How do children who understand mixed emotion represent them in freehand drawings of themselves and others?

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Abstract

This research is the first to assess children's representation of mixed emotion using a freehand drawing task. 241 5 - 11 year olds completed a drawing and a colour preference task. Children heard a condition appropriate vignette about themselves or a protagonist designed to evoke mixed emotion, and were asked to draw the self or the protagonist experiencing neutral, happy, and sad affect. Children who reported mixed emotions after the story also drew themselves or the protagonist experiencing mixed emotion. For mixed emotion, children used red, green and blue more in drawings of the protagonist, and yellow more in drawings of the self. Interestingly, strategies for mixed emotion drawings were similar to those used for happy drawings; more specifically, in drawings of the self, children were particularly more likely to use smiles (for happy and sad drawings) and fewer frowns. Findings are discussed in relation to self-presentational behaviour.

Keywords: mixed emotion, childhood, drawing, self-presentation, colour

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Mixed emotions in childhood

Early to middle childhood is an important time in the development of social and emotional competence (Saarni, 1999). During this time, children are engaging in an increasing number of social interactions with peer groups and they need to navigate new social experiences, particularly in the school environment. Therefore, as children age the social situations that they experience become increasingly complex (Zajdel, Myerbow, Bloom, Fireman, & Larsen, 2013). Children's experiences in these interactions are important for their development; it is believed that it is within the context of children's social interactions that the construction of social understanding develops (Carpendale & Lewis, 2004). One particular aspect of social understanding that develops during this time is the understanding that one can experience more than one emotion in a given situation (mixed emotion).

The focus on mixed emotions in the developmental literature has been to investigate when children recognise, experience, and report mixed emotions in themselves and in other people. A body of research has shown that during the school years children, usually aged between 7- 12 years, have a better conceptual understanding than younger children that mixed emotions are possible (Donaldson & Westerman, 1986; Harter & Buddin, 1987; Larsen, To, & Fireman, 2007; Wintre & Vallance, 1994) and are more likely to feel mixed emotion as a result of emotionally complex situations (Larsen et al., 2007).

On occasion however 6 year old children have been found to appreciate that mixed emotion can be provoked and experience by other people

(Wintre & Vallance, 1994); although, at this age children often report mixed emotions as occurring successively rather than simultaneously (e.g., Harris, 1983, 1994, 2000; Harter, 1982). Whitesell and Harter (1989) found that 7- to 8-year-olds could report simultaneous mixed emotions. Although it may not be reported as simultaneously, there is also some evidence to show that even younger children (namely 5- 6-year-olds), like adults (Larsen, et al., 2007), can report feeling happy and sad about the same situation. Interestingly, children tend to report that specific emotions pairs are likely to co-occur in the same situation: happy and sad, happy and angry, and sad and angry (Harter & Buddin, 1987).

Importantly, Larsen et al. (2007) have cautioned that researchers do not confuse children's understanding and recognition of mixed emotion with possible verbal limitations in reporting them, and called for the development of nonverbal measures to assess children's experience and understanding of mixed emotion. For example, 5 year olds can match mixed emotion vignettes to appropriate depictions of mixed emotion (Kestenbaum & Gelman, 1995). The present study was therefore partly designed to continue to assess children's nonverbal recognition and experience of mixed emotions through the behavioural domain of drawing.

It is important to increase understanding about how children's feelings about the topics, events and people they draw can be interpreted as children's drawings are used and interpreted for meaning in both clinical and educational settings (e.g. Hammer, 1997; Lubin, Larsen, Matarazzo, & Seever, 1985; Watkins, Campbell, Nieberding & Hallmark, 1995). Drawn properties continue to form a basis for practitioner conclusions about how children feel about what they draw. (e.g., Bekhit, Thomas, & Jolley, 2005; Hammer, 1997; Hunsley,

Lee, & Wood, 2003; Malchiodi, 1998; McNiff, 1992). Yet, there is an oversight in the literature about the range of ways children's understanding and recognition of mixed emotions in other people and in themselves may be understood on the basis of a range of drawing strategies.

Emotion in children's drawings

There is a wealth of research that has examined children's recognition, experience, and depiction of single positive and negative emotions through properties that they tend to alter in relation to the emotional nature of the drawing topic (e.g., Hammer, 1997; Ives, 1984; Jolley, 2010; Koppitz, 1966; Machover, 1949; Parsons, 1987). Children can identify single emotions in drawings in increasingly complex ways between the ages of six and eleven years (Picard, Brechet, & Baldy, 2007; Jolley & Rose, 2008) and produce drawings in line with emotional themes (e.g., happy or sad) from around the age of 6 years (e.g., Burkitt & Watling, 2013; Cox, 1992; Ives, 1984; Jolley, 2010; Jolley, Fenn, & Jones, 2004; Winston, Kenyon, Stewardson, & Lepine, 1995).

From an early age, around 5 years, children have been found to depict single emotions through various properties of drawings. For example, in certain circumstances children's colour use can be linked to their single positive and negative feelings towards the topics they draw and their preferences for specific colours (Burkitt, 2008). This tendency has usually been found when children are restricted to the use of one colour (Burkitt, 2008), yet not necessarily when given free choice or multiple colours to select (Crawford, Gross, Patterson, & Hayne, 2012).

Recently, Burkitt and Sheppard (2014) explored children's recognition of mixed emotion through their drawings focussing purely on colour choice. Between the ages of five and eight years the use of red and blue were used systematically in mixed happy and sad

drawings of another child, while red was used in mixed emotion drawings of themselves. Children's colour use for depicting positive and negative emotion has been linked to colour preferences, whereby children use more preferred colours for positive and less preferred colours for negative figures (Burkitt, 2008; Burkitt & Sheppard, 2014). One aim of the present study was therefore to assess whether the relationship between colour choices and colour preferences were reliable when children were permitted to use other strategies to depict themselves and another child in a state of mixed emotion.

In addition to colour, children sometimes alter the spatial distance to reflect positive or negative attachment between figures by using greater distance between disliked people than friends (Bombi & Pinto, 1994). However reducing human figure size has been found to be largely unreliable within experimental (Burkitt, Barrett, & Davis, 2003:Thomas, Chaigne, & Fox, 1989: Thomas & Jolley, 1998) and naturalistic tasks (Jolley & Vulic-Prtoric, 2001). More recently researchers have been focussing on specific features in drawings. For instance, children tend to alter line heaviness, literal and non-literal features when asked to draw topics characterised by a single positive and negative emotion (e.g., Burkitt & Barrett, 2010; Ives, 1984; Jolley et al., 2004; Picard & Lebaz, 2010). With increasing age, children can also use sophisticated features in combination to depict emotion literally and in abstract ways; for example, by conveying negative mood through wilting plants, gesturing negatively to others, and depicting tears, while conveying positive mood through portraying superheroes, idols, and smiling plants (Burkitt & Watling, 2013; Burkitt, Watling, & Murray, 2011; Jolley 2010; Jolley et al., 2004). The majority of previous research in this field has, however, focused on the perception and portrayal of single positive and negative emotions rather than mixed ones.

Design considerations

The present study used a freehand drawing paradigm based on a sequence of studies utilising a similar methodology that has uncovered effects of contrasting affective characterisations on children's drawings of single emotions in themselves and others (Burkitt, Barrett, & Davis, 2004; Burkitt & Sheppard, 2014; Thomas, Chainge, & Fox, 1989). It has been found that when drawing nice and nasty figures or happy and sad characters, children tend to alter literal properties of facial details, actions, and details (such as gift giving or drawing congruent good or bad weather) around a human figure (Burkitt & Barrett 2010; Burkitt & Watling, 2013; Jolley, 2010). Further, to convey more metaphorical associations children have been found to adjust metaphorical properties, such as varying line use (often applying heavier pressure when depicting nastiness or sadness), displaying drooping objects, and using circular for positive and jagged for negative lines.

The graphic strategies children use vary widely when constrained by choice of material, and when they are asked to either copy or produce freehand drawings in relation to the affective state of the drawn figure (Burkitt & Barnet, 2006; Burkitt & Barrett, 2011; Golomb, 1981, 1992). We chose to explore the emotions of happiness and sadness, which is an emotion pair that is likely to co-occur in the same situation (Harter & Buddin, 1987). A freehand drawing task was chosen to assess whether or not strategies would vary as a function of the depiction of mixed happiness and sadness rather than single happy and sad emotion. Moreover, the study was designed to investigate whether strategy use would vary as a function of single and mixed emotion in relation to depictions of self and an age and gender matched peer. Colour use was restricted to one colour to assess the robustness of comparable findings (Burkitt & Sheppard, 2014).

Method

Participants

Two hundred and forty one children from four mainstream schools across the South East of the UK participated. The schools were identified using age appropriate stratified random sampling from school listings of similar socio economic status across this region. There were 80 six year olds (M_{age} = 6 years 1 month,age range: 5 years 1 month to 7 years 1 month; 42 girls), 83 eight year olds (M_{age} = 8 years 3 month, age range: 7 years 2 months to 9 years 1 month; 42 girls); and 78 ten year olds (M_{age} = 10 years 4 month, age range: 9 years 2 months to 10 years 4 month; 37 girls). The age groups represented a sample where children have been found to recognise and comment upon the possibility of mixed emotion in themselves and others. Whilst all children in each class participated to enhance inclusion, data from children deemed by the teachers as having any special leaning needs, emotional adjustment issues or below average drawing ability were not included in the analyses. The drawings of two children with colour blindness as gauged by teacher report were also not analysed. Within each age group children were assigned on the basis of alternate appearance by gender on class lists to one of two conditions: ether drawing themselves or drawing the protagonist in the story (a gender and age matched child). This resulted in equal balance of boys and girls, within each age group, in each condition.

Materials and Procedure

The emotional character of each figure was described in short vignettes (Burkitt & Sheppard, 2014) that children heard before each drawing task. Immediately after completion of each drawing, children rated their affect towards the figure to check that the figures were perceived with the anticipated affective valence. Consistent with previous research (Burkitt et al., 2003, 2004; Burkitt & Newell, 2005; Burkitt, Tala, & Low, 2007), colour preferences were assessed using 10 laminated colour cards shaded using Crayola crayons (red, orange, yellow, green, blue, purple, pink, grey, brown and black) . The same range of colours were

provided for the drawing tasks. A five-point smiley-face Likert scale (showing faces with very unhappy, unhappy, neither unhappy nor happy, happy, and very happy expressions) was used to assess affect ratings towards each colour in the colour preference task.

Procedure

Children were seen individually in a quiet area of their school for two sessions, which were administered in counterbalanced order and conducted on successive days for each child. In Session A, participants heard a condition appropriate vignette about themselves or an age and gender matched protagonist describing events of mixed valence that could create happy, sad, and mixed emotional reactions (see Appendix A for the vignettes). Following an established protocol that has demonstrated children's recognition of single and mixed emotion in lead characters (see Burkitt & Sheppard, 2014; Larsen et al., 2007; Donaldson & Westerman, 1986), children were interviewed about their emotional responses to the vignette immediately after hearing it. Each child then completed the drawing tasks, which entailed drawing a baseline figure and then completing counterbalanced happy and sad versions of the lead figure, about themselves or the protagonist. The mixed emotion drawings by condition were only elicited if the child identified the experience of mixed emotion (spontaneously, when prompted, and whether they reported as simultaneous or sequential experiences) in themselves or in the protagonist. In Session B, children's colour preferences for the range of crayons were measured.

Session A. To assess the understanding of their own emotional reactions or those of the protagonist children heard a vignette as in Burkitt and Sheppard (2014; see Appendix A). The protagonist was described as being the same age as the participant and matched for gender.

Understanding of mixed emotions and drawing strategy: Self. A female research assistant interviewed children about their emotional responses to the vignette in each condition. The interview process was based on that used by Larsen and colleagues (2007) and Burkitt and Sheppard (2014). To assess children's spontaneous reporting of mixed-emotion, the interview began with ''How does the ending of the story make you feel?'' Children who mentioned only one emotion were prompted with, ''Does the ending make you feel anything else?'' If no positive/negative emotion had been mentioned, they were asked, ''Did the ending make you feel happy/sad?'' The interviewer also asked the children to explain why they felt the way they did in order to confirm that events from the end of the vignette elicited their emotion responses. Several follow-up questions were asked when children reported emotions of opposite-valence. If children reported opposite valence emotion, they were asked a series of follow up questions confirming their responses, for example, 'So the ending of the story makes you feel happy and sad?'. They were also asked if they could say more about feeling happy and sad and if they felt 'happy and sad at the same time, or first one and then the other.' .

Drawing of self. Children completed a baseline task, followed by a happy and a sad drawing in counterbalanced order, and if they stated that the character would feel both happy and sad a mixed emotion figure was drawn (99% of children in the 'other' condition and 66.67% of children in the 'self' condition reported the experience of mixed emotion). Each completed drawing was removed before the completion of the next figure. The instructions for completion of each figure were as follows:

Baseline drawing task. "I'd like you to draw yourself. Use the pencil to draw, and colour in using one of these colours. Please draw yourself as well as you can and colour in as well as you can".

Happy/Sad drawing task. "Now think about when you felt happy/sad when listening to this story. Please draw yourself remembering when you felt happy/sad because of the story. Use the pencil to draw, and colour in using one of these colours, Please draw yourself as well as you can and colour in as well as you can".

Mixed emotion drawing task. "Now think about when you felt sad and happy [counterbalanced order of emotion terms] when listening to this story. Please draw yourself remembering when you felt sad and happy [counterbalanced order of emotion terms] during the story. Use the pencil to draw, and colour in using one of these colours. Please draw yourself as well as you can and colour in as well as you can".

The equivalent procedure and instructions for the children in the protagonist condition can be seen in Appendix B.

Session B .The following colour preference task was administered in counterbalanced order to session A. Children were shown ten colour cards successively in a random order. (red, orange, yellow, green, blue, purple, pink, grey, brown and black). As each colour was presented, children were asked to rate how they felt about each colour using a five-point Likert scale. Responses were scored from 1 to 5 (showing faces with very unhappy, unhappy, neither unhappy nor happy, happy, and very happy expressions). The following instructions were used:

"I would like to find out how this colour makes you feel. What I'd like you to do is point to the face to show how you feel about the colour. Here are the faces that you are going to be looking at (pointing to each face). The first one is a very unhappy face; the next one is quite an unhappy face; the middle one is neither happy nor unhappy. The fourth face is quite a happy face and the last one is a very happy face. When you answer my question, I'd like you to point to the face that describes how you feel about the colour. OK?"

Results

Recognising and experiencing mixed emotion

To check if children differentially reported experiences of mixed emotions depending on if they were self-reporting or reporting about the protagonist's feelings at the end of the story (see Appendix A, for vignette), children's judgements were analysed. Specifically, similar to the analyses of Donaldson and Westerman (1986) and Larsen et al. (2007) a hierarchical logical regression with age and gender entered as predictors in the first step and with the age by gender interaction was entered in the second step was conducted to explore if age and gender could predict the child's reporting of mixed emotions. Separate analyses were conducted for the three outcome measures: 1) spontaneously (i.e., without a prompt) reporting the self or the protagonist experiencing mixed emotion, 2) participant reporting the self or the protagonist experiencing mixed emotion overall (i.e., spontaneously or after a prompt), and 3) reporting the self or the protagonist experiencing simultaneous (namely happiness and sadness at the same time) mixed emotions (see Table 1 for numbers of children for each outcome measure, by age group and gender, for the self and for the other (protagonist) conditions).

INSERT TABLE 1 ABOUT HERE

Focus on self-reported experience of mixed emotion group. To examine whether older children were more likely than younger children to actually report the experience of mixed emotions in response to the story a binomial hierarchical logistic regression, as outlined above, was conducted. First, age was a significant predictor on the spontaneously reporting of mixed emotions, *b* 0.58 (odds ratio 1.78, $p<.001$). Similarly, it was found that there was a linear effect of age on the reporting of experiencing mixed emotions (either spontaneously or after prompting), *b* 1.04 (odds ratio 3.10, $p<.001$). Lastly, both age was a

significant predictor of if the child reported that the experience of mixed emotions would be simultaneous experiencing simultaneously mixed emotions, *b* 1.30 (odds ratio 3.03, *p*<.001). Thus, the story elicited more mixed emotions within the self among older children than younger children. Unlike Larsen et al.'s (2007) study, but in line with findings from Burkitt and Sheppard (2014), no gender and age curvilinear effects were found.

Focus on protagonist's reported feelings of mixed emotion group. To examine whether older children were more likely than younger children to report that the protagonist would experience mixed emotions in response to the story a hierarchical logistic regression, as outlined above, was conducted. First, older children were more likely than younger children to spontaneously report that the protagonist would experience mixed emotions, *b* 0.35 (odds ratio 1.16, *p*<.001). Secondly, older children were more likely than younger children to report that the protagonist experienced mixed emotions, *b* 0.56 (odds ratio 2.16, *p*<.001). Additionally, older children were more likely than younger children to report that the protagonist would experience mixed emotions that were simultaneous, *b* 1.08(odds ratio 1.22, *p*<.001. Thus, in line with previous studies (Burkitt & Sheppard, 2014; Donaldson & Westerman, 1986; Larsen et al., 2007) older children were more likely to think that the story's protagonist experienced mixed emotions more often than younger children and that they judged emotions were more likely to be experienced simultaneously.

The relation between children's experience of emotions and their perceptions of the protagonists' emotions was then investigated; thereby, recognising that the protagonist's experience of mixed emotions might be a precondition for the self experiencing mixed emotions in response to the story (Harter & Buddin, 1987; Wilson & Cantor, 1985). Consistent with this hypothesis, McNemar tests ($p < .001$) indicated that children were more likely to report that the protagonist had experienced mixed emotions than that they

themselves had. Similarly, they were more likely to spontaneously report that protagonist has experienced mixed emotions than that they themselves had experienced mixed emotions. Lastly, children were more likely to report that the protagonist, as opposed to themselves, had experienced simultaneously mixed emotions ($p < .001$). These results are consistent with the suggestion on previous research (Burkitt & Sheppard, 2014; Larsen et al., 2007) that in order to experience empathic mixed emotions children must first recognise mixed emotions in others.

Colour use to represent baseline, happy, sad, and mixed emotions for the protagonist and self

Colour response frequencies for all drawing types overall and across all conditions were analysed using correspondence analysis (Hammond, 1988, 1993) where response frequencies of greater than 5 permitted. Significant dimensions were found permitting interpretation in two dimensional space, (χ^2= (1) =16.17, p<0.001, 12.23 % and χ^2 (3) = 8.52, p<0.001, 14.06% (dimensions of response frequencies by colour, see Figure 1). Findings showed that red was used more in happy than baseline figures overall. Yellow was used more in happy and baseline drawings rather than sad and mixed emotion drawings overall.

INSERT FIGURE 1 ABOUT HERE

Further analyses explored overall colour use by drawing type and condition separately. One significant dimension was found, χ^2 (8) = 11.01, p<0.001, 9.21% (dimension of response frequencies by colour, see Figure 2). Yellow was used more in drawings of happy and mixed emotion figures than in sad or baseline figures.

INSERT FIGURE 2 ABOUT HERE

Colour use between drawings of self and the protagonist for colours with acceptable response frequencies across drawing types was then analysed. This analysis of drawing type for the drawings of the protagonist also revealed two significant dimensions, χ^2 (8) = 27.36, p<0.001, 11.01% and χ^2 (6) = 08.07, p<0.05, 12 % (dimensions of response frequencies by colour, see Figure 3). Red, green and blue were more frequently used in drawings of mixed emotion in the protagonist than in the drawings of the self experiencing mixed emotion. Orange was more frequently used in baseline drawings of the self than of the protagonist. Yellow was more associated with happy drawings and mixed drawings of the self than of the protagonist.

INSERT FIGURE 3 ABOUT HERE

Colour preferences for colours used for each drawing type

The colour preference data was submitted to a 3 (age group) x 2 (gender) x 2 (condition: protagonist vs. self) x 4 (drawing type: baseline vs. happy vs. sad vs. mixed) four-way mixed ANOVA, with drawing type entered as repeated measures, and age group, gender, and condition entered as between subject measures. A main effect for drawing type was found, F (3, 145) = 236, p < .001, with post hoc paired t-tests (p < 0.05) indicating that children used more preferred colours for happy (X=4.27, SD = 0.08) than baseline (X= 1.98, SD = 0.06) and sad colours (X=1.26, SD=0.04). Interestingly, children used colours that were significantly more preferred (X= 2.89, SD= 0.08) for mixed emotion drawings than for baseline and sad drawings. No other main or interaction effects emerged (see Table 2 for children's overall preferences for each colour).

INSERT TABLE 2 ABOUT HERE

Additional drawing strategies

Coding procedure. A male and a female coder naïve to the aims of the study were asked to independently code the drawings for overall response strategies and develop a mutually exclusive scheme. The table below shows the emergent superordinate categories which received initial inter-rater agreement of 87% to 99%. The difference was resolved through discussion until 100% agreement was obtained. The coders then placed each incidence of the strategy within the coding range. The confused face category was most contended having an initial 87% agreement. Eye brow and mouth angle and placement were agreed as indicative of confusion (see Table 3 for the frequency of children who included each feature within each drawing type for both the self and the protagonist drawing condition).

INSERT TABLE 3 ABOUT HERE

Importantly, given our primary interest in how children integrated features in mixed drawings we assessed if children's use of each drawing strategy differed between the baseline, the happy, and the sad drawings and the mixed drawing. We used McNemar's test, using the exact p statistic, separately for the self and the protagonist drawing groups for each strategy where there were greater than 5 children using the feature in their mixed drawing and at least one other drawing. Additionally, Bonferroni correction was applied to control for multiple comparisons with mixed emotion in comparison to more than one single emotion (or baseline) drawing (i.e., where there are three comparisons we used $p < .017$ as our criterion to reject the null hypotheses that there is no association) (seeTable 4 showing the cross-tabulation of frequencies for each analysis outlined below).

INSERT TABLE 4 ABOUT HERE

Smiles. For both the baseline and happy drawings there was a significant difference in the proportion of children who drew a smiling figure in comparison to the mixed emotion

drawings of the self, *ps* < .001, and of the protagonist, *ps* < .001, with fewer smiling figures drawn in the mixed emotion than in the baseline and the happy drawings. Additionally, the difference in the proportion of children who drew a smiling figure in the mixed than the sad drawings of self was approaching significance, $p = .024$, with a greater number of smiles in the mixed emotion drawings. However, no significant difference in the proportions were found in the drawings of the protagonist, $p = .122$.

Frowns.There was a significant difference in the proportion of children who drew a frowning figure in the mixed than the sad drawings of self, $p < .001$, with a fewer number of frowns in the mixed emotion drawings. However, no significant difference in the proportions were found in the drawings of the protagonist, $p = .265$.

Of particular interest, in the single and mixed emotion drawings was that no significant proportional differences of use found between drawing type within each condition for the strategies of gift giving, holding money, waving, reading and singing. These findings reflect the fact that when the features were present in the baseline and happy drawings, they were used in mixed drawings to a similar extent. In sum, it appears that when drawing figures experiencing mixed emotion, children are more likely to use drawing strategies that are more similar to those used in happy emotion drawings than sad emotion drawings.

Discussion

The present findings support the claim that the recognition of mixed emotion in self and others increases with age (Burkitt & Sheppard, 2014; Larsen et al., 2007). In extension of previous research, it was found that colours were used differentially between drawings representing single happy and sad emotion and in relation to mixed emotion. Moreover, a

small selection of additional drawing strategies were used differentially between single negative and positive drawing types and those used to represent mixed emotion.

Colour use, colour preference and mixed emotion

Unlike previous research where children used red for drawings of mixed emotion in themselves and in drawings of another child (Burkitt & Sheppard, 2014), the present study showed that red was more frequently associated with mixed emotion drawings of another child than in drawings of the self. It could be argued that the resources afforded by a freehand task permitted children to select other ways of representing mixed emotion reducing the reliance on colour use. Nonetheless, the differential use of red in mixed emotion drawings of another child could be related to the interpersonal properties of red (Elliot & Maier, 2012; Fetterman, Robinson, Gordon & Elliot, 2011). Red has been found to elicit either positive or negative inter and intrapersonal effects (Elliot and Maier, 2012) depending on the precise context and behavioural domain in question.

Perhaps, surprisingly, children used yellow in drawings of themselves in both the happy and the mixed emotion drawings. Yellow has been found to be associated with happy figures in children's drawings, yet also with sadness (Burkitt, Barrett, & Davis, 2005; Burkitt et al., 2007) when drawings produced by children from contrasting educational backgrounds have been compared. In other contexts, yellow has also been observed to be associated with sickness or urgency as well as more positive stimuli such as sunshine and brightness (Burkitt, 2008; Elliot & Maier, 2012). This duality of association is important to understand and may to some extent be culturally mediated over time with the pairing of either positive or negative associations or indeed associations of mixed valence. Conversely, children used green more in drawings of mixed emotion in another child rather than in drawings of the self. It is interesting to speculate why green elicits interpersonal associations which again may in part

be influenced by learnt associations or may be a result of a more generalised mechanism (Elliot & Maier, 2012) associating mixed responses. Similarly, blue was used more frequently in mixed emotion drawings of another child than in children's mixed emotion drawings of the self. Blue tends to be a favoured colour in this age range (Burkitt, 2008; Burkitt & Sheppard, 2014; Gelineua, 1981; Nelson, Allan & Nelson, 1971) and has been found to be used extensively in drawings of single positive emotion and in drawings of mixed emotion in another child when children are using colour alone to depict mixed emotion (Burkitt & Sheppard, 2014). The present findings indicate that the use of blue to encode mixed emotion is robust in completion and freehand drawing tasks.

Under proscribed forced choice situations where children are constrained to single colour use alone to draw nice or nasty, and happy or sad figures, trends have emerged in relation to using more primary colours for positive affect, while using secondary and darker colours for negative affect (Burkitt, 2008; Burkitt & Sheppard, 2014); yet, when given choice over representational and nonrepresentational colours the trends are less likely to be found (Crawford et al., 2012; Picard & Lebaz, 2010)**.** Colour use in relation to single emotion and mixed emotion seems to be dependent upon the precise situations under which the drawings were produced echoing Elliot and Maier's (2012) argument that affective responses are context dependent for the majority of colours.

Children used more preferred colours for happy, baseline, and less preferred colours for sad drawing types supporting findings showing systematic colour-affect associations for single emotions (e.g., Boyatzis & Varghese, 1994; Burkitt et al., 2003; Picard et al., 2007; Pranckeviciene, Zardecktaite-Matulaitiene, & Soikinaite, 2009). For mixed emotion drawings, children used colours that they rated more favourably than those they chose for the baseline and sad drawings. Such findings suggest that combined emotions rather than simply

singular ones can influence children's colour and affect associations and subsequent colour use.

Additional drawing strategies

Children systematically used a small range of additional strategies differentially between the baseline, positive, negative and, on occasion, the mixed emotion drawings. Smiling figures were less likely to be drawn within a child's mixed emotion drawing than in the baseline and happy drawing. Furthermore, when children were drawing themselves (but not the protagonist) smiles were more likely to be included in their mixed emotion than in their sad drawings. Similarly in drawings of themselves, children were more likely to depict the self with a frown in their drawings of sadness than in their drawings of mixed emotion. The range of features used for happy and sad figures support certain literal and abstract strategies that have been found in previous research (e.g., Burkitt & Barrett, 2010; Ives, 1984; Jolley et al., 2004; Picard et al., 2007; Winston et al., 1995) as ways that children may encode single affect in their human figure drawings under different task conditions.

The appearance of classic features of happiness (smile) and sadness (frown) in drawings of the self may demonstrate children are more likely to identify with the self when drawing about emotion and be less clear about how someone else may display their feelings. This could relate to children's understanding of another's thoughts and feelings; for instance, Lucariello, Durand, and Yarnell (2007) found children were less reliable in their ability to explain why the self would hide a true emotion in comparison to why a protagonist would hide a true emotion (intrapersonal versus social theory of mind). Additionally, when experiencing mixed emotions, we know with age children become more aware of the importance to create a positive impression in others (have others approve of their behaviour; Tyler & Feldman, 2005), whereby, children tend to expect that others will be more likely to

disclose positive, as opposed to negative, information about themselves (Heyman, Fu, & Lee, 2007). Children's increased understanding of impression management and disclosure, along with understanding of display rules and emotion regulation (i.e., hiding negative emotion to avoid hurting the feelings of another or for self-protection; Gnepp & Hess, 1986), may explain why when mixed feelings are experienced the children in this study were more likely to draw a smile and were less likely to draw a frown than in their sad drawings, when drawing the self than when drawing the protagonist. In public representations of the self, children may view that the presentation of positive (smile) and negative (frown) features are really important, where they want to put forth more positive images, while for drawings of others they think that this differentiation is not as essential.

Of particular interest are the features that children included in their mixed emotion drawings; specifically, the features used are all features that were prominent in the happy drawings and equally as often. For instance, they were just as likely to include gift-giving, holding money, waving, reading and singing features in the mixed emotion drawing as in the happy drawing. These findings did not vary depending on who the drawing was a picture of (e.g., self or protagonist). This demonstrates that more widely than just the findings for the smiles and frowns children are likely to put features generally associated with happiness in their mixed emotion drawings. This highlights further that children will hide (not include referential features for) the negative emotions they or the protagonist is experiencing in favour of putting on a positive display.

The results show that single features can represent two emotions and this opens the possibility of using drawings as an aid to understand children's mixed feelings about themselves and other children. The findings suggest that drawings could be used to enable practitioners to encourage children to recognise and communicate about mixed, as well as

single, emotions in settings that can provoke complex feelings. Practitioners and educationalists could talk to children about the type and amount of feelings that a whole drawing or specific properties represent to better understand the child's emotional understanding and experiences. Drawing could be integrated into activities designed to enhance children's social and emotional development, such as those within personal social and emotional development activities in schools (Matthews, 2004, 2006) by encouraging children to think about and convey single and mixed emotion. This type of activity could contribute to activities that foster emotion recognition, regulation and communication: a crucial aspect of positive development (Raver, 2002).

The evidence suggests that this line of enquiry is fruitful in understanding how children encode mixed emotions in their drawings. Further research could examine whether additional combinations of mixed emotion and the intensity of the single and mixed emotion influences choice of graphic strategies as related research has shown that certain emotions differ in their intensity. For example, sadness and happiness have been found to be of similar intensity whereas anger has been found to be a more intense experience (Wintre & Vallence, 1994). Further questions remain concerning how colour-affect associations develop in different populations, which responses may be implicit and or rooted in biological responses, and the extent to which broader cultural and educational contexts may influence children's formation of colour associations and additional graphic strategies for mixed as well as singular emotional responses. The utility of drawing and interpreting drawings of mixed emotion in different contexts could in relation to developing emotional literacy and communication could be formally assessed.

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Tables

Table 1

Number of children in each age group who spontaneously reported the experience of mixed emotion, who were able to report mixed emotion (either spontaneously or after prompt, total reports), and who when reported mixed emotion believed it was simultaneous for the self and other (protagonist) conditions, by gender.

			Spontaneously reported mixed emotion	Total reports of mixed emotion (inc.spontaneous)	Reported simultaneous experience of mixed emotion
Self condition					
Girls	6 years	(n = 22)	8	10	1
	8 years	(n = 21)	15	16	5
	10 years	(n = 19)	16	19	6
Boys	6 years	(n = 19)	2	11	0
	8 years	(n = 21)	10	13	4
	10 years	(n = 21)	7	13	4
Other (protagonist) condition					
Girls	6 years	(n = 20)	10	20	2
	8 years	(n = 21)	18	21	5
	10 years	(n = 18)	15	18	8
Boys	6 years	(n = 19)	8	18	1
	8 years	(n = 20)	15	19	8
	10 years	(n = 20)	16	20	9

Table 2

Frequency of colour choice in each condition by drawing type and mean colour preference rating

	Colour									
	Red	Orange	Yellow	Green	Blue	Purple	Pink	Grey	Brown	Black
Self condition										
Baseline (N=123)	17	17	16	21	20	7	7	8	6	4
Happy (N=123)	43	8	28	14	22	4	3	0	0	1
Sad (N=123)	33	9	21	13	4	1	2	2	10	28
Mixed (N=82)	14	2	26	5	15	10	5	2	1	2
Other (protagonist) condition										
Baseline (N=118)	21	7	23	24	16	13	4	2	7	1
Happy (N=118)	37	5	24	16	21	9	4	1	0	1
Sad (N=118)	35	4	14	10	6	4	0	2	16	27
Mixed (N=116)	33	5	13	21	28	10	2	1	2	1
Mean (SD) colour preference rating										
	4.21 (0.72)	3.52 (0.63)	3.99 (0.74)	2.15 (0.31)	4.10 (0.68)	3.01 (0.98)	3.75 (0.34)	1.35 (0.29)	1.20 (0.20)	2.00 (0.55)

Table 3

Frequency of drawing strategies by condition (self and protagonist) and drawing type

Strategy	*Drawing type*	*Self N=123*	*Protagonist N=118*
Line Use	Baseline	20	10
	Happy	1	0
	Sad	18	21
	Mixed	0	0
Smile	Baseline	59	44
	Happy	79	53
	Sad	13	10
	Mixed	27	19
Frown	Baseline	0	0
	Happy	0	0
	Sad	34	19
	Mixed	11	12
Confused face	Baseline	0	0
	Happy	0	0
	Sad	0	1
	Mixed	10	11
Gift giving (e.g., flower, chocolate)	Baseline	11	10
	Happy	15	10
	Sad	0	0
	Mixed	11	10
Shaking a fist	Baseline	0	0
	Happy	0	0
	Sad	8	11
	Mixed	0	0
Good weather	Baseline	1	0
	Happy	12	10
	Sad	0	0
	Mixed	2	0
Bad weather	Baseline	0	0
	Happy	0	0
	Sad	14	10
	Mixed	3	0
Holding money	Baseline	0	0
	Happy	18	21
	Sad	0	0
	Mixed	13	21
Reading	Baseline	0	0
	Happy	16	13
	Sad	18	21
	Mixed	14	13
Play park	Baseline	2	0
	Happy	6	4

	Sad	0	0
	Mixed	0	0
Pet/s present	Baseline	0	0
	Happy	11	10
	Sad	0	0
	Mixed	0	0
Singing	Baseline	0	0
	Happy	12	10
	Sad	0	0
	Mixed	10	8
Waving	Baseline	0	0
	Happy	16	13
	Sad	0	0
	Mixed	11	13

Table 4

Table of cross-tabulation showing children's raw frequencies displaying when an identified feature was present or absent in the mixed emotion drawing and if the identified feature was present or absent in the baseline, happy, or sad drawings.

			Feature presence in Mixed Emotion drawing			
			Self-drawing		Protagonist-drawing	
Identified feature	Drawing type		Absent	Present	Absent	Present
Smile	Baseline	Absent	48	16	64	10
		Present	48	11	35	9
	Happy	Absent	33	11	58	7
		Present	63	16	41	12
	Sad	Absent	86	24	90	18
		Present	10	3	9	1
Frown	Sad	Absent	85	4	88	11
		Present	27	7	18	1
Gift-giving	Baseline	Absent	112	0	108	0
		Present	0	11	0	10
	Happy	Absent	108	0	108	0
		Present	4	11	0	10
Money	Happy	Absent	105	0	97	0
		Present	5	13	0	21
Read	Happy	Absent	107	0	105	0
		Present	2	14	0	13
	Sad	Absent	92	13	87	10
		Present	17	1	18	3
Sing	Happy	Absent	103	8	101	7
		Present	10	2	9	1
Wave	Happy	Absent	107	0	105	0
		Present	5	11	0	13

Figures 1-3- *Please see separate file*

Appendix A

Vignettes for self and protagonist conditions

Self

Please imagine that you have just moved to a new town with your family. You used to live in a small village where you had a very close friend. You went to the local village school which you loved. You went everywhere together and loved to play games together. But now you have moved far away from everything you loved. You did not know anyone to play with for a long time. Yet after a while you made a new friend at the new village school. You go everywhere together and most of all you love to play games together. One evening you think a lot about your old friend where you lived before and your new friend where you live now from school.

Protagonist

Please imagine that boy /girl has just moved to a new town with their family. He/she used to live in a small village where they had a very close friend. The boy/girl went to the local village school which they loved. They went everywhere together and loved to play games together. But now he/she has moved far away from everything that they loved. He/she did not know anyone to play with for a long time. Yet after a while he/she has made a new friend at the new village school. They go everywhere together and most of all they love to play games together. One evening he/she thinks a lot about the old friend where they lived before and their new friend where they live now from school.

Appendix B

Drawing task procedure and instructions for children in the protagonist condition

Understanding of mixed emotions and drawing: Protagonist.

Also in line with Larsen at al.'s (2007) protocol, children in the protagonist condition were asked comparable questions to those used with children in the self-condition about the protagonist's emotions at the end of the vignette. For instance, they were asked, ''How does he/she feel at the end of the story?'' Children who reported (with or without prompting) that the protagonist felt mixed emotions were asked follow-up questions comparable to those asking about the children's own emotions in the self condition. Finally, all children were asked several questions about what happened during the story (e.g., what happened to him/her?) to check that they had understood the vignette.

Children then completed a baseline task and then a happy and a sad drawing in counterbalanced order followed by a mixed emotion figure where appropriate. The instructions for completion of each figure were as follows.

Baseline drawing task. Children were first asked to draw a baseline figure of the character in the story using the following instructions:

"Now think about the boy/girl the same age as you that you have just heard about. Please draw them. Use the pencil to draw, and colour in using one of these colours. Please draw them as well as you can and colour in as well as you can".

Happy task. "Now think about the boy/girl the same age as you that you have just heard about when they felt happy during the story. Please draw them remembering when they felt happy. Use the pencil to draw, and colour in using one of these colours. Please draw them as well as you can and colour in as well as you can".

Sad task. "Now think about the boy/girl the same age as you that you have just heard about when they felt sad during the story. Please draw them remembering when they felt sad. Use the pencil to draw, and colour in using one of these colours. Please draw them as well as you can and colour in as well as you can".

Only those children who reported that they themselves would experience mixed emotions (including whether the emotions were reported spontaneously, whether the emotions were reported after being prompted, and whether or not the emotions were experienced simultaneously) were given the following instructions.

Mixed emotion drawing task. "Now think about the boy/girl the same age as you that you have just heard about when they felt sad and happy [counterbalanced order of emotion terms]. Please draw them remembering when they felt sad and happy [counterbalanced order of emotion terms] in the story. Please draw them as well as you can and colour in as well as you can".