an inanimate topic.

The final focus of the present study was to examine gender differences in expressive drawings across the conditions and topic types. Few studies have examined gender differences in this vein of expressive drawing with the notable exception that Picard et al. (2007) found that females used literal strategies more frequently than males yet used combinations of literal, content and abstract strategies less frequently than males. This tendency was therefore also assessed in the present study.

# Method

# Participants

Three hundred and twenty two children were recruited from mainstream schools across the South East of the UK and formed four age groups. The participants were rated as not having any drawing difficulties by their teachers. Children in age group 1 (*n*=79) were aged between 5 years 10 months-6 years 10 months with an average age of 6 years 6 months, *SD* = 2 months. Age group 2 (*n* =80) ranged from 6 years 11 months-7 years 10 months with an average age of 7 years 5 months, SD= 1 month. Age group 3 (*n* = 82) ranged from 7 years 11 month-8 years 10 months, averaging 8 years 6 months, *SD*=2 and children in age group 4 (*n*= 81) were aged between 8 years 11 months-9 years 10 months with an average age of 9 years 4 months, *SD*= 1 month. Overall the participants were aged between 5 years 10 months – 9 years 10 months with an average age of 7years 11 months, *SD*= 1 month. There were equivalent numbers of boys and girls in each condition by drawing type and they were allocated to condition and drawing type by gender based on alternating appearance on class lists. The number of children in each condition drawing either a house or a human figure is shown in Table 1 for each age group.

*\*\*INSERT TABLE 1 ABOUT HERE\*\**

# Materials

 Each child produced drawings on sheets of plain white A4 size paper presented in landscape orientation with separate sheets for each drawing. Thirteen Crayola crayons were provided for the children’s use consisting of red, orange, pink, yellow, light green, dark green, light blue, dark blue, purple, silver, gold, brown and black. A five point sad-smiley face Likert scale assessing affect towards the drawn figures was used with the corresponding ratings (1=very sad, 2=sad, 3= neither happy nor sad, 4=happy, 5=very happy).

# Procedure

 The children were seen individually in a quiet area of their classroom within view of their class teacher. All children produced three pictures of either a house or a man. All baseline drawings were drawn first followed by a happy and a sad version of the topic in counterbalanced order. The baseline drawings were included to assess graphic development and to assist with coding any changes between strategies used in the baseline and the expressive drawings in both conditions as with Picard et al.’s 2007 design. In line with previous research (Burkitt et al., 2011), a peer audience was specified in the present study as this audience type has been found to influence children’s use of expressive strategies for human figure drawings differently between contrasting communication contexts.

**House Drawings**

## **Baseline Drawing Task.** Instructions used for the baseline drawing task for both conditions were as follows:

*“I would like you to draw a house. You can use any of the crayons in front of you. Do you understand?”*

### Reference condition

### *Happy Drawing Task.* The first drawing was removed and children were given a new piece of A4 size paper and the following instructions were given.

 *“I would like you to draw a happy house. I would like you to make the house as happy as you can. You can use any of the crayons in front of you. Do you understand?”*

***Sad Drawing Task.***The children were given a new piece of A4 size paper. The children received the following instructions:

 *“I would like you to draw a sad house. I would like you to make the house as sad as you can. You can use any of the crayons in front of you. Do you understand?”*

**Communication condition**

***Happy Drawing Task.*** The children assigned to the communication group received the following instructions.

*“I would like you to draw a happy house to show your friend from a different school. I would like your friend to be able to tell from your drawing that the house is happy. I would like you to make the house as happy as you can. You can use any of the crayons in front of you. Do you understand?*

***Sad Drawing Task***. The children were given a new piece of A4 size paper and received the following instructions.

 *“I would like you to draw a sad house to show your (“same friend” if second instruction) friend from a different school. I would like your friend to be able to tell from your drawing that the house is sad. I would like you to make the house as sad as you can. You can use any of the crayons in front of you. Do you understand?*

## **Human figure group**

The procedure for the human figure group was identical to that for the participants in the house group with the exception that the word man was substituted for the word house across the different drawing task instructions.

***Affect rating task.*** Immediately after completion of each drawing all children were asked to rate how they felt about the figure/house using a smiley face five point Likert scale (see Figure 1). The instructions were: *'I would like you to point to the face that shows how you feel about the figure/ house. Here are the faces that you are going to be looking at (pointing to each in turn) The first one is a very sad face, the next one is sad, the next one is a bit sad, the middle one is just OK, the fourth one is a bit happy, the next one is happy and the last one is a very happy face. Which one do you feel about the figure/house most at the moment?’* The children's responses were scored on a scale from 1 (very sad) to 5 (very happy).

*\*\*INSERT FIGURE ONE ABOUT HERE\*\**

**Coding**

Coding and scoring procedures were used to assess expressivity and the types of features used in the happy and sad drawings in both conditions to facilitate comparability with related research (Picard, Brechet & Baldy, 2007) the same procedures were used to assess expressivity and the types of features used in the happy and sad drawings in both conditions.

***Depicting happiness and sadness.*** Two independent raters blind to the children’s age, gender, and communication condition coded the drawings separately to determine whether the drawings were baseline, or appropriate depictions of happy or sad emotion. The judges coded each drawing individually rather than relatively and in random order. The following day, the coding was replicated by the same judges and intra-judge consistency was calculated applying Bakeman, Quera, McArthur et al.s’ (1997) interpretation of Cohen’s Kappa reaching high internal consistency (*.84)*. Initial inter-judge agreement for baseline, happy and sad drawings was *.80, .81, .85* respectively. All inter-judge disagreements were resolved through discussion and all baseline, happy and sad drawings were therefore coded as neutral and mood appropriate respectively.

***Drawing strategies.*** As with Picard et al. s’ (2007) coding process the expressive drawings assessed as happy or sad were then analysed for the types of strategies children used to depict mood overall relative to the baseline drawings.

*\*\*INSERT TABLE TWO ABOUT HERE\*\**

The drawings were coded by two further independent coders into the use of a literal (L) strategy, a non-literal content strategy (NLC), a non-literal abstract strategy (NLA) or a combination of all three types of strategy. Table 2 lists the features for each strategy. A drawing was considered to include a strategy when there was at least one emotion appropriate graphic cue for the strategy. The two judges coded the drawings separately using the individual baseline drawings as reference drawings. Inter-judge reliability was very high (0.84). The minor coding differences were settled through discussion and all drawings were included in the analyses. Figure 2 is an example of the depiction of a sad house drawn by a boy aged 5 years 11 moths which was coded into the L-NLC category.

*\*\*INSERT FIGURE TWO ABOUT HERE\*\**

***Mood depiction score.*** When identifying the strategies, as with Picard and colleagues’ coding procedure, each drawing was assigned an overall mood depiction score derived from the use of the above strategies. This score ranged from 0-6 with high scores reflecting the use of more complex and often multiple strategies. Strategy L was regarded as the simplest strategy depicting mood through concrete elements in a straightforward manner. Strategy NLC was more complex with the use of figurative components yet in an indirect manner. Strategy NLA was thought the most complex expressive strategy depicting mood in a purely abstract way. The strategies were scored as follows using Picard et al.’s scheme: no strategy (score 0), strategy L (score 1), strategy NLC (score 2), strategy NLA (score 3), strategy L-NLC (score 1 + 2 = 3), strategy L-NLA (score 1 + 3 = 4), strategy NLC-NLA (score 2 + 3 = 5), and strategy L-NLC-NLA (score 1 + 2 + 3 = 6). A score of 3 could imply the sole use of strategy NLA as well as the combined used of strategies L and NLC. However, the ambiguity of this score did not pose a problem in subsequent analyses as participants did not use it in isolation.

***Graphic development score.*** Baseline drawings were coded to check the relationship between expressivity and drawing ability (Jolley et al., 2004; Picard et al., 2007) in the same way as in Picard et al.’s (2007) study. The baseline human figure drawings were coded using Goodenough’s (1926) 51 point scheme derived from the presence or absence of multiple features within the categories of overall detail, overall and fine head detail, attachments of body parts, profile of body parts, clothing detail, hand detail, apparent motor coordination and the proportion of body parts (please see Appendix A for the complete scoring criteria). The baseline house drawings were scored using Barrouillet, Fayol and Chevrot’s (1994) 22-point scale procedure where a score of 1 is awarded for all items except item 21 which can attract 2 points (please see Appendix B for a list of the complete criteria). Two judges familiar with the use of these scales yet blind to the aims of the research independently coded all of the drawings and (.83, .88) inter-rater reliability was obtained respectively. The discrepancies were resolved though discussion.

**Results**

**Overall mood score**

The data met certain conditions and assumptions (for example, the number of degrees of freedom of the error term must be above 40) to permit the use of parametric testing with binary data (e.g., Greer & Dunlap, 1997; Lunney, 1970; Picard et al., 2007). Each of the dependent measures of expressivity depicting the requested emotion, and the presence or absence of each strategy (and strategy combination) used to depict mood were entered into a 4 · 2 · 2 · 2. 2 mixed analysis of variance (ANOVA) with age (4), sex (2), condition (2) and topic (2) as between-subject factors and mood (2) as a within-subject factor. The mean percentage of expressive drawings is shown in Table 3 across drawing topic, condition and age group.

*\*\*INSERT TABLE 3 ABOUT HERE\*\**

The expectation that expressivity overall would be higher in the communication rather than reference group was confirmed by a main effect for condition, *F* (1, 198) = 17.33, *p* =.02, with a small effect size Cohen’s *d* (*d*= .35, *P*=1.0) and high observed power. In line with expectations, the overall mood was higher in the communication condition than in the reference condition (93% Vs.81%). An interaction was observed between condition, topic and age group *F* (2, 79) =8.91, *p* <.01, with a small effect size and high observed power (d=.20, *P*=.89). Holding age group as a constant, independent t-tests (*p* < .05) using Bonferroni corrections across condition and topic types for each age group separately showed that children in the reference condition drawing houses showed more expressivity in the third than first age group (88% Vs. 70%). In contrast, children in the reference condition drawing human figures showed higher mood scores in the oldest age group than in age group 2 (89% Vs. 74%). Children in the communication condition showed more expressivity in age group 2 than in age group 3 when drawing the human figures (97 % Vs. 83%) but no age group effects were found for children in this condition when drawing houses.

 **Expressivity by strategy**

The ANOVA and *post hoc* analyses (*p*<.05) revealed several main and interaction effects for each strategy (please see Appendix C for a detailed presentation of the findings).

In sum, effects of communication condition, topic and age group emerged. For L, there was more use for the communication than reference condition for both topics for the two oldest age groups drawing human figures, and for age groups 2, 3 and 4 drawings houses. NLC was used more in drawings of houses than human figure drawings and in the communication group for the youngest age group and less so for the oldest age group. No effects of topic and age for NLA emerged as in Picard et al.s’ study nor an effect of condition. L-NLC was used more in the communication condition for house drawings in age group 1 and 3 than in the reference condition. For age group 2, L-NLC was used more in human figure drawings in the communication condition than the reference condition yet conversely, it was used more by age groups 1 and 4 to draw human figures in the reference rather than the communication condition. For L-NLA, more use in the communication than reference condition for house drawings in age groups 2 and 4, and human figures in age groups 3 and 4 were observed. More use of the combination NLC-NLA was observed in the communication than reference condition for house drawings only and for L-NLC-NLA, for human figure drawings only, less use was observed in the communication than reference condition for the oldest age group.

The specific cues that contributed to the main changes in use between conditions were predominantly L and NLC and L-NLC. In the house drawings, the cues entailed more use of single and combined strategies such as facial features, curved or neater lines overall to indicate changes from baseline drawings in the state of the houses, mood related weather and additional figures such as people and pets and broken lines overall reflecting expression in the houses in combination with more markers of mood appropriate weather and condition of the building. For the human figures, L-NLC was used less in the communication than reference condition where children used fewer alterations of facial features to depict mood. More use of NLC-NLA weather related cues, colour, actions, and changes in line quality for the house drawings with increasing age.

**Exploring the relationship between mood depiction score and graphic development**

Table 4 displays children’s average mood score and graphic development score across topic, condition and age group. It was anticipated that children’s average mood score would be positively related to their graphic development (Picard et al., 2007).

*\*\*INSERT TABLE FOUR ABOUT HERE\*\**

The relationships between the measures of the mood depiction score and graphic development score were explored using Pearson’s product moment correlation. Across both topics and age groups, there was a significant positive correlation between expressivity score and graphic development score for the happy, *r* =.31, *p*<.05, and for the sad drawings, *r* =.27, *p*<.05.

Pearson’s product moment correlational analyses were then run separately to explore possible relationships between the mood graphic development scores for topic and for condition with age partialled out. Significant positive relationships between mood and graphic scores for children in the house and human figure groups,(*r* = 0.29 and *r*= 0.32 for the happy and sad human figure drawings respectively and *r*=0.31 and *r*=0.33 for the happy and sad houses respectively, *ps* <.05) and in both the communication and reference conditions were found (*r* = .22 and *r*= .27 for the happy and sad drawings in the communication condition and *r*=.21 and *r*=.23 for the happy and sad drawings in the reference condition *ps* <.05.

**Affect towards drawing types**

To assess whether children rated affect towards baseline, happy and sad figures in the anticipated direction, the scale data were submitted to ANOVA 4(age group) x 2 (topic) x 2 condition) x 3 (drawing type) analysis with drawing type entered as a within subject repeated measure and the other measures entered as between subject measures. A large main effect with high observed power of drawing type was found, *F* (1,108) =16.21, *p* =0.02, with large effect size and power, *d*=.67, *P*=.98. *Post hoc* paired t-tests showed that children rated the happy drawings (*X*=3.50, *SD*=0.91) significantly more positively than both the baseline (*X* = 2.13, *SD* = 1.02) and sad drawings (*X*=0.99, *SD*=0.89), and rated the baseline drawn figures significantly more positively than the sad figures showing that the affect manipulation was effective.

**Discussion**

The primary aim of this study was to assess the differential impact of instructions to communicate mood to a specified audience on children’s use of expressive drawing strategies when depicting an inanimate or animate topic. In line with expectations, overall expressivity was influenced by the presence of an explicit communication context revealing different patterns of strategy use between the inanimate and animate topics that tended to be dependent on the children’s age. The pattern of results demonstrates the effectiveness of the task instructions to influence changes in children’s usual graphic routines (Barrett & Bridson, 1983; Barrett Beaumont & Jennett, 1985; Light & McEwen, 1987; Light & Simmons, 1983; Sitton & Light, 1992) between conditions where the explicitness to communicate mood is varied (Burkitt & Watling, 2013; Burkitt, Murray & Watling, 2011).

**Overall mood depiction**

As anticipated, overall mood depiction was higher in the communication condition than in the reference condition. The task instructions impacted on the level of children’s expressivity via children’s use of available strategies that were broadly consistent with comparable research using freehand human figure drawing tasks (Burkitt & Watling, 2013; Burkitt, Watling & Murray, 2011). As in research with comparable coding and analytical procedures, (Picard et al., 2007; Picard & Gauthier, 2012), there was an overall tendency to increase the quantity and quality of expressivity with increasing age and this was positively correlated with children’s developing graphic ability.

The topic specific effects in regards to the communication context varied across age groups. The explicit communication context influenced expressivity in human figure drawings more for the middle age group than for the youngest and oldest groups. This could reflect different processes operating at these ages. Children in these age groups may employ an experimental approach to strategy selection trying different strategies in response to the task instructions whereas the older children may be using more established strategies. The oldest children may be more familiar with the idea that drawings are often used to communicate an array of information and thus are less responsive to the explicit instructions to communicate information. Rather than supporting a strict stage like account of children’s increasing expressivity (Parsons, 1987), the present findings echo Picard et al.’s (2007) suggestion that developmental accounts of expressivity need to take topic type. Moreover cues to communicate need to be considered when assessing developmental progression within drawn expressivity.

**Specific expressive strategies**

Literal, literal content and abstract strategies including cues such as smiles, frowns, alterations in the condition of the house, actions, the inclusion of mood appropriate weather and changes in colour and line quality for the house and human figure drawings were observed overall (Burkitt & Barrett, 2010; Burkitt & Watling, 2013; Burkitt, Watling & Murray, 2011; Ives, 1984; Jolley et al., 2004; Picard et al., 2007; Winston et al., 1995). The age related increase in expressivity in the reference group echoes Ives’ (1984) and Picard et al.’s (2007) observation and aligns with age related increases in the use of expressive strategies reported in studies employing different coding procedures of expressivity (e.g., Burkitt & Barrett, 2010; Jolley et al., 2004; Picard & Gauthier, 2012; Picard & Lebaz, 2010).

The present study extended previous findings by demonstrating the mixed impact of a communicative context on drawings of an inanimate compared to an animate topic. The arguably simplest expressive device of changing literal features to depict mood was increased following communicative instructions for both house and human figure drawings in the older age groups. This effect had a differential impact on age groups as children in the second age group drawing houses increased expressivity using literal properties, whereas children in the communication condition drawing human figures did not. It could be argued that there are less realistic literal cues available to show mood in inanimate topics and that the communication context enhanced children’s reliance on the literal cues available to vary expression in the inanimate topic at this younger age.

Children’s use of non-literal content properties, such as altering the condition of the figure and including good or bad weather more in drawings of houses than in human figures (Picard et al., 2007) was generally supported by the present study. The presence of a communication context exaggerated this tendency in house drawings and more so for the youngest than the older children. The use of this relatively simple expressive strategy may be related to drawing ability and the point that houses offer fewer realistic cues than human figures to depict mood thus encouraging children to use more non-literal ways to represent mood in houses.

The most differential impact between the communication contexts on the different topics emerged for the use of the combined strategy of literal and non-literal content features. The instructions to communicate impacted on drawings of houses for the youngest children and those in the third age group more than for the children in the reference condition. This tendency was observed for the second age group drawing human figures. However the opposite pattern of use was found for the youngest and oldest age groups who used literal-nonliteral content features less in the communication context when drawing human figures. Therefore for houses, the communication instruction enhanced, whereas for human figures reduced, expressivity for different age groups. It could be argued that communicating mood in inanimate topics forces consideration of how to communicate mood in different ways more so than for human figure drawings.

Similarly, the type of topic and instruction to communicate mood impacted on the use of literal-nonliteral abstract strategies. These were used with increasing age more in the communication condition than in the reference condition for drawings of houses in age groups 2 and 4, and drawings of human figures in age groups 3 and 4. Use of the nonliteral content-nonliteral abstract strategy increased within a communication condition for the house drawings alone, and use of the literal- nonliteral content-nonliteral abstract strategy was used more by children in the reference group for human figure drawings only. In line with expectations, the complexity and amount of expressive devices tended to progress with age (Ives, 1984; Jolley et al., 2004; Picard et al., 2007; Winston et al., 1995) with slight differences in the exact type and combination of types of strategies depending upon topic type and age group.

Therefore, the expression of mood was directly impacted by topic type. The strategies employed to depict mood were differentially influenced by communication contexts and age. It is interesting to speculate about why children would use different strategies to explicitly communicate mood in drawings of houses and human figures. The animate and inanimate nature of the topics afford different realistic mood related features and actions to portray. Children in the explicit communication condition may have increased the use of simpler expressive devices when drawing houses rather than humans based on the enhanced need to communicate about a topic which has fewer natural expressive features. This may have resulted in the observed greater inclusion of facial features and elements that reflect a good or a bad state of the building and the weather.

The impact of familiarity with drawing mood may account for the younger children’s use of simpler expressions of mood and the older children’s use of combined and more abstract strategies. Educational factors often account for variations in expressivity in children’s drawings (Burkitt & Barrett & Davis, 2005; Burkitt, Jolley & Rose, 2010; Rose & Taplin, 2010; Rose, Jolley & Burkitt, 2006). For example, children within the Steiner education system use colours to reflect mood differently to children in mainstream education. There may be an influence of education that could partly account for educational related age differences within an explicit communicative context. Indeed, the lesser impact of the instructions to communicate mood on the older age groups may reflect a growing understanding that drawings serve a communicative function by their nature regardless of whether or not they have been asked explicitly to produce communicative drawings.

No gender differences in the use of expressive strategies were found in this study contrary to Picard et al.’s (2007) finding that females use literal strategies more frequently and combinations of literal, content and abstract strategies less frequently than males. They proposed that girls use more literal depictions of mood than boys as they may be better at decoding nonverbal affective cues. This explanation seems reasonable given the mounting evidence that girls process nonverbal emotion cues more effectively than boys (e.g., Hall & Bernieri, 2001; McClure, 2000). Cohort differences, such as abilities in emotion decoding, between the studies may account for the contrasting findings. It would be interesting to measure nonverbal emotion decoding in relation to drawn expressivity to explore potential gender differences in future research.

Overall this study shows that an explicit communicative instruction differentially impacts children’s depiction of mood by topic type between an inanimate and animate topic. The present findings support Freeman’s (1995) framework theory of art whereby children develop increasing understanding of the intentional relations between the drawing, the world and the artist; in this case, children’s growing awareness of the communicative or public nature of drawing. In support of the cue dependency model of children’s drawings (Freeman, 1980), the simple contrasting task instructions afforded cues in the drawing situation that were sufficient to effect changes in drawing strategy. In line with Picard et al.’s tentative suggestion, a stage like account of expressivity in drawings could be moderated in relation to expressivity in relation to topic type and, in light of the present findings, with respect to whether or not children have been explicitly instructed to communicate mood to a viewer.

The use of literal expressive strategies, such and smiles and frowns, may have been influenced by the presentation of faces in the Likert scale that was used to measure how children felt about the topics they had drawn immediately after production of each one. It is possible that seeing these scales may have encouraged children to use more literal features in their expressive drawings, especially when drawing human figures. To assess this possibility, effects of non-graphical emotion type scales and facial Likert scales on children’s use of literal cues could be compared in future work. Nonetheless, the current scales permitted comparisons between expressive strategies used between across communication contexts.

The presence of an experimenter in both conditions may have implied a communicative function for the drawings. However as with previous research (Burkitt & Waling, 2013; Burkitt, Murray & Watling, 2011) this design allowed comparisons between the communication and reference conditions as the same experimenter was present in both therefore standardising possible experimenter effects across the conditions. It would be interesting to assess the effects of topic animism on drawn expressivity by using a larger selection of exemplars from each category. It is possible that the human emotions of happiness and sadness would be variously applied to topics varying in animism.

# References

Bakeman, R., Quera,V., McArthur, D., & Robinson, B. F. (1997). Detecting sequential patterns and determining their reliability with fallible observers. Psychological Methods, 2, 357–370. [doi](https://en.wikipedia.org/wiki/Digital_object_identifier):[10.1037/1082-989X.2.4.357](https://dx.doi.org/10.1037/1082-989X.2.4.357)

Barrett, M. D., & Bridson, A. (1983). The effect of instruction upon children’s drawings. *British Journal of Developmental Psychology*, *1*, 175-178. doi: 10.1111/j.2044-835X.1983.tb00555.x

Barrett, M. D., Beaumont. A., & Jennett, M. (1985). Some children do sometimes do what they have been told to do: Task demands and verbal instructions in children’s drawings. In N. H. Freeman & M. V. Cox (Eds.), *Visual order: The nature and development of pictorial representation,* pp. 176-187. Cambridge: Cambridge University Press. doi: 10.2466/PMS.70.2.663

Barrouillet, P., Fayol, M., & Chevrot, C. (1994). Le dessin d’une maison, construction d’une e´chelle de de´veloppement. *L’Anne´e Psychologique,* *94*, 81–98.

Bekhit, N., Thomas, G., & Jolley, R. (2005). The use of drawing for psychological assessment in Britain: Survey findings. *Psychology and Psychotherapy: Theory, Research and Practice*, *78*, 205-217. doi:10.1348/147608305X26044

Brechet, C., Baldy, R., & Picard, D. (2009). How does Sam feel? : Children’s labelling and drawing of basic emotions. *British Journal of Developmental Psychology,* *27*(3), 587-606. doi: 10.1348/026151008X345564

Buck, J. (1948). The H-T-P technique, a qualitative and quantitative scoring method. *Journal of Clinical Psychology Monograph Supplement,* *5*, 1-120.

Buck, J. (1981). *The House-Tree-Person technique: A revised manual.* Los Angeles, CA:

Western Psychological Services.

Burkitt, E. (2008). Children’s choice of color to depict metaphorical and affective information, in Millbraith C. & Trautner, H. M. (Eds.). *Children's understanding and production of pictures, drawings and art: Theoretical and empirical approaches,* pp. 107-120. London: Hogrefe & Huber Publisher.

Burkitt. E., & Barnett, N. (2006). The impact of brief and elaborate mood induction on drawing size: A question of approach? *Educational Psychology, 26*(1), 93-108. doi:10.1080/01443410500341049

Burkitt, E., & Barrett, M. (2010). Children’s graphic flexibility: A response to representational redescription, *Journal of Creative Behavior, 44*(3), 169-190. doi: 10.1002/j.2162-6057.2010.tb01332.x

Burkitt, E., Barrett, M., & Davis, A. (2003). Children’s colour choices for completing drawings of affectively characterized topics. *Journal of Child Psychology and Psychiatry, 44*(3), 445–455. doi: 10.1111/1469-7610.00134

Burkitt, E., Barrett, M., & Davis, A. (2004). The effect of affective characterizations on the use of size and colour in drawings produced by children in the absence of a model. *Educational Psychology, 24*(3), 315-343. doi: [10.1080/0144341042000211670](http://dx.doi.org/10.1080/0144341042000211670)

Burkitt, E., Barrett, M. & Davis, A. (2005). Drawings of emotionally characterised figures by children from different educational backgrounds. *International Journal of Art and Design Education, 24* (1), 71-83. doi: 10.1111/j.1476-8070.2005.00424.x

Burkitt, E., Jolley, R., & Rose, S. E. (2010). Art educational issues in the attitudes and practices that shape children’s drawing experience at home and at school. *International Journal of Design and Art Education. 29*(3), 257-270. doi: 10.1111/j.1476-8070.2010.01658.x

Burkitt, E., & Newell, T. (2005). Effects of human figure type on children's use of colour to depict sadness and happiness. *International Journal of Art Therapy, 10* (1), 15-22. doi: 10.1080/17454830500136143

Burkitt, E., & Watling, D. (2013). The impact of audience age and familiarity on children’s drawings of themselves in contrasting affective states. *International Journal of Behavioral Development, 37*(3), 222-234. doi: [10.1177/0165025413478257](http://dx.doi.org/10.1177/0165025413478257)

Burkitt, E., Watling, D., & Murray, L. (2011). Children’s drawings of significant figures for a peer or an adult audience. *Infant and Child Development, 20*(6), 466–473. doi: 10.1002/icd.735

Callaghan, T. C. (1999). Early understanding and production of graphic symbols. *Child Development*, 7*0*(6), 1314-1324. doi: 10.1111/1467-8624.00096

Cox, M. V. (2005). *The pictorial world of the child.* Cambridge: Cambridge University Press.

Crawford, E., Gross, J., Patterson, T., & Hayne, H. (2012). Does children’s color use reflect the emotional content of their drawings? *Infant and Child Development, 21*(2)*,* 198-215. doi: 10.1002/icd.

Dalley, T. (1984). *Art as therapy*. London. Tavistock Publications.

Davis J. H. (1997). Drawing’s demise: U-shaped development in graphic symbolization. *Studies in Art Education*, *38*(3), 132–157. doi: 10.2307/1320290

Freeman, N. H. (1980). *Strategies of representation in young children: Analysis of spatial skills and drawing processes.* London: Academic Press.

Freeman, N. H. (1995). The emergence of a framework theory of pictorial reasoning. In C. Lange-Kutter (Ed), *Drawing and looking: Theoretical approaches to pictorial representation in children,* pp. 135-146. Hemel Hempstead: Harvester Wheatsheaf.

Golomb, C. (1992). *The child’s creation of a pictorial world.* Berkley: University of California Press.

Goodenough, F. L. (1926). *Measurement of intelligence by drawings.* New York: World Book Co.

Greer, T., & Dunlap, W. P. (1997). Analysis of variance with ipsative measures. *Psychological Methods, 2*, 200-2007.

Gross, J., & Hayne, H. (1998). Drawing facilitates children’s verbal reports of emotionally laden events. *Journal of Experimental Psychology: Applied, 4*, 163-79. doi:10.1037/1076-898X.4.2.163

Hall, J. A., & Bernieri, F. J. (Eds.). (2001). *Interpersonal sensitivity: Theory and measurement.*

Hillsdale, NJ: Erlbaum.

Hammer, E. F. (1997). *Advances in projective drawing interpretation*. Springfield, Ills.: C. C. Thomas.

Haanstra, F., Damen, M. L., & van Hoorn, M. ( 2011). The U-shaped curve in the low countries: A replication study. *Visual Arts Research, 37*(72) 16–29. doi: 10.5406/visuartsrese.37.1.0016

Hunsley, J., Lee, C. M., & Wood, J. M. (2003). Controversial and questionable assessment techniques. In S. O. Lilienfeld, S.J. Lynn & J. M. Lohr (Eds.), *Science and pseudoscience in clinical psychology*, pp. 39-76. New York: Guilford Press.

Ives, S. W. (1984). The development of expressivity in drawing. *British Journal of Educational Psychology, 54*(2), 152–159. doi: 10.1111/j.2044-8279.1984.tb02575.x

Jolley, R.P. (2010). *Children and pictures: Drawing and understanding.* Wiley Blackwell: Chichester.

Jolley, R. P., Fenn, K., & Jones, L. (2004). The development of children’s expressive drawing. *British Journal of Developmental Psychology, 22*(4), 545–567. doi: 10.1348/0261510042378236

Killian, G. (1985). The House-Tree-Person (H-T-P). In D. Keyser & R. Sweetland (Eds.), *Test critiques*, Vol I, pp. 338-352. Kansas City, MO: Test Corporation of America.

A. M. Kindler, A. M. (2000). From the U-curve to dragons: Culture and understanding of artistic development. *Visual Arts Research*, 26, 15–28.

Light, P. H., & McEwen, F. (1987). Drawings as messages: The effect of a communication game upon production of view-specific drawings. *British Journal of Developmental Psychology, 5*, 53-60. doi: 10.1111/j.2044-835X.1987.tb01041.x

Light, P. H., & Simmons, B. (1983). The effects of a communication task upon the representation of depth relationships in young children’s drawings. *Journal of Experimental Child Psychology*, *35*(1), 81-92. doi: 10.1111/j.2044-835X.1987.tb01041.x

Lunney, G. H. (1970). Using analysis of variance with a dichotomous dependent variable: An empirical study. *Journal of Educational Measurement, 7*(4), 239–263. doi: 10.1111/j.1745-3984.1970.tb00727.x

Malchiodi, C. A. (1998). *Understanding children’s drawings*. London: Jessica Kingsley Publishers.

Macleod, E., Gross, J., & Hayne, H. (2014). Drawing conclusions: The effect of instructions on children’s confabulation and fantasy errors. *Memory*. *24(1),* 1-11. doi: 10.1080/09658211.2014.982656

McClure, E. B. (2000). A meta-analytic review of sex differences in facial expression processing and their development in infants, children and adolescents. *Psychological Bulletin,* *126*(3), 424–453. [doi:10.1037/0033-2909.126.3.424](http://psycnet.apa.org/doi/10.1037/0033-2909.126.3.424)

Pariser, D., & van den Berg, A. (1997). The mind of the beholder: some provisional doubts about the U-curve aesthetic development thesis. *Studies in Art Education*, *38*, 158–178. doi: 10.2307/1320291

Parsons, M. J. (1987). *How we understand art: A cognitive developmental account of aesthetic experience.* Cambridge: Cambridge University Press.

Patterson, T., & Hayne, H. (2011). Does drawing facilitate older children's reports of emotionally laden events. *Applied Cognitive Psychology, 25*, 119-126. doi:10.1002/acp.1650

Picard, D., Brechet, C., & Baldy, R. (2007). Expressive strategies in drawing are related to age and topic. *Journal of Nonverbal Behavior, 31*(4),243-257. doi: 10.1007/s10919-007-0035-5

Picard, D., & Gauthier, C. (2012). The development of expressive drawing abilities during childhood and into adolescence. *Child Development Research*, vol. 2012, Article ID 925063, 7 pages, 2012. doi:10.1155/2012/925063

Picard, D. & Lebaz, S. (2010). Symbolic use of size and colour in freehand drawing of the tree: Myth or reality? *Journal of Personality Assessment*, *92*(2), 186–188. doi: 10.1080/00223890903510464

Rose, S.E., Jolley, R.P., & Burkitt, E. (2006). A review of children's, teachers' and parents' influences on children's drawing experience. *International Journal of Art and Design Education, 25*(3), 341-349. doi: 10.1111/j.1476-8070.2006.00500.x

Rose, S. E., & Taplin J. T. (2010). An investigation of the expressive and representational drawing development in National Curriculum, Steiner and Montessori schools.  *Kindling:* *The Journal for Steiner Waldorf Early Childhood Care and Education, 18*, 12-14.

Sayil, M. (1998). The development of emotional facial drawings in children. *Journal of Child and Adolescence Mental Health, 4,* 129–133.

Sitton, R.., & Light, P. (1992). Drawing to differentiate: Flexibility in young children’s human figure drawings. *British Journal of Developmental Psychology, 10,* 25–33. doi: 10.1111/j.2044-835X.1992.tb00560.x

Stetsenko, A. (1993). The psychological function of children’s drawing: A Vygokskian perspective. In C. Lange-Kutter (Ed), *Drawing and looking: Theoretical approaches to pictorial representation in Children,* pp. 147-158. Hemel Hempstead: Harvester Wheatsheaf.

Winner, E., & Gardner, H. (1981). The art in children's drawings. *Review of Research in Visual Arts Education, 7*(2*)*, 18-31. doi: 10.2307/20715322

Winston, A. S., Kenyon, B., Stewardson, J., & Lepine, T. (1995). Children’s sensitivity to expression of emotion in drawings. *Visual Art Research,* *21*(1), 1–15.

Woolford, J., Patterson, T., Macleod, E., Hobbs, L., & Hayne, H. (2015). Drawing helps children to talk about their presenting problems during a mental health assessment. *Clinical Child Psychology & Psychiatry*, *20*(1), 68-83. [doi: 10.1177/1359104513496261](http://dx.doi.org/10.1177/1359104513496261)

Tables

Table 1

*Number of children by topic type, condition and age group*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| DrawingType | Condition |  |  | Age Group  |  |   | N |
|  |  |  | 1  | 2  | 3 | 4 |  |
| House | Communication |  | 21 | 20 | 20 | 19 | 80 |
|  | Reference |  | 19 | 20 | 21 | 20 | 80 |
|  | N= 160 | 160 | 40 | 40 | 41 | 39 | 160 |
| Human Figure | Communication |  | 20 | 20 | 20 | 21 | 81 |
|  | Reference |  | 19 | 20 | 21 | 21 | 81 |
|  | N= 162 | 162 | 39 | 40 | 41 | 42 | 162 |
| Total | N= 322 | 322 | 79 | 80 | 82 | 81 | 162 |

Table 2

*Changes from baseline drawings in types of graphic cue by Literal (L), Non Literal Content (NLC) and Non-Literal Abstract (NLA) by Topic*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Strategy Type |  |
| Topic | L | NLC | NLA |
| House | Smiles frownstearsPatios, driveway, garden, windows, roof, chimney, door | Natural elementsWeatherAnimalsObjectsActionsActions | Line qualityColourFigurative abstract |
| Human Figure | Smiles frowns tearsPosture | ActionsGivingWeatherObjectsConditionAnimalsOther humansCharacterisations (e.g., Action man, robber, super hero) | Line qualityColourFigurative abstract |

Table 3

*Mean percentage of expressive drawings by strategy across topic, condition and age group*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Human Figure |  |  |  | House |  |  |  |
| Condition |  |  |  |  | Age group |  |  |  |  |  |
| Reference | 1 | 2 | 3 | 4 | Mean | 1 | 2 | 3 | 4 | Mean |
| L | 48 | 33 | 21 | 23 | 31.25 | 32 | 15 | 12 | 16 | 18.75 |
| NLC | 1 | - | - | - | 0.25 | 10 | 18 | 24 | 31 | 20.75 |
| NLA | - | 1 | - | - | 0.25 | 1 | 3 | 5 | 5 | 3.50 |
| L-NLC | 20 | 11 | 29 | 34 | 23.50 | 5 | 10 | 7 | 2 | 6 |
| L-NLA | 10 | 17 | 12 | 10 | 12.25 | 2 | 7 | 10 | - | 4.75 |
| NLC-NLA | - | 1 | 5 | 2 | 1.75 | 13 | 23 | 30 | 28 | 23.5 |
| L-NLC-NLA | 6 | 11 | 16 | 20 | 13.25 | 7 | 2 | - | - | 2.25 |
| Overall expressivity | 85 | 74 | 83 | 89 | 82.50 | 70 | 78 | 88 | 82 | 79.50 |
| Communication |  |  |  |  |  |  |  |  |  |  |
| L | 55 | 26 | 30 | 33 | 36 | 39 | 20 | 23 | 38 | 30 |
| NLC | 2 | - | 1 | 3 | 1.5 | 18 | 20 | 26 | 19 | 20.75 |
| NLA | - | - | - | - | - | 3 | 2 | 4 | 6 | 3.75 |
| L-NLC | 11 | 23 | 26 | 22 | 20.50 | 18 | 16 | 18 | 5 | 14.25 |
| L-NLA | 14 | 16 | 21 | 20 | 17.75 | 8 | 20 | 15 | 17 | 15 |
| NLC-NLA | 1 | 5 | 4 | 3 | 3.25 | 5 | 9 | 7 | 8 | 7.25 |
| L-NLC-LNA | 7 | 13 | 15 | 10 | 11.25 | 8 | 8 | - | - | 4 |
| Overall expressivity | 90 | 83 | 97 | 91 | 90.25 | 99 | 95 | 93 | 93 | 95 |

Note: L = literal, NLC = non-literal content, NLA = non-literal abstract, L-NLC = literal and non-literal content, L-NLA = literal and non-literal abstract, NLC-NLA = non-literal content and non-literal abstract, L-NLC-NLA = literal, non-literal content, and non-literal abstract

Table 4

*Mean mood and graphic development score by topic, age group and condition with standard deviations in parentheses*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Condition |  |  | Human Figure |  |  | House |  |  |
|  |  |  |  | Age group |  |  |  |  |
| Reference | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Mood | 1.28(1.22) | 1.33(1.11) | 1.76(1.20) | 2.30(1.73) | 1.20(0.99) | 1.22(1.01) | 1.17(1.02) | 2.20(1.68) |
| Graphic | 12.46(3.43) | 14.21(5.32) | 15.90(5.21) | 16.73(4.32) | 11.86(4.17) | 13.98(5.38) | 16.53(4.83) | 17.03(5.21) |
| Communication |  |
| Mood | 1.18(1.02) | 1.32(1.08) | 1.69(1.12) | 2.10(1.33) | 1.33(1.17) | 1.28(1.34) | 1.36(1.19) | 2.90(1.31) |
| Graphic | 11.99(4.23) | 13.28(5.20) | 15.01(5.75) | 17.03(5.39) | 12.03(4.17) | 14.08(5.01) | 16.03(5.53) | 16.41(5.46) |

Note: Maximum for mood score=6, max for graphic development house=22, human figure=51

Appendix A

Table A1 shows the overall categories of features for the Goodenough (1926) scale and items within each category.

Table A1

*Goodenough (1926) Overall Categories and 51-point Scoring Criteria*

|  |  |
| --- | --- |
| Overall Category | Criteria |
| Gross detail | Head presentLegs presentArms presentTrunk presentLength of trunk greater than breadthShoulders are indicated  |
| Attachments | Both arms and legs attached to trunkArms and legs attached to trunk at correct pointsNeck presentOutline of neck continuous with that of head, trunk, or both |
| Head detail | Eyes present (one or two)Nose presentMouth presentNose and mouth in two dimensions, two lips shown.Nostril shownHair shownHair on more than circumference of head and non-transparent  |
| Clothing  | Clothing present (any clear representation of clothing)Two articles of clothing non transparent Entire drawing free from transparencies Four articles of clothing definitely indicatedCostume complete with incongruities  |
| Hand detail | Fingers present (any indication)Correct number of fingers shownFingers in two dimensions – length greater than breadth, angle subtended not greater than 180 degreesOpposition of thumb clearly definedHand shown distinct from fingers and arm |
| Joints | Fingers present (any indication)Correct number of fingers shownFingers in two dimensions – length greater than breadth, angle subtended not greater than 180 degreesOpposition of thumb clearly definedHand shown distinct from fingers and arm |
| Proportion | Head not more than ½ or less than 1/10 of trunk Arms equal to trunk but not reaching kneeLegs not less than trunk not more than twice trunk sizeFeet in 2 dimensions – not more than 1/3 or less than 1/10 of legBoth arms in two dimensions |
| Motor Coordination | Lines firm without marked tendency to cross, gap, or overlapAll lines firm with correct joiningOutline of head without obvious irregularities Trunk outlineArms and legs without irregularities. 2 dimensions and no tendency to narrow at point of junction with trunkFeatures symmetrical  |
| Fine head detail | Ears present (2 in full face, 1 in profile)Ears present in correct position and proportionEye details – brow or lashes shownEye detail – pupil shownEye detail – proportionEye detail – glance Chin and forehead shown |
| Profile | Projection of chin shown Heel clearly shownBody profile – head, trunk, and feet without errorFigure shown in true profile without error or transparency |

Appendix B

List of Scale Items for Scoring Baseline House Drawings

* Path (presence)
* Window (presence of at least one window in the facade)
* Two windows upstairs (the facade has two windows, one on the left, one of the right)
* More than two windows (the facade has more than two windows)
* Window position (none of the sides of the house constitutes one side of a window)
* Window proportions (height of window is between 1/4 and 1/6 of the height of the facade; idem for width)
* Window alignment (windows aligned on the same horizontal in the facade)
* Panes (represented as crosses inside windows)
* Shutters (presence)
* Curtains (presence)
* Attic room (one or more windows drawn in the roof)
* False perspective (two sides drawn, but incorrect perspective)
* Perspective (two sides drawn, correct perspective)

Appendix C

Analyses of Expressivity by Strategy

**Expressivity by strategy**

The ANOVA and *post hoc* analyses (*p*<.05) revealed several main and interaction effects for each strategy as follows:

**Literal**. In line with expectations that a communication context would increase expressivity, an interaction for communication condition x topic x age group *F* (1, 35) = 9.14, *p*<.05, was found with medium effect size and high observed power (*d*= .42, *P* = .97). A combination of *post hoc* independent t-tests applying Bonferroni correction ( *p*<.05) and Tukey (p<.05) tests across age groups holding communication context and topic constant showed that children drawing human figures used L more in the communication rather than in the reference condition in the two oldest age groups (age group 3:30% Vs. 21%, age group 4: 33% Vs. 23%). Children drawing houses in the communication condition used this strategy more than in the reference condition in age groups 2, 3 and 4 (age group 2: 20 % Vs. 15; age group 3; 23% Vs. 12, age group 4: 38 Vs. 16).

**Non Literal Content.** As anticipated, and in line with Picard et al.’s (2007) findings, this strategy was used more in house than human figure drawings. A main effect of topic was found *F* (1, 88) = 17.89, *p* = 0.02, with a small effect size and high observed power (*d*= 0.8, *P*=1.0). NLC was used more by children drawing houses than human figures (H: 20.75% vs. HF: 0.88%). An interaction between communication condition, topic and age group was found *F* (1, 71) = 14.62, *p* = .01, with moderate effect size and high observed power (*d*=0.38, *P*=0.87). *Post hoc* independent t-tests applying Bonferroni corrections (*p*<.05) between communication conditions and topic types holding age group constant, followed up by Tukey tests (*p*<.05) across communication conditions and topic for each age group separately showed that children in the communication condition drawing houses used NLC more in age group 1 (1: 18% Vs. 10%) and children in the reference condition drawing houses used NLC more than in the communication condition in age group 4 (31% Vs. 19%).

**Non Literal Abstract**. As in previous research (Picard et al., 2007), no significant main or interaction effects by topic, communication condition or age group were found.

**Literal-Non Literal Content.** Expectations regarding interactions between communication context topic type and age group were exploratory. However the expectation, in line with Picard et al.s’ (2007) findings that this strategy may be used more in drawings of houses was confirmed. An interaction effect of communication condition by topic was found *F* (1, 9.86) = 11.28 , *p* = .03, with medium effect size and medium observed power (*d*=0.40, *P*= 0.71). Holding age group and topic type constant and applying Bonferroni corrected independent t-tests (*p*<.05) across communication conditions showed that L-NLC was used more by children in the communication condition than in the reference condition for house drawings (C: 14.25% Vs. R: 6%).

A second interaction effect emerged between topic, communication condition and age group *F* (1, 34) = 18.43. *p* < .001. The effect was of medium size with high observed power (*d*=0.41, *P*=1.00). *Post hoc* Tukey tests (*p*<.05) across age groups and independent t-tests applying Bonferroni corrections (*p*<.05) showed that L-NLC was used more in human figure drawings in the reference condition than in the communication condition for the age groups 1 and 4 (age group 1: 20% Vs. 11%: age group 4: 34% Vs. 22%) and used more in the human figure drawings in the communication condition than in the reference condition for age group 2 (23% Vs. 11%). Children drawing houses used this strategy more in the communication than reference condition in age groups 1 and 3 (age group 1: 5% Vs. 18%, age group 3: 7% Vs. 18%).

**Literal-Non Literal Abstract.** An interaction between communication condition, topic and age group *F* (1, 42) = 9.15, *p* = .03 was found, which was small with high power (*d* = 0.19, *P*=0.91). A combination of Tukey tests (*p*<.05) across age groups and repeated independent t-tests applying Bonferroni corrections (*p*<.05) between communication conditions and topic type for each age group separately identified the interactions. Children drawing human figures used L-NLA more in the communication than reference condition in age groups 3 and 4 (age group 3: 12% Vs. 21%, age group 4: 10% Vs. 22%). For house drawings, L-NLA was used more in the communication condition than reference condition by age groups 2 and 4 (age group 2: 7% Vs. 20%, age group 4:0% Vs. 17%).

**Non Literal Content-Non Literal Abstract.** An interaction effect between topic and communication condition *F* (1, 23) = 11.39, *p* = .02, of medium size with high power (*d*=39, *P*=0.98) was found. *Post hoc* independent t-tests (p<0.5) with Bonferroni corrections showed that only in the house condition was this combination used more in the reference than in the communication condition (R: 23.5% Vs. C: 7.25%).

**Literal-Non Literal Content-Non Literal Abstract**. A small interaction effect with high power between topic, communication condition and age group *F*(2, 16)=9.63, *p* = .03 (*d* =.17, *P*=.94) was found. *Post hoc* Tukey testing (p<.05) across age groups between topic type and communication condition and Bonferroni adjusted repeated independent t-tests (p<.05) within age groups across topic type and communication condition showed that children drawing human figures used this combination more in the reference than communication condition only in the oldest age group (age group 4; 20% Vs. 10%).